

# Assessment of rational use of drugs using World Health Organisation's indicators in a government hospital of central Nepal

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## Abstract

**Background:** Irrational practice of medicines use is a serious problem of health care setting.

**Objectives:** The primary aim of this study was to assess rational use of drug (RUD) at a government hospital of central Nepal using World Health Organisation (WHO) core drug use indicators.

**Methods:** This descriptive, cross-sectional study was conducted from 2022 November to December at Hetauda Hospital after ethical clearance. A total of 500 prescriptions were taken retrospectively by using systematic sampling method for prescribing indicators whereas 100 patient interviews were conducted prospectively to study patient care indicators. For facility-based indicators different departments of the selected hospital were visited to collect the data.

**Results:** The mean values of prescribing indicators of RUD in the surveyed hospital compared with WHO values for prescription of generics, antibiotics, and injections was found to be 6.3% (n = 119) vs. 100%; 28.4% (n = 142) vs. 20-26.8%; and 1.2% (n = 6) vs. 13.4-21.1% respectively. Another discrepancy reported was regarding the mean number of drugs per prescription which was found to be more than the WHO optimal value (3.77 vs. 1.6-1.8). The average consultation time and dispensing time was found to be 5.52 ± 4.49 minutes vs. 10 minutes and 111 ± 60.2 seconds vs. more than 180 seconds, respectively as compared with WHO value.

**Conclusion:** According to the WHO/RUD core drug use indicators, rational medicine use is not attained in most prescribing and patient care components. It is recommended that health institutions should co-operate to promote the judicious use of medications.

**Key words:** Patient care indicators; Prescribing indicators; Rational use of drugs; World health organisation.

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## INTRODUCTION

Rational use of medicines means appropriate use of medicines so that their selection, dose, duration is according to guidelines, appropriate to clinical needs, that are available at the lowest cost to provider, community, and patients; and are dispensed correctly and taken properly.<sup>1</sup> According to World Health Organisation (WHO), more than 50% of all medicines are prescribed, dispensed, or sold inappropriately.<sup>2</sup> Although, medicines used wisely, improve health and



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well-being of individuals, irrational use of medicines is serious public problem which has several health outcomes for patients and hinders effective functioning of health care systems.<sup>3</sup> Common practices of irrational use of drugs are polypharmacy, inappropriate use of antimicrobials, overuse of injection, and non-compliance to prescribing standards as per national guidelines.<sup>4</sup>

In Nepal, concept of rational use of drugs (RUD) was introduced along with publication of list of essential medicines in 1986 AD.<sup>5</sup> The WHO core drug use indicators are considered as the first line indicators validated by WHO for measurement of drug use. These core drug indicators provide comprehensive picture of drug use than complementary indicators in health care settings.<sup>6</sup> Hence, primary objective of this study was to assess RUD at a government hospital of Nepal using WHO core drug use indicators.

## METHODOLOGY

This was a quantitative, descriptive, cross-sectional study that was conducted at Hetauda Hospital at Hetauda, Makwanpur, Nepal. Hetauda Hospital is one of the government hospitals in central Nepal managed by Bagmati Province. The data collection period was from 2022 November to 2022 December. Ethical approval was obtained from the Institutional Review Committee of Madan Bhandari Academy of Health Sciences (Ref. 2079/2080 IRC-08), Hetauda, Makwanpur, Nepal. A formal letter of approval and co-operation was obtained from Hospital Director of Hetauda Hospital for data collection purposes. Confidentiality of the patients was maintained to the utmost.

Systematic sampling method was utilised for data collection that were taken both prospectively as well as retrospectively. The retrospective data (500 prescriptions) were taken to assess prescribing indicators while prospective data (100 patients) were used to study patient care indicators and facility-based indicators.<sup>3</sup> The prescribing encounters that were illegible or those containing medical supplies only were excluded during the sampling process.<sup>5</sup> In total, 500 prescribing encounters from the hospital were analysed. The first prescription was randomly selected by the data collector and then every fifth prescription was taken for the research purpose. Again according to the WHO/International Network for Rational Use of Drugs (INRUD) guideline, 100 patient interviews are taken as the standard for studying patient care indicators. Hence, 100 patients who visited the outpatient departments (OPDs)

were selected and interviewed by using systematic sampling method.<sup>7</sup>

The data collection tool was a checklist, based on the standard guidelines given by the WHO for both prescribing indicators and facility-based indicators.<sup>5</sup> Five hundred prescriptions dispensed during the study period from different clinical departments (OPDs) of Hetauda Hospital were studied, 100 patient interviews were taken for patient care indicators. For the facility-specific indicators, 30 key medicines enlisted in the data collected checklist were selected, based on the national list of essential medicines of Nepal. The availability of standard treatment guidelines, essential drug list, and drug formularies to the prescriber were also checked.

After the completion of data collection process, data were checked for completeness and robustness. Data were entered in Microsoft Excel sheet and exported to IBM SPSS Statistics for Windows, version 21 (IBM Corp., Armonk, N.Y., USA) for further analysis. The analysis was made by using descriptive statistics such as mean, frequency, and proportion; and standard deviation. The findings were interpreted according to international standards given by the WHO.

## RESULTS

For the assessment of WHO prescribing indicators, a total of 500 prescriptions were analysed. On average  $3.77 \pm 1.609$  drugs were prescribed in the selected hospital (Table 1). In 500 prescriptions, a total of 1871 drugs were prescribed out of which 119 (6.3%) drugs were prescribed by generic name (Table 2). Out of the 500 prescriptions analysed, 279 (55.8%) drug prescriptions had three or more drugs. Among the prescription encounters assessed, the study revealed that 142 (28.4%) prescriptions contained antibiotics while only six (1.2%) prescriptions contained at least one injectable medication (Table 3).

The average consultation time and dispensing time in the selected government hospital (Hetauda Hospital) was found to be  $5.52 \pm 4.49$  minutes and  $111 \pm 60.2$  seconds, respectively (Table 4). Besides, on average, 322 medicines were actually dispensed and among dispensed prescriptions within the health facility, of which 309 (95.9%) of them were adequately labelled. Moreover, 89% patients knew about the correct dosage schedule of the prescription, 87% patients knew about the correct dosage duration, 90% patients knew about the correct frequency of the drugs prescribed to them

(Table 5). A short list of 30 key drugs that were mostly based on burden of disease were made and checked for their availability in the hospital's pharmacy. Twenty-two

(73.3%) of the listed drugs were found in the pharmacy which shows that the drug availability was within the WHO's standards (Table 6).

**Table 1: Number of drugs per prescribing encounters (degree of polypharmacy) in the hospital**

Number of drugs	Overall results n (%)	WHO standard mean
One	26 (5.2)	
Two	87 (17.4)	
Three	108 (21.6)	
Four	140 (28.0)	
Five	84 (16.8)	
Six	28 (5.6)	
Seven	16 (3.2)	
Eight and more	11 (2.4)	
Mean ± SD	3.77 ± 1.609	≤2 (1.6-1.8)

**Table 2: Drugs prescribed by generic name in the hospital**

Prescription	Frequency and Percent	WHO standard percentage
Total number of prescription	500	
Number of drugs prescribed	1871	
Number of drugs prescribed in generic	119 (6.3%)	100%

**Table 3: Encounters with antibiotics and injections prescribed**

Prescribing indicators	Encounters	WHO standard percentage
Antibiotics	142 (28.4%)	< 30 (20–26.8%)
Injections	6 (1.2%)	(13.4–21.1%)
<b>Total</b>	<b>500</b>	

**Table 4: Consultation time, dispensing time, and percent of drugs actually dispensed**

Patient care indicators	Values	WHO Standards
Average consultation time (minutes)	5.52 ± 4.49	10 min
Average dispensing time (seconds)	111 ± 60.2	≥180
Total number of drugs actually dispensed	322	

**Table 5: Patient knowledge about dosage of dispensed drugs**

Drug parameters	Value (%)
Dose	89
Frequency	90
Duration	87

**Table 6: Key essential drugs selected (N = 30)**

Essential drugs	Availability
Amoxicillin capsule	Yes
Artemether + lumefantrine (Quartem)	No
Ceftriaxone injection	Yes
Chloramphenicol	Yes
Cimetidine	No
Ciprofloxacin tablet	Yes
Cloxacillin capsule	No
Diclofenac injection	No
Diclofenac tablet	Yes
Doxycycline	Yes
Enalapril	No
Erythromycin	Yes
Ferrous sulfate	Yes
Fluoxetine	No
Glibenclamide	Yes
Haloperidol	Yes
Hydrocortisone and polymyxin B sulfate	Yes
Metformin	Yes
Metoprolol	Yes
Metronidazole	Yes
Norfloxacin tablet	No
NPH insulin	No
Omeprazole	Yes
Oral rehydration salt (ORS)	Yes
Paracetamol	Yes
Regular insulin	Yes
RH (Rifampin + Isoniazid)	Yes
RHZE (Rifampine + Isoniazide + Pyrazinamide + Ethambutol)	Yes
Sulphamethoxazole + trimetoprim (cotrimoxazole)	Yes
Terra cortil® (oxytetracycline)	No
Tetanus antitoxoid	Yes
Essential drugs available	22 (73.3%)
WHO standard	100% (66-99 %)

## DISCUSSION

The average number of drugs prescribed per prescription in the hospital was  $3.77 \pm 1.609$ . Moreover, 279 (55.8%) drug prescriptions had more than three drugs prescribed. These values do not fall inside the WHO's standard. The data suggest practice of polypharmacy in the hospital. However, further research is necessary to find out the factors related to polypharmacy in the hospital. Similar studies done in other low- and middle-income countries (LMICs) show that polypharmacy can be attributed

to lack of appropriate training and knowledge about prescribing practices in health professionals and lack of improper or absence of monitoring mechanisms in health care system. Other major causes could be symptomatic approach in patient treatment and variability in socioeconomic status of the population. Polypharmacy is a serious concern as it could increase the chance of drug–drug interactions and adverse drug reactions. Additionally, it could lead to wastage of drugs, increase the chance of antibiotic resistance and an increased patient expenditure in health care.<sup>5</sup>

The percentage of drugs prescribed by the generic name was found to be only 6.3% (119 drugs) which shows a huge deviation from the WHO core drug use standards (100%). Though the study was conducted in a government hospital, the practice of generic drug prescribing was not found. Several research findings have shown that prescribing with brand name or trade name is associated with increased treatment costs, confusion in remembering names of medicines and demand of a certain brand in patients. It is a major cause of bioequivalence problems as well.<sup>8</sup> Therefore, more effort has to be invested to effectively avoid the problems of commercial brand prescribing and to promote safe, cost-effective and accessible generic drugs. Percentage of prescribing encounters with antibiotic was 28.4% (142 prescriptions) which is only a slight deviation from the WHO standard of (20-26.8%). Amoxicillin/amoxicillin + clavulanic acid was the most prescribed antibiotic in the hospital which was followed by fluoroquinolones. In this study the prescribing of antibiotics was not as observed in other studies of similar nature in LMICs like Pakistan, Ethiopia, and India.<sup>2</sup> This shows that health care providers were aware of the rational prescribing practices of antibiotics.

The percentage of prescription encounters with injections was only 1.2% (six prescriptions with injections) in the given study which is largely below the WHO standards (13.4–21.1%). This result is also a better finding than practices in other countries. This result could be seen because only outpatient prescriptions were taken in the study and emergency prescriptions were excluded so that authors were not able to observe an overestimation of data because in emergency unit, mostly injections are prescribed.<sup>5</sup> Injectable, though have quick actions than oral medicines but they often increase the cost of medication, increase the risk of transmitting infections, and cause psychological and physical pain to the patients. Therefore, it is considered better to choose oral drugs over injectable drugs.

In this study, the mean consultation time was  $5.52 \pm 4.49$  minutes which is quite short (less than 10 minutes as per the WHO standard). This consultation time is better than consultation times observed in selected hospitals of Ethiopia, India, Middle East, Malaysia, and other studies conducted previously in Nepal as well.<sup>9</sup> On average,  $111 \pm 60.2$  seconds was the average dispensing time calculated from this study which is less than the dispensing time given by WHO ( $\geq 180$  seconds). This difference could be attributed to the variation on patient load on the individual health care setting as the average number of patients visiting the hospital is more than a thousand on a daily basis. Short dispensing time affects labelling and patient counselling which affects overall knowledge about the right dose, frequency and duration of the drug among patients. Overall, short dispensing time also results in patient non-compliance.<sup>10</sup>

From the prescribed medications, only 322 drugs were actually dispensed from the hospital pharmacy. This finding indicates that unavailability of medications in the hospital compelled patients to buy medicines from retail outlets where the charge for medicine is usually higher than hospital pharmacy.

Patient knowledge on dose, duration, and frequency of drugs were 89%, 90% and 87% respectively which indicates that nearly 14% to 16% patients had a chance of missing drugs according to their prescription.<sup>3</sup>

A short list of 30 key drugs that were mostly based on burden of disease were made and checked for their availability in the hospital's pharmacy. Twenty-two (73.3%) of the listed drugs were found in the pharmacy which shows that the drug availability was within the WHO's standards (66% to 99%). The possible reasons

for unavailability of medicines could be the shortage in supply chain management or due to the government process of drugs procurement. This could also be because of shortage of drugs due to health insurance program. The Essential Medicines List (EML)/Formulary or a copy of the Standard Treatment Guideline (STG) were not available in all the departments during the study period which shows that treatment guidelines are not properly followed by health professionals. Thus, these documents must be made available in all the departments for effective delivery of health care.<sup>3</sup>

The limitation of the study was that the findings are from only one government hospital of Nepal, which cannot precisely give the picture of prescribing practices in other government hospitals of Nepal. This was because of limited resources and lack of funding in this research study. However, this study can be replicated to all the government hospitals to study a bigger scenario of rational use of drugs in Nepal.

## CONCLUSION

According to the WHO/RUD core drug use indicators, rational medicine use was not attained in most prescribing and patient care components. As a result, both health institutions should co-operate to promote the judicious use of medications.

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