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A retrospective study of prevalence of urinary tract infection and the antibiotic sensitivity pattern of uropathogens in patients attending microbiology department of MGM medical college, Jamshedpur, a tertiary care hospital of Kolhan region of Jharkhand

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Abstract
Background: UTI, the most common bacterial infection in urinary tract, is a serious health- problem that occurs in millions of people at any age in each year. Its empirical treatment is difficult worldwide. Local susceptibility-pattern of uropathogens is, therefore, important.
Aim: To determine the prevalence of UTI, identify common isolates in UTI cases, and there *in vitro* sensitivity and resistance patterns to common antibiotics.
Material & Methods: The midstream urine samples were collected from patients of different age-groups, followed by culture method and determination of antibacterial sensitivity patterns using Kirby-Bauer disc diffusion technique. All the analysis was performed using simple percentage method.
Result: Out of 338 samples suspected of UTI 118 samples showed positive growth in MacConkey agar. Antibiotic susceptibility test was done by disc diffusion method. The most frequently isolated uropathogen was E.coli 51% and the antibiotic susceptibility pattern of E.coli was observed.
Conclusion: Drug resistance has become a global problem these days. Resistance to the commonly used drugs was high. So prevent the emergence of resistant strains, rational use of drugs is encouraged.

Keywords: urinary tract infection (UTI), Uropathogen, antibiotic sensitivity pattern, prevalence

Introduction
Urinary tract infection (UTI) is caused by microorganisms anywhere in the region that comprises of kidney, renal pelvis, ureters, urinary bladder, urethra, and adjacent structures including perinephric fascia, prostate, and epididymis.

The bacteria from digestive tract climb at opening of urethra and multiply therein to cause UTI [1, 2, 3].
More susceptibility of UTI among females is due to short length of urethra, absence of prostatic secretion, pregnancy and easy contamination of the tract with faecal flora. [Figure: 01] [4]

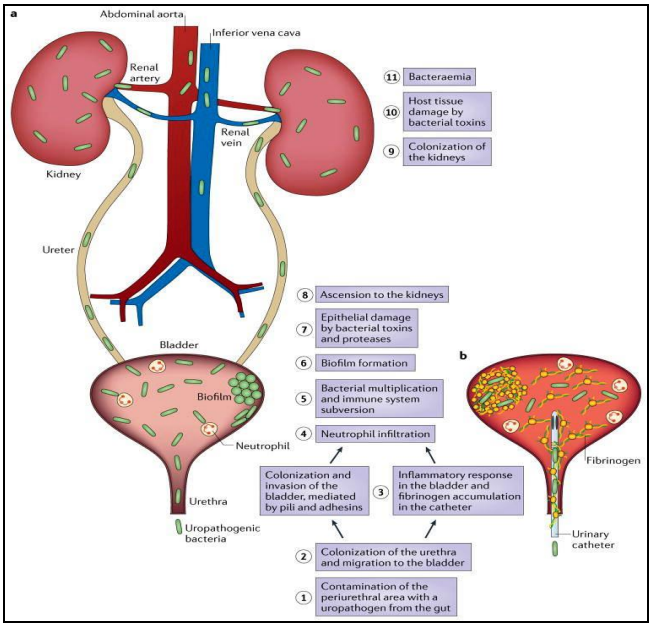

Fig 1: Pathogenesis of urinary tract infection

A confirmatory diagnosis of UTI is made through microscopy, culture, and biochemical tests. Medical Treatment is then initiated based on the antibiotic susceptibility patterns to the organism isolated. A major challenge in recent times is the abuse of antimicrobials which poses a major public health problem leading to the emergence and reemergence of resistant strains.
Studies aimed at gaining knowledge about the prevalence of the disease, type of pathogens responsible for UTIs and their susceptibility patterns may help the clinicians to choose the right empirical treatment.

Objective: To determine the prevalence of UTI, identify common isolates in UTI cases, and there *in vitro* sensitivity and resistance patterns to common antibiotics.

Material & Methods

Study Design-

A retrospective observational study was conducted to find out Prevalence of Urinary Tract Infection and the Antibiotic Sensitivity Pattern of Uropathogens between June 2017 to January 2018 at Microbiology Department, MGM Medical College, Hospital, Jamshedpur, Jharkhand (India).

Inclusion Criteria: signs and symptoms of urinary tract infection. Includes with fatigue, fever, foul smelling & cloudy urine, urge to urinate and pain in lower abdomen, vaginal irritation were present. A pre-defined questionnaire was used to extract the sociodemographic data and clinical characteristics of both inpatients and outpatients that used the center.

Sample Collection

Clean catch mid-stream urine samples were collected from the all suspected UTI patients attending to OPD/IPD of various departments of MGM Medical College Hospital, Jamshedpur using sterile screw capped containers. The samples were aseptically cultured on appropriate media and incubated.
Standard biochemical tests were used for identification of isolated organisms. Antibiotic susceptibility testing was done on identified uropathogens using the Kirby-Bauer disc diffusion method as per CLSI (clinical and laboratory standards institute) criteria [5]. All the analysis was performed using simple percentage method.

Result

A total of 338 urine samples were studied out of which 118 samples were positive culture growth. The overall prevalence was 34.9% .Among these isolates organism identified as E.coli were 61(51.6%) followed by Klebsiella spp. 22 (18.6%), Pseudomonas 15 (12.7%), Proteus 9 (7.6%), Staphylococcus aureus 01 (0.8%), coagulase negative Staphylococcus 01 (0.8%) Candida spp. 9 (7.6%). The overall prevalence of Urinary tract Infection [UTI] was found to be 34.91%. [Table: 1]

Table 1: Distribution of organism Isolated for Urinary Tract Infection

Organism Isolated (Count Value)	Total (% Value)
E. coli	61(51.6%)
Klebsiella spp.	22 (18.6%)
Pseudomonas	15 (12.7%)
Proteus	9 (7.6%)
Staphylococcus aureus	01 (0.8%)
Staphylococcus	01 (0.8%)
Candida spp.	9 (7.6%).
Total Positive cases	118

Table 2: The age and sex distribution of positive cases

Age	Male(n=34)	Female(n=64)
<18	2 (5.88%)	7 (10.9%)
18-45	4 (14.70%)	46 (71.87%)
>45	28 (79.41%)	11 (17.18%)

Table 3: Distribution of Sensitivity patterns of some antibiotics used

Antibiotics	Percentage Sensitivity
Ampicillin	12(10.16%)
Trimethoprim/ sulfomethaxazole	09(7.62%)
Amikacin	33(27.9%)
Gentamycin	29(24.57%)
Cefotaxime	22(18.64%)
Levofloxacin	30(25.42%)
Piperacillin/ Tazobactum	52(44.06%)
Nitrofurantoin	45(38.13%)

A large number of microorganisms were isolated from female patients (54.23%) with the high bacteria count. This study shows a higher incidence of urinary tract infection in females than males (28.81%). In females more cases were seen in the age group 18-45 years. Whereas in males more than 45 age group was most affected. [Table: 2] Since the most common urinary pathogen isolated was E.coli. So the antibiotic susceptibility pattern of the organism was observed.

Discussion

Urinary tract infection is one of the common causes for seeking medical attention in the community. The prevalence in this study was 34.91%.This is closely related to the previous studies done by M Dash, *et al.* [6] and M. Mehta *et al.* [7] A study conducted in Abuja by Iregbu *et al*. in 2013 [8] and Aiyegoro *et al.* in Ile-Ife [9] however recorded a lower prevalence of 13% and 11.9%, respectively.
The most commonly isolated organism found in our study was Escherichia coli 51.6% [10, 11, 12]. The proportion of bacterial species isolated in the present study was similar to those described in several previous studies. [13, 14] *E. coli* was the most predominant isolate causing UTI in this study while *Klebsiella* spp. ranked second in prevalence.
The high resistance rates shown to the oral antibiotics (Ciprofloxacin, Ampicillin, cotrimoxazole, Cefuroxime) in the present study may be due to the uncontrolled consumption of these antibiotics in the community in the past decade in Garhwal region. Our study demonstrates high sensitivity of isolated organisms to Piperacillin/Tazobactum

(44.06%), Nitrofurantoin (38.13%) followed by Amikacin (27.9%), Gentamycin (24.57%), Levofloxacin (25.42%) [Table: 3]

Other research study observed that highest resistance to Ampicillin, Fluroquinolones, Ceftriaxone whereas Gentamycin & Nitrofurantoin were most sensitive hence Nitrofurantoin can be preferred instead of Cotrimoxazole for empiric treatment [15].

In the Indian setting, routine urine cultures may be necessary, since treatment failure with empirical therapy is likely to occur in India, we need specific guidelines based on local susceptibility patterns. Development of regional surveillance programs is necessary to provide information which would then enable the development of Indian UTI guidelines [16]. Inappropriate, rapid and rampant, without proper prescription use of antibiotics has led to the emergence of resistance and hence should be discouraged.

Conclusion

This study determined the incidence of urinary tract infection in youth & younger population and highlighted the major bacterial agent involved in this condition. It is therefore suggested that appropriate antimicrobials administered after antibiotic sensitivity tests have been carried out in order to prevent the cases becoming symptomatic later with resultant renal damage. Periodic evaluation of the antibiotic sensitivity pattern of UTI pathogens for commonly used antimicrobials should be done while interventions aimed at reducing unnecessary antibiotic use should be encouraged. Education programs should be conducted to reduce the prevalence of disease in the community as well as enlighten the quality of life for patients living in low- and middle-income regions.

Permission: Necessary Permission was sought prior to the conduction of the study.

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