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Original Research Article

## Drug utilization study of urinary tract infections in obstetrics and gynecology department

Anshu Gupta\*, Chanderpriya Agarwal, Karun Bhatti, Arvind Agarwal, Rosy Tayal

Department of Pharmacology, MMIMSR, MMDU, Mullana, Ambala, Haryana, India

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**\*Correspondence:**

Dr. Anshu Gupta,

Email: anshudmc@gmail.com

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### ABSTRACT

**Background:** The aim of study was to determine the utilization pattern of antimicrobial agents in obstetrics and gynaecology department. Antimicrobial agents are one of the most commonly used drugs world wide and has main contribution in human health system. UTI infection is one of the most widespread bacterial infections of genitourinary tract which can be treated by AMAs. The main aim of this study is; to identify the pattern of drug utilisation of antimicrobials in prescriptions, to analyse the utilisation of different classes of drugs and to identify the outcome of the treatment.

**Methods:** This prospective, observational and analytical study was conducted in patients of obstetrics and gynaecology department of MMIMSR, Mullana after obtaining approval from institutional ethical committee. Demographic data, medical history, prescribed treatment details (drug name, dose, frequency, dosage form etc) and diagnosis, type of UTI, laboratory investigations and outcome of treatment was evaluated.

**Results:** A total 242 female patients were registered, out of which 200 were included in the study as 42 were dropouts. Majority of female patients were belonging to the age group of 18-37 (63%). Most of the female patients had uncomplicated UTI 188 (94%) (p value=0.35), 186 (93%) had significant pyuria and 64 (32%) had urine culture positive (p value= 0.01). Burning micturation and frequency were the most common symptoms observed in 146 (73%). In the study 67(33.5%) females were pregnant and 133 (66.5%) were non pregnant (p value= 0.01). Out of 200 patients 64 (32%) had positive urine cultures and 136 (68%) had negative urine culture reports. *E. coli* 28 (14%) was the most common bacteria isolated followed by *Klebsiella* 16 (8%). Average number of drugs prescribed per prescription to non-pregnant was 3.97 and to pregnant were 4.67. In majority of prescriptions, the drugs were prescribed by oral routes (51%) and most of the drugs prescribed were generic (57%). Most of the patients (93%) were recovered from UTIs in 5-7 days of treatment.

**Conclusions:** Our study concluded that the uses of AMAs for UTI were found to be rational and according to the causative organism and susceptibility pattern.

**Keywords:** Drug utilization, Urinary tract infection, Antimicrobial agents, Obstetrics and gynaecology department

### INTRODUCTION

Drug utilization is defined as marketing, prescription and uses of drugs in a society with special emphasis on the resulting social and medical consequences.<sup>1</sup> Drug

utilization studies include prescription audit and retrospective analysis of medical records which can be conducted to assess the rational prescribing skills of clinicians. Such types of studies are helpful for the assessment of beneficial and adverse impacts of the prescribed drug.<sup>2</sup> Antimicrobial agents are broad group

containing all natural, semisynthetic and synthetic agents which inhibit or kill the microorganisms. They act like antibiotics, antifungals, microbicidal etc.<sup>3</sup> UTI infection is the one of the most widespread bacterial infection of genitourinary tract which is caused by microorganisms causing inflammation that infects 150 million people worldwide.<sup>4</sup> UTI is a broad term used to describe microbial colonization of the urine and infection of the structures of urinary tract extending from the kidneys to the urethral meatus.<sup>5</sup> These infections occurs very few in schoolgirls and then increase markedly in incidence with onset of sexual activity in adolescence, and are highest among the elderly. Infections at various sites may occur together/independently; may either be asymptomatic/symptomatic or may be uncomplicated/ complicated.<sup>6</sup>

## METHODS

### *Study design and location*

It is a prescription based prospective, observational and analytical study. The study was conducted at MMIMSR, Mullana, Ambala. It is a tertiary care hospital in rural area which receives referrals from other private clinics, hospitals and general physicians at department of pharmacology in collaboration with department of obstetrics and gynaecology.

### *Sample size*

Total 200 patients were taken as sample size who attended out-patient department (OPD). Written informed consent was taken from all the patients before their prescriptions were analyzed.

### *Inclusion criteria*

Inclusion criteria for current study were; Subjects who have informed consent to access their prescription, All the female patients of age above 18 years, Both pregnant & non-pregnant females, All patients with symptomatic and asymptomatic UTI and Patients with complicated and uncomplicated UTI.

### *Exclusion criteria*

Exclusion criteria for current study were; Inadequate urine samples (less than 10 ml urine), urine bag collected specimens, specimens collected more than 2 hours, specimens in leaking or dirty, unsterile containers.

### *Data collection*

Demographic data, medical history, prescribed treatment details (drug name, dose, frequency & dosage forms etc.) and diagnosis, types of UTIs, laboratory investigations will be obtained on designated proforma and outcome of the treatment will be evaluated.

## **Procedure**

Patient evaluation: Urine specimens from both outpatients and inpatients of gynaecology and obstetrics department of MMIMSR having one or more urinary symptoms like burning during micturation, fever, pyuria, frequency of urine, dysuria, flank pain, suprapubic discomfort etc were evaluated. Collection, isolation and identification of urine samples: Antimicrobial susceptibility testing was performed for bacterial isolates by using Kirby Bauer disc diffusion method as recommended by CLSI. Forceps, plates then incubated at 37°C for 16 hrs, Clinical evaluation of the patients was done, Assessment of drug therapy was done by: Clinical Parameters (based on signs and symptoms), fever, dysuria, frequency, flank pain, painful burning micturation, watery discharge. Laboratory parameters (based on laboratory investigation), Urine routine (microscopy, red blood cells, pus cells by dipstick method), Urine culture (by cysteine lactose electrolyte deficient agar plates), Assessment of drug utilization pattern was done based on: Type of UTI (complicated and uncomplicated), presenting symptoms, laboratory investigations, microorganisms isolated from urine culture, antibiotics prescribed, route of drug administration, duration of the treatment, adjuvant drugs along with antibiotics for UTI and outcome of treatment. Study Schedule: The patient were monitored on each visit on Day 0, 3, 7. If symptoms do not resolve then again on Day 14.

### *Statistical analysis*

Data was entered in latest version of SPSS software, result were expressed in percentages and intergroup comparison was done using Chi-square test, p value was assessed using chi-test function, and p value <0.05 was considered statistically significant.

## **RESULTS**

A total of around 242 female patients were registered in department of obstetrics and gynaecology, out of which 42 were not fitted according to selection criteria, thus they were drop out from the study. 200 patients were finally included in the study, in which laboratory investigation of urine analysis and culture tests were done. Among the 200 patients, 74 (37%) patients were between 18-27 years of age group followed by 52 (26%) in 28-37 years of age group, 38 (19%) in 38-47 years of age group, 20 (10%) in 48-57 years of age group, 10 (5%) 58 in 58-67 years of age group, 6 (3%) in 68-77 years of age group (Table 1). Out of 200 patients, 109 (54.5 %) were undergraduate followed by 50 (25%) were illiterate and 39 (19.5%) were graduate. Among the 200 patients, 133 (66.5%) patients were non-pregnant and only 67 (33.5%) patients were pregnant.

Out of 200 patients, 188 (94%) female suffered from uncomplicated UTI were as 12 (06%) had complicated UTI. Out of 200 patients majority of patients 146 (73%) complained of burning micturation followed by frequency

in 96(48%), dysuria in 54 (27%), fever in 50 (25%), flank pain in 42 (21%) and watery discharge in 14 (7%).

**Table 1: Demographic data of the patients.**

Variables	N (%)	
Age wise distribution	18-27	74 (37)
	28-37	52 (26)
	38-47	38 (19)
	48-57	20 (10)
	58-67	10 (5)
	68-77	6 (3)
Educational status	Illiterate	50 (25)
	Undergraduate	109 (54.5)
	Graduate	39 (19.5)
	Post Graduate	02 (1)
Pregnancy status	Pregnant	67 (33.5)
	Non-pregnant	133 (66.5)

**Table 2: Types of UTI, symptoms and laboratory investigations.**

Variables	N (%)	
Type of UTIs	Uncomplicated	188 (94)
	Complicated	12 (6)
Common UTI symptoms	Burning micturation	146 (73)
	Frequency	96 (48)
	Dysuria	54 (27)
	Fever	50 (25)
	Flank pain	42 (21)
	Watery discharge	14 (7)
Urine culture report	Urine culture positive	64 (32)
	Urine culture negative	136 (68)
Urine analysis	Significant pyuria	186 (93)
	Insignificant pyuria	14 (7)
	Haematuria	26 (13)

Out of 200 patients, 136 (68%) patients had negative urine culture and 64 (32%) patients had positive urine culture reports. Out of 200 patients, maximum number of patients 186 (93%) had significant pyuria and 14 (7%) had insignificant pyuria and out of 200 patients, haematuria was observed in 26 (13%) of patients (Table 2). Result of average number of drugs per prescription and in pregnant women (67) it was found to be 4.67(313/67) and in non-pregnant women (133) it was found to be 3.97 (529/133) (Table 3). Total numbers of AMAs prescribed to non-pregnant women were 247 and to pregnant women were 137. The details of the pattern, type, routes, duration and outcome of the treatment is shown in (Table 4). Among the 200 patients, 122 (61%) patients were prescribed combination of antimicrobial agents and 78 (39%) patients were prescribed single antimicrobial agent. Out of 200 patients, 164 (82%) patients were prescribed empirical antimicrobial treatment and 36 (18%) patients were prescribed antimicrobial treatment according to culture test reports. Out of 200 patients, 114 (57%) patients were prescribed generic drugs and 86 (43%) patients were prescribed branded drugs. Out of 200 patients, 102 (51%)

patients were prescribed drugs to be taken by oral route only and 98 (49%) patients were prescribed drugs to be taken by both oral and IV routes. Out of 200 patients, Majority of patients 108 (54%) were received treatment with antimicrobials for 5 days, followed by 69 (34.5%) for 7 days, 20 (10%) for 10 days and 3 (1.5%) for 14 days. Among 200 patients, majority 186 (93%) patients were treated with antimicrobials and 14 (7%) patients were continued with urinary tract infections.

**Table 3: Total and average number of drugs.**

Indicators	Variables	Observation
Average no. of drugs per prescription	Pregnant (67)	4.67
	Non-Pregnant (133)	3.97
Total no. of AMAs Prescribed (384)	Pregnant	137

**Table 4: Details of pattern, type, routes, duration and outcome of the treatment.**

Variables	N (%)	
Prescription pattern of AMA	Single AMA	78 (39)
	Combination of AMA	122 (61)
Type of treatment prescribed	Empirical	164 (82)
	Culture	36 (18)
	Generic	114 (57)
	Branded	86 (43)
Routes of drug administered	IV + Oral	98 (49)
	Oral	102 (51)
Duration of therapy observed	5 Days	108 (54)
	7 Days	69 (34.5)
	10 Days	20 (10)
	14 Days	3 (1.5)
Outcome of treatment	Treated	186 (93)
	UTI Persists	14 (7)

## DISCUSSION

The present study was a prospective and observational study. A total 200 patients with urinary tract infections were included in the study. The study was conducted in department of pharmacology in collaboration with obstetrics and gynaecology MMIMSR Mullana, Ambala. From the study it was depicted that highest prevalence of UTIs was seen in the females of reproductive age groups, 18-27 (37%) and 28-47 (45%). It was also noted that 133 (66.5%) patients were non pregnant and 67(33.5%) patients were pregnant (Table 1). It is in accordance with the fact that close proximity to female urethral meatus to anus, shorter urethra and sexual intercourse are the factors that influence higher prevalence of UTI in women as given by Mishra et al who conducted a study on drug utilisation pattern in UTI in which females suffering from UTI in age groups 18-30 was 25% and 31-50 (55%).<sup>7</sup> The educational status of patient is associated with the socio-economic status, hygiene and nutrition. In our study it was noted that

109 (54.5%) were undergraduate, 50 (25%) were illiterate and only 41 (20.5%) patients were educated as graduates and post graduates (Table 1). It was in accordance with a similar study by Eima et al in which out of 327 females 61.77% were illiterate 24.46% were educated and 13.76% were highly educated.<sup>8</sup>

Uncomplicated UTI was found in 188 (94%) patients which outnumbered complicated UTI which was in only 12 (6%) patients. Thus the observed and expected frequency was not associated (Table 2). Mahesh et al conducted a cross sectional study on complicated urinary tract infections in a tertiary care centre in south India and found that out of 458 patients 38% females had complicated UTI, the results of which were not relevant with our study. Burning micturition and frequency of urine was the most common symptoms observed in 73% and 48% patients respectively, associated with dysuria in 27%, fever in 25%, flank pain in 21%, with watery discharge in least 7% also catheter associated UTI was found in 6% patients (Table 2). Similar findings were observed by Mishra Rajat et al (2014).<sup>7</sup> Urinalysis and culture was done in all patients and it was observed that pyuria was found in all patients, significant (93%) and insignificant (7%) with or without haematuria (13%) (Table 2). Arul et al also conducted a similar study in 200 patients and found results which didn't related to our study in which significant pyuria was found in 44.4%, insignificant was found in 55.5% and haematuria in 4.57%. Urine culture reports showed that out of 200 female patients, 32% had culture positive urine samples with significant bacteriuria and 68% had culture negative reports (Table 2). Mukta also conducted a study on drug utilisation pattern and found similar findings in urine culture tests that out of 88 patients 34% had culture positive urine samples.<sup>9-11</sup> The average number of drugs per prescription in our study was 3.97 in case of non-pregnant patients (133) out of 529 drugs and 4.67 in case of pregnant patients (67) out of 313 drugs. The total number of drugs prescribed to 200 patients was 842 and total number of AMAs prescribed to 200 patients was 384 (Table 3). Singh et al also conducted a similar study on 130 patients and found similar results.<sup>12</sup> The average number per prescription was 3.88 and total number of AMAs prescribed to 130 patients was 360.

Combination of different antimicrobials is often recommended for successful treatment and to prevent development of resistance. In our study, 61% of prescriptions were found to contain two or more AMAs and 39% of prescriptions contained single AMA. In our study, oral AMAs were used in 51% of the prescriptions and injectable AMAs were used along with oral AMAs in 49% of prescriptions. The use of injectable AMAs may be due to the fact that most of the patients suffer from acute illness, also IV injectables increases bioavailability of drugs. In our study, 57% patients were prescribed with generic drugs and 43% patients were prescribed with branded drugs. Singh et al also conducted study on 130 patients and found majority of drugs (218) prescribed by

injectable route which did not related with our study.<sup>12</sup> Empirical therapy of AMAs is given in the absence of precise diagnosis of the infection. In our study, 82% patients were prescribed with empirical therapy and 18% patients were prescribed AMAs after culture reports (Table 4). Similar study was conducted by Mukta and found that 82% patients received empirical therapy of AMAs.<sup>11</sup> Maximum number of patients 88% recovered in 5-7 days of therapy followed by patients 12% recovered in 10-14 days of therapy. The study shows that majority of patients 93% were treated by anti-microbial therapy and 7% patients persisted UTI (Table 4). Similar study reported by Mishra Rajat et al (2014)<sup>7</sup> in which out of total 120 patients 76% patients recovered, 9 % patients were persisted UTI and 18 % lost to follow up.

## CONCLUSION

The spectrum of UTIs is quite vast, so it was not possible to do full justice to each and every aspect related to it. The reason for the above is that an irrational and unnecessary use of antimicrobials can result in emergence of bacterial strains that can exhibit multidrug resistance, adverse drug events and unnecessarily increased therapy cost. The present study concluded that there is need to conduct drug utilisation studies for rational use of drug in clinical practice in development countries, especially in case of AMAs to decrease development of resistance, adverse drug events and health care cost. The study also highlights the facts that regular screening should be done for the presence of symptomatic or asymptomatic bacteriuria in pregnancy and safe drug should be administered.

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## REFERENCES

1. Chaudhary MK, Barai L, Shrestha M, Sen R, Kandel S. Utilization of antimicrobials by gynaecology and obstetrics department of crimson hospital. *Int J Res Pharm Biomed.* 2020;9(7):1695-703.
2. Agarwal CP, Gupta A, Walia R, Kumar N. Utilization pattern of drugs in expecting mothers visiting obstetrics and gynaecology in rural tertiary care center. *Int J Med Sci Innovate Res.* 2018;3(5):183-9.
3. Srivastava SK, Srivastava R. *Pharmacology for MBBS.* India: Avichal publishing company; 2021: 566.
4. Prakasam Arul KC, Kumar Dileesh KG, Vijayan M. A Cross Sectional Study on Distribution of Urinary Tract Infection and Their Antibiotic Utilization Pattern in Kerala. *Int J Res Pharm Biomed Sci.* 2012;3(3):1125-30.
5. Johnson LW. *Family medicine principles and practice part 2.* *Urinary Tract Infect.* 2020.
6. Fauci AS, Braunwald E, Kasper DL, Hauser SL, Longo DL, Larry JJ, Loscalzo J. *Harrison's Principles of*

Internal Medicine 17th edn. USA: Mc Graw Hill companies; 2008:1820.

7. Mishra R, Pradeep. Drug utilisation study of urinary tract infections in medicine department in a tertiary care hospital. *J Evol Med Dent Sci.* 2014;3(63):13804-16.
8. Fatima E, Anwar A, Dudeja M, Akhtar M, Najmi KA. Drug utilisation pattern and adverse drug reaction monitoring in urinary tract infection patients in a tertiary care hospital. *J Drug Delivery Therap.* 2015; 5(6):23-30.
9. Mahesh E, Ramesh D, Indumathi VA, Punith K, Kirthi R, Anupama HA. Complicated urinary tract infection in a tertiary care centre in south India. *Alamen J Med Sci.* 2010;3(2):120-7.
10. Prakasam KCA, Kumar KG, Dileesh, Vijayan M. A cross sectional study on distribution of urinary tract infection and their antibiotic utilisation pattern in Kerala. *Int J Res Pharm Biomed Sci.* 2012;3(3):1125-30.
11. Chowta NM. Drug utilisation pattern in urinary tract infections. A retrospective study. *Insta Sci J Med Sci Clin Res.* 2011;1(1):13-9.
12. Singh P, Singh VK, Nazam R, Khan FA, Matreja PS. Antimicrobial usage in obstetrics and gynaecology department of a tertiary care teaching, *Int J Pharmacol Res.* 2017;7(3):77-80.

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