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[1]Sunsari Technical College, affiliated to Institute of Medicine (IOM), Tribhuvan University, Dharan, Nepal,
[2]Purbanchal University School of Health Sciences (PUSH), Purbanchal University, Gothgaun, Morang.
[3]CiST college, affiliated to Pokhara University, Newbaneshwor, Kathmandu , Nepal
[4] Birat Medical College Teaching Hospital , Morang, Nepal

*Corresponding author
Prasanna Dahal
Email ID:
drprasannadahal@gmail.com
ORCID iD:
https://orcid.org/0000-0002-8085-9119

Assessment of Drug Use Pattern Using WHO Core Drug Use Indicators in Two Primary Health Care Centers of Sunsari District, Eastern Nepal

Bijaya Karki[1], Prasanna Dahal[2]*, Naveen Shrestha[3], Surya Bahadur Parajuli[4]

Abstract

Introduction: Rational use of drugs is the matter of global concern in today's world. Drug utilization studies are an important tool to evaluate drug utilization practices.

Objective: The objective of this study was to assess drug use patterns in two Primary Health Care Centers (PHCCs), namely Chatara and Itahari PHCC, of Sunsari district using standard WHO core drug use indicators.

Method: A cross-sectional descriptive study was conducted using WHO core drug indicators. Descriptive statistics were used for data analysis.

Result: A total of 609 prescriptions were analyzed. The average number of drugs prescribed was 2.64 (±1.03). Percentage of encounters with at least one antibiotic prescribed was 70.77% whereas encounters with at least one injection prescribed was low 0.66%. The total percentage of drugs prescribed using generic names was found to be 59.93% and the percentage of drugs prescribed from EDL was 68.51%. The average consultation and dispensing time was 6.60 minutes and 99.45 seconds respectively. Only 17.73% of patients had adequate knowledge of the drug whereas none of the drugs were adequately labelled. Percentage of drugs actually dispensed was 64.22%. The total percentage of availability of key drugs in health facilities was 90.63%. The most common morbidity was respiratory tract infections i.e. 129 (21.18%), acid peptic disease (APD) 77 (12.64%), allergies 64 (10.51%) and dental caries 62 (10.18%). A total of 1607 drugs were prescribed in 609 prescriptions. The most commonly prescribed drug class was antimicrobials 449(27.95%) followed by antipyretics 260 (16. 18%).

Conclusion: Among the prescription evaluated, the rational prescribing and dispensing practice was inadequate mainly reflected by high antibiotics encounters, low generic prescribing, inadequate labelling and poor patient's knowledge of drugs. Effective intervention programs are encouraged in these health facilities for the prescribers and the dispensing health personnel for promoting rational use of medicines.

Keywords: Drug utilization; Primary health care center; Rational drug use; WHO drug use indicators

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Introduction

Studies related to drug use pattern are important to determine whether or not drugs are utilized rationally. Rational use of drugs particularly is concerned about safety, convenience and cost-effective utilization of drugs at all stages of drug use chain.[1] With the passage of time various drug utilization researches have been conducted in many developing countries with the evidence of irrational drug use.[2-5] Poly-pharmacy, non-generic prescribing, improper antibiotics and injections use, self-medication etc. are some of the concerns related to irrational practice behaviors by prescriber as well as the consumers.[6] Drug utilization studies should be performed on regular basis to not only promote rational drug prescribing and dispensing, but also to assess the patient's comprehension about drug use. Previous study in various regions of Nepal shows the problem in the prescription pattern, health facilities problem and deviation in the generic medicine utilizations. [7-10]

In Nepal, the government runs Primary Health Care Centers (PHCCs) that provide basic primary healthcare services to the majority of citizens residing in both rural and urban areas of country. The objective of this study was to evaluate drug prescribing practices, patient care and facility- specific factors in two PHC centers namely Chatara and Itahari PHC, of Sunsari district using WHO standard drug use indicators.

Method

The cross-sectional descriptive study was conducted in Chatara PHCC and Itahari PHCC of Sunsari district starting from September 16, 2014 to February 2015. Sample was selected randomly irrespective of their age and gender. An inclusion criterion includes all outpatients with general illness irrespective of age and gender however; Patient for DOTS, immunization, patients with multiple co-morbidity or critically ill, pre- and post-natal care patients were excluded from the study. The study was carried out by using standard WHO drug use indicators which include prescribing, patient care and facility specific

indicators and using recommended methodology of WHO.[11] As per WHO, 600 samples of prescription will be enough to assess drug use pattern in the health facilities.[11] Modified International Network for Rational Use of Drug (INRUD-NEPAL) encounter form was used as a data collection tool.[12] Permission was obtained from the district health office, Sunsari before conducting the study. All relevant data such as patient age, sex, diagnosis, prescription character such as drug name, strength, dose; dispense quantity; patient drug use knowledge about when, how much and how long to use the drug ; adequate labelling indicator as patients name , drug name and when to take the drug was provided or not, were recorded in the data collection form. The consultation time and dispensing time were recorded separately without prescriber and dispenser being aware that they had been observed. A total of 100 (50 from each PHCC) records were considered to determine average consultation and dispensing time. After the data was collected, it was entered into a prescription indicator form, a patient care indicator form, and the parameters were calculated using the recommended techniques. After completion of data collection in either PHCC, data were tabulated in summary reporting sheets and the results were reported to the prescribers and the staff at health care facilities. Necessary advice and suggestions were provided on the lacking areas on the basis of the findings of the study. Data collection statement was also obtained from the study centers. Final Data from both the health facilities were transformed into SPSS version 16 for further analysis using recommended techniques.

Calculation techniques of the core drug use indicators of study were calculated in accordance to WHO Core drug indicator calculation guidelines[11]:

I. Prescribing indicators

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1. Average number of drugs per encounter = total number of drugs prescribed / total number of encounters surveyed;
2. Percentage of drugs prescribed by generic name = total number of drugs prescribed by generic name / total number of drugs prescribed * 100
3. Percentage of encounters with an antibiotic prescribed = (number of patient prescription encounters during which an antibiotic was prescribed / total number of encounters surveyed) * 100
4. Percentage of encounters with an injection prescribed = number of patient prescription encounters during which an injection was prescribed / total number of encounters surveyed * 100
5. Percentage of drugs prescribed from essential drugs list = (number of drugs prescribed from essential drugs list [13]/ total number of prescribed drugs) * 100

II Patient care indicators
1. Average consultation time = total time for a sequence of consultations / number of consultations
2. Average dispensing time = total time for dispensing drugs to sequences of patients / number of patient encounters
3. Percentage of drugs actually dispensed = number of drugs that are actually dispensed / total number of drugs prescribed * 100
4. Percentage of drugs adequately labelled = number of drugs dispensed with adequately labelled / total number of drugs dispensed * 100
5. Percentage of patients correct knowledge of drugs = number of patients who can adequately report the dosage schedule (when, how much and how long) for all drugs / total number of patients interviewed * 100

II Health facility indicators

1. Availability of key drugs = (number of specified drugs actually in stock / total number of drugs on the checklist) * 100
2. Availability of copy of essential drugs list or formulary at health facility: yes or no

Key indicator drugs used in study

Disease	Key drugs
Diarrhoea/ dysentery	ORS, metronidazole, cotrimoxazole
Fever/ respiratory tract infection	Paracetamol, amoxicillin, ciprofloxacin
Gastritis	Dried aluminium hydroxide and $Mg(OH)_2$
Skin infection	Povidone iodine, calamine lotion, Gamma benzenehexachloride,
Fungal infection	benzoic acid + salicylic acid
Eye/ear infection	Chloramphenicol eye/ear drops
Respiratory disorder	Salbutamol/aminophylline
Worm infestation	Albendazole
Avitaminosis	Vit B complex

Key drugs selected for the study [13,14]

Result

A total of 609 prescriptions (306 prescriptions from Health facilities 1, 303 Prescriptions from health facilities 2) were received from the both PHCs and they were analyzed for the various parameters which include prescription indicators, patients care indicators and facility indicators. Out of the total number of patients visiting PHCCs i.e. 609, the numbers of females were 346 (56.80%) and male were 263(43.20%). The median age of all the patients was found to be 30 years (IQR 42). The average number of drugs prescribed per encounter from two PHC facilities studied was 2.64 (±1.03). Among total patients, 70.77% received at least one antibiotic in their prescription and 0.66% patients received at least one injection from both health care facilities. Percent of drugs actually dispensed from both the PHCCs was 64.22%. The total percentage of drugs prescribed in generic was 59.93% and total percentage drugs prescribed from EDL was 68.51% respectively

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(table 1). The average consultation time and the dispensing time were found to be 6.60 (±1.52) minutes and 99.45 (±31.82) seconds. This study shows that only 17.73% of patients have adequate knowledge of drugs. However, the percentage of patient knowledge on parameter *'when'* was 70.28%, whereas knowledge on parameter '*how much*' and '*duration*' were 64.20% and 18.55% respectively. Both the PHCCs had the availability of an essential drug list. The total percentage availability of key drugs on PHCCs studied was 90.63% as shown in table 1.

Table 1: WHO core drug indicator summary form

Number of cases	Prescribing	609
	Patient care	609 (100 for consultation and dispensing time)
Average number of drugs prescribed (SD)		2.64 (1.03)
Percentage of drugs prescribed by generic name		59.93%
Percentage of encounters with antibiotics		70.77%
Percentage of encounters with injection prescribed		0.66 %
Percentage of drugs prescribed on essential drug list		68.51 %
Average consultation time		6.60 min
Average dispensing time		99.45 sec
Percentage of drugs actually dispensed		64.22 %
Percent correct patient knowledge of drugs		17.73%
Percentage availability of key indicator drugs		90.63 %

Note: Percentage of drugs adequately level was Nil. Copy of Essential drug list chart was available in both health facilities

Table 2. Most commonly prescribed drugs in the PHCs during the study period

According to drug class Drug class	Drugs	n	Total (N= 1607)	%
Antimicrobials	Amoxicillin	183		
	Ciprofloxacin	64		
	Metronidazole	62		
	Albendazole	36	449	27.95
	Cotrimoxazole	71		
	Azithromycin	19		
	Others	14		
Antipyretic	Paracetamol	260	260	16.18
Vitamins, minerals and electrolytes	VitaminB-complex	127		
			192	11.95
	ORS	44		
	Zinc sulphate	12		
	Iron	9		
Antiallergics, and antispasmodics	Chlorpheniramine maleate	123	147	9.14
	Hyoscine butyl bromide	20		
	Promethazine	4		
Ulcer protectives	Antacid	74	139	8.65
	Pantoprazole	26		
	Ranitidine	39		
Miscellaneous			420	26.13

The most commonly prescribed drugs were paracetamol 260 (16.18%) and amoxicillin i.e 183 (11.39). Other prescribed drug was vitamin B complex 127 (7.90%), chlorpheniramine maleate 123 (7.65%), cotrimoxazol 71 (4.42%), antacid 74 (4.60%) and metronidazole 62 (3.86%) as shown in table 2.

Morbidity profile of patients

In our study, the most common diagnosis was Respiratory Tract Infection 129 (21.18%) (which included both Upper Respiratory Tract Infection (URTI) 82(13.43%) and Lower Respiratory Tract Infection (LRTI) 47(7.71%) followed by Acid Peptic Disease (APD) i.e. 77 (12.64%);

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allergy 64 (10.51%), dental caries 62 (10.18%) and others as shown in Table 3

Table 3: Morbidity profile of patients (n=609)

Diagnosis	n(%)
Weakness / headache	29 (4.76)
Fever	25 (4.10)
APD	77 (12.64)
Common cold	26 (4.27)
Dental caries	62 (10.18)
Diarrhoea	26 (4.27)
Respiratory tract infection (URTI (82) /LRTI (47))	129 (21.18)
Conjunctivitis	14 (2.30)
Ear infection	30 (4.93)
UTI	14 (2.30)
Neuromuscular pain	32 (5.25)
Tinea-infection/ fungal infection	26 (4.27)
Allergy	64 (10.51)
Others(wounds/ cuts)	55 (9.03)

URTI- Upper respiratory tract infection; LRTI- Lower respiratory tract infection; APD- Acid peptic disease ; UTI- Urinary tract Infection

Discussion

In this study the percentage of distributions of male and female attending PHCs was 43.20% and 56.80% respectively. It also shows that prevalence of disease is not precise with gender. The average number of drugs prescribed in our study was 2.64 which was comparatively higher than the results obtained in other studies at PHCs in Nepal [3,9] but was comparatively lower than that in Pakistan [15] and Bangladesh [16] where the average drug prescribed were found to be 3.4 and 3.31 respectively. The discrepancies in results could be related to variations in socioeconomic profile as well as morbidity and mortality characteristics of the population. According to WHO recommendation, the average number of drug per prescription 1.6-1.8 is considered as optimal [11], therefore the result from our study reflects some degree of poly-pharmacy. It may be because treatment was based on symptoms rather than the diagnosis and unavailability of Standard Treatment Guidelines (STG).

In this study, the percentage encounter with antibiotics was 70.77% which was higher than that found in PHCCs of Kaski 67% [17] and western

Nepal 59.9% [10]. Similar studies in the developing countries like Pakistan, Bangladesh and Bahrain found that antibiotics encountered were found 49.9%, 49.1% and 26.2%. [15,16,18] In our study, This finding may be due to the presence of the intern doctors and health assistant prescribing, which reflects lack of experience about the rational drug prescribing patterns. According to WHO, 15-25% of antibiotics encountered is expectable in the countries where an infectious disease is more prevalent. [11] It showed the overuse of antibiotics. Irrational use of antibiotics not only increases the risk of antibiotic resistance but also results in economic burden to patients and loss of scarce resources. Absence of antimicrobial susceptibility and culture testing laboratory facilities in PHCCs, lack of determination of severity of illness, peer norms, fear of poor outcomes, lack of awareness related to antibiotic use guidelines resulting in adjudged empirical prescribing of antibiotics were found to be main contributing factors for this irrationality. The percentage of injection prescribed was only 0.66% which was less than that reported in studies in Kaski [3,17] and that reported in other developing countries like Bahrain (8.3%)[18], Pakistan (27.1%)[15], Bangla-desh (13.6%)[16] . Previous study in terai district of Nepal shows 13.7% of injections prescribed.[9] Less number of injections in prescriptions was a rational drug use sign and it also decreased the cost of prescription. In the present study, drug prescribe in generic was 59.93% which was similar with the other study conducted in PHC of terai district (63.50%) and that conducted in western Nepal (59%) [9,10] but was comparatively more than the findings in private and tertiary health sectors (19%)[19]. In the developing countries like Barhain it was found that 14.3% of drug was prescribe in generic which was very less than our study[18]. Similarly, study in Nigeria reports 49.3% [20] and Madhya Pradesh, India reports 60.9% [21] of drugs dispensed in generic form. The WHO recommends generic prescribing because it allows patients to choose from a wider range of drugs options and often

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helps reduces costs associated with brand variation. Some of the factors which influence low prescribing of generic drugs are poor regulation and enforcement, less promotion and production of the generic drugs in Nepal.

In our study it was found that 68.51% of drugs were prescribed from EDL. In this study we found OJT students and intern doctors were involved in prescribing the drugs, contributing to prescribing beyond the EDL. Similar study in two PHC of western Nepal found 59.9% and 67% prescribing from EDL.[10,17] In Nigeria and Bangladesh it was found that 90.5% and 62.6% were prescribed from EDL.[16,20] Prescribing from EDL is fundamental as it contains cost effective, rational and evidence based and clinically verified category of drugs that meets the basic health care needs of majority of people. It also ensures the access to and rational utilization of medicines supplied in PHC centers by the government. In our study, excessive usage of antibiotics, antihistamines and various multivitamin formulations which are not listed in Nepal's EDL may have contributed to the low incidence of prescribing from EDL. EDL prescribing practice reduces the unwanted cost and also promotes rational drug use. The drawback of non-EDL prescribing was the irregularities of drug supply in health care facilities. Only 64.22% of drugs were dispensed from the both health care facilities. It was due to lack of drug stock and due to poor prescribing knowledge. Similar study in terai district showed 81% of drugs prescribed were dispensed from PHCC [9]. A similar study in Pakistan reported 90.9% of drugs were dispensed.[17] Drug dispensed in this study was found to be less satisfactory. This was due to inadequate supply of drugs to health care facilities.

In our study, consultation and dispensing time were 6.60 minutes and 99.45 seconds respectively. Similar study in the PHC of Kaski district showed an average consultation time of 2.2 minutes and dispensing time around 42.52 seconds.[3] Similarly previous study in eastern terai district has shown the consultation time of 2.7 minute.[9] This showed that our study centers physician and medical assistants were comparatively providing more consultation time to a patient which is a good approach. Appropriate consultation time results in proper diagnosis and enhanced prescriber judgement. The dispensing time is also satisfactory; this means that dispensing staff were handling the prescription properly during dispensing of drugs. However, only 17.73% patients had the knowledge about the drug dispensed to them which is very less in comparison to similar other study in Nepal where patient's knowledge was found to be 28.6% and 30%.[9,3] Dispensing is the last step of patients contact with the healthcare professionals. At this stage, The drug dispenser should have an obligation to provide adequate information and counselling to the patients regarding proper use of medication prescribed.[22] So there should be the provision of providing proper information of drugs for the rational use of drugs and promotions of drugs. Patient's knowledge, unskilled manpower, inadequate labelling, inadequate counselling by medical personnel and dispensers are the factors that affect the patient's knowledge on doses.

Adequate labelling in our study was found to be nil or zero. Most of the drug utilization studies at PHC in Nepal have similar results.[3,9] Labelling plays a vital role in rational drug use and promotion of drugs. In our study 45.54% was labelled as 'WHEN'. The main reason for this was lack of proper practice of drug labelling. Patient's name and drug name were not included due to lack of system and procedure. In both PHCs there was a copy of EDL or formulary and availability of key drugs was found to be 90.63% which was quite satisfactory. Drug management in these health care facilities was in accordance with the national standard.

In this study, the most common diagnosis was URTI i.e. 82 (13.46%) and APD i.e. 77 (12.64%) and allergy 64 (10.51%). The most commonly prescribed classes of drug were paracetamol 260 (16.18%) and amoxicillin i.e. 183(11.39). Another commonly prescribed drug was vitamin

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B complex i.e. 127 (7.90%). This finding related to prescribing and disease pattern were similar to findings obtained by Bajracharya et al in study in Duwakot health center, Nepal where fever, respiratory infection, APD were common morbid conditions and the NSAIDs and antibiotics were commonly prescribed drugs. [23] Study in Tamil Nadu India had also found significant prescription of NSAIDs, multivitamins and antibiotics in their study.[24] However, this study have certain limitation as we did not performed the review of prescription in relation to health problem or diagnosis of the patient and Secondly, the study was conducted in single season therefore the findings related to morbidity pattern might be limited by that particular season.

Conclusion

Among the prescriptions evaluated, the rational prescribing and dispensing practice was inadequate mainly reflected by high antibiotic encounters, low generic prescribing, inadequate labelling and poor patient's knowledge of drugs. Effective intervention programs are encouraged in these health facilities for the prescribers and the dispensing health personnel for promoting rational use of medicines

Recommendation

Promoting rational use in medicine is a fundamental issue to prevent drug use problems. Prescribers are encouraged to prescribe drugs in generic name and maximize use of drugs from EDL or national formulary. Similarly, Training to the pharmacy staff is highly recommended, so that the drug dispensing and appropriate labelling procedure is carried out efficiently.

Conflict of interest

The author declares no conflict of interest.

Acknowledgments

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