

# Assessment of rational use of drugs using World Health Organization prescribing and patient care indicators in a tertiary care hospital

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**ABSTRACT:** The present study aimed to assess the rational use of drug use using World Health Organization (WHO) prescribing and patient care indicators in a tertiary care hospital. 180 prescriptions were analyzed. 636 drugs were prescribed in total. The mean age group of patients was 37.14±19.54 years. 93.3 % of prescriptions contain less than or equal to five drugs. Anti-ulcer drugs, vitamin supplements, and non-steroidal anti-inflammatory drugs are most commonly prescribed. The average number of drugs per encounter was 3.53, 29.77% drugs were prescribed by generic names, 2.77% prescriptions contain injection formulations, 31.66% prescriptions contain antibiotics, and 96.85% drugs are from essential drugs list. The average consultation time and dispensing time were 4.57 mins and 175.8 secs respectively. The percentage of drugs dispensed was 83.82%, the percentage of drugs adequately labeled was 0%, and the percentage of patients knowing the correct dose was 67.77%. Except for the percentage of injections prescribed, remaining prescribing indicators should be improved to reach optimal value suggested by WHO. Except for dispensing time, remaining patient care indicators should be improved to reach optimal value suggested by WHO. A clinical pharmacist can help improve rational drug use by improving scores of the indicators where ever possible.

**KEYWORDS:** Prescribing; patient care; indicators; World Health Organization; rational drug use.

## 1. INTRODUCTION

There are a wide variety of medicines available globally. This is a double-edged sword because it increases the availability of medicines to all economical categories of people, also it increases the chance of the medicine-related problems. Also, the diversity of prescribing practices among physicians for the same condition can cause a variety of medicine-related problems. So, a systematic evaluation of this drug use was required to identify problem areas that need much focus. Drug utilization pattern was one of that measures which helps you to identify the medicine-related problems and helps to promote rational drug use. This present study aimed to identify any problem areas in medicine prescribing by using core drug use indicators i.e., prescribing and patient care indicators by World Health Organization (WHO).

*WHO prescribing indicators* [1] are part of core drug use indicators and are used to know the drug use in health facilities. They measure the appropriate use of drugs by the healthcare providers. The advantage of this prescribing indicators was they measure the general prescribing tendencies with in a given setting independent of specific diagnosis [1]. They are five indicators which serves different purposes. The indicator 1 is the average number of drugs per encounter to measure the degree of polypharmacy, the indicator 2 is the percentage of drugs prescribed by generic name to measure the tendency to prescribe by generic name, the indicator 3 is the percentage of encounters with antibiotics prescribed to measure the tendency to prescribe antibiotics, the indicator 4 is the percentage of encounters with injection prescribed to measure the overall use of costly forms of drug therapy, and the indicator 5 is the percentage of drugs prescribed from essential drugs list to measure the degree to which practices confirm to national drug policy.

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WHO patient care indicators [1] address key aspects of patients experience at health facilities and how well they have been prepared to deal with the drugs that have been prescribed and dispensed [1]. Patient's expect good communication and cooperation from the physician. Also, patient's knowledge on medications helps them to adhere to the course of treatment. There are five indicators. The indicator 1 is the average consultation time to measure time that medical professional spend time with patients in the process of consultation and prescribing, the indicator 2 is the average dispensing time to measure the average time that personnel dispensing drugs spend with patients, the indicator 3 is the percentage of drugs actually dispensed to measure the degree to which health facilities are able to provide the drugs which were prescribed, the indicator 4 is the percentage of drugs adequately labelled to measure the degree to which dispensers record essential information on the drug packages they dispense, and the indicator 5 is the patients knowledge of correct dosage to measure the effectiveness of the information given to patients on the dosage schedule of the drugs they receive.

## 2. RESULTS AND DISCUSSION

A total of 180 prescriptions were collected during the study period. 636 drugs were prescribed in total. The mean age of the patients was 37.14±19.54 years. Females are high in number (60.55%). Patients from the urban province are high in number (87.22%). Among comorbidities, hypertension was relatively high (38.00%). The number of prescriptions with ≤5 drugs was high (93.3%) (Table 1). Anti-ulcer drugs (50%), followed by vitamin supplements (31.66%) and non-steroidal anti-inflammatory drugs (31.66%) were commonly prescribed drugs (Table 2).

**Table 1.** Socio demographic and clinical details of patients visiting various departments.

S.No.	Name of the characteristic	Frequency	Percentage
1	<b>Age in years</b>		
	0-20	36	20.00
	<b>21-40</b>	<b>66</b>	<b>36.66</b>
	41-60	56	31.11
	61-80	22	12.22
2	<b>Gender</b>		
	Male	71	39.44
	<b>Female</b>	<b>109</b>	<b>60.55</b>
3	<b>Area of residence</b>		
	Rural	23	12.77
	<b>Urban</b>	<b>157</b>	<b>87.22</b>
4	<b>Co morbidities (n=50)</b>		
	<b>Hypertension</b>	<b>19</b>	<b>38.00</b>
	Diabetes & others*	7	14.00
	Diabetes & Blood Pressure	11	22.00
	Others†	13	26.00
5	<b>No of drugs</b>		
	≤ 5	<b>168</b>	<b>93.33</b>
	> 5	12	6.66

\* others= Thyroid; asthma ; Others† = Thyroid alone; Rheumatoid arthritis; Osteoarthritis.

Table 3 depicts the results of WHO prescribing indicators of our study. The average number of drugs per encounter was 3.53±1.40 which is higher than the WHO reference value of <2 [18]. Many studies reported a higher average number of drugs per encounter relative to WHO reference value [2-6]. Not having standard treatment guidelines, prescribing vitamin supplements to patient's wishes, a patient's compulsion to prescribe drugs for small ailments like mild pain, a peak time for physicians are attributed to the high average number

of drugs per encounter relative to WHO reference value. The patient-physician interaction time was short (4.57 mins), which increases the chances of conveying the intensity or severity of patient's complaints in the wrong way. This increases the wrong interpretation, and the consequence will be the prescribing of unnecessary drugs. Comorbidities are one factor which increases the polypharmacy.

**Table 2.** Class wise distribution of commonly prescribed drugs.

S. No.	Category	Average dose	Dosage form	Frequency of administration	Frequency
<b>1</b>	<b>Antibiotic</b>				
	Amoxicillin and Clavulanic acid	625mg	Tablet	BD*	20
	Metronidazole	400mg	Tablet	TID†	8
<b>2</b>	<b>Anti-ulcer</b>				
	Pantoprazole	40mg	Tablet	OD‡	48
	Ranitidine	150mg	Tablet	BD	42
<b>3</b>	<b>Vitamin supplements</b>				
	Vitamin B Complex	---	Tablet	OD	46
	Methylcobalamin	500mcg	Tablet	BD	11
<b>4</b>	<b>Non-Steroidal Anti-Inflammatory Drugs</b>				
	Diclofenac	50mg	Tablet	BD	45
	Paracetamol	60ml	Syrup	TID	12
<b>5</b>	<b>Calcium supplement</b>				
	Calcium carbonate	500mg	Tablet	OD	37
<b>6</b>	<b>Cardiovascular</b>				
	Amlodipine	5mg	Tablet	OD	9
	Telmisartan	40mg	Tablet	OD	4
<b>7</b>	<b>Anti-diabetic</b>				
	Metformin	500mg	Tablet	BD	13
	Glimepiride	1mg	Tablet	BD	7
<b>8</b>	<b>Anti-histamine</b>				
	Cetirizine	10mg	Tablet	BD	26
	Chlorpheniramine	60ml	Syrup	TID	10
<b>9</b>	<b>Others</b>				
	Amitriptyline	10mg	Tablet	BD	10
	Ambroxol hydrochloride	60ml	Syrup	TID	7

‡OD= once in die, once a day; \*BD= Bis in Die, twice daily; †TID= thrice in die, three times a day

**Table 3.** WHO Prescribing Indicators observed in the study.

S. No.	Name of the indicator	Frequency/ Percentage	WHO reference value
1	Average number of drugs per encounter	3.53±1.40	<2
2	Percentage of drugs prescribed by generic name	29.77%	100%
3	Percentage of encounters with an antibiotic prescribed	31.66%	<30%
4	Percentage of encounters with an injection prescribed	2.77%	<20%
5	Percentage of drugs prescribed from essential drug list or formulary	96.85%	100%

The percentage of drugs prescribed by generic name was 29.7%, which is nearly one-fourth of the WHO optimal value (100%) [18]. Prakash, 2015 [4], reported an even smaller percentage of drugs by generic name (6.67%) than our study. Few studies reported a higher percentage of generic name prescribing than our study [2, 3, 5, 6]. Generic drugs are equally effective as the branded ones, also affordable than branded drugs. Medical Council of India brought an amendment to prescribe drugs with their generic names legibly and preferably with capital letters and the physician should ensure rational prescription of drugs [7]. However, in spite of this regulation, lesser than 50 percent of medicines are prescribed by their generic names [8]. The patients are also unaware of the actual name of the drug and start to believe in the efficacy of the branded drug only. So, in case of unavailability of this branded drug, they hesitate to purchase their generics, because they believe that branded drugs are effective and safer than generics. This increases an unnecessary economic burden on the patient. This misgivings about generics should be cleared with the help of patient education about the generic drugs and bringing awareness of Jan Aushadhi Centers established by the Government of India, which supplies quality generic drugs for affordable costs.

The percentage of prescriptions with injection was 2.77% which is below the WHO reference value (<20%) [18]. Sivaprasad et al [6] and Parveen et al [2], reported optimal injectable prescribing in their studies (1.6% vs 11.6% respectively). However, few studies reported higher percentages than the WHO reference value [3-5]. The medicines are supplied on a non-profit basis in the hospital, so they will never encourage unnecessary prescribing of injectables, which are reserved for emergency and acute conditions. The misconception among patients is that injection can cure or give instant relief for them when compared to any oral dosage form. So, in spite of the alert from the physician, they start annoying doctors to prescribe an injection. The physicians also want to reach the patient's expectations, which is crucial for the reputation of the hospital. So, the physicians start prescribing injections. Also, private sector hospitals prefer using injectables, because they are a good source of income for them. This misconception can be corrected by providing facts or truths about it. The physicians should bring complete awareness (verbally or through displaying charts) about when should an injection be used? What are the advantages and disadvantages of injections over oral dosage forms? This educates patients and also helps to prevent unnecessary expenditures.

The percentage of antibiotics prescribed in our study (31.66%) was slightly higher than the WHO reference value (<30%) [18]. Siva prasad et al [6] reported optimal usage of antibiotics (9.6%). Few studies reported higher usage of antibiotics than reference value [2-5]. Irrational use of antibiotics poses a major threat to mankind in the coming years. Irrational prescribing of antibiotics to treat malaria, diarrhea and respiratory tract infections of viral origin was reported [9, 10]. In general, empirical antibiotic prescribing is permitted in case of apparent infections. However, in the case of unconfirmed diagnosis, no culture sensitivity reports or unknown infection, it leads to overprescribing and treatment failure. In private clinical settings, patients demand antibiotics and injections for quick relief of the symptoms associated with the disease. Prescribers are more likely to prescribe accordingly for fear of losing out the patients. Two studies reported a positive correlation between patient overload and injection and antibiotic use [11,12]. Formulating strong antibiotic treatment guidelines, promoting antibiotic stewardship programs within the hospital, adequate training of the staff through continuing medical education programs will decrease the irrational antibiotic use.

The percentage of drugs prescribed from an essential drug list or formulary in our study (96.85%) was near the WHO reference value (100%) [18]. Birhanu et al [5] reported 100% percent of drug prescribing from the essential drugs list. Some studies reported fewer percentages of essential drug prescribing contrary to our study finding [2, 3, 4, 6]. Essential drugs are selected based on strong evidence on safety, efficacy, and cost-effectiveness. They should be made available at all times in adequate quantities and in appropriate dosage forms [13]. So, prescribing essential drugs promotes the rational use of drugs. However, when it comes to individualization of therapy, one should also consider patient allergies and patient variability of response to the therapy. In such conditions, essential drugs may not be suitable all the time.

Table 4 depicts the results of WHO patient care indicators of our study. The average consulting time in our study was  $4.57 \pm 1.90$  mins which are far less than the WHO optimal consultation time ( $\geq 30$ mins). Mahalli et al [14] reported a mean consultation time of  $7.3 \pm 5.7$  mins, Koley et al [15] reported a mean consultation time of 5.93 mins whereas Fereja [16] reported a mean consultation time of  $18.20 \pm 4.3$  mins. Consulting time with a physician is important for exploring detailed notes on chief complaints, history of present illness, past medical and medication history, social and family history, socioeconomic status, occupational history, etc., which are equally important as drug because they influence the treatment regimen. If this consultation time was short due to the low doctor to patient ratio, this will affect the treatment. In spite of the growing patient

population, the doctor to patient ratio in this hospital was low due to the lack of appointments of competent staff.

**Table 4.** WHO Patient care indicators observed in the study.

S. No.	Name of the indicator	Frequency/ Percentage	WHO reference value
1	Average consultation time (in mins)	4.57±1.90	≥30 mins
2	Average dispensing time (in sec)	175.8±58.8	≥60secs
3	Percentage of drugs actually dispensed	83.82%	100%
4	Percentage of drugs adequately labelled	0%	100%
5	Patients knowledge of correct dose	67.77%	100%

The average dispensing time was 175.8 sec which is more than the optimal dispensing time by WHO (≥60 sec). Mahalli et al [14] reported a mean dispensing time of 100 sec, while Koley et al [15] reported 47.4 sec. The dispensing in this hospital was satisfactory because they are enough competent staff, they also tell them how to take each medicine. Also, on an average three drugs were prescribed in prescriptions, which eases dispensing and brief medication counseling.

The percentage of drugs dispensed was 83.82% which is lower than the WHO reference value of 100%. This is lower than Mahalli et al [14]. The drug acquisition process was the reason for the delay in drug supply. The chief pharmacist has to make an indent for the drugs that are required for a year in advance (based on the previous census). This order will be verified by two or three authorities and then the bill will be passed. Then the central drug store will supply medicines. However, there will never be a delay in the supply of emergency and important classes of drugs.

The percentage of drugs adequately labeled was 0%. According to WHO, adequate labeling of drugs requires dosage regimen, patient name, and drug dose [1]. This was lower than Mahalli et al [14] and similar to Akl et al [17]. The medicines dispensed here does not contain any patient name and dosage regimen. Instead, the drug packaging contains only details of dose of the drug. Patients face difficulty with the dosage regimen because many of them complain that they lost the prescription form. However, during our study, we provided detailed counseling on the dosage regimen with the help of stickers on the drug packaging which tells them the frequency and time of administration.

The patient's knowledge of the correct dose was 67.7%, which is two-third of WHO reference value (100%). Fereja [16] reported 82%, Akl et al [17] 94% while Koley et al [15] reported 94.3%. Patient's knowledge of correct dose avoids overuse and thus adverse drug events and also it increases the chances of therapeutic success. The patients with chronic diseases were having good knowledge of their medications owing to their daily use. However, patients with their first visit to the hospital or for acute conditions or pediatric patients expressed difficulty in knowledge about the correct dose of medicines.

### 3. CONCLUSION

Our study observed irrational drug use with the help of prescribing indicators. Unnecessary prescribing of vitamin supplements should be minimized. Prescribing using generic names, prescribing from an essential drug list, rational use of antibiotics should be implemented. Consultation time with physicians, adequate labeling of drugs, imparting correct knowledge about drugs to the patient need to be improved.

### 4. MATERIALS AND METHODS

#### 4.1. Study design, sampling technique, and sample size

A descriptive cross-sectional study was carried out in the dispensing pharmacy of the Visakha Institute of Pharmaceutical Sciences, Hanumanthuvaka for duration of four months (August to November, 2019). By considering 5% error of margin, 95% confidence interval, and a population size of 300, and a response distribution of 300, the estimated sample size was 169. However, 180 prescriptions were collected. Simple random sampling was used to select the prescriptions.

## 4.2. Ethical Approval

The study was approved by the Institutional Ethical Committee (VIPT/IEC/59/2019). Patient consent form was taken from willing to cooperate patients after explaining the aim of the study.

## 4.3. Inclusion and Exclusion criteria

Prescriptions with at least one drug, patients who are willing to cooperate to answer the patient care indicators are included in the study. Prescriptions with illegible handwriting, with insufficient details, cognitive impaired patients, patients who are not willing to invest their time, elderly patients who cannot cooperate due to health concern, illiterate patient/ caregiver are excluded from the study.

## 4.4. Data Collection and Analysis

The data collection form contains three parts. The first part contains socio demographic details like age, gender, area of residence and clinical details like co morbidities, number of drugs of the patients. The second part contains details of the prescription like name, dose, and route of administration of drugs. The third part contains questions about prescribing and patient care indicators. The data was tabulated and analyzed for prescribing practices and patient care indicators to draw conclusions. Descriptive statistics like mean/median was calculated using Minitab (version 18.0).

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**Conflict of interest statement:** The author reports no conflicts of interest.

**Ethics committee approval:** The study was approved by the Institutional Ethical Committee (VIPT/IEC/59/2019).

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