

**PRESCRIBING PATTERN OF ANTIBIOTICS IN OUTPATIENT DEPARTMENT IN A TERTIARY HOSPITAL**

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Article Received on 02/03/2021

Article Revised on 21/03/2021

Article Accepted on 11/04/2021

**ABSTRACT**

**Objective:** In this study our main goal is to evaluate the antibiotic utilization pattern among patients of outpatient department. **Method:** This Observational Cross-sectional Descriptive study was conducted in in outpatient department of Medicine, Surgery, Gynaecology and Obstetrics of Dhaka medical college & Hospital. Later the study was compiled in the Department of Pharmacology, Dhaka Medical College. Total study period was one year extending from January, 2019 to December, 2019. Patients in outpatient department of Medicine, Surgery, Gynaecology and Obstetrics of Dhaka Medical College & Hospital. **Results:** A total 2404 prescriptions was screened in this study, among 600 prescriptions containing antibiotics purposively selected according to inclusion and exclusion criteria from different outpatient of Medicine, Surgery and Gynaecology & Obstetrics department of Dhaka Medical College and Hospital to reach the end of the study. **Conclusion:** In conclusion we can say that, the need for introduction of guideline for antibiotic prescribing & implementation of antibiotic policy is mandatory in institutions that will promote rational use of antibiotic.

**KEYWORDS:** Antibiotic, microorganisms, prescriptions, bacterial resistance.

**INTRODUCTION**

Antibiotics are described as substances produced by microorganisms, suppresses the growth or kill other microorganisms at very low concentrations. The term antimicrobial agents include both synthetic as well as naturally obtained drugs. Since 1936 after Alexander Fleming has discovered Penicillin, antibiotics have become an inevitable part of the modern life. Human longevity and quality of life has been improved by antibiotics. They are among the most commonly prescribed drugs of any kind throughout the globe.<sup>[1]</sup> Currently the antibiotic resistance is the greatest challenge to the effective treatment of infections globally. Resistance adversely affects not only clinical outcome but also financial therapeutic outcome which includes the failure of an individual patient to respond to therapy, the need for expensive and/or toxic alternative drugs, increasing the social cost, longer duration of hospitalization and the need for changes in empirical therapy.<sup>[2]</sup> Antibiotic resistance threats world widely today and to control this condition awareness of the

threat that antibiotic resistance poses should be increased and encourage immediate action to address the threat (CDC, 2013).<sup>[5]</sup>

Prescriptions in health institutions are the important elements to design programs to encourage appropriate antibiotic use, infection control and cost containment.<sup>[3]</sup>

Though the disease burden of Bangladesh is moving from communicable to non-communicable diseases the major causes of morbidity and mortality in our country are infective diseases and therefore antibiotics are the most widely used group of medicine. Moreover, the costs of antimicrobials contribute up to 25% or more of total health budget.<sup>[4]</sup>

Different studies conducted in Bangladesh during last decade revealed that the use of antibiotics is not satisfactory and the condition is contributing to emergence of resistance day.<sup>[6,7,8]</sup>

The knowledge about antibiotic utilization patterns is necessary for a constructive approach to problems that arise from multiple antibiotic usages. It is extremely important that institutions and hospitals should have an antibiotic policy and ensure that the best choices are made by individual prescribers.<sup>[9]</sup>

There is no National guideline of antibiotics in Bangladesh till now except BSMMU guideline of antibiotic 2015 but Physicians are not bound to follow this guideline. To avoid unnecessary use of antibiotic & prevent emergence of drug resistance the BSMMU guideline will provide guidance to healthcare personnel.

For this reason, this study is designed on antibiotic utilization pattern among patients in outpatient department of a tertiary care hospital. The Study aims to assess the practitioner's prescription habits in accordance with BSMMU guideline 2015. Clinical audit in accordance with guideline can favorably change inappropriate antibiotic prescribing & decrease the incidence of bacterial resistance.

## OBJECTIVE

### General objective

- To evaluate the antibiotic utilization pattern among patients of outpatient department (Medicine, Surgery, Gynaecology & Obstetrics) of a tertiary care hospital

### Specific objective

- To find out the common antibiotics & diseases in which antibiotics are used among patients of outpatient department of Dhaka Medical College & Hospital.
- To observe the antibiotics used empirically and/or definitively among patients of outpatient department of Dhaka Medical College & Hospital.
- To see whether the antibiotics used are based on updated BSMMU guidelines.

## METHODOLOGY

**Type of the study:** This was an Observational Cross-sectional Descriptive study.

**Place of the study:** The study was carried out in outpatient department of Medicine, Surgery,

Gynaecology and Obstetrics of Dhaka medical college & Hospital. Later the study was compiled in the Department of Pharmacology, Dhaka Medical College.

**Study period:** Total study period was one year extending from January, 2019 to December, 2019.

**Study population:** Patients in outpatient department of Medicine, Surgery, Gyn aecology and Obstetrics of Dhaka Medical College & Hospital.

**Sampling technique:** Purposive sampling technique.

## Sample selection criteria

### Inclusion criteria

- Patients of both gender and aged >18 years.
- Patients attending outpatient department of (Medicine, Surgery and Gynaecology & Obstetrics) of Dhaka Medical College and Hospital.
- Patients who are prescribed with antibiotics.
- Patients who are willing to give consent.

**Exclusion criteria:** Following patients were excluded from the study:

- Patients of either gender and aged <18 years.
- Patients' needs admission on inpatient department of (Medicine, Surgery, & Gynaecology & Obstetrics) of Dhaka Medical College and Hospital.
- Patients who are not prescribed with antibiotics.
- Patients who are not willing to give consent.

## Data collection instruments and procedure

After taking verbal consents from the patients attended in outpatient medicine department of Dhaka Medical College and Hospital, the prescriptions were seen and sorted whether prescription contained antibiotic or not. If the prescription had no antibiotic then it was recorded in data collection form as an entry only to be utilized to calculate the proportion of antibiotic prescribing. If prescription contained antibiotic then written informed consent was taken from patient and the picture of those prescriptions were captured by a photo capturing device. Later on, the photo of antibiotic containing prescription was screened and reviewed to record in the data collection form. Whether, there was a plan for testing culture and sensitivity, the report of test was collected later from patient and was documented in data collection form. Total data collection period was three months extending from June to August, 2019.

## RESULTS

### Demographic characteristics of the study patients

#### Age distribution of study patients

Table I: Distribution of study patients by age in years (N= 600).

Age range of respondents	Frequency	Percentage
≤20	63	10.5
21-40	445	74.1
41-60	81	13.5
61-80	11	1.9
Mean ± SD (Range)	31.80 ± 10.92 (20-43)	

Table I illustrates that the highest antibiotic usage age group was 21-40 years which occupied 445 (74.1%), followed by 41-60 years 81(13.5%), ≤20 years 63 (10.5%) and the lowest age group 61-80 years 11(1.9%).

Minimum age of patients of this study was 18 years, Maximum age of this study was 77 years. The mean age was 31.80 years and SD was 10.92 years.

### Monthly income and educational status of study patients

**Table II: Distribution of monthly income of study patients (N=600).**

Variable	Frequency	Percentage
<b>Monthly Income</b>		
<b>Range in taka</b>		
≤ 20,000	460	76.7
20,001-40,000	121	20.2
>40,000	19	3.1
<b>Educational status</b>		
Illiterate	128	21.3
Primary education	175	29.1
Below SSC	142	23.6
Below HSC	89	14.8
Graduate	35	5.8
Post-graduate	31	5.4

Table II shows that 460 (76.7%) study patients earned ≤ 20,000 taka monthly, 121 (20.2 %) earned 20,001-40,000 and 19 (3.1%) earned >40,000 taka monthly. Most of

patient's monthly income below 20, 000 taka. Most of Patients were primary educated (29.1%).

**Table III: Department wise distribution of study subjects receiving antibiotics (N=600).**

Name of outpatient	Patient attend	Prescribed antibiotic
Department	Number (Percentages)	Number (Percentages)
Medicine	625 (26.0 %)	200 (32.0%)
Surgery	704 (29.2%)	200 (28.4%)
Gynaecology & Obstetrics	1075 (44.8%)	200 (18.6%)
Total	2404 (100%)	600(24.9%)

In this study 24.9% Patients of outpatient department received antibiotic. Among them Medicine was (32%), Surgery was (28.4%), Gynecology & obstetrics was

(18.6%). Most of prescribed antibiotics were in Medicine outpatient department.

### Number of antibiotics prescribed per prescription

**Table IV: Percentage of number of antibiotics per prescription (N=600).**

Number of antibiotic	Medicine	Surgery	Gynaecology & Obstetrics	Total	Total antibiotic used
	n(%)	n(%)	n(%)	n(%)	
1	190(31.6%)	97 (16.1%)	112 (18.6%)	399 (66.5%)	399 ×1= 399
2	10(1.6%)	103(17.2%)	88(14.7%)	201 (33.5%)	201×2 = 402
Total	200 (33.3%)	200 (33.3%)	200 (33.3%)	600(100%)	801

Number of antibiotics per prescription was (801 /600= 1.34)

### Distribution of prescribed antibiotic by nomenclature

**Table V: Department wise distribution of receiving antibiotics by nomenclature (N=600).**

Name of outpatient	Trade name	Generic name
Department	Number (Percentages)	Number (Percentages)
Medicine	163 (81.5%)	37(18.5%)
Surgery	170 (85%)	30(15%)
Gynaecology and Obstetrics	182(91%)	18(9%)
Total	515 (85.8%)	85 (14.2%)

Table V shows that, 515 (85.8% %) prescriptions were prescribed by antibiotic in trade name, 85 (14.2% %) by

generic name. Most of prescribed antibiotics were in trade name.

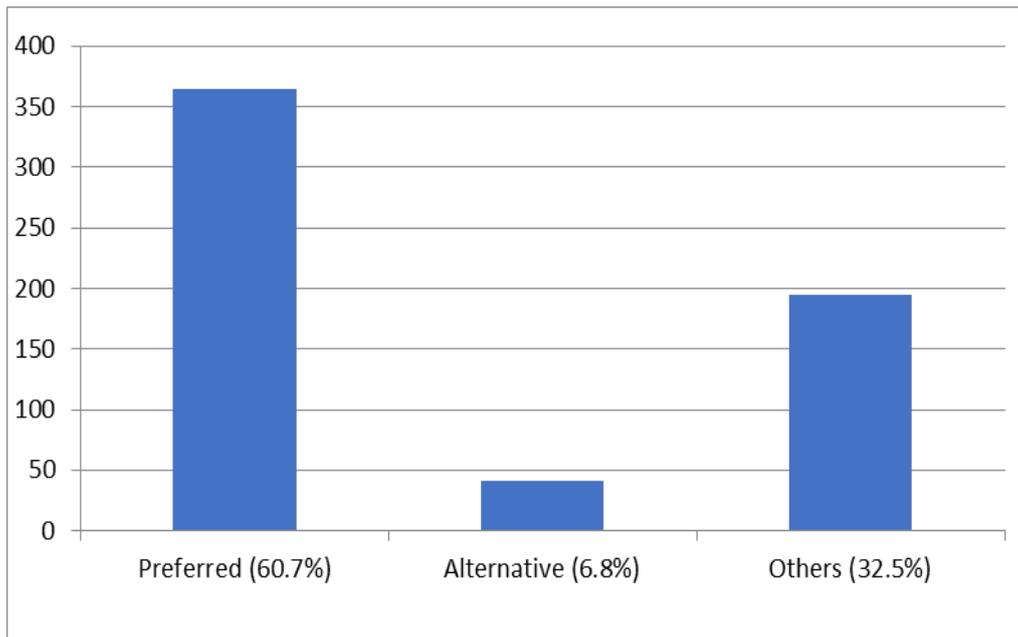


Figure 1: Bar diagram of number of antibiotic usage according to BSMMU guideline of antibiotic. (N=600)

Figure 1 shows that most of prescribed antibiotics were preferred group 364 (60.7%), 41(6.8%) encounters alternative drugs and 195(32.5%) encounters others that not included BSMMU guideline.

**Proportion of commonly prescribed group of antibiotic usage pattern in different OPD (N=600)**

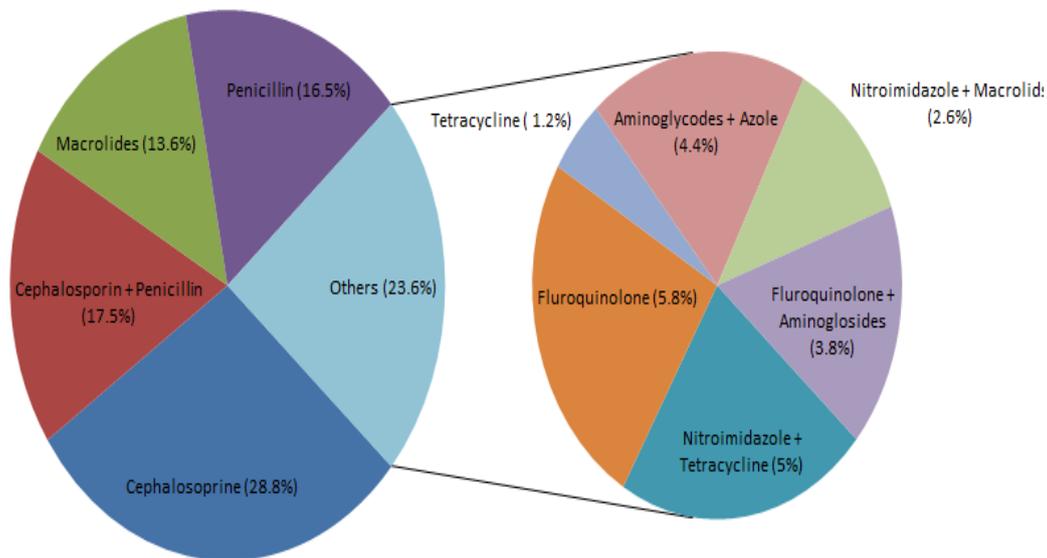


Figure 2: Proportion of commonly prescribed antibiotic group usage pattern in different OPD.

Figure 2 shows illustrate the antibiotics, which were preferred in outpatient department of a tertiary care hospital. The use of antibiotic expressed in percentage, among them Cephalosporin 173 (28.8%) is most commonly uses antibiotics followed by combined Cephalosporin and Penicillin 105 (17.5%), Penicillin 99 (16.5%), Macrolides 82 (13.6%), Fluroquinolone 34 (5.8%), Tetracycline + Nitroimidazole 30 (5%), Aminoglycosides + Azole 26 (4.4%), Aminoglycosides + Fluroquinolone 23 (3.8%), Macrolides + Nitroimidazole

16 (2.6%), Tetracycline 7 (1.2%), Nitrofurantoin 5 (0.8%) respectively.

**Table VI: Proportion of commonly prescribed antibiotic group usage pattern in different OPD in Tertiary Hospital.**

Antibiotic group	Surgery OPD	Medicine OPD	Gynecology and Obstetrics OPD
Cephalosporin	25%	37%	24.4%
Penicillin	19.5%	16.5%	13.3%
Fluroquinolone	3%	8.5%	5.6%
Cephalosporin+ penicillin	52.5%	0	0
Macrolide	0	38%	3 %
Tetracycline (Doxycycline)	0	0	3.6%
Nitrofurantoin	0	0	2.5%
Aminoglycosides (Topical Neomycin) + Fluroquinolone	0	0	11.6%
Aminoglycosides (Topical Neomycin) + Azole	0	0	13%
Tetracycline + Nitroimidazole	0	0	15%
Macrolides + Nitroimidazole	0	0	8%

Table VI shows illustrates the pattern of Group of antibiotics in different OPD in tertiary Hospital, in Surgery it was both cephalosporin and penicillin was 52.5% followed by only cephalosporin 25%, in Medicine it was Macrolides 38%, followed by Cephalosporin 37%, in Gynecology and Obstetrics it was Cephalosporin 24.4% followed by Tetracycline + Nitroimidazole 15%.

## DISCUSSION

This study was carried out to assess the prescribing pattern of antibiotic in out-patient department of tertiary care hospital. Antibiotics are drugs used for treating infectious disease such as bacterial, fungal and some parasitic infections but irrational prescriptions of antibiotic contribute to resistance development and poor management of infectious disease.

In this study the demographic profile showed the predominant age group of this study was 21-40 years (74.1%), which was similar to the study, conducted in Assam, India 21-40 years age group (53%), (Bhagawati, Kakati and Thakuria, 2017)<sup>[10]</sup> and Kolkata, India, where predominant age group was 25-30 years (Manab et al., 2017).<sup>[11]</sup> The reason of this finding may be the younger patients are more concerned about illness.

The highest income range of this study was  $\leq 20,000$ Tk (76.7%), which is may indicate the low economic group of people who mainly visited the Govt. hospitals. The patients attended in outpatient department of DMCH were mostly educated by primary (29.1%) followed by below SSC (23.6%). The reasons of this educational status may be poverty and lack of social awareness of our population.

In present study, it was found that more than 28.4% Patients in Surgery OPD were treated with antibiotic which was around similar to the study done in Rajendra Institute of Medical Sciences, Ranchi, Jharkhand, India, it was 33%.<sup>[12]</sup>

The average number of drugs per prescription is an important parameter of a prescription audit. To minimize

the risk of drug interactions, development of bacterial resistance and hospital costs, it is preferable to keep the number of drugs per prescription as low as possible. In our study we concentrated only on antibiotics. The average number of antibiotic per prescription was 1.34 which was similar to the study organized in Eastern, India 1.61.<sup>[11]</sup> Single antibiotic was prescribed in 66.5%, whereas two antibiotics were prescribed in 33.5%, this findings was similar to a study Biswas, et. al., 2014 where single antibiotic was 74.5%, two or more was 25.44%.<sup>[13]</sup> Another study by Singha, et al., 2018 showed average number of antibiotic per encounter was 1.26 and Ata, et al., 2018 showed single antibiotics use was 79.9% and two antibiotics were 21.1%.<sup>[14]</sup>

Prescribing drug by generic name can promote the rational use of drugs with regard to safety, efficacy and cost by identifying the product with its scientific name (Singha, et al., 2018).<sup>[14]</sup> In this study, 85.8% antibiotics are prescribed in trade name, which was similar to study by Alam, et al., 2011 (98.7%).<sup>[15]</sup> Though Generic prescribing decreases the risk of wrong medicines being given to patients as many medicines with different generic names have similar brand names, generic medicines however are not widely manufactured in Bangladesh.

In this study 86% prescribed antibiotics were in oral formulation as a single route in OPD of surgery, medicine and gynaecology department. This was similar to Manab, et al., 2017, Kumar, et al., 2010 where prescribed oral formulation of antibiotics were 98% and 94.94% respectively.<sup>[11,16]</sup>

## CONCLUSION

On the basis of the study findings, it can be concluded that antibiotic therapy is mostly empirical based. 67.5% prescriptions were followed BSMMU antibiotic guideline 2015. The knowledge about antibiotic utilization pattern according to BSMMU guideline is essential for prescribers, medical students & should be recognized as a part of medical education as well as training programme. The need for introduction of guideline for antibiotic prescribing & implementation of

antibiotic policy is mandatory in institutions that will promote rational use of antibiotic.

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