

Prevalence and Multi Drug Resistance Pattern of Uro Pathogens in Tribal and Tea Garden Workers in Assam

K. Raja Pandiyan¹, S. Shanthi², P. Raja¹,
J.S. Gnanaraj Jesudian¹ and S. Madhavan^{3*}

¹Department of Microbiology, Burrows Memorial Christian Hospital, Allipur, Assam - 711 101, India.

²PG & Research Department of Microbiology, Srimad Andavan Arts and Science College, Trichirappalli - 620 005, India.

³PG & Research Department of Microbiology, Sengamala Thayar Educational Trust Women's College, Mannargudi - 614 001, India

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Urinary tract infections (UTI) are the most common cause of morbidity and mortality. In the present study, the prevalence and antibiotic susceptibility, Multi Drug Resistance (MDR) pattern of uropathogens among the tribal and tea garden workers in Assam are reported. A total of 1701 urine samples were collected from out patients and patients of rural community health camps of Burrows memorial Christian hospital, Alipur, Assam, India. Pathogens were isolated, identified and subjected to antibiotic sensitivity and Multi Drug Resistance screening, using standard microbiological methods. Out of 1487 positive samples 43.2 % *E.coli*, 27.4 % *S.aureus*, 12.4 % *Klebsiella* sp, 10.4 % *Pseudomonas* sp and 6.6 % *Proteus* sp were isolated. UTI was most common in tea garden workers (59.4 %), followed by (Kashi) tribal (21.7 %), farmers (10.6 %) and others 8.3 %. Females are highly susceptible to uropathogens. It is prevalent in 21-50 age group, especially in females (74.6 %). Almost all clinical isolates are MDR to gentamycin, amikacin, ciprofloxacin, cotrimoxazole cefatazidime, cephotaxime, tetracyclin, chloromphenical, nalidixic acid, penicillin, oxacillin and vancomycin. The determination of prevalence and antibiotic sensitivity and MDR pattern of uropathogens will help the rural clinicians for first line treatment of malnutrition, unhygienic and unhealthy patients lying below the poverty line.

Key words: Antibiotics, Multi drug resistance, Pathogens, Urinary Tract Infection.

The chemical composition of human urine favours and supports the bacterial growth (Asscher *et al.*, 1996; Chernew *et al.*, 2001).

Urinary tract infections are the most common cause of morbidity and mortality. Moreover, even in the absence of any detectable urinary tract malformations many patients have repeated episode of UTI, which are asymptomatic (Bergstrom & Winberg, 1968). Since the symptoms of UTI are mild, only a few seek medical attention. On the other hand, in rural hospitals antibiotics are usually prescribed empirically before the laboratory results of urine cultures are available. Pattern of antibiotic sensitivity and multi drug resistant nature of pathogenic organisms may vary even over a short

* To whom all correspondence should be addressed.
E-mail: madhu_atthi@yahoo.com

period of time and it depends on the site of isolation and different environment. Hence periodic evaluation of antibacterial susceptibility and resistance pattern of uropathogen is mandatory for appropriate therapy (Jones *et al.*, 1982; Fukp Neu *et al.*, 1978; Nokasino *et al.*, 1988). Rural people selected for this present study belongs to the tribal (Kashi), Tea garden workers, farmers and other out patients. These people are lying below the poverty line, they are highly unhygienic, malnutrition and unhealthy. UTI is most common in malnutrition and unhygienic people (Abrams *et al.*, 1986; Sandvik *et al.*, 1993). Hence the present work is aimed at the prevalence of urinary tract infection among these people.

MATERIAL AND METHODS

This study was conducted in Burrows Memorial Christian Hospital, Alipur, Assam, India. A total of 1701 urine samples were collected from out patients and rural Community health camps of this hospital from February 2007 to November 2008. There were 1023 females and 464 males with different age groups ranging from 18 - 80 years.

Fresh midstream urine samples were collected aseptically and kept in ice bucket and transported to the microbiology laboratory and processed. Each sample was plated on to 5 % sheep blood agar and Macconkey agar using calibrated loop delivering 0.01ml of sample and incubated at 37°C overnight. Observation was made on the next day. Plates showing (>10 CFU/ml) were considered as significant as per kass count (Kass, 1956), were further processed. Few samples (<10 CFU/ml) were excluded from this study if without documented clinical evidence of patient history of fever, chills, flank pain, pyuria, history of antibiotic intake, structural abnormalities, diabetes mellitus and any immuno-compromised state (Azra & Hasan, 2007). For *Staphylococcus aureus* even <10 CFU/ml were considered as significant and further processed (Forbes, 1998). Among 1701 samples 1487 proven urine isolates were subjected to biochemical identification (Koneman *et al.*, 1997). After biochemical identification antimicrobial sensitivity testing was performed for the isolates using Muller Hinton agar by disc diffusion method (Bauer & Kirby, 1966), Standard discs were obtained from

Hi-media. At the end of 24 hrs the results were noted and interpreted as per the NCCLS guidelines (NCCLS, 1993). *E.coli* (ATCC - 25922), *Staphylococcus aureus* (ATCC - 25923) and *Pseudomonas aeruginosa* (ATCC - 27853) were used as standard cultures. The following antibiotics were used as standard throughout the study. Gentamycin (10 µg), amikacin (30 µg), vancomycin (30 µg) penicillin (10 µg) oxacillin (1µg), ciprofloxacin (5 µg) cotrimoxazole (25 µg) nalidixic acid (30 µg) tetracycline (30 µg), cefatazidime (30 µg), cephotaxime (30 µg) and chloromphenical (30 µg).

RESULTS

One thousand seven hundred and one urine samples were collected and analyzed. Among which 1487 samples showed positive results for uropathogens. The predominant isolate was *E.coli* (43.2 %) followed by *Staphylococcus aureus* 27.4 %, *Klebsiella sp* 12.4 %, *Pseudomonas sp* 10.4 % and *Proteus sp* 6.6 %. The frequencies of uropathogens are showed in Fig. 1. In male patients the frequency of *S.aureus* was high. On the other hand in females, high frequency was recorded in *E.coli*.

UTI was more common in tea garden workers 59.4 % as compared to tribal 21.7 %, farmers 10.6 % and others 8.3 % (Fig. 2). In all the categories females were more susceptible to this infection than male. Prevalence of UTI among males and females in different age groups are shown in table-1. When different age group patients were analyzed for uropathogens 21-50 were more prone to this infection followed by 18-20 and 51-80. In all the age group patients, percentage of female patients was more when compared to male (Table 1). *Proteus sp* and *Pseudomonas sp* were absent in the age group 18-20 in both male and females. On the contrary

Table 1. Percentage of occurrence of uropathogens categorized based on the age group and sex

Age Group	Male patients	Female patients
21-50	25.4	74.6
51-80	42	58
18-20	39	60.6

significantly high from May to September and post summer seasons and corresponding high recovery of isolate was observed during this season. World wide reports suggest that a significant, peak in the incidence of UTI for a few months each year. This raise generally in the post summer season (Anderson *et al.*, 1983). Another study revealed that in post summer season (August) the incidence of UTI was observed as high. They attribute this to hot and humid conditions during this month (Anderson *et al.*, 1983).

Resistant to several antimicrobial agents was prevalent among the isolates recovered from the tribal and tea garden workers. We have also observed that *Pseudomonas*, *Proteus*, *Klebsiella* and *E.coli* were MDR to Gentamycin, Nalidixic acid Cotrimaxazole, Tetracycline. In the seventies MDR was practically non existent and the cause was restricted to mutation of chromosomal genes. However, during the last two decades bacterial resistance mediated by plasmids which carry resistance genes to a large number of antibiotics, which are rapidly transferred and has worsened the scenario (Ram *et al.*, 2000). The MDR may be linked to the integrons, which are genetic element capable of recombination. In a study from south India they report, antimicrobial resistance genes clustered in integrons. According to them resistant to Ampicillin, Cotrimaxazole, Nalidixic acid, Chloramphenicol, Tetracycline and Gentamycin are the common isolates with integrons (Mathi *et al.*, 2004). Multidrug resistance was commonest in *Pseudomonas* and *E.coli* (Azra & Hasan, 2007). Our results are well coinciding with this.

To conclude, *E.coli* is highly sensitive to Ceftaxidime, Amikasin and Chloromphenical. *Pseudomonas* sp and *Klebsiella* sp could be controlled by Chloromphenical followed Ceftazidime. In contrast to our study Ciprofloxacin was suggested as the best antibiotic to control the *Pseudomonas* sp., *Proteus* sp. is highly sensitive to ceftazadime, cephotaxime and chloromphenical. Gram positive *S.aureus* could be effectively controlled by Vancomycin, Ciprofloxacin and Gentamycin.

In view of the emerging drug resistance amongst bacteria, as far as possible therapy should be advocated only after culture and sensitivity tests

has been performed. This would, not only help in the proper treatment of the patient, but would also discourage the indiscriminate use of antibiotics and reduce further development of bacterial drug resistance. To prevent the spread of MDR uropathogen and incidence of UTI, hygienic measures should be improved.

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