INTRODUCTION

Urinary tract infection (UTI) is one of the most common diseases in human societies which occur in women more than men. The UTI occurrence depends on several factors providing the presence of bacteria (more than 105/ml) in urine. These bacteria cause UTI and if not treated, the infection will spread and cause serious damage to the patient. UTI treatment with antibiotics is carried out usually before receiving microbiology test results. This therapy, without rational drug prescription occasionally leads to antibiotic resistance and treatment failure as its result.

The most important factor in increasing microbial resistance is improper use of antibiotics which includes incorrect and unreasonable antibiotics prescription. Considering time, the appropriate dose and manner of administration are the most important aspects of rational drug prescription. Studies have shown that all countries have focused on this problem which is a serious threat to modern medicine.

According to the World Health Organization in 2014, antimicrobial resistance is increasingly a global threat for public health and all countries have focused on this problem which is a serious threat to modern medicine.

The reliability of the study findings were guaranteed by implementing quality control (QC) measures throughout the whole process of the laboratory work. Culture media was tested for sterility and performance. To standardize the inoculum density whole process of the laboratory work. Culture media was tested for sterility and performance. To standardize the inoculum density

Materials and Methods

This cross-sectional study was performed from January 2017 to December 2017 in a tertiary care hospital in India. Overall, 380 patients attending OPD with clinical symptoms of UTI were subjected as samples, and they were cultured and pure isolated bacteria were identified using biochemical tests and subjected to antibiogram assessment using disc diffusion method.

RESULTS

Totally, 57 (15%) from 380 patients had positive UTI result. 51 (89.5% of positive case) patients were resistant to at least one antibiotic. Escherichia coli, Staphylococcus spp., and Pseudomonas spp. were the most prevalent bacteria which were present in 25(43.8%), 17(29.8%) and 5(8.7%) of the positive samples, respectively.

Conclusion

The results of this study revealed a great concern for emerging UTI-related multidrug-resistant strains of bacteria causing UTI in Iran.

ABSTRACT

Dr. Riti Jain Seth* Department Of Microbiology, Nscb Medical College, Jabalpur.*corresponding Author

Background: This study aimed to investigate the bacteria associated with urinary tract infection (UTI) and antibiotic susceptibility pattern of the isolates during LAST one year in a tertiary care hospital of central India.

Materials and Methods: Overall 380 patients attending OPD with clinical symptoms of UTI were subjected as samples, and they were cultured and pure isolated bacteria were identified using biochemical tests and subjected to antibiogram assessment using disc diffusion method.

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Conclusion: The results of this study revealed a great concern for emerging UTI-related multidrug-resistant strains of bacteria causing UTI in Iran.
Table 1: bacterial isolates from positive urinary tract infection patients

<table>
<thead>
<tr>
<th>Bacterial isolates</th>
<th>number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Escherichia coli</td>
<td>25</td>
<td>43.8</td>
</tr>
<tr>
<td>Staphylococcus aureus</td>
<td>7</td>
<td>12.3</td>
</tr>
<tr>
<td>CONS</td>
<td>10</td>
<td>17.5</td>
</tr>
</tbody>
</table>

Table 2: Resistant Gram-positive bacteria and the percentage of their antibiotic resistance

<table>
<thead>
<tr>
<th>Bacterial isolates</th>
<th>number</th>
<th>Amp</th>
<th>AmoxC</th>
<th>ak</th>
<th>cd</th>
<th>cip</th>
<th>ctr</th>
<th>gen</th>
<th>ipm</th>
<th>me</th>
<th>ox</th>
<th>cot</th>
<th>va</th>
</tr>
</thead>
<tbody>
<tr>
<td>staphylococcus aureus</td>
<td>7</td>
<td>6(85.7)</td>
<td>1(14.3)</td>
<td>1(14.3)</td>
<td>0(0)</td>
<td>2(28.6)</td>
<td>4(57.2)</td>
<td>2(28.6)</td>
<td>1(14.3)</td>
<td>1(14.3)</td>
<td>1(14.3)</td>
<td>2(28.6)</td>
<td>0(0)</td>
</tr>
<tr>
<td>CONS</td>
<td>10</td>
<td>8(80)</td>
<td>1(10)</td>
<td>2(20)</td>
<td>0(0)</td>
<td>1(10)</td>
<td>3(30)</td>
<td>1(10)</td>
<td>1(10)</td>
<td>1(10)</td>
<td>1(10)</td>
<td>3(30)</td>
<td>0(0)</td>
</tr>
<tr>
<td>Enterococcus faecalis</td>
<td>1</td>
<td>1(100)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>1(100)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>0(0)</td>
</tr>
</tbody>
</table>

TOTAL: 18 | 15(83.3) | 2(11.1) | 3(16.6) | 0(0) | 4(22.2) | 7(38.9) | 3(16.6) | 2(11.1) | 2(11.1) | 2(11.1) | 5 | 0

*
= Resistant Gram-positive bacteria; % = the percentage of their antibiotic resistance; Ampicillin (Amp), Amoxyclav(Amoxc), Amikacin (Ak), Clindamycin(Cd); Ciprofloxacin(Cip); Ceftriaxone(Ctr), Gentamycin(Gen); Imipenem(ipm); Methicillin(Me); Oxacillin(Ox); Cotrimoxazole (Cot); Vancomycin(Va)

Table 3: Resistant Gram-negative bacteria and the percentage of their antibiotic resistance

<table>
<thead>
<tr>
<th>Bacterial isolates</th>
<th>Number</th>
<th>Amp</th>
<th>AmoxC</th>
<th>Ak</th>
<th>Caz</th>
<th>Cip</th>
<th>Ctr</th>
<th>Nit</th>
<th>Gen</th>
<th>ipm</th>
<th>me</th>
<th>ox</th>
<th>cot</th>
<th>va</th>
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</thead>
<tbody>
<tr>
<td>Escherichia coli</td>
<td>25</td>
<td>22(88)</td>
<td>15(60)</td>
<td>5(20)</td>
<td>9(36)</td>
<td>19(76)</td>
<td>10(40)</td>
<td>8(32)</td>
<td>6(24)</td>
<td>1(4)</td>
<td>19(76)</td>
<td>12(48)</td>
<td>0(0)</td>
<td></td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>5</td>
<td>5(100)</td>
<td>4(80)</td>
<td>1(20)</td>
<td>3(60)</td>
<td>3(60)</td>
<td>3(60)</td>
<td>2(40)</td>
<td>1(20)</td>
<td>1(20)</td>
<td>5(100)</td>
<td>5(100)</td>
<td>0(0)</td>
<td></td>
</tr>
<tr>
<td>Klebsiella pneumoniae</td>
<td>4</td>
<td>3(75)</td>
<td>2(50)</td>
<td>1(25)</td>
<td>2(50)</td>
<td>3(75)</td>
<td>2(50)</td>
<td>2(50)</td>
<td>1(25)</td>
<td>0(0)</td>
<td>4(100)</td>
<td>2(50)</td>
<td>0(0)</td>
<td></td>
</tr>
<tr>
<td>Enterobacter spp.</td>
<td>2</td>
<td>2(100)</td>
<td>1(50)</td>
<td>0(0)</td>
<td>1(50)</td>
<td>2(100)</td>
<td>1(50)</td>
<td>1(50)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>2(100)</td>
<td>2(100)</td>
<td>0(0)</td>
<td></td>
</tr>
<tr>
<td>Proteus mirabilis</td>
<td>1</td>
<td>1(100)</td>
<td>1(100)</td>
<td>0(0)</td>
<td>1(100)</td>
<td>1(100)</td>
<td>1(100)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>1(100)</td>
<td>1(100)</td>
<td>0(0)</td>
<td></td>
</tr>
<tr>
<td>Acinetobacter baumanii</td>
<td>1</td>
<td>1(100)</td>
<td>1(100)</td>
<td>1(100)</td>
<td>1(100)</td>
<td>1(100)</td>
<td>1(100)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>1(100)</td>
<td>1(100)</td>
<td>0(0)</td>
<td></td>
</tr>
<tr>
<td>Citrobacter freundii</td>
<td>1</td>
<td>0(0)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>0(0)</td>
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<td>0(0)</td>
<td>0(0)</td>
<td>0(0)</td>
<td></td>
</tr>
</tbody>
</table>

TOTAL: 39 | 34 (87.1) | 24 (61.5) | 8 (20.5) | 17 (43.5) | 29 (74.3) | 18 (46.1) | 12 (30.7) | 9 (23) | 2 (5.1) | 32 (82) | 23 (58.9) | 0 (0)

*
= Resistant Gram-negative bacteria; % = the percentage of their antibiotic resistance; Ampicillin (Amp), Amoxyclav(Amoxc), Amikacin (Ak), Cefazidime(Caz); Ciprofloxacin(Cip); Ceftriaxone(Ctr), Gentamycin(Gen); Imipenem(ipm); Nalidixic Acid (Na); Cotrimoxazole (Cot); Colistin (Cl)

According to the results presented in [Table 2] and [Table 3], among the isolated bacteria, the most resistant Gram-positive bacteria were Staphylococcus spp. and the most resistant Gram-negative bacteria were E. coli. Gram-positive and Gram-negative bacteria showed the highest antibiotic resistance to ampicillin, respectively, and also demonstrated the most sensitivity to imipenem and amikacin.

**DISCUSSION**

The improper use of the antimicrobials for the treatment of the infections has adverse effects on public health organization of a country both in economic impact and increasing of the drug resistance among causative bacteria. Hence, it is essential to continuously evaluate the antimicrobial resistance condition in a society which was the first purpose of the present study, particularly in the case of UTIs. At first glance, results of the study demonstrate relatively high occurrence of the positive urine culture among samples collected from patients with UTI clinical signs, in comparison with other studies. It may be due to the climate and nature of the central India, which has humid and relatively hot weather.

As bacterial resistance increased in recent decades, the isolates of the present study recovered from UTIs showed high resistance. Hence, 89.5% of them demonstrated resistance to at least one antibiotic. E. coli and Staphylococcus, similar to other studies were the most prevalent Gram-negative and Gram-positive bacteria, respectively. The most resistance of the bacterial isolates was against ampicillin, as more than 80% of the Staphylococcus strains were resistant. However vancomycin resistance was not seen at all in this study and it could be because of only outdoor patient registration. Among Gram-negative bacteria, multidrug-resistant (MDR) strains have been reported as important and increasing strains which can spread the resistance among different populations of bacteria. E. coli and Pseudomonas spp. are the most significant Gram-negative MDRs, particularly in UTI patients.

None of the isolates were pan drug resistant (PDR).

Results of antibiogram test for 57 bacterial isolates recovered from UTI revealed that amikacin, nitrofurantoin, vancomycin, colistin and imipenem were the most effective antimicrobials against the strains. Some Gram-negative bacteria were resistant to antibiotics, which are widely used for treating hospital-acquired infections with MDR Gram-negative bacteria such as Pseudomonas and Acinetobacter. Carbapenems are resistant to the -lactamase enzymes produced by numerous MDR Gram-negative bacteria, so, playing a significant role in the treatment of infections not cured with other antibiotics. Hence, judicious use of these antibiotics is required as probable increase of the imipenem-resistant strains can be an emerging concern for health control systems of a tropical climate and nature of the central India, which has humid and relatively hot weather.
country. It seems that administrators should have a special precision and care in the use of these drugs for treatment of the UTI and/or other infections.

To survey the antimicrobial resistance pattern among patients with specific infection within a few years, it is essential to evaluate and compare antibiotic resistance condition in each of the years. And first step to obtain a proper management and good control policy for decreasing the development of antibiotic resistance among microorganisms, particularly the pathogens is the evaluation and practical assessment of the antibiotic resistance patterns among definite populations of the patients of a country.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

REFERENCES