

Original article

## Prescribing Pattern of Antibiotic usage for Urinary Tract Infection in two tertiary care hospital.

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### Abstract:

Urinary tract infection is the most common infectious disease in the community medical practice. It was a cross-sectional descriptive study conducted on patients diagnosed with UTI. The objective was to study the prescribing pattern of antibiotic used in the treatment of UTI. The study was carried out in the OPD of Medicine, Surgery and Gynaecology & Obstetrics from 1<sup>st</sup> January to 31<sup>st</sup> March 2012 in Sir Salimullah Medical College and Mitford Hospital and Dhaka National Medical College Hospital, Dhaka. Urinary Tract Infection patients who were in the age group of 18-80 years were included after obtaining their informed consent. A suitable data collection form was prepared and used to collect the required data. Among 360 patients 180 from Sir Salimullah Medical College and 180 from Dhaka National Medical college. Most of the patients were prescribed with Ceftriaxone, Cefotaxime and ciprofloxacin respectively in Sir Salimullah Medical college and cefotaxime, nitrofurantoin and ciprofloxacin respectively in Dhaka National Medical College. The study found that Cephalosporin's were most commonly used and Quinolones were the second most commonly used drugs for the treatment of UTI. The third category drug used in female patients was Nitrofurantoin which is relatively inexpensive and safe for both pregnant and non-pregnant women.

### Introduction:

Urinary tract infection is a broad term that encompasses both asymptomatic microbial colonization of the urine and symptomatic infection with microbial invasion and inflammation of urinary tract structure.<sup>1</sup> Urinary tract infection is an extremely common condition that occurs in both male and female of all the ages. The prevalence and incidence of UTI is higher in women than in men, due to several clinical factors including anatomic differences, hormonal effects and behavioral pattern.<sup>2</sup> Half of all women will have at least one episode of acute cystitis during their adult life and one-quarter will also report recurrent episodes.<sup>3</sup> From a microbiologic perspective, urinary tract infection (UTI) exists when

pathogenic microorganisms are detected in the urine, urethra, bladder, kidney, or prostate. In most instances, growth of  $\geq 10^5$  organisms per milliliter from a properly collected midstream "Clean Catch" urine sample indicates infection. However, significant bacteria is lacking in some cases of true UTI. Especially in symptomatic patients, fewer bacteria ( $10^2 - 10^4$ /ml) may signify infection. Conversely, colony counts of  $>10^5$ /ml in midstream urine are occasionally due to specimen contamination, which is especially likely when multiple bacterial species are found.<sup>4</sup>

Urinary Tract Infection in pregnancy may result in low birth weight infants, premature delivery and occasionally still birth. It is well documented that effective treatment of

UTI significantly reduces the incidence of pyelonephritis, premature deliveries and low birth weight baby. The practice of prescribing antibacterial drugs for pregnant Urinary Tract Infection patients varies in different countries. Apart from economic factors, the problem of selecting an antibacterial agent for treatment of UTI in pregnancy is the possible confusion between a well established and well tolerated drug and empirically known to be harmless to the fetus, and also a drug to which there is a low level of bacterial resistance. The general drugs prescribed for uncomplicated urinary tract infections are trimethoprim, nitrofurantoin and norfloxacin, ciprofloxacin and cotrimoxazole. Nitrofurantoin is the commonly used drug to treat UTIs in pregnancy.<sup>5</sup>

Prescribing drugs is an important skill which needs to be continuously assessed and refined accordingly. Commonly, the prescription behavior is influenced by many factors like unethical drug promotion, lack of knowledge, direct consumer advertising and non-availability of drugs. So there is a chance of prescribing irrational drugs. The assessment of the prescription will help to know the attitude of the physicians towards their prescribing, their therapeutic knowledge upgrading need/requirement and to ensure rationality in the prescription. The rationality of the prescriptions will help the physician in selecting the most appropriate cost effective treatment.<sup>6</sup>

#### Material and Method:

This was a prospective cross sectional study conducted in the Out Patient Department (OPD) of Medicines, Surgery, Gynaecology and Obstetrics in Sir Salimullah Medical college – Mitford Hospital and Dhaka National Medical College Hospital. UTI patients (both recently diagnosed and recurrences) treated with antibiotics (age - 18 to 60 yrs ) were included and patients below 18 yrs of age were excluded.

#### Sources of data:

- Patient case sheet, medication chart
- Patient interview.

Study procedure: Prescriptions of out-patients was reviewed for the treatment of the UTI in Medicine, Surgery and Gynae departments. Patient consent was obtained before collecting the required data.

Determination of Prescription pattern: Patients diagnosed with UTI were interviewed to collect the socio-demographics and therapeutic data such as drugs prescribed, doses, route of administration, duration and other laboratory data were obtained by reviewing prescriptions. The follow-up of the patients was done weekly once for out-patients. The changes in the prescribing drugs or their doses or duration were also documented.

**Statistical methods :** Descriptive statistical analysis has been carried out in the present study.

#### Result:

Out patient department of Medicine, Surgery, Gynaecology and Obstetrics of two teaching hospitals were included in this study. A total of 360 prescriptions were analyzed during study period. 180 prescriptions from one hospital and 180 prescription from other hospital. Among 180 patients in Sir Salimullah Medical College and Mitford Hospital, 130 patients (72.22%) were female and 50 patients (27.77%) were male. In Dhaka National Medical College Hospital, out of 180 patients, 120 patients (66.67%) were female and 60 patients (33.33%) were male.

**Table 1: Sex distribution of the patient.**

Sex	SSMC (n=180)	DNMC (n=180)
	No. (%)	No. (%)
Female	130 (72.22)	120 (66.67)
Male	50 (27.78)	60 (33.33)

In Sir Salimullah Medical College & Mitford Hospital, the age group 20 – 29 years accounted for the highest number 72 (40%) and 60 – 69 years of age accounted for the lowest number 3(1.66%) of patients followed by 19.44% less than 20 years of age, 28.33% between 30 and 39 years, 3.89% between 50 – 59 years. In Dhaka National Medical College Hospital, the age group 20 – 29 year were 70 (38.8%), 27.7% between 30 – 39 years, 22% less than 20 years, 5.55% between 40 – 49 years, 3.33% were 50 – 59 years and 2.22% between 60 – 69 years. The age distribution of patient is given in table 2.



**Table 2: Distribution of age of the study subjects.**

Sex	SSMC (n=180)	DNMC (n=180)
	No. (%)	No. (%)
<20	35 (19.44)	40 (22.22)
20-29	72 (40.00)	70 (38.89)
30-39	51 (28.33)	50 (27.78)
40-49	12 (6.67)	10 (5.56)
50-59	7 (3.89)	6 (3.33)
60-69	3 (1.67)	4 (2.22)

In our study, most of the patients culture sensitivity test was not done, which shows that treatment was given with empirical therapy. In SSMC&MH, out of 180 encounters the most commonly used antibiotic in UTI was Ciprofloxacin 65 (36.11%) followed by Cefuroxime, Nitrofurantoin; Cefixime Azithromycin, Levofloxacin, Cephadrine, Metronidazole were 20%, 18.88%, 13.88%, 11.11%, 6.66%, 5.55%, 4.44%, 8.33% respectively. In DNMC, out of 180 encounters the commonly used antibiotic in UTI was Nitrofurantoin 55(30.55%) followed by Cefuroxime, Ciprofloxacin, Azithromycin, Cefixime, Levofloxacin, Metronidazole, Cefradine were 22.22%, 16.66%, 13.88%, 11.11%, 7.22%, 5.55%, 3.88% respectively. The most commonly used antibiotics are shown in Table 3. In pregnancy, the most commonly prescribed drug was cefuroxime, nitrofurantoin, Cefixime. In SSMC cefuroxime (22.22) mostly used antibiotic in pregnancy and nitrofurantoin (30.50%) was most commonly used antibiotic in DNMC.

**Table 3: Most commonly prescribed antibiotics per prescription.**

Antibiotics	SSMC (n=180)	DNMC (n=180)
	No. (%)	No. (%)
Ciprofloxacin	65 (36.11)	30 (16.66)
Cefuroxime	36 (20.00)	40 (22.22)
Cefixime	25 (13.88)	20 (11.11)
Nitrofurantoin	34 (18.88)	55 (30.55)
Azithromycin	20 (11.11)	25 (13.88)
Levofloxacin	12 (6.66)	10 (7.22)
Cephadrine	10 (5.55)	7 (3.88)
Metronidazole	8 (4.44)	10 (5.55)
Cotrimoxazole	15 (8.33)	0

**Discussion:**

The study of prescribing pattern is a component of medical audit, which seek monitoring, evaluation in the prescribing practices of prescribers to achieve rational and cost effective medical care. It is necessary to define prescribing pattern and to identify irrational prescribing habits to drive a remedial message to the prescribers. Our study showed that, majority of UTI patients were female mainly due to the structural and anatomical differences like shorter urethra. The same observations were made by several resources like Tomas.L, Greibling studies, and text books of<sup>2,7</sup> pharmacotherapeutics by Herfindal and Roger walker. The present study was conducted in the age group of 18 – 80 years. Both of the hospitals majority of female patients showed the incidence of UTI at the age group of 21-30 years, which is the child bearing age as well as sexually active period. During the post-menopausal period, most of the women shows the chances of UTI and its symptoms, this is also observed in our study. Maximum of the females visited OBG department 74(76.2%) and minimum to surgery department 1(1.0%). Males 24(61.5%) mostly visited to the department of general medicine and least number of males 5(12.8%) visited to the department of surgery. Female UTI patients who visited the OBG department were more because of female patients generally prefer to check/diagnose with the same gender, for exchange of information freely and more availability of female doctors. Some female patients who visited this department for UTI complications, their final diagnosis report confirmed that either they were pregnant or diabetic along with UTI. Symptomatic UTIs can occur essentially in all age groups of the population but are most prevalent in females. The same observations were identified in the epidemiology of urinary tract infection.<sup>7</sup> Among 180 patients in SSMC, culture sensitivity test was performed only for 15(8.3% out of which 5(2.2%) were male and 10(5.5%) were female. In DNMC among 180 patients culture sensitivity was done only for 30(16.6%) out of 8(3.3%) were male and 22 (12.2%) were female. Culture sensitivity tests were not performed in most of the patients because of non-

affordability or financial/socio-economic issues of the rural patients. The prescribing pattern of antibiotics usage study out-patients showed 9 types of antibiotics prescribed. Ciprofloxacin 65(36.11%), Cefuroxime 36(20%), Cefexime 25(13.88%), Nitrofurantoin 34(18.88%), Azitromycin 20(11.11%), levofloxacin 12(6.66%), Cephradine 10(5.55%), Metronidazole 8(4.4%), Cotrimoxazole 15(8.33%). In DNMC Nitrofurantoin 55(30%), Cefuroxime 40(22.22%), Ciprofloxacin 30(16.66%), Cefexime 20(11.11%), Azithromycin 25(13.88%), Levofloxacin 16(7.22%), Cephradine 7(3.88%), Metronidazole 10(5.55%). Cephalosporins and Fluoroquinolones was the most commonly used antibiotics in the hospital practice for the<sup>8,9</sup> treatment of UTI. Fluoroquinolones remains the choice among the orally administered antibiotics, followed by second and third generation Cephalosporins. The prescribing pattern of antibiotics for the treatment of UTI in our hospital showed that, Cefuroxime Cephalosporins, Quinolones, Nitrofurantoin was most commonly prescribed antibiotics. Similar findings were observed in the studies conducted by Mathi E et al and Joe et al and Kallen et al<sup>8,9,10</sup>. Our study also found the antibiotics safety in pregnancy UTI. This showed that nitrofurantoin is safe and efficacious.<sup>11</sup> The safe use of antibiotics was observed with cephalosporins like cefixime and cephalexin. Similar study<sup>12,13</sup> supported by Cimoli and Kay sam. The inappropriate selection and use of antibiotic not only causes resistance but also causes more harm thus leading to recurrence of the UTI. Concerns about increased resistance have contributed to greater use of fluoroquinolones, but widespread empiric use of this class of medications might promote resistance to fluoroquinolones. Hence fluoroquinolones should not be considered as first-line therapy. Now a days nitrofurantoin is very much sensitive in UTI treatment. It is very cheap and readily available in developing countries. We can use it as a 1<sup>st</sup> line drug treatment. It is comparable drug treatment with the study of Nigeria.<sup>11</sup> The limitation of this study was, short duration and less number of pregnant UTI patients enrolment. Our study showed a few potential

directions for future research are establishing of antibiotic guidelines for UTI, prescribing pattern study in Pregnant UTI in large samples and antibiotic resistance studies.

#### **Conclusion:**

Complications from inadequately treated UTIs contribute to increased patient morbidity, increased health care costs, and increased drug resistance. It was found that Cephalosporins, Quinolones, Nitrofurantoin were most commonly used drugs, for the treatment of UTI. Nitrofurantoin, a relatively inexpensive and safe drug for the treatment of UTI was used in both pregnant and non pregnant patients. Widespread empirical use of Fluoroquinolones also might promote microbial resistance to Fluoroquinolone group of drugs. Hence, Fluoroquinolones should not be considered as first-line therapy. Our findings indicate an urgent need for the establishment proper guidelines, dissemination of information to practitioners and supervision of antibiotic usage in low income countries like Bangladesh.

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