

## **A study of drug prescribing pattern using WHO prescribing indicators in the state of Goa, India**

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### **ABSTRACT**

**Background:** The quality of life in developing countries can be improved by enhancing the standards of medical treatment at all levels of the health care delivery system. Teaching hospitals have a special responsibility toward society to promote rational prescribing by their staff and, through them, the future generations of doctors.

**Methods:** A sample of 1000 patient prescriptions was assessed retrospectively to assess the drug prescription patterns in the state of Goa.

**Results:** Of 1842 drug products prescribed, the average number of drugs per prescription was 1.842. The total number of drugs prescribed by generic name was 1 (0.05%). An antibiotic was prescribed in 318 patient encounters (31.8%). Almost all drugs prescribed (n=1842, 99.67%) were on the essential drug list of India. During the study period, antibiotics were prescribed the most (n=318, 17.26%), followed by drug for cardiovascular system (n=265, 14.39%) and gastrointestinal tract (n=238, 12.92%).

**Conclusions:** Baseline data gathered by this study can be used by researchers and policymakers. Further the problem-based basic training in pharmacotherapy; targeted continuing education can prove useful to medical profession to improve prescribing practice and public health administrators for promoting effective rational drug use.

**Keywords:** Prescribing pattern, Prescribing indicators, National list of essential medicines, Polypharmacy

### **INTRODUCTION**

The quality of life in developing countries can be improved by enhancing the standards of medical treatment at all levels of the health care delivery system.<sup>1</sup> To promote rational drug use in developing countries, it is important to assess drug use pattern using the World Health Organization (WHO) drug use indicators. Rational drug prescribing is defined as “the use of the least number of drugs to obtain the best possible effect in the shortest period and at a reasonable cost.”<sup>2</sup> Measurement of drug use in health facilities not only describes drug use patterns and the behavior of prescribers but also helps in the identification of polypharmacy and the problems associated with it.<sup>3</sup> Such information can prove useful to medical profession, public health administrators as well as to the society at large. A constant self-assessment of prescriptions can be made and improvement thereof can be tried by an individual.

“Essential medicines” - A concept adopted by WHO in 1977 were defined as “those that satisfy the priority healthcare needs of the population.” They are selected with due regard to public health relevance, evidence on efficacy and safety, and comparative cost effectiveness.” India produced its National Essential Drugs list (EDL) in 1996 and has revised it in 2011 with the title “National List of Essential Medicines” (NLEM). This include 348 medicines which are considered to be adequate to meet the priority healthcare needs of the general population of the country.<sup>4</sup>

An inappropriate prescribing pattern by doctors often encourages inappropriate self-medication by patients because of the asymmetry of medical information.<sup>1</sup> The attitude today is the root on which the future grows. Hence, it is generally agreed that the teaching hospitals have a special responsibility to society to promote rational prescribing

by their staff and, through them, the future generations of doctors.<sup>5</sup>

Further, to increase prescription quality and improve the rationality of drug use, we need to investigate the subjective and objective factors that affect doctors' prescription patterns.<sup>6</sup>

### **Aim**

The aim of this study was to assess the drug prescription patterns in the state of Goa (India).

### **METHODS**

A quantitative and cross sectional study was conducted in the month of April 2014 to determine the current prescribing practices in the state of Goa (India). According to the WHO document "How to investigate drug use in health facilities," at least 600 encounters should be included in a cross-sectional survey to describe the current prescribing practices, with a greater number, if possible.<sup>6</sup> For this particular study a total of 1000 prescriptions were collected retrospectively from more than 3000 prescriptions written in the month of April 2014. Commonly used drugs were classified and divided into 23 groups depending upon their primary effect and use. All data were first analyzed manually and then using Microsoft Excel 2007. In the statistical analysis, frequencies, averages/means and percentages were obtained.

#### **Prescribing indicators**

The WHO prescribing indicators with slight modifications were used in this study.<sup>7</sup>

The prescribing indicators that were measured included:

1. The average number of drugs prescribed per encounter was calculated to measure the degree of polypharmacy. It was calculated by dividing the total number of different drug products prescribed by the number of encounters surveyed. Combinations of drugs prescribed for one health problem were counted as one
2. Percentage of drugs prescribed by generic name is calculated to measure the tendency of prescribing by generic name. It was calculated by dividing the number of drugs prescribed by generic name by total number of drugs prescribed, multiplied by 100
3. Percentage of encounters in which an antibiotic was prescribed was calculated to measure the overall use of commonly overused and costly forms of drug therapy. It was calculated by dividing the number of patient encounters in which an antibiotic was prescribed by the total number of encounters surveyed, multiplied by 100
4. Percentage of encounters with an injection prescribed was calculated to measure the overall level use of commonly overused and costly forms of drug therapy. It was calculated by dividing the number of patient

encounters in which an injection was prescribed by the total number of encounters surveyed, multiplied by 100

5. Percentage of drugs prescribed from an NLEM was calculated to measure the degree to which practices conform to a national drug policy as indicated in the national drug list of India. Percentage is calculated by dividing number of products prescribed, which are in NLEM by the total number of drugs prescribed, multiplied by 100.

#### **Operational definitions**

- a. Generic drugs: NLEM was used as a basis to determine and confirm the generic name of a drug
- b. Antibiotics: Drugs such as antibacterial, anti-infective dermatological drugs, and anti-infective ophthalmological agents, anti-diarrheal drugs with streptomycin, neomycin, and metronidazole are considered antibiotics when used in the context of antibiotics
- c. Combination of drugs: Two or more drugs that are prescribed for a given health condition is counted as one
- d. Miscellaneous drugs: Oral rehydration salts, diagnostic kits were included as miscellaneous drugs.

#### **Ethical consideration**

Approval was obtained from the Institutional Ethics Committee, Goa Medical College, Bambolim, Goa (India).

### **RESULTS**

A sample of 1000 patient encounters/prescriptions was assessed retrospectively written in the month of April 2014 in the state of Goa (India).

A total of 1842 drug products were prescribed. Thus, the average number of drugs per prescription or mean was 1.842 with a range between 1 and 6. The total number of drugs prescribed by generic name was 1 (0.05%). An antibiotic was prescribed in 318 patient encounters (31.8%). Almost all drugs prescribed (n=1842, 99.67%) were included in the NLEM of India (Table 1).

Out of the total drugs prescribed (n=1842) during our study, the percentages of drugs prescribed by oral, parenteral and topical route were 84.58%, 9.77% and 5.65% respectively (Table 2 and Figure 1).

Most of the prescriptions had either 1 (51.9%) or 2 (27.1%) drugs prescribed in them. Maximum drugs prescribed in a prescriptions were 6 (1.3%), followed by 5 (2.8%), 4 (5.6%) and 3 (11.3%) (Figure 2).

During the study period, antibiotics were the most drugs prescribed (n=318, 17.26%) followed by cardiovascular (n=265, 14.39%) and gastrointestinal (n=238, 12.92%)

drugs. Out of the 17 categories, antifungal drugs were prescribed the least (Table 3).

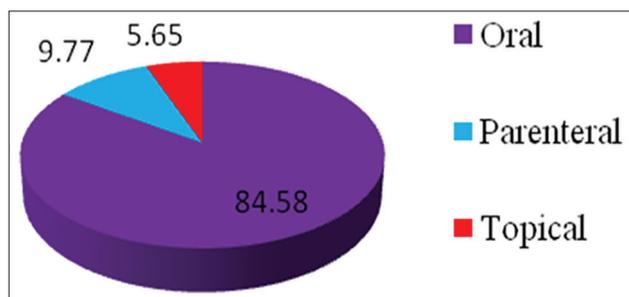


Figure 1: Percentage of drugs prescribed by specific route.

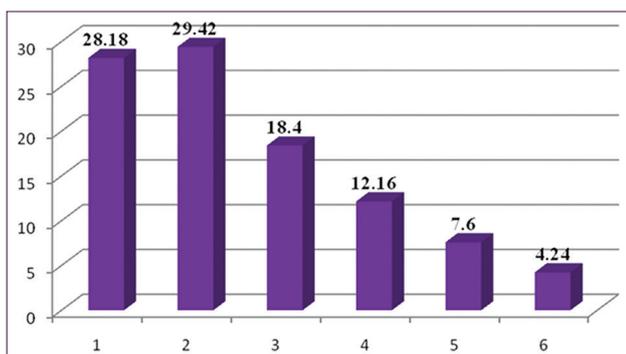


Figure 2: Percentage of drugs prescribed per prescription.

Table 1: Prescribing indicators.

Parameter	Number of drugs	Results
The average number of drugs prescribed per encounter	1842	1.842
Percentage of drugs prescribed by generic name	1	0.05
Percentage of encounters in which an antibiotic was prescribed	318	31.8
Percentage of encounters with an injection prescribed	180	18
Percentage of drugs prescribed from an NLEM	1836	99.67

NLEM: National List of Essential Medicines

Table 2: Incidence of polypharmacy.

Number of drugs prescribed per prescription	Number of prescriptions	Percentage
1	519	28.18
2	542	29.42
3	339	18.40
4	224	12.16
5	140	7.6
6	78	4.24
Total	1842	100

## DISCUSSION

In this study, average number of drugs prescribed per encounter was 1.8 with a maximum of 6 drugs, which is within the range as compared with the standard (1.6-1.8) derived as ideal<sup>8</sup> and is acceptable compared with the WHO's recommended value of 1.3-2.0.<sup>6</sup>

In this study, average number of drugs prescribed is much lower than the relevant domestic research findings of Upadhyay et al. (3.76) and Raj et al. (4.98) as well as findings in other countries by Shankar et al. (3.39), Wang et al. (3.52), Xinyi et al. Baotou, Inner Mongolia (2.7), Lianzhen et al. Beijing (2.63), Hua et al. Guangdong (2.36), Daohai et al. Guangxi (1.95) provinces and Bimo Nigeria (3.8).<sup>1,6,9-15</sup>

Further in comparison with a similar study of drug use pattern in 12 developing countries, the average number of drugs per encounter in our study is higher as compared to Sudan (1.4) and Zimbabwe (1.3).<sup>16,17</sup>

The percentage of drugs prescribed by generic name in our study is 0.05%, which is too low compared with the standard derived to serve as an ideal (100%).<sup>8</sup>

Compared with other studies; the indicator was significantly low than in other studies in India (15.1%), Nigeria (49.3%),

Table 3: Category-wise prescribing frequency.

Drug category	Number of drug prescribed (n=1842)	Percentage of drug prescribed
Antibiotics	318	17.26
Analgesics	200	10.86
Gastrointestinal drugs	238	12.92
Respiratory drugs	61	3.31
Cardiovascular drugs	265	14.39
CNS drugs other than analgesics	78	4.23
Antihistaminics	66	3.58
Antimalarials	54	2.93
Anthelmintics	13	0.71
Antidiabetics	77	4.18
Tonics	206	11.18
Ophthalmic preparations	41	2.23
Aural preparations	28	1.52
Dermatological preparations	104	5.65
Genitourinary other than antibiotics	29	1.57
Antifungals	12	0.65
Miscellaneous drugs	52	2.82

CNS: Central nervous system

Sri Lanka (78%), Laos (78%), Ethiopia (87%), and South Ethiopia (98.7%).<sup>5,18-21</sup>

Wang et al. found that with the increase in doctor's education and training experience on rational drug use, and improvement of their pharmaceutical knowledge, the proportion of drugs prescribed with generic names by doctors showed a slight decrease.<sup>6</sup> Possible reason for low presentation by generic names could be due to impressive and continuous communication with the doctor by pharmaceutical companies which made the doctors more likely to use non-generic (brand) names than generic names.

Percentage of antibiotics prescribed was 31.8% that is close to the standard (20-26.8) derived to be ideal.<sup>8</sup> Though it is higher than Yemen (24.6%), Saudi Arabia (20%) and China (29.9%)<sup>6,22,23</sup> it was lower than Laos (47%), Sri Lanka (47%), Zimbabwe (58%), South Ethiopia (58%) and Nigeria (72.8%).<sup>5,19,20,24,25</sup>

This is an unprecedented trend of prescribing antibiotics for all infections including viral conditions like cold and flu. This reflects the misuse of antibiotics in our study where the maximum number of prescriptions belonged to the antibiotic category.

The percentage of encounter in which injections were prescribed was 18% (n=180) which is within the range of the standard (13.4-24.1) derived to serve as ideal<sup>8</sup> and is almost equivalent to Indonesia (17%) and Ecuador (17%).<sup>26,27</sup> It significantly lower compared with Sudan (36%), South Ethiopia (38.1%) and Uganda (48%).<sup>5,15,16</sup> In our study, injection prescribed were higher than in similar study by Raj et al (14.15%)<sup>10</sup> and by Shankar et al. (7.98%).<sup>1</sup>

The percentage of drugs prescribed from the NLEM during our study period in the state of Goa (India) was 99.67%, which is almost similar to cross sectional study in south Ethiopia (99.6) and is identical with the standard (100%) derived to serve as ideal,<sup>8</sup> as well as a National baseline study on drug use indicator in Ethiopia (99.9%).<sup>21</sup> In our study, drugs prescribed from the NLEM is high when compared to prescription pattern in a similar study in India by Raj et al. (31.36%), Nepal (88%), Tanzania (96%), and South Ethiopia (96.6%).<sup>5,10,26,28</sup>

## CONCLUSION

Based on the finding of this study, the prescribing practices for antibiotic and drugs by generic names show deviation from the standard recommended by WHO. As antibiotics are prescribed the most in our study, one needs to keep watch on usage of antibiotics in order to avoid resistance. On the other hand, prescribing injections and prescribing from NLEM were not found to be a problem in this study. Baseline data gathered by this study can be used by researchers and policymakers to improve prescribing practice. Several activities have proved useful and effective

in promoting rational drug use and should be recommended for general use. These are Standard Treatment Guidelines, EDL, Establishing Drug and Therapeutic Committee, problem-based basic training in pharmacotherapy, drug use evaluations, targeted continuing education and availability, accessibility, and affordability of drugs of a good standard. Drug information centers and drug bulletins can be started for reference from time to time. Care is, of course, necessary to implement and ensure success.

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