

## Prescription pattern of antibiotics for outpatients: A cross sectional health survey conducted in three major cities of Bangladesh

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**Abstract:** The worldwide rising incidence of superbugs and the associated risk factors could be country or area specific. A case control study identifying prescription pattern of antibiotics, was conducted in three major cities Dhaka, Rangpur and Dinajpur for a period of 6 months. A total number of 600 patient's prescription with age of '0' to over '60' years were collected from the different Primary Health Care (PHC) facilities during the study period. A total number of 2494 individual medicines were prescribed in 600 patient's prescription. In this study, the majority of the patients were female 321 (53.5%) and male 228 (37.83%) patients and the gender of 52 (8.67%) patients were unidentified in the prescription. The average highest prescribed antibiotic among these three cities were in Rangpur 43.82% and followed by the lowest one was Dhaka city (23%). Most commonly prescribed antibiotic class was cephalosporin of which cefuroxime (22.10%), cefixime (14.98%), ceftriaxone (6%), and cefradine (2.62%). This study revealed that the prescription pattern has irrational result and indiscriminate use of antibiotic irrespective to the age of patients. Moreover most of the cases the patients present condition and diagnosis was missing in the prescription.

**Key Words:** Antibiotic Uses, Superbugs, Prescription Survey

### I. INTRODUCTION

At present, resistance of antibiotic is one of the most common issue in the worldwide due to misuse or over use of antibiotics [1]. Studies reported that 20 – 30% of all antibiotic use is inappropriate resulting in increased adverse effects, cost of treatment and upraises antimicrobial resistance [2]. According to the previous studies, third world countries double their expenditure on drugs every four years whereas Gross Domestic Product (GDP) doubles in every sixteen years [3].

In recent years, drug utilization studies are found to be useful tool to facilitate rational use of drugs in health care delivery systems. To ensure rational use, a drug must be safe, effective and prescribed for specific therapeutic indication with correct dose and dosage forms. Various indicators were developed by International Network on the Rational Use of Drugs (INRUD) in collaboration with WHO that provides objective indices for the assessment of drug use practices and thus, suggesting remedial measures [4].

World health organization (WHO) has designed standardized prescribing indicators to evaluate the trends of prescribing in health facilities [5]. In Bangladesh, the doctors are prescribing antibiotics irrationally without taking consideration the clinical test in most of the cases. Subsequently the patients are also not completing the dosage regimen of antibiotics, if it is given in cold and general fever or even in other complicated infectious diseases [6]. Also, WHO reported that more than half of all medicines are prescribed, dispensed or sold inappropriately and half of the patients are failed to take the prescribed medicines properly [7].

Therefore, research is needed to evaluate the antibiotic usage patterns so that interventions can be developed and implemented. Although there are extensive variation in the pattern of drug use from country to country and in different areas of an individual country [8]. This is aimed to analyze and justify whether antibiotics are being prescribed rationally or irrationally for outpatients as well as to indicate the prevalence of most prescribed antibiotics in three cities Dhaka, Rangpur and Dinajpur of Bangladesh.

## II. METHODS

### 2.1. Study Design

The present research study was conducted in three major cities namely Dhaka, Rangpur and Dinajpur in Bangladesh. Data were collected for from August 2018 to November 2018. This prospective and observational study was conducted in private and public hospital.

### 2.2. Study population and data collection

Study populations of this study was selected specifically but the data was collected randomly from that specific populations. This study was carried out with a self-designed standard questionnaire by directly interviewing the patients and their Guardian. A total of 600 patients with age of '0' years to over '60' years were selected for the analysis of prescription pattern. The patients who were unconscious/mentally retarded, who were suffering with psychiatric diseases and who were admitted into hospitals were excluded from the study. Few questionnaires were excluded during the data analysis because of inadequate information.

### 2.3. Ethical Approval

The study was conducted following the general principles (section 12) of World Medical Association (WMA) declaration of Helsinki. This survey based research is also logistically supported by the Department of Pharmacy, University of Information Technology and Sciences, Dhaka-1212, Bangladesh. The human subjects involved in this study did not use any hazardous agents and samples were not collected from them. As the human subjects only participated in the interview, this survey based research didn't take any further approval from institutional ethics committee. Confidentiality of the results was maintained by using codes in place of prescriber names in the questionnaires. Study participants signed an informed consent form to indicate their willingness to participate in the study.

### 2.4. Statistical analysis

Descriptive statistics were applied to the collected data using Microsoft Excel software. Results are expressed graphically in percentages, mean, standard deviation (SD).

## III. RESULT

In our study, we were analyzed a total number of 600 patient's prescriptions from different regions of Bangladesh. Considering the population density and patient versus doctor's ratio we had selected Dhaka, Rangpur and Dinajpur region for the prescription analysis. We collected equally per 200 prescriptions in three cities (Dhaka, Rangpur and Dinajpur).

### 3.1. Demographic Characteristics of Patients:

In the study, the majority of the patients were female 321 (53.5%) and male 228 (37.83%) patients and the gender of 52 (8.67%) patients are unidentified in the prescription. Diagnosis was confirmed only in 276 (46%) prescriptions. The demographic characteristics of patients are given in Table 1.

**Table 1.** Demographic Characteristics of Patients

Variables	Frequency (n=600)	Percentage (%)	
<b>Gender distribution</b>	Male	228	38
	Female	321	53.5
	Unidentified Gender	51	8.5
<b>Age distribution</b>	Unidentified Age	73	22.83
	Less than 1 year	19	3.61
	1-10 year	87	16.51
	11-20 year	76	14.42
	21-30 year	119	22.58
	31-40 year	73	13.85
	41-50 year	65	12.33
	>50 years	88	16.7

### 3.2. WHO prescribing indicators:

A total number of 2494 individual medicine were prescribed in 600 patients. The number of drug prescribed ranges from 1 to 6 drugs and the average number of medicine per prescription was 4.17. In this study WHO prescribing indicators are assessed. After analysis this study revealed that no drugs are prescribed by generic name and 43% of total prescribed medicine is antibiotic. All other WHO prescribing indicators data are given in the Table 2.

**Table 2.** Assessment of WHO Prescribing Indicators:

Characteristics	Value
Total number of prescription	600
Total number of drugs prescribed	2494
Average number of drugs per prescription	4.17
Percentage of drugs prescribed by generic name	0%
Percentage of patient encounters with an antibiotic prescribed	43%
Percentage of patient encounters with an injection prescribed	9%
Percentage of drugs prescribed from the national EDL	28.63%

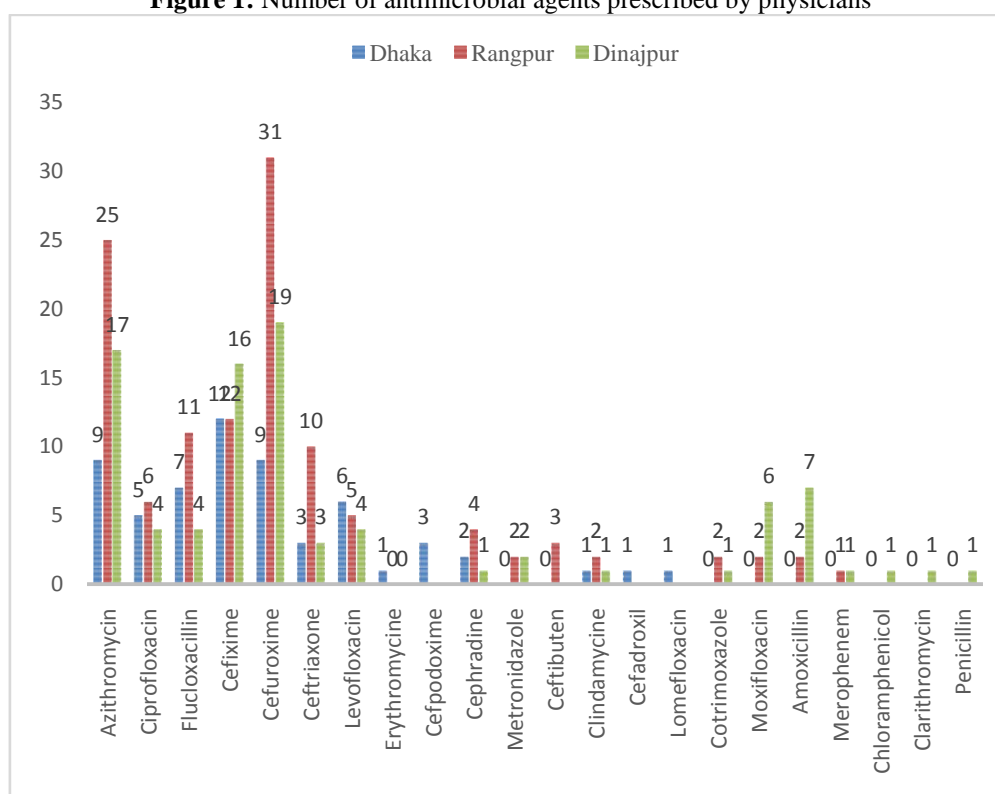
**3.3. Antibiotic usage among patients:**

In this study, 258 (40.2%) prescription contains Antibiotics. Most of the prescription included single antibiotic 247 (94.2%). More than one antibiotics were also given in 11 (5.81%) of prescriptions.

Out of total medicine 267 (10.70%) antibiotics were prescribed. The average highest prescribed antibiotic groups in these three cities were cephalosporin 129 (48.31%) followed by  $\beta$ -lactam antibiotics 40 (14.98%), macrolides 53 (19.85%), quinolones 39 (14.61%), metronidazole 4 (1.5%) and meropenem 2 (0.75%).

It was found that among the cephalosporin, cefuroxime 59 (22.10%), cefixime 40 (14.98%), ceftriaxone 16 (6%), cefradine 7 (2.62%), Ceftibuten 3 (1.12%) were used. Prescriptions also included  $\beta$ -lactum antibiotics of which amoxicillin 9 (3.37%), flucloxacillin 22 (8.24%) were used. Prescriptions also included macrolides antibiotics of which azithromycin 51 (19.10%), clarithromycin 1 (0.37%). It was found that among the quinolones, ciprofloxacin 15 (5.62%), moxifloxacin 8 (3%), levofloxacin 15 (5.62) is used mostly (Figure 1).

**Figure 1:** Number of antimicrobial agents prescribed by physicians



Prescription pattern of Cephalosporin's were highest in Rangpur city (43.97%) whereas lowest in Dhaka city (25.53%). This antibiotic was prescribed for the patients suffering from infections like respiratory tract infections (RTI), urinary tract infections (UTI), typhoid fever etc. After the cephalosporin's, the highest antibiotic usage was macrolides which were prescribed highest in Rangpur city (47.17%) whereas lowest in Dhaka city (18.87 %) Which were indicated for the treatment of common cold & fever.

Quinolones were prescribed highest in Dinajpur city (35.89%) and lowest in Dhaka city (30.77 %) and prescribed for the ailment of typhoid fever, respiratory infections and Skin Problem. Beta Lactam were

prescribed highest in Rangpur city (42.5%) but lowest at Dhaka city (20%) and given mainly for recovery of wound infections as well as respiratory infections.

In this study, we collected equally per 200 prescriptions in three cities (Rangpur, Dinajpur and Dhaka). The average highest prescribed antibiotic among these three cities were Rangpur 43.82% and the lowest one was Dhaka city (23%).

#### **IV. DISCUSSION**

This study revealed that patients belonged to the age group of '0' to over 60 years. Aged from 20' years to 30 years old took the highest percentage of visiting Doctor (22.58%) followed by people aged above 50 years (16.7 %) and the age of 51 (8.5%) patient are unidentified in the Prescription. Some error was found when we analyzed the prescription. Some data was not found at that time. Children aged from '0' years to 20 years old were given the highest percentage of antibiotics (53.3%) followed by people aged 21 to 40 years (28.93%) whereas aged above 40 years were received only 17.77% of antibiotics among the total 197 antibiotics.

WHO highly recommends prescribing medications by generic name as a safety precautions for patients because it identifies the drug clearly, provides better information exchange and allows better communication between health care providers. Our study revealed that none of drugs was prescribed by generic name and the prescriber were not aware of the importance of generic name. In other developing countries the rate generic prescribing was above.

The study was limited in that it was not designed to reveal the reasons leading to irrational prescribing of drugs. The sample size was small and seasonal variation in illness was not taken into consideration as because they might have affected disease patter and antibiotic use. Future studies was required to investigate this factors. The study had a number of strength also. Use of WHO/INRUD core drug prescribing indicators added strength to the study. It was the first study conducted on antibiotic patients in three district of Bangladesh. So it will be beneficial to measure the degree of rational or irrational drug use by the health care services.

#### **V. CONCLUSION**

On the basis of the finding of this study, the prescribing practices for antibiotic commonly over used and costly forms of drug therapy need to be regulated closely. The pattern of antibiotic prescriptions found in this study is generally not satisfactory. Drug use evaluation should be done for some of the antibiotics to check whether they were appropriately prescribed or not. On the other hand, poly pharmacy, generic prescribing were not found to be a problem in this study. In order to improve on both prescribing and patient care indicators, the hospital's Drug and Therapeutic Committee (DTC) should be strengthened to control antibiotic use. This study could provide baseline data for further studies that will investigate the reasons why there is polypharmacy and high antibiotic usage in this setting and why clinicians are reluctant to own and use the standard treatment guidelines.

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