

## Pattern of Antibiotic prescription in Urinary tract Infection

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### Abstract

Urinary tract infection (UTI) is a very commonly noted entity in clinical practice. UTI is defined as the presence of bacteria in urine along with symptoms of infection. Antimicrobials are used commonly for urinary tract infection. But if they are used irrationally then it increase chances of resistance of bacteria as well as increase in duration of morbidity and total cost of therapy. This study was conducted to see the antibiotics utilization pattern.

**Material and Methods:** Case sheets diagnosed with UTI were collected from medical records department (MRD). The demographic data and prescription pattern of each case sheet were evaluated. The data obtained was subjected to descriptive statistical analysis using Microsoft excel.

**Result:** Out of 47 cases studied all were females. The age of the patient in the present study ranged from 20 - 88 years. Out of the 47, 15 were pregnant women. Culture and sensitivity was done in only 3 (6.38%) cases of UTI and Ecoli was isolated in two patients and in one was sterile. Out of the total case records analyzed, antibiotics were not prescribed in 3 (6.39%) cases. Rest received antibiotics (93.61%). The World Health Organization (WHO) indicators (utilization in defined daily doses (DDD); DDD/1000inhabitant/day) were used and the ATC/DDD method was implemented.

**Conclusion:** The DDD/1000inhabitant/day of ceftriaxone was the highest (7.74), followed by cefotaxime (3.7). All the pregnant women received 3<sup>rd</sup> generation cephalosporin's, which can be safely used during pregnancy.

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### Introduction

Urinary tract infection (UTI) is a very commonly noted entity in clinical practice.<sup>(1)</sup> UTI is defined as the presence of bacteria in urine along with symptoms of infection. UTI is extremely common condition that occurs in both male and females of all ages. The prevalence and the incidence of UTI is higher in the women than in males may be due to several clinical factors including anatomic differences, hormonal effects and behavioral pattern.<sup>(2)</sup>

Etiology is influenced by the factors such as age, diabetes, spinal cord injury, urinary catheterization and other factors<sup>(3)</sup>. UTI is mostly caused by gram negative aerobic bacilli found in the GI tract. These includes E. coli, Klebsiella, Enterobectoe, Citrovector and Proteus. Other common pathogens include staphylococcus epidermidis, staphylococcus saprophytic us and enterococcus species.<sup>(4)</sup> The risk of urinary tract infection (UTI) is governed by bacterial virulence factors and the magnitude of deficiencies in host defense.

The initial choice of antibacterial therapy is based on the knowledge of the predominant pathogens in the patient's age group, antibacterial sensitivity patterns in

the practice area, clinical status of the patient and follows up options.

Monitoring of prescription and drug utilization studies could identify the problems which are associated and can be helpful in providing the feedback to the prescriber so as to create awareness about the irrational use of drugs.<sup>(5)</sup> It is necessary to define the prescribing pattern and to target the irrational prescribing habit for sending remedial message.<sup>(6)</sup> Drug utilization studies aids in commenting about unnecessary and irrational prescribing which increases burden of cost of therapy, also causes loss of working hours; either due to hospitalization or morbidity. These are definitely not affordable for a developing country like India.<sup>(7)</sup> In the recent years studies on drug utilization have become a potential tool to be used in the evaluation of health systems.

The objective of present study is to focus on the trends in the antimicrobial utilization in urinary tract infections. This information is not disease specific but reflects overall rates and illustrates trends in utilization of antimicrobials in the treatment of urinary tract infection.

### Materials and Method

The present study was conducted after obtaining the permission of institution ethical committee of Azeezia Institute of Medical sciences, Kollam, Kerala. The present study included patients diagnosed with UTI admitted in Azeezia Hospital, Kollam, and Kerala. It was a six month (July 2013 to December 2013) non-interventional retrospective study record based, observational study and the data were collected from

the Medical Record Room. The proforma for collecting the data was designed. The demographic data and prescription pattern were evaluated in detail and data collected were subjected to descriptive statistical analysis using Microsoft excel. Anatomical therapeutic chemical (ATC) classification and defined daily dose (DDD) system was used for the quantification of drug utilization. Following formula of defined daily dose was used for calculation and results obtained were expressed in terms of defined daily dose per 1000 inhabitants per day (DDD/ 1000 inhabitants/ day)<sup>(8)</sup>.

#### Formula:

$$\text{DDD/1000inhabitants /day} = \frac{\text{Total use of a drug(mg) during the study period}}{\text{DDD (mg) x Duration of study} \times \text{Total sample size}} \times 1000$$

#### Result

The study monitored the drug utilization pattern in the patients treated for UTI at Azeezia Hospital, Kollam, and Kerala.

Out of 47 cases studied all were females. The age of the patient in the present study ranged from 20 - 88 years. Out of the 47, 15 were pregnant women.

#### Age wise distribution of illness

Age	20 – 29	30 – 39	40 – 49	50 – 59	60 – 69	70 – 79	80– 89
No	18	7	5	7	7	2	1
Percentage	38.29	14.89	10.63	14.89	14.89	4.25	2.12

#### Associated illness

Illness	Anemia	CAD	DM + HTN	DM	HTN	Fibroid	PIH	Renal calculi
No	1	1	6	2	2	1	1	3
Percentage	2.12	2.12	12.76	4.25	4.25	2.12	2.12	6.38

Out of the 47 case records, culture and sensitivity was done in only 3 (6.38%) cases of UTI and Ecoli was isolated in two patients and in one was sterile. Out of the total case records analyzed, antibiotics were not prescribed in 3 (6.39%) cases. Rest received antibiotics (93.61%). Out of the 15 pregnant women admitted for the treatment of UTI, Cefotaxime was used in 13 and rest two received Ceftriaxone.

#### Distribution of individual AMA's and non-antimicrobial agents

Drug	No	%
<b>Cephalosporins</b>		
Cefotaxime	20	42.55
Ceftriaxone	13	27.65
Cefixime	1	2.12
Cephalexin	1	2.12
<b>Flouroquinolones</b>		
Ciprofloxacin	6	12.76
Norfloxacin	4	8.51
Ofloxacin	3	6.38
Levofloxacin	1	2.12
<b>Other</b>		
Nitrofurantoin	2	4.25
Amikacin	2	4.25
Azithromycin	1	2.12

**Table 6: ATC code, DDD, PDD and DDD/1000inhabitants/day of the AMAs**

Drug	ATC Code	DDD (mg)	PDD	DDDs/1000 inhabitants/day
<b>Cephalosporins</b>				
Cefotaxime	J01DD01	4000	2133.33	3.7
Ceftriaxone	J01DD04	2000	2093.75	7.74
Cefixime	J01DD08	400	400	0.23
Cephalexin	J01DB01	2000	750	0.13
<b>Flouroquinolones</b>				
Ciprofloxacin (Oral)	J01MA02	1000	1000	2.89
Ciprofloxacin		500	618.18	1.57

(parental)				
Norfloxacin	J01MA06	800	836	1.32
Ofloxacin (oral)	J01MA01	400	400	0.80
Ofloxacin (parental)		400	244.4	0.63
Levofloxacin	J01MA12	500	1000	0.69
<b>Others</b>				
Nitrofurantoin	J01XE01	200	175	0.40
Amikacin	J01GB06	1000	750	1.12
Azithromycin	J01FA10	300	500	0.57

**Table 7: Comparison of PDD and DDD**

PDD > DDD	PDD < DDD	PDD = DDD
Ceftriaxone	Cefotaxime	Cefixime
Ciprofloxacin (parental)	Cephalexin	Ciprofloxacin (Oral)
Norfloxacin	Ofloxacin (parental)	Ofloxacin (oral)
Levofloxacin	Nitrofurantoin	
Azithromycin	Amikacin	

## Discussion

In general practice, the therapeutic approach for UTI is primarily empirical and the main aim of the physicians is to treat as specifically as possible. The present study indicates the general trends of use of medicines in UTI in Azezia Medical College Hospital.

Drug utilization studies have the potential to make objective evaluation and analysis of health professionals work and provide them with feedback to stimulate thinking about their practice and looking for ways to improve their own performance. These studies should become a method of increasing job satisfaction and means of education for health professionals, rather than being perceived as threat or another bureaucratic burden.<sup>(9)</sup> Antibiotic resistance is an emerging problem and has become a major threat to the medical field. Excessive and in appropriate use of antibiotic has been a major contributor to this ever growing problem.<sup>(10)</sup>

This study is not planned to comment about the decision of appropriateness in the use of antimicrobials in UTI against any known guidelines. The study was planned to show the prescription practices in the tertiary hospital and also the changes that might be required in the empirical treatment. Out of 47 cases studied all were females, as seen in many studies female predominance is noted here also and the age of the patient in the present study ranged from 20-88 years. Further it was noted that a majority of the patients were in the age group of 20–29 (38.29%), followed by 30–39 (14.89%), this result does not coincide with study done by Mahesh E. et al.<sup>(11)</sup> and Pargavi B. et al.<sup>(12)</sup> where higher incidences were noted in the age group of 40 and above.

Out of 47 cases 15 were pregnant which accounts for 31.91% and were in the age group of 20–29. Among them Cefotaxime was used in 13 and rest two received Ceftriaxone. UTI being one of the most common

infection during pregnancy and associated with serious risk both to the fetus and mother. Cephalosporins are preferred for the treatment.<sup>(13)</sup>

The reason for admission to the hospital of UTI might be recurrent infection as the chief complaints were not suggestive of the associated illness. When prescriptions were screened thoroughly, antibiotics were not prescribed in 3 (6.39%) cases. Rest received antibiotics.

Most of the drugs are prescribed by brand name. Prescribing by generic name helps the hospital pharmacy to have better inventory control. These will also aid the pharmacy to purchase the drugs on contract basis, as the number of brand is less, reduce the confusion among the pharmacists while dispensing. Generic drugs are often more economic than the branded ones. Prescribing by brand name may be an evidence of vigorous promotional strategies by pharmaceutical companies.

Urine microscopy was done in all the patient and had revealed significant bacteriuria. Culture was done in only 3 (6.38%) cases of UTI. The decrease in the percentage of culture might be based on the clinical presentation at the time of admission or patient might have consumed the antibiotic prior to admission. E.coli was isolated in two patients and is considered as the most common cause of uncomplicated UTI and accounts for approximately 75 to 95 percent of all infections.<sup>(14)</sup>

Drug consumption data were expressed as defined daily doses (DDD) per 1000 inhabitants per day. The highest value of 7.744 DDD/1000 inhabitants/day was accounted for ceftriaxone indicating that it was the popular drug of choice as a broad spectrum antibiotic, followed by Cefotaxime with the value of 3.7 DDD/1000 inhabitants/day. Out of 47, Cephalosporin's were prescribed in 35 cases which accounts for 74.44%. In cephalosporin's third generation agents were preferred, this coincides with study done by Bay AG. et al.<sup>(15)</sup>

The PDD can vary according to both the illness treated and national therapy traditions. For anti-infective, for instance, PDDs vary according to the severity of the infection. The DDDs for most anti-infective are based on treatment of moderately severe infections. In hospital care, much higher doses are

frequently used and this must be considered when using the DDD as a unit of measurement.

### Conclusion

To conclude, it is evident from the present study that for UTI antibiotics were commonly prescribed, most commonly used antibiotic was ceftriaxone followed cefotaxime. All the pregnant women were treated with cephalosporin (Cefotaxime and Ceftriaxone). Prescribing by generic names has to be encouraged.

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