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Original Research Article

## Prescribing pattern of antibiotics in ENT outpatient department in a tertiary care teaching hospital

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### ABSTRACT

**Background:** Antibiotics are the most commonly used and misused of all drugs. Patterns of antibiotic resistance widely follows local patterns of antibiotic prescribing and usage. Periodic data collection and analysis of antibiotic prescriptions at regional level are essential to understand and combat antibiotic resistance. Objective of the study was to study the prescribing pattern of antibiotics in outpatient department of Otorhinolaryngology in a tertiary care teaching hospital.

**Methods:** A prospective observational study of prescribing pattern of antibiotics was conducted in the department of Otorhinolaryngology. Data of antibiotic utilization in outpatient department was collected through duplicate copies of the prescriptions. The data obtained was analyzed and the conclusions were drawn using descriptive analysis.

**Results:** A total of 606 prescriptions were collected and analyzed during the study. Average number of antibiotics prescribed per prescription was 1.24 most of the antibiotics were prescribed for a duration of 1 to 5 days. Commonly prescribed antibiotic class was penicillin (48.1%) followed by quinolone (18.3%). Most of the antibiotics were prescribed by their brand names (98.8%).

**Conclusions:** The present study highlights the wide use of extended spectrum antibiotics, along with brand names for prescribing. Interventions for prescribing of generic drugs from the essential drug list needs to be encouraged among physicians.

**Keywords:** Antimicrobial usage, Antimicrobial resistance

### INTRODUCTION

Infections remain an important cause of disease, morbidity and mortality among people worldwide, especially among lower income groups.<sup>1</sup> Upper respiratory tract infections (URTI)s like nasopharyngitis, pharyngitis, tonsillitis and otitis media contribute to 20-40% of infections among patients attending outpatient departments (OPD).<sup>2</sup>

Several studies on pattern of drug utilization in URITs highlight the frequent use of antibiotics.<sup>3</sup> An estimated 80-90% of the volume of human antibiotics use and antibiotic expenditure (>60%) occurs in OPD.<sup>4</sup> This highlights that a sizeable proportion of antibiotics usage and expenditure occurring in OPD for the treatment of URITs.

Acute respiratory tract infections are treated using antibiotics.<sup>3</sup> There is a considerable variation in prescribing of antibiotics in the treatment of URITs.

Infecting organism and its susceptibility to antibiotics, host factors and pharmacological factors influence the selection of antibiotics. Factors like prescribing physician choice, patient's condition (e.g., a high-risk or vulnerable patient history), environment (e.g., regulation of pharmaceutical prescribing and dispensing and lack of resources for etiological diagnosis), local policies, treatment guidelines and cost of treatment also influence prescribing of antibiotics.<sup>5</sup>

Use of antibiotics is an important factor in development of antimicrobial resistance (AMR). Pattern of AMR widely follows, the local patterns of antibiotics prescribing and its usage.<sup>6</sup> Inappropriate and inadequate community prescribing of antibiotics is associated with increase colonization of the infecting organism. Antibiotic selection, appropriateness of use, dose and duration of treatment, infection control measures, cross selection, antibiotic residues, increased industrialization, patient movement and socioeconomic factors also aid in the development and propagation of AMR.<sup>7</sup> AMR increases the hospital stay, morbidity, mortality and also cost of treatment.<sup>8</sup>

India is among one of the countries with high burden of infectious diseases.<sup>9</sup> This also contributes to increase consumption of antibiotics especially in the outpatient settings, fueling the development of AMR.<sup>10</sup> Hence it is imperative to collect data, monitor, evaluate the patterns of antibiotics prescribing and usage periodically from various regions in India. It aids to understand the patterns of microbial susceptibility and resistance to various antibiotics. Available literature in India and abroad bears testimony to the widespread concern about the appropriate use of antibiotics.<sup>11-13</sup>

As antibiotics are commonly prescribed in outpatient setting for upper respiratory tract infections, the present prospective observational study was aimed to evaluate pattern of antibiotics prescribing in Otorhinolaryngology (ENT) outpatient department (OPD) at Vydehi Institute of Medical Sciences and Research Centre, Bangalore.

## METHODS

This study was carried out at outpatient department of ENT at Vydehi Institute of Medical Sciences and Research Centre, Bangalore, after obtaining approval from the Institutional Ethics Committee during May 2011 to June 2011.

Duplicate carbon copies of the prescriptions of patients with at least one antibiotic were collected from the doctors at regular intervals. Prescriptions of follow up, secondary wound infection and readmission patients were excluded from the study. Total of 606 prescriptions were collected and analyzed.

Prescriptions were evaluated based on the world health organization (WHO) core drug prescribing indicators

(average number of drugs per prescription, average number of antibiotics per prescription, average duration of antibiotic drug treatment and percentage of antibiotics prescribed by generic name).<sup>14</sup> Antibiotic prescribing pattern based on the group, route of administration, duration, dosage formulation and fixed dose combinations (FDC) was also analyzed.

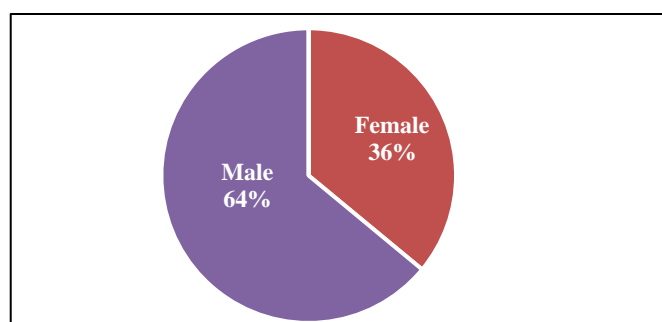
The data collected from the prescriptions were fed into Microsoft excel sheet to create a data base file. To analyze the antibiotics and adjuvants prescribed, each drug was assigned a code to obtain the master chart and data was analyzed using descriptive statistics. Results on categorical measurements are presented in number and percentage and was used for generating graphs and tables.

## RESULTS

A total of 606 prescriptions were collected from the ENT OPD and analyzed. 37% of the prescriptions were prescribed for patients between the age group of 21-30 years, followed by the age group of 31-40 years (17.5%) (Table 1). 64% of prescriptions were prescribed to males in comparison to 36% prescribed among females (Figure 1).

**Table 1: Distribution of prescriptions according to age (n=606).**

Age in years	N (%)
1-10	66 (10.9)
11-20	83 (13.7)
21-30	224 (37)
31-40	106 (17.5)
41-50	65 (10.7)
51-60	27 (4.5)
61-70	16 (2.6)
71-80	1 (0.2)



**Figure 1: Distribution of prescriptions according to gender.**

### *Analysis of antibiotics prescribed*

Average number of antibiotics prescribed per prescription was 1.23. In 76.1% of the patients received a single antibiotic (Table 2). Most of the dosage form were tablets (46.2%), followed by capsules (28.6%) and topical drops

(19%) (Table 3). Commonest route of administration prescribed was oral (79.3%) followed by topical application (20.6%) and least was intravenous route (0.8%) (Figure 2).

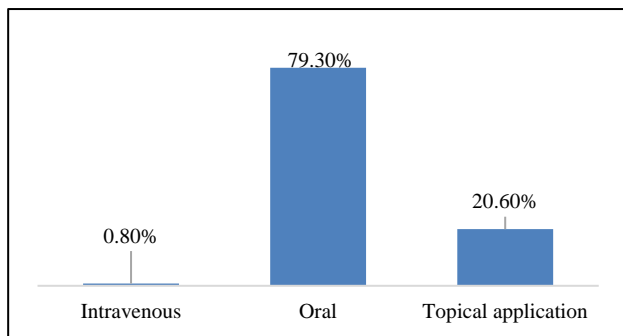
Most of the antibiotics were prescribed for 1 to 5 days (Table 4). Commonly prescribed antibiotics belonged to penicillin group (48.1%) and quinolones (18.3%). Topical preparations of polymyxin were also prescribed (Figure 3). Most common prescribed FDC was amoxicillin with clavulanic acid (Table 5). Most of the antibiotics were prescribed by brand name (98.9%).

**Table 2: Distribution of the number of antibiotics prescribed per prescription (n=606).**

No of antibiotic per prescription	N (%)
1	461 (76.1)
2	143 (23.6)
3	2 (0.3)

**Table 3: Distribution of dosage formulation of antibiotics prescribed (n=747).**

Prescribed dosage form	N (%)
Ointment	12 (1.6)
Syrup	28 (3.7)
Drops	142 (19)
Tablets	345 (46.2)
Capsules	214 (28.6)
Injection	6 (0.8)



**Figure 2: Distribution of antibiotics based on route of administration.**

**Table 4: Distribution of antibiotics based on duration (n=747).**

Duration (days)	N (%)
1-5	582 (77.9)
6-10	62 (8.2)
>10	18 (2.4)

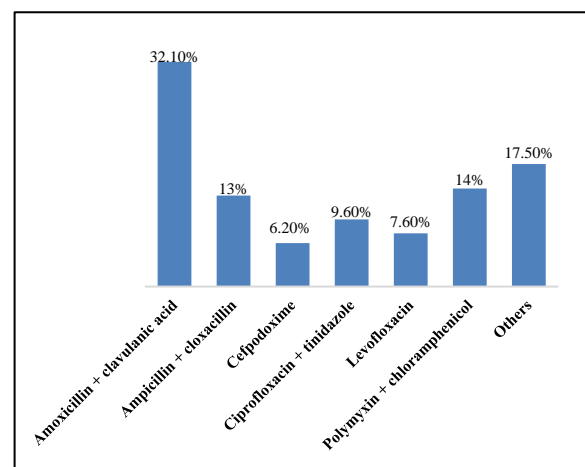
**Analysis of adjuvants prescribed**

Average number of drugs prescribed per prescription including antibiotics was 2.7. Of the 606 prescriptions 272 (44.9%) had at least three drugs prescribed (Table 6).

Nasal decongestants were prescribed in 60% of prescriptions followed by non-steroidal anti-inflammatory drugs (NSAIDs) in 22.6% of prescriptions (Table 7).

**Table 5: Distribution of FDCs of antibiotics prescribed (n=554).**

FDCs of antibiotics	N (%)
Amoxicillin + clavulanic acid	240 (43.3)
Ampicillin + cloxacillin	97 (17.5)
Cefpodoxime + clavulanic acid	11 (1.9)
Ciprofloxacin + tinidazole	72 (12.9)
Clotrimoxazole + ofloxacin	2 (0.3)
Chloramphenicol + clotrimazole	14 (2.5)
Polymyxin + chloramphenicol	104 (18.7)
Polymyxin + neomycin + bacitracin	14 (2.5)



**Figure 3: Distribution of antibiotics prescribed.**

**Table 6: Distribution of the total number of drugs prescribed per prescription (n=606).**

No of drugs	N (%)
1	32 (5.3)
2	224 (37)
3	272 (44.9)
4	56 (9.2)
5	14 (2.3)
6	7 (1.2)
7	1 (0.2)

**Table 7: Distribution of prescriptions based on the adjuvants prescribed.**

Group of adjuvant	Percentage
Nasal decongestants	60.2
NSAIDs	22.6
Antihistamines	13.7
Gastric acid secretion inhibitors	9.2
Nutritional supplements	8.4
Others	4.7

## DISCUSSION

Patients belonging the age group of 21-30 and 31-40 years were commonly prescribed antibiotics, and the least number of prescriptions belonged to the geriatric age group, similar to Ain et al.<sup>15</sup> 64% of the prescriptions were prescribed among male patients in comparison 36% in female patients similar to study by Ain et al, Suman et al.<sup>15,16</sup> Higher prescriptions among male indicate higher exposure to environmental pollutants and pathogens due to higher ambulatory working adult male population. Frequent visits to the physician by the adult working population shall also result in financial burden. Use of natural gas for cooking and decreased exposure to fumes in the kitchen also contributes to lesser incidence among urban female patients.

### *Analysis of antibiotics prescribed*

Average number of antibiotics prescribed per prescription was 1.23 including the topical antibiotics which is lower than in the study done by Suman et al. (1.69).<sup>16</sup> Most commonly prescribed group of antibiotics were penicillins (48.1%), followed by fluoroquinolones (18.3%) and cephalosporins (8.7%). Combinations of amoxicillin with clavulanic acid was the commonest prescribed antibiotics followed by ampicillin with cloxacillin among the penicillin group. The studies conducted by Suman et al, Khan et al, Bhat et al. have shown that beta lactam antibiotics were the most commonly prescribed antibiotics.<sup>16-18</sup> This indicates a change in the prescribing patterns from a narrow spectrum to extended spectrum penicillins. Prescribing of extended spectrum penicillins could be due to an increase in antibiotic resistance. Prescribing an extended spectrum antibiotics also increase the cost of treatment. Regular use of levofloxacin (7.6%) reduces its efficacy when used in the treatment of multi drug resistant Tuberculosis.

Most of the antibiotics were prescribed orally, followed by topical application. Less than 1% of antibiotics prescribed were injectables similar findings were seen in study done by Padwal et al.<sup>19</sup> Injections were prescribed in 0.8% of encounters on average, which was well within the acceptable limit proposed ( $\leq 10\%$ ). Increase use of injections fuels the cost of health care management. The study also indicates a substantial use of antibiotics as topical preparations.

### *Analysis of adjuvants prescribed*

In this study, the average number of drugs per encounter was 2.70, which is lower than the WHO recommendation of less than 3 drugs per encounter, but indicates a trend towards polypharmacy.<sup>14</sup> Increase in prescribing errors, drug-drug interaction, adverse drug reactions and cost of treatment increase with increase in number of drugs prescribed per prescription. Similar to Padwal et al NSAIDs were prescribed in 22.6% of prescriptions.<sup>19</sup> Similar to the study by Suman et al predominant

prescribing of nasal decongestants (60 %) and antihistamines indicates the need to provide symptomatic relief to patients.<sup>16</sup> WHO recommends 100% prescribing by generic name as a safety precaution for patients as it identifies the drug, enables better information exchange and better communication between health care providers.<sup>20</sup> In the present study only 1.1% of the drugs were prescribed by generic name, indicating extensive use of brand names. Extensive availability and promotion of branded drugs also increases the prescribing of non-generic drugs.

93% of the drugs are from the National list of essential medicine, India. WHO recommendation of 100% prescription of drugs from the essential medicines list (EDL).<sup>21</sup> Prescribing drugs from the EDL issued by WHO provides a framework for rational prescribing. Drugs in EDL are well-established drugs, with established clinical use and lower cost than newer drugs.

## CONCLUSION

The present study measured the drug prescribing pattern in the department of ENT outpatient department using the WHO core drug prescribing indicators. The results showed that the average number of drugs prescribed per encounter and the percentage of encounters with injections prescribed were within the optimal values proposed. However, the percentage of drugs prescribed by generic name was far from the optimal value. Hence the study recommends interventions to encourage physicians to prescribe generic drugs from the EDL. Future studies are needed to understand the rationality of antibiotics prescribed. Periodic surveillance of antibiotic use regionally with creation of a database shall provide information of the antibiotic usage, antibiotic resistance pattern and also indicate various methods to tackle antibiotic resistance regionally. Involvement of healthcare physicians, health care workers and digitalization of prescribing with feedback, helps in the creating a data base and also in management of antimicrobial resistance aiming to achieve excellent health care to the patients.

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