Utilization pattern of antibiotics in urinary tract infection patients in Jimma Hospital, Ethiopia

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Abstract

Aim: Drugs are one of the health care components needed to be used rationally and appropriately as the emergency of antibiotic resistance has become a major issue of health care delivery. Our aim was to assess the utilization pattern of antibiotics in urinary tract infection patients in Jimma University Specialized Teaching Hospital.
Methods: A cross-sectional study was conducted during 2013-2014. Prescribed parameters related to patients, prescribers, the medications prescribed and errors associated with these parameters were compiled from patient record data. The parameters were matched against WHO prescribing recommendations.
Results: A total of 282 cards of urinary tract infection patients were observed during the study period. Out of these, 170 (60.3%) were prescribed for females. From the total 282 prescriptions, 264 (93.6%) contained one drug, while 17 (6.0%) prescriptions had two drugs per encounter. All the antibiotics were prescribed in their generic name. Fluoroquinolones 189 (67.0%) were the most prescribed drugs, followed by penicillin 54 (19.1%), tetracycline 16 (5.7%) and sulfa drugs 14 (5.0%). Important information frequently overlooked by prescribers were physician signatures 34 (62.9%), dosage forms 10 (18.5%) and quantity of drugs 8 (14.8%). Average number of antibiotics prescribed per encounter and percentage of encounters with an injection prescribed were 1.07 and 15.25%, respectively.
Conclusion: The prescribing patterns of antibiotics in urinary tract infection patients was found to be good as the drugs were prescribed from national treatment guidelines and in their generic name. However, some important information was frequently missing such as physician signature, dosage form and quantity of treatment.

***Keywords**:* antibiotics, patients, prescribing patterns, urinary tract infections.

Introduction

Urinary tract infection (UTI) is an extremely common clinical problem which may involve urethra, bladder, Uterus and Kidney (1,2). It has been estimated that 150 million people were infected with UTI per annum worldwide (1). It affects all groups, but women are more susceptible than men due to short urethra, absence of prostate secretion, pregnancy and easy contamination of urinary tract with fecal flora (2,3). UTI is mostly caused by gram negative aerobic bacilli found in GI tract. Included in this family are the E. coli, Klebsilla, Enterobactor, Citrobacter, Proteus and Serratia species. Other common pathogens include Staphylococcus epidermidis, Staphylococcus saprophyticus and Enterococcus species which presumably result in UTI following colonization of the vagina or perianal skin (4).

Antibiotics are among the most frequently prescribed drugs and play a vital role in treatment of infectious diseases (5). Hence, they are the mainstay treatment for all UTIs. A variety of antibiotics are available and choices depend on many factors, including whether the infection is complicated or uncomplicated or primary or recurrent. Treatments should not necessarily be based on the actual bacterial count (6).

Fluoroquinolones are the most commonly used therapy for uncomplicated urinary tract infection (7); however, the widespread use of fluoroquinolones for such a common infection raises concern regarding the possibility of accelerated development of resistance (8). Recently, the third generation cephalosporin, especially ceftriaxone, was the most prescribed antibiotic for treatment of patients with infection diseases at most hospitals (9).

Antimicrobial resistance has increased rapidly and a major reason for this is the extensive use of drugs (10,11). Therefore, the emergency of antibiotic resistance has become a major issue of health care delivery; some of the prescriber's related factors that lead to increased resistance include lack of knowledge, inadequate diagnosis, incorrect drug selection, duration and route, prescription in response to patient pressure, financial gain and response to promotional pressure (12). Many reports have indicated the presence of multidrug resistance in organisms causing UTIs (13). Therefore, the aim of this study was to assess utilization patterns of antibiotics in urinary tract infection patients in Jimma University Specialized Teaching Hospital.

Methods

A cross-sectional study was conducted in Jimma University Specialized Teaching Hospital during 2013-2014. The Hospital has a bed capacity of 450 and it provides services for approximately 9,000 inpatient and 80,000 outpatient attendances a year from the catchment population of about 15,000 million. The hospital has six departments that offer clinical residency (internal medicine, surgery, pediatrics, psychiatry, obstetrics and gynecology and ophthalmology) and other departments without residency program like ENT, neurology and dermatology departments. The study was carried out on one year cards with antibiotics prescribed for UTI patients from January 2013-Feburary 2014. The study population consisted of all UTI patients to whom antibiotics were prescribed during the stated study period which was found to be 282.

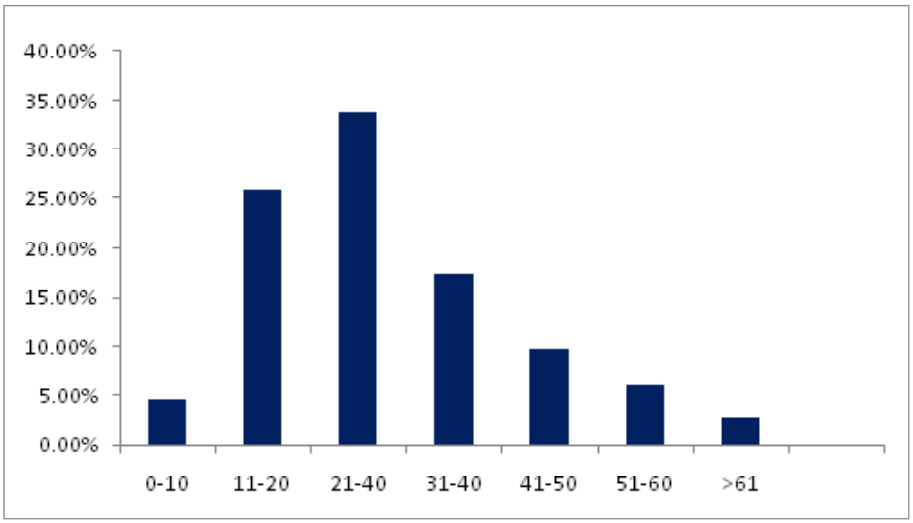
All the necessary and relevant information are collected from patients' records using a suitable data collection form. Prescribed parameters related to patients, prescribers, the medications prescribed and errors associated with these parameters were compiled from patient record data. The parameters were matched against WHO prescribing recommendations. The data was analyzed by using SPSS version 16.1. Descriptive results were expressed as frequency and percentage. The processed data was finally presented using tables and figures.

Results

During the one year study period, 282 of patients used antibiotics for treatment of urinary tract infection. Out of these patients, the majority of them were females, 170 (60.3%). Most of patients were in the age group of 21-30 (33.7%), followed by 11-20 (25.9%), 31-

40 (17.4%), 41-50 (9.6%), and 51-60 (6.0%). Antibiotics were also prescribed for UTI patients with extreme age groups of less than 10 (4.6%) and above 61 years (2.8%) (Figure 1).

Figure 1. Distribution of Urinary Tract Infection (UTI) patients in different age-groups

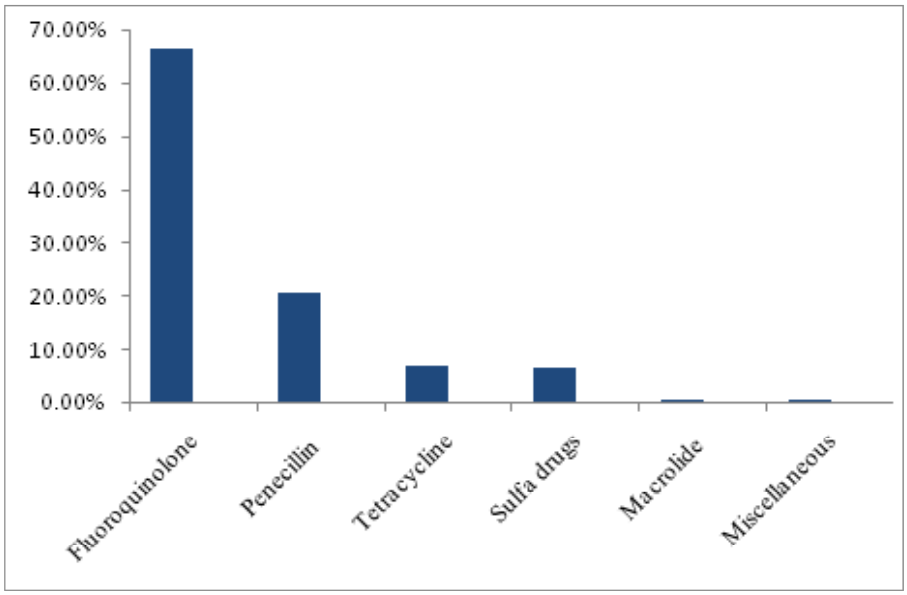


Out of 282 patients, 264 (93.6%) of them took one drug per encounter, while 17 (6.0%) of them used two drugs and only one patient was prescribed with three drugs per encounter. A total of 301 antibiotics were prescribed for 282 patients. In addition to antibiotics, 151 other drugs were prescribed for patients making the total amount of drugs used in these patients 451. The most commonly prescribed antibiotic class was fluoroquinolones accounting for 199 (66.1%), followed by penicillin 61 (20.3%), tetracycline 20 (6.6%) and sulfonamides 19 (6.3%) (Table 1). Among the fluoroquinolones, the most frequently prescribed drug was norflorxacin 129 (42.9%, N=301), followed by ciprofloxacin 71 (23.6%, N=301) (Figure 3). Among penicillin, amoxicillin was the only prescribed drug 61 (20.3%, N=301). Doxycycline 20 (6.6%, N=301) and cotrimoxazole 19 (6.3%, N=301) were also prescribed for treating UTI, representing tetracycline and sulfonamides classes, respectively (Figure 2). All of drugs were prescribed from national treatment guideline in which all of these medications are recommended to be used in UTI patients.

Table 1. Antibiotics prescribed for Urinary Tract Infection patients

Antibiotics	Frequency	Percentage
Norfloxacin	129	42.90
Ciprofloxacin	71	23.58
Amoxicillin	61	20.27
Doxycycline	20	6.64
Cotrimoxazole	19	6.31
Erythromycin	1	0.33
Chloramphenicol	1	0.33

Figure 2. Percentage of antibiotic classes prescribed for Urinary Tract Infection patients



The analysis of the antibiotic prescribing errors showed that a total of 54 prescribing errors were detected, making the prevalence of antibiotic prescribing error to be 34.9%. All of the detected errors were identified to be omission errors. The commonly omitted information were physician signatures 34 (62.9%), dosage form 10 (18.5%) and quantities of medications 8 (14.8%). Omission of frequency of administration 1 (1.9%) and route of administration 1 (1.9%) were the least prevalent errors observed (Table 2).

Table 2. Antibiotics prescribing errors observed

Prescription errors	Frequency	Percent (%)
Physician signatures	34	62.96
Dosage forms	10	18.52
Quantity of drugs	8	14.82
Frequency of drug use	1	1.85
Routes	1	1.85

The average number of antibiotics per prescription and percentage of encounters with an injection prescribed were 1.07 and 15.25%, respectively. The majority of drugs (91.57%) were prescribed with generic names. However, all antibiotics were written in their generic names (Table 3).

Table 3. Prescribing pattern indicators with respective WHO references

Indicator	Values		
	Total drugs	Antibiotics	WHO reference
Average number of drugs per prescription	451/282 1.6	301/282 1.07	1.6-1.99
Percentage of encounters with an injection prescribed	53/451 11.75	43/282 15.25	13.4-24.1
Percentage of drugs prescribed by generic name	413/451 (91.57%)	301/301 (100%)	100%

Discussion

The writing of correct and complete drug prescription is an important component of scientific process. Rational drug prescription avoids many adverse drug reaction and complications, which arise from inappropriate prescribing of drugs. Omitting data in prescribed drugs could lead to numerous problems including under or over treatment of the patients (14). In this study, the result of prescribing pattern analysis indicated that a total of 54 prescribing errors were detected. All of the detected errors were omission errors. The frequent omitted information was dosage form of drugs, quantities of medications and physician signatures.

In the present study, all of antibiotics were prescribed by generic names. This is to be encouraged, as it is in consistence with the World Health Organization (WHO) recommendation which states that drugs should be prescribed by their generic name. However, a study conducted in the US showed that prescribers' preferred brand medicines than generic and the percentage of drugs prescribed by brand name was 80% (15).

The number of drugs prescribed per encounter should be as low as possible to minimize the risk of drug interaction, development of drug resistance and medication cost. In this study the number of general drugs and antibiotics prescribed per encounter was 1.6 and 1.07, respectively with majority of prescriptions containing one antibiotic drug. This observation is in line with WHO recommendations which states that in average not more than 1.99 drugs should be written per prescription. On the other hand, the present result is somewhat different from a previous study done in teaching hospital, western Nepal, with a number of antibiotics per prescription of 1.76 (16).

Fluoroquinolones were the most frequently prescribed class of drugs for treatment of UTI in the present study. Among flouroquinolones, norfloxacin and ciprofloxacin were frequently prescribed medications. The possible reason is that these agents are used as first line drugs for treatment of UTI in the country. The present observation is different from the previous study conducted in Malaysia, in which penicillin was the most frequently prescribed drug, followed by cotrimoxazole (17). On the contrary, Chowta reported that cephalosporin was the most commonly used drug for treatment of UTI (18).

Conclusion

The prescribing patterns of antibiotics among urinary tract infection patients was found to be good, as the drugs were prescribed from national treatment guide line and in their generic name; moreover, the majority of drugs were prescribed as mono therapy. However, some important information was frequently missing from prescription such as physician signature, dosage form and quantity of treatment. Hence, the concerned institutions have to take action to solve these problems by training and ensuring continuous follow-up of prescribers, providing prescription that fulfills the criteria of the WHO recommendations.

Conflicts of interest: None declared.

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