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PREVALENCE AND ANTIBIOTIC RESISTANCE PATTERN OF *E.COLI* ISOLATED FROM UTI IN TERTIARY CARE HOSPITAL, KHANPUR

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ABSTRACT
Urinary tract infections (utis) are amongst the most common infections encountered in clinical practice and an important cause of hospital associated infection. It is the second most common infectious presentation in community medical practice. The emergence of antibiotic resistance in the management of utis is a serious public health issue, particularly in the developing world where apart from high level of poverty, ignorance and poor hygienic practices. There is also high prevalence of fake and spurious drugs of questionable quality in circulation. Studies aimed at gaining knowledge about the type of pathogens responsible for utis and their resistance patterns, may help the clinicians to choose the right empirical treatment (Mohemid *et al.*, 2013). The present study mainly focuses on the gram-negative isolates associated with uti (*E.coli*). The highest incidence of uti was seen in the age group of 21 to 40 years. The most common isolated uropathogens in gram-negatives were *E. Coli* (35.18%). In this study, the highest resistance observed with ampicillin. The resistance of *E. Coli* to ampicillin was (94.24%).this resistance pattern were higher than those in studies from developed countries.

Keywords: *UTI-Urinary Tract Infection, AST-Antibiotic Susceptibility Testing, CDC-Center for Disease Control, Escherichia Coli*

INTRODUCTION
Urinary tract infections (UTIs) are amongst the most common infections encountered in clinical practice and an important cause of hospital associated infection. Majority of pathogens are gram-negative species, with predominance of members of *Enterobacteriaceae* (Neu *et al.,* 1992). *Escherichia coli* are one of the common etiological agents of Urinary tract infections (UTIs), with an estimated burden of more than 250 million cases annually. Thus, remains an alarming problem for both patients as well as health care agencies (Ronald *et al.,* 2001). It is the second most common infectious presentation in community medical practice and is classified as uncomplicated or complicated. Uncomplicated UTIs occur in sexually active healthy female patients with structurally and functionally normal urinary tracts. Complicated UTIs are those that are associated with co morbid conditions that prolong the need for treatment or increase the chances for therapeutic failure. These conditions include abnormalities of the urinary tract that impede urine flow, the existence of a foreign body (e.g., indwelling catheter, stone), or infection with multidrug resistant pathogens. UTIs in male patients are considered complicated Despite involvement of the upper urinary tract, pyelonephritis can be considered uncomplicated when it occurs in a healthy patient (Hooton *et al.,* 2009; Stapleton *et al.,* 2003). Urinary tract infection may involve only the lower urinary tract or both the upper and the lower tracts (Mandell *et al.,* 2005). The treatment of UTIs varies according to the age of the patient, sex, underlying disease, infecting agent and whether there is lower or upper urinary tract involvement (Warren *et al.,* 1999; Zerovs *et al.,* 2003). Among suspected UTI cases, antibiotic treatment is most often initiated empirically, even before the urine culture reports are available. Unfortunately, antibiotic resistance has become an increasingly critical problem even in developing countries like India (Sumeeta *et al.,* 2002; Tankhiwale *et al.,* 2004). Furthermore, it has been observed that antibiotic resistance pattern of bacterial isolates does not remain constant, but dynamics might vary with time and environment (Hassan *et al.,* 1985). The emergence of antibiotic resistance in the

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management of UTIs is a serious public health issue, particularly in the developing world where apart from high level of poverty, ignorance and poor hygienic practices. There is also high prevalence of fake and spurious drugs of questionable quality in circulation. Studies aimed at gaining knowledge about the type of pathogens responsible for UTIs and their resistance patterns, may help the clinicians to choose the right empirical treatment (Mohemid *et al.,* 2013).

MATERIALS AND METHODS
The present study was carried out in the department of Microbiology, Bhagat Phool Singh Government Medical College for Women (BPS GMCW), Khanpur Kalan, Sonepat, India, during January 2015 to June 2015. This was an analysis of data generated from the records of consecutive urine samples received in the laboratory during the study period. Only the initial sample of an individual received was included to avoid duplication.

Analysis of the data was carried out focusing on the age, gender, whether admitted or not, whether received prior antibiotic therapy or history of urinary tract infection in the past. During the course of study 1950 patients with complaints of UTI were enrolled in the study. Mid stream urine samples were collected in a sterile screw capped containers. Urine microscopy was done for pus cells and was cultured on blood agar & Mac-conkey agar (Cappuccino *et al*., 1996). The plates were incubated aerobically at 37ºC for 24-48 hours.

The identification of the bacterium was carried out with the help of colony morphology, staining characters and biochemical properties. All the samples were subjected to Gram staining, Hanging Drop, Catalase and Oxidase.

The isolates were subjected to biochemical reaction which includes Indole test, Methylred test, Voges-prauskaer test, Citrate Utilization test, Urease test, Triple Sugar Iron test etc., along with individual sugar fermentation such as glucose, sucrose, lactose and maltose (Murugan *et al.,* 2014).

Antimicrobial susceptibility testing of the isolates was carried out using Kirby-Bauer disc diffusion method on Mueller-Hinton agar as recommended by Clinical and Laboratory Standards Institute (CLSI). The antibiotic discs and their concentration per disc included: Imipenem (10mcg), Amikacin (30mcg), Nitrofurantoin (300mcg), piperacillin and tazobactum (100/10mcg), Gentamicin (30mcg), Ciprofloxacin (5mcg), and Ampicillin (10mcg). Isolates were interpreted as resistant according to the zone of inhibition which were read with metallic rulers in mm and interpreted using standard zone of inhibition charts.

RESULTS AND DISCUSSION
A total of 1950 urine samples were included in the study, of these (36.66%) were sterile, (11.28%) were contaminated and (52.05%) were culture positive (their colony count was equal or more than 10^5cfu/ml). The highest incidence of UTI was seen in the age group of 21 to 40 years. The frequency of isolated microorganisms and their relation to sex is given in table 1.

There were 713 (70.25%) females and 302 (29.75) males among patients with urine positive cultures. A higher prevalence of UTI was reported in women than men (table 2), principally owing to anatomic and physical factors (Kumar *et al.,* 2006; Khan *et al.,* 2004). Gram-negative bacilli isolated accounted for 692 (68.18%) of the positive cultures, while Gram-positive were (31.82%). The most common isolated uropathogens in Gram-negatives were *E. coli* (35.18%). The present study mainly focuses on the gram-negative isolates associated with UTI (*E.coli*).

Table 1: Age Wise Distribution

Age (Years)	<20	21-40	41-60	61-80	>80	Total
Male	10	23	35	48	05	121
Female	20	158	33	24	01	236
Total	30	181	68	72	06	357

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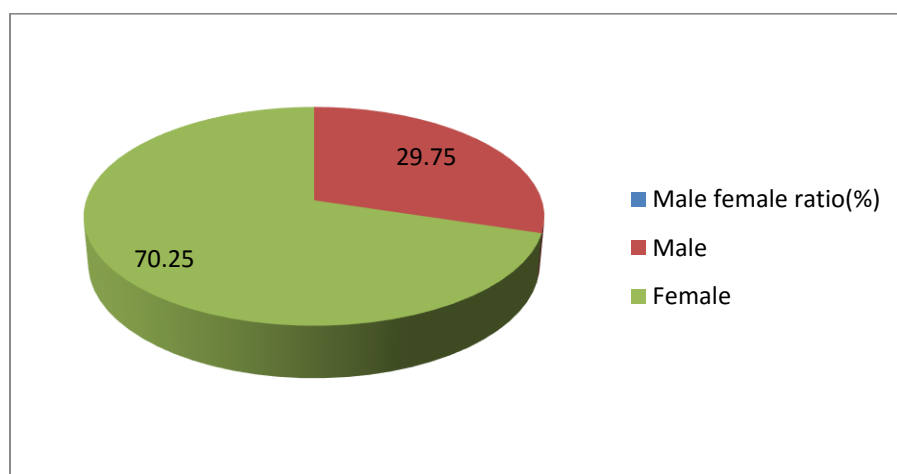
Table 2: Sex Wise Distribution

The isolated bacteria showed wide differences in their resistance to the tested antibiotics. The relation between antimicrobial resistance patterns of the isolated bacteria in urine of the population studied is presented in table 3.
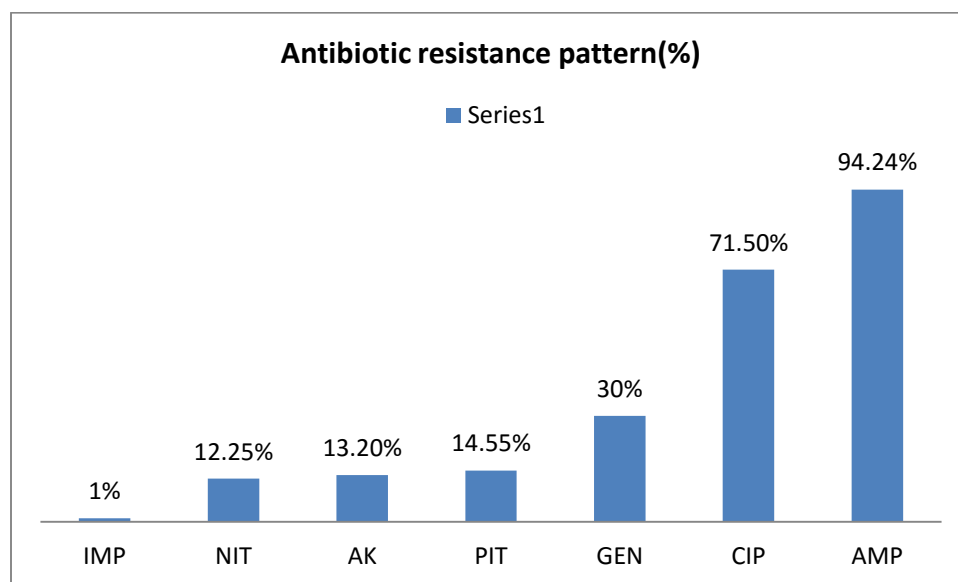
Table 3: Antibiotic Resistance Pattern of Individual Isolates

Abbreviations

Imp- Imipenem, Nit- Nitrofurantoin, Ak- Amikacin, Pit- Piperacillin and Tazobactum, Gen- Gentamicin, Cip- Ciprofloxacin, Amp- Ampicillin.

Antibiotic resistance is a major clinical problem in treating infections caused by micro-organisms. The resistance to the antimicrobials has increased over the years. Resistance rates vary from country to country (Gales *et al.,* 2001).

It was accounted that majority of the organisms isolated were the members of *Enterobacteriaceae* family. This is consistent with reports where *E. coli* was the predominant pathogen isolated from patients with community acquired UTIs (Manges *et al.,* 2006; Phislippon *et al.,* 1996). *E. coli* is the most important pathogen for uncomplicated and complicated UTI and has shown a slow but steady increase in resistance to several antibiotics over the past decade (Kahlmeter, 2003; Gales *et al.,* 2002*;* Turnidge *et al.,* 2002)**.**

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The highest resistance observed with Ampicillin was found to be as much as (94.24%), such high levels of resistance to Ampicillin have been quoted by many other studies from India. Gupta *et al.,* (2007) reported (76%), Jharna *et al.,* (2012) reported (80%) and Manjunath *et al.,* (2011) from Karnataka reported a resistance of (91%). Study from abroad, Farjana *et al.,* (2008) reported (86.09%) from Bangladesh, Mansour *et al.,* (2009) reported (92.4%) resistance to ampicillin from Iran. In this study, the resistance of *E. coli* to ampicillin was (94.24%).This resistance pattern were higher than those in studies from developed countries. Only a miner number of isolates (1%) were moderately resistance to Imipenem which is compatible with the study of, Rahman *et al.,* (2009) from Bangladesh. Imipenem was found to be the most effective against the uropathogens (*E.coli*) followed by nitrofurantoin and amikacin.

Conclusion

The current study have shown that ampicillin possess the lower efficacy while Imipenem have the higher efficacy. The increased antibiotics resistance considered a threat to the public health problem worldwide. This important issue is to be addressed by the policy makers to formulate a strict antibiotics prescription policy in our country.

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