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Research article

## A RETROSPECTIVE STUDY OF PRESCRIPTION PATTERN OF ANTIMICROBIALS IN AN URBAN HEALTH CENTRE RUN BY A MEDICAL COLLEGE

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### ABSTRACT

**Background:** Antimicrobials are widely prescribed agents in clinical practice. Overuse of antimicrobials has led to emergence of drug resistance. **Aims:** The present study was aimed at knowing the choice of antimicrobial prescribing and to understand the rationality of antimicrobial usage. **Materials and Methods:** A retrospective prescription audit was done of all 655 prescriptions issued between 01/01/2012 and 31/12/2012 at the outpatient department of Urban Health Centre attached to a medical college. Demographic information, diagnosis, and medication details (dose, duration, frequency) were recorded and analyzed, and data was expressed as percentages. **Results:** Of the total number of prescriptions, 46% prescriptions were containing at least one or more than one antimicrobial agent. Average number of antimicrobials prescribed per prescription was 1.35. Cotrimoxazole was the most common antimicrobial agent prescribed. Of the total 307 items of prescribed antimicrobials, 57% were prescribed by proprietary name and 43% by nonproprietary name. Out of the antimicrobial items prescribed, 44% were available at the pharmacy of the Urban Health Centre. Fifty eight percent of antimicrobials prescribed were from WHO Essential Drug List. **Conclusion:** Among the various antimicrobials prescribed at the Urban Health Centre, cotrimoxazole was found to be the most commonly prescribed antimicrobial agent in the year 2012. More than half of the antimicrobials were prescribed by proprietary name. Less than half of the antimicrobials prescribed were available at the Urban Health Centre. Majority of the antimicrobials prescribed were from the WHO Essential Drug List.

**Keywords:** Prescription pattern, Antimicrobials, retrospective study, Cotrimoxazole

### INTRODUCTION

Antimicrobial agents are widely prescribed in health care set-ups for treatment of common ailments like coryza, cough, fever or pain in abdomen.<sup>1</sup> Irrational and unnecessary use of antimicrobials remains common in developing countries.<sup>1,2</sup> The overuse or inadvertent use of antimicrobials is known to lead to the emergence of drug resistance.<sup>3,4</sup> Drug resistance is one of the major obstacles in medical management of diseases.<sup>1</sup> Many physicians augment the drug therapy with a high dose of antimicrobials and prescribe various antimicrobial combinations. A study showed

that polypharmacy is now-a-days a common practice.<sup>5</sup> Also, many medications are available as 'over the counter' drugs. Many antimicrobials thus may be taken without knowing the appropriate dosage and frequency. Many times the antimicrobials are discontinued before completing the antimicrobial course of the specified days. This results in inadequate treatment, and also increases the possibility of emergence of drug resistance. Considering all these issues, the present study was undertaken. The objectives of the present study were: 1) To know the

prevalence of conditions associated with infections and to know what antimicrobial agents were prescribed, 2) To determine whether the drug prescribing was rationally in accordance with WHO guidelines for prescribing drugs, 3) To identify common errors in prescriptions, and propose interventions for improvement.

## MATERIALS AND METHODS

This was a retrospective prescription audit. The study was approved by the Institutional Ethics Committee. All the prescriptions issued in the outpatient department of the Urban Health Centre of Bhausaheb Sardesai Rural Hospital attached to MIMER Medical College, Talegaon-Dabhade (located in Pune district of Maharashtra) were studied. The prescriptions issued from 01/01/2012 to 31/12/2012 were included in the study, and the total number of prescriptions were 655. It was not necessary to exclude any prescriptions on account of incompleteness or illegibility. Demographic information of the patients, diagnosis of the illnesses, the medication details (dose, duration, frequency, formulation, and whether prescribed from WHO Essential Drug List<sup>6</sup> or not), and the follow-up details of the patients were recorded. All prescriptions were critically evaluated using guidelines of WHO as described in 'How to investigate drug use in health facilities'.<sup>10</sup> The common antimicrobial agents prescribed, the different types of antimicrobials prescribed, the number of antimicrobials prescribed per prescription, and the availability of antimicrobial agents at the Urban Health Centre were recorded. Further, whether the physicians prescribed the medications with proprietary or nonproprietary names was also noted.

### Indicators used for prescription pattern study:

#### A. Prescribing Indicators:<sup>1,8</sup>

1. Average number of drugs per encounter was calculated by dividing the total number of drugs prescribed by the total number of prescriptions.
2. Average number of antimicrobials per prescription was calculated by dividing total number of antimicrobials prescribed by the total number of prescriptions.
3. Percentage of drugs prescribed from WHO Essential Drug List was determined by dividing the number of products prescribed from the WHO Essential Drug List by the total number of drugs prescribed, multiplied by 100.

#### B) Facility indicators:<sup>1,8</sup>

- a) Availability of copy of Essential Drug List by stating "Yes" or "No".
- b) Availability of drugs was calculated by dividing the number of specified products actually in stock by the total number of drugs on the checklist of essential drugs multiplied by 100.

**Selection of Cases:** All the prescriptions issued at the Urban Health Centre from 01/01/2012 to 31/12/2012 were included in the study.

**Statistical Analysis:** It is a descriptive study and purposive sampling was done. Data was analyzed and expressed as a percentage.

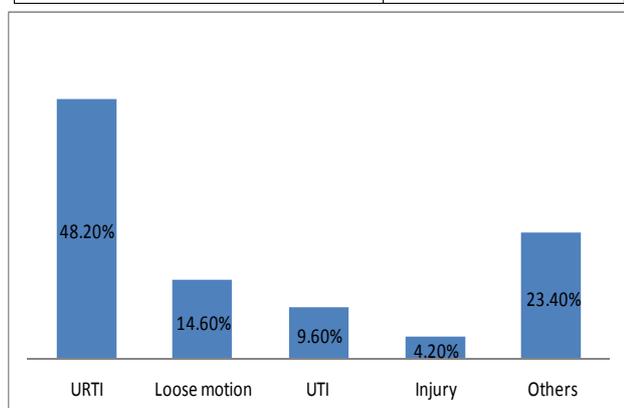
## RESULTS

Of the total 655 prescriptions, 46% prescriptions were containing at least one or more antimicrobial agents. Average number of antimicrobials prescribed per prescription was 1.35. Of the total 226 patients taking antimicrobials, 82 were males and 142 were females. There were 84 children. Upper respiratory tract infection was the most common diagnosis in all adults and children followed by diarrhea (Figure 1) (Table 1). There were 26 different antimicrobials prescribed, of which 4 were prescribed most commonly. Cotrimoxazole was the most common drug prescribed to both adults and children (36.2%) followed by metronidazole, norfloxacin, and amoxicillin (Figure 2). A single antimicrobial was prescribed in 81% of all prescriptions, whereas 17% prescriptions contained two antimicrobial agents. The prescriptions containing cephalosporins were 2%. Percentage of antimicrobial items prescribed by brand name (proprietary name) was 57% and those prescribed by non-proprietary name was 43%. The doses of the antimicrobial medications were prescribed according to standard regimens. Of the 226 patients, 63 came for follow-up and 22 of them received antimicrobials on follow-up. Antimicrobial agent was changed in 15% patients on follow-up. Out of all the antimicrobial items prescribed, 44% were available at the pharmacy of the Urban Health Centre. Most common antimicrobial prescribed from outside the Urban Health Centre was doxycycline. The WHO Essential Drug List was available at the Urban Health Centre. Fifty eight percent of antimicrobials prescribed were from WHO Essential Drug List. Of the antimicrobials prescribed from WHO Essential Drug checklist, 46% were available at the pharmacy of the Urban Health Centre.

Fluoroquinolones (norfloxacin, ciprofloxacin) were administered to 5 children, of which three had the diagnosis of diarrhea, and two were diagnosed with fever and chills.

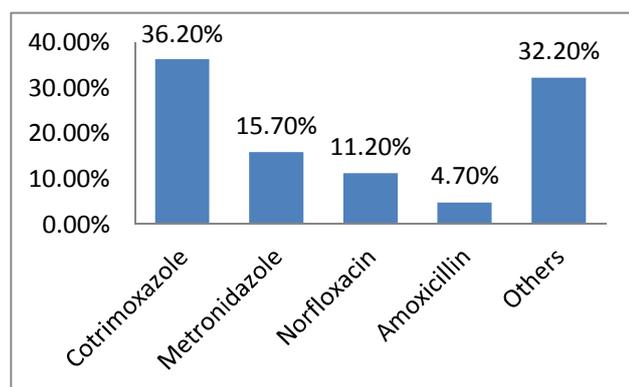
**Table 1: Some common disease conditions and corresponding antimicrobial prescribed**

Most common diagnosis	Most common antimicrobials prescribed
Upper respiratory tract infection (URTI)	Cotrimoxazole
Loose Motion	Metronidazole
Urinary Tract Infection (UTI)	Norfloxacin
Injury	Cotrimoxazole
Folliculitis	Cotrimoxazole



**Fig 1: Diagnosis observed in percentage:**

URTI- Upper respiratory tract infection, UTI- Urinary tract infection



**Fig 2: Antimicrobials prescribed**

## DISCUSSION

There is a widespread use of antimicrobials all over the world. In a study from rural clinics in Western China, almost half of the prescriptions contained antimicrobial agents.<sup>9</sup> This figure was 54.8% in

Lagos, Nigeria, 67% in Hai Phong Province, Vietnam, 27.1% in a primary healthcare centre in Lebanon, 15.3% in United States, and 32% in Spain.<sup>9</sup> In a study from India, 69% prescriptions contained one or more antimicrobial agents.<sup>4</sup> In the present study, 46% prescriptions contained one or more antimicrobial agents. The difference is statistically significant. ( $Z=8.08$ ,  $p<0.001$ ). Upper respiratory tract infection was the most common diagnosis, and cotrimoxazole was the most commonly prescribed antimicrobial agent (36%) followed by metronidazole, norfloxacin, and amoxicillin. Two other studies also found cotrimoxazole as the most commonly prescribed antimicrobial agent (36% prescriptions).<sup>4,7</sup> The results are comparable with our study. In a study conducted in Kyrgyz Republic, penicillin G was the most common antimicrobial agent prescribed<sup>3</sup>. Now-a-days the cephalosporins are one of the most commonly prescribed antimicrobials in various countries. A study in South India reported cefixime to be the most commonly prescribed antimicrobial agent<sup>2</sup>. In the present study there were 26 different antimicrobials prescribed of which 4 were prescribed most commonly; however, the cephalosporins were infrequently prescribed. In a study conducted in China, there were 49 antimicrobials prescribed in total, 17 of them were prescribed frequently.<sup>9</sup> In the present study, prescriptions with one antibiotic comprised 81% of all prescriptions, those with two antimicrobials represented 17%. In the study conducted in China, prescriptions with one antibiotic comprised 40.6% of all prescriptions, and those with two antibiotics represented 7.08%.<sup>9</sup> The frequency and proportion of prescribed antimicrobials in the present study are higher compared with the other studies.<sup>9</sup> The average number of medicines per encounter (2.8%) is higher than the range of 1.3–2.2 found in similar studies in other countries conducted at the district or regional levels, either in hospitals or health centers.<sup>1</sup> Though a significant number of antimicrobials were prescribed by the non-proprietary name, the physicians prescribed majority of the antimicrobials by brand (proprietary) name. It was found in the prescriptions that the doses of the antimicrobial medications were appropriate in context with the medical conditions and the patient factors. Almost one third of the patients taking antimicrobials returned for follow up. Less than half of the antimicrobials prescribed were available at the Urban Health Centre. Majority of the antimicrobials

were prescribed from the WHO Essential Drug List (58%). When this figure was compared with those from other studies, it was found that the percentage of antimicrobials prescribed from WHO Essential Drug List was higher in other studies, e.g. being 79% in a study done in Lesotho and with the WHO study showing that the adherence to the Essential Medicine List in Tanzania was 88% (Ofori-Adjei, 1992) and in Nepal 86%.<sup>1</sup> It was suggested that improvements in the prescribing pattern can be made by prescribing the drugs to a larger extent by their non-proprietary name. More antimicrobial agents should be prescribed from the WHO Essential Drug List. We suggest that more drugs which are prescribed and included in the WHO Essential Drug List should be available in the Urban Health Centre pharmacy. In the present study, it was noticed that fluoroquinolones were administered to 5 patients less than 18 years of age. Fluoroquinolones may damage growing cartilage and cause arthropathy. Therefore these drugs are not routinely recommended for patients less than 18 years of age.<sup>11</sup>

## CONCLUSION

Prescription audit of prescriptions over a period of 1 year at the Urban Health Centre of a rural hospital showed that antimicrobials were widely prescribed. Cotrimoxazole was the most common antimicrobial prescribed. There were antimicrobial items found to be prescribed by the proprietary name in significant number of prescriptions. Suggestions and recommendations from this particular audit would be useful to improve the prescribing trends for the benefit of the recipients.

## ACKNOWLEDGEMENTS

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