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Original Article

A study on rational drug prescribing and dispensing in outpatients in a tertiary care teaching hospital of Western Nepal

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Abstract
Objectives: To analyze the prescriptions of out-patients for rational prescribing and dispensing and to evaluate the patient's knowledge regarding use of drugs, using INRUD indicators.
Methods: A cross-sectional, descriptive study was conducted at the Manipal Teaching Hospital, Pokhara, Nepal during the time period from June 10th to August 19th 2004.
Results: Totally 247 prescriptions were randomly selected for analysis, wherein 720 drugs were prescribed. Only 15% of drugs were prescribed by generic name, 21.67% of the total drugs consisted of fixed-dose combinations, only 40% of drugs were from the Essential drug list of Nepal and 29.44% (n=212) were from the WHO Essential drug list. It was found that more than half (54.17 %) of the drugs were from Nepalese National Formulary and 35.69% were from WHO model formulary. Dermatological products were most commonly prescribed followed by drugs acting on central nervous system, antimicrobials and drugs acting on cardiovascular system. Among the drugs dispensed, 79.16% were oral followed by topical (18.19%) and parenteral forms (2.98%). Diagnosis was mentioned only in 3.23% (n=8) of the prescriptions and the average cost per prescription was found to be 241.11 Nepalese rupees (US$ 3.26). It was found out that pharmacist labelled only 0.4% of the medication envelopes with the name of the patient. However, 82.6% of the medication envelopes were labelled with name of the drug and 87.0 % with drug strength. Only 53.8% (n=133) of the patient knew both the duration of the therapy and administration time of drugs.
Conclusion: There is a need for educational intervention for prescribers and both managerial and educational intervention for the hospital pharmacists to improve prescribing and dispensing.

Key words: Rational use of drugs, Dispensing, Pharmacist, Prescribing

It is well documented that safe and effective drug therapy most is possibly only when patients are well informed about the medications and their use[1]. Every member of the healthcare team should practice rational drug therapy. Rational drug use means patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time and at the lowest cost to them and their community.[2] Confusion over brand names, overwhelming workload of doctors and pharmacists, cost factor, patient attitudes, erratic supply of drugs, lack of institutional formulary etc can lead to irrational use of drugs. Irrational drug use can lead to reduction in quality of drug therapy, increased risk of unwanted effects, drug resistance etc. The five important criteria for rational drug use are accurate diagnosis, proper prescribing, correct dispensing, suitable packing and patient adherence[3]. The prescribers should make an accurate diagnosis and prescribe rationally and the pharmacist should ensure that effective form of the drug reaches the right patient in prescribed dosage and quantity, with clear instructions on its appropriate use. Competent and qualified pharmacists should be trained for dispensing and for giving clear/proper instructions to the patient on safe and effective use of drugs. The pharmacists should have an easy access to complete and unbiased information on the drugs used and should undergo prerequisite training programs. The Omnibus Budget Reconciliation Act-1990 (OBRA-90) and Society of Hospital Pharmacists of Australia (SHPA) have established the minimum standards for information to be given to the patients by the dispensing pharmacists[4,5].

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The pharmacist is often the last member of the health care team to see the patient before he/she takes the drug and has an immense responsibility in counselling the patients[6]. Concept of rational use of drug is new in developing countries like Nepal, though several steps have been taken in the recent past towards ensuring rational drug use. Among the various measures, the development and revision of National essential drug list, development of National Formulary, amending pharmacy act and opening drug information centres are vital. The periodic evaluation of prescriptions can be a good tool to evaluate the rational use of drugs in terms of prescribing and dispensing and to evaluate patient understanding regarding drug usage. We conducted the study with the following objectives:

1. To analyze the prescriptions for rational prescribing and dispensing,
2. To evaluate the patient's knowledge regarding use of drugs; as per the International Network for Rational Use of Drugs (INRUD) indicators.

Materials and methods

Settings

The study was conducted at the out patient pharmacy of the Manipal Teaching Hospital, Pokhara, Nepal, a 550-bedded tertiary care teaching hospital. The data for this study was collected over the time period from June 10th to August 19th 2004 (10 weeks). Patients visiting the out patient pharmacy with a prescription from the hospital OPD were randomly enrolled in the study.

Questionnaire and interview

The INRUD encounter form (Appendix 1) was used for the study. The patients and their prescriptions were used as source of data. The prescription and labelling of the dispensed drugs were checked for their accuracy and all the relevant data were entered in the encounter form. The patients were also interviewed for their knowledge regarding dose, duration, and frequency of the drugs to be taken after the drugs were dispensed. In case of paediatric patients and patients with mental illness, patient party was interviewed as the patients themselves may not be able to communicate well.

Analysis

The filled encounter forms were analyzed for the age distribution of patients, department wise categorization of prescriptions, average number of drugs per prescription, therapeutic category of drugs prescribed, encounters with an antibiotic prescribed, encounters with at least one injectable, cost analysis of the prescriptions and patient knowledge on proper use of drugs as per the INRUD indicator. The average number of drugs per prescription and the patient knowledge of use of drugs were compared among different departments. Mann-Whitney U test was used for dichotomous variables and Kruskal-Wallis test for the others. A p-value less than 0.05 was taken as statistically significant.

Results

Totally, 247 encounters were documented, in which a total of 720 drugs were prescribed. The mean ± SD number of drugs prescribed was 2.91 ± 1.41 out of them 706 (98.05%) were dispensed from the hospital pharmacy. The remaining drugs were either not available in the pharmacy or the patients had the drugs in their home or the patients did not have enough money to buy them.

More than 1/5th [21.67%, (n=156)] of the total drugs prescribed were fixed dose combinations (FDCs), and only 15% of the drugs (n=108) were prescribed by generic name, 40 % (n=288) of drugs were from the Essential drug list of Nepal and 29.44% (n=212) were from WHO essential drug list. It was found that 54.17 % (n= 390) of the drugs were from Nepalese National Formulary and 35.69% (n=257) were from WHO model formulary.

Gender analysis revealed that female patients were slightly more in number (49.8%) compared to males (46.6%). In 3.2% of prescriptions sex was not mentioned. With regard to age 23.5% patients were in the age group of 21-30 Years while 18.2% patients were in the age group 31-40 years. Table 1 shows the details of the age distribution.

In relation to various departments, 71 (28.7) were from the Department of Medicine followed by Dermatology (13.8%). The details are listed in Table 2.

The average number of drugs per prescription was found to be higher in psychiatry department and least in orthopaedics department. The details are displayed in Table 3.

Out of 720 prescribed drugs, it was found that 17.2% of drugs were dermatological and topical products followed by Central Nervous System (CNS) drugs (14%), antimicrobials (12.1%) Cardiovascular system (CVS) drugs, renal and drugs acting on blood (11.7%). The details are shown in Table 4. The cost of the prescription was also assessed in the study and is listed in Table 7. The average cost per prescription was found to be NRs 241.11 (US$ 3.26).

Among the 247 encounters, an antimicrobial was prescribed in 72 encounters (29.1%). The department wise break-up of encounters with an antibiotic prescribed is shown in Table 5. In the ENT department an antimicrobial was prescribed in 2/3rd (66.77%) of encounters.

With regard to dosage forms, it was found that majority of drugs prescribed were oral [570 (79.2%)] followed by topical [131 (18.2%)] and parenteral [15 (2.1%)]. others 2 (0.3%). The use of injectables was found to be highest in OBG department with at least one injectable in 26.7 % of the prescriptions.

The pharmacy at Manipal Teaching Hospital utilizes an envelope system to dispense the medicines. The patients are provided with an envelope for every individual drug purchased from the pharmacy. The envelope has a provision for patient name, name of the drug and instructions for taking the medicines. In this study it was found that only 3 (0.4%) of the drugs had the patient name labelled on the envelope while 595 (82.6%) of the drugs had the drugs name and 633 (87.9%) had the administration time only labelled on the envelope.

On interviewing the patients, it was found only 133 (53.8%) of the patients/patient party knew both the time of administration and quantity of drugs to be taken. Moreover there was no significant difference between male and female patients and patients belonging different age groups with regard to their knowledge of correct use of drugs. The patient knowledge regarding proper use of drugs is displayed in the Table 8.

Table 1: Age distribution of patients

Age group (Yrs)	**Number**	**Percentage**
Less than 10	21	8.5
11-20	30	12.1
21-30	58	23.5
31-40	45	18.2
41-50	31	12.6
51-60	14	5.7
61-70	27	10.9
> 70	13	5.3
Not mentioned	8	3.2

Table 2: Department wise categorization of prescriptions

Departments	**No. of prescription**	**Percentage**
Medicine	71	28.7
Dermatology	34	13.8
ENT	30	12.1
Psychiatry	27	10.9
OBG	15	6.1
Ophthalmology	15	6.1
Orthopaedics	13	5.3
Others (Paediatrics, oncology, dental, surgery and emergency)	42	17

Table 3: Average number of drugs per prescription

Departments	Total number of drugs	Average drugs per prescription
Medicine	225	3.2
Dermatology	87	2.6 *
ENT	86	2.9
Psychiatry	91	3.4 ▷
OBG	51	3.4 **
Ophthalmology	36	2.4 ▷▷
Orthopaedics	21	1.6 ß
Others (Paediatrics, oncology, dental, surgery, emergency, unidentified departments)	123	2.9

**p=0.001 compared to orthopaedics*
*** p=0.004 compared to other departments*
ß p=0.013 compared to other departments
▷ p=0.051 compared to other departments
▷▷p= 0.036 compared to orthopaedics

Table 4: Therapeutic category of drugs prescribed

Therapeutic classification	No. of drugs (%)	Percentage
Dermatological and other topical agents	124	17.2
Central nervous system	101	14
Antimicrobials	87	12.1
Cardiovascular, renal and blood	84	11.7
Antihistamines	74	10.3
Analgesics and anti-inflammatory	54	7.5
Vitamins, minerals and dietary supplements	53	7.4
Gastrointestinal system	48	6.7
Respiratory system	27	3.8
Anti diabetics	20	2.8
Hormone and Hormone antagonist	13	1.8
Autonomic nervous system	11	1.5
Anti-parasites	3	0.4
Others	20	2.8

Table 5: Encounters with an antibiotic prescribed (n=72)

Departments	Number	Percentage
Medicine	12	16.9
Dermatology	12	35.3
ENT	20	66.7
Psychiatry	2	7.4
OBG	9	60.0
Ophthalmology	1	6.7
Orthopaedics	1	7.7
Others (Paediatrics, oncology, dental, surgery and emergency)	15	35.7

Table 6: Injectable encounters (n=15)

Departments	Number	Percentage
Medicine	7	9.9
Dermatology	0	0.0
ENT	2	6.7
Psychiatry	0	0.0
OBG	4	26.7
Ophthalmology	0	0.0
Orthopaedics	0	0.0
Others (Paediatrics, oncology, dental, surgery and emergency)	2	4.8

Table 7: Cost analysis

Cost (NRS)	Number of prescriptions	Percentage
0-100	69	27.94
101-200	75	30.36
201-300	42	17.00
301-400	23	9.31
401-500	12	4.86
500 -600	11	4.45
>600	15	6.07

Table 8: Patient knowledge on proper use of drugs

Departments	No. of patients	Percentage
Medicine	42	59.2
Dermatology	26 *, **	76.5
ENT	12 ▷	40.0
Psychiatry	12 ▷▷	44.4
OBG	9 ß	60.0
Ophthalmology	12 ß ß	80.0
Orthopaedics	9	69.2
Others (Paediatrics, oncology, dental, surgery, emergency and unidentified departments)	11	26.2

*** p= 0.018 compared to Psychiatry*
** p= 0.005 compared to ENT*
▷ p= 0.046 compared to Ophthalmology
▷▷p= 0.028 compared to Ophthalmology
ß p= 0.003 compared to other departments
ß ß p= 0.001 compared to others

Discussion

Prescribing pattern of drugs reflects the clinical judgment of the clinicians. The average number of drugs per prescription was found to be 2.91 in our study which is less than that reported from studies conducted in Brazil (8.6), Ghana (3.6) and West Bengal, India (3.2)[7,8,9]. Lesser number of drugs is a positive sign as polypharmacy is known to be a contributing factor for hospitalizations[10]. It may also lead to drug interactions, adverse drug reactions patient and non-adherence. However, in certain conditions like cardiovascular problems, the patients may require more than one drug. The recently published Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC-VII) guidelines also permit polypharmacy in hypertension[11].

Our study reports that 21.67% of drugs used were FDCs. A North Indian study reported a higher value of 45% of FDCs[12]. The use of combination products reduces the number of pills to be taken, cost of packing and dispensing fee. The patient adherence may be improved, as lesser number of drugs has to be ingested. There is an inverse relationship between patient adherence and the complexity of the

regimen[13]. However, the FDCs may lead to irrational combination as a marketing strategy of the pharmaceutical companies and hence need special attention.

Our study reports only 15% of drugs were prescribed by generic name. Our value is less than that reported in other studies[8,14]. Prescribing by generic name helps the hospital pharmacy to have a better inventory control. This will also help the pharmacy to purchase the drugs on contract basis, as the number of brands is less. It can also reduce the confusion among the pharmacists while dispensing. Generic drugs are often more economic than the branded ones. Prescribing by brand name may be an evidence of vigorous promotional strategies by pharmaceutical companies.

The percentage of drugs prescribed from the essential drug list of Nepal was 40% which is lower compared to that of the study conducted in Ghana (93.2%) and in North India (75-95%)[15,16]. The reason for this could be related to lack of awareness about essential drug concept and essential drug list among prescribers. It was found that 54.17 % of the drugs were from Nepalese National formulary and 35.69% were from the WHO model formulary. Prescribing from these formularies can reduce the number of irrational combinations entering the market. It can also reduce the cost incurred on drugs.

In our study, 28.7% of prescriptions were from the Department of Medicine. The medicine department had the maximum out patient turn over. In this hospital, although the numbers of dermatological prescriptions were less than prescription from the department of medicine, the dermatological and topical products were more in number because the departments other than dermatology also prescribed topical products.

Dermatological products were most commonly prescribed (17.2%) followed by the drugs acting on CNS and antimicrobials. Our results contradict the result of studies in Brazil and India[7,17]. A similar study conducted in Western Nepal, two years back had a different pattern of distribution; antimicrobials (26.6%) were prescribed more often[18]. The difference in drug distribution may reflect the disease prevalence of the study site during the study period.

The dosage form plays a very important role in patient adherence. In our study, we found maximum use of oral dosage form (79.2%) and 2.1% of drugs were injectables which is more than that noted in the study conducted in North India (0.9%) and less than that of a study in Eastern India (3.9%)[17,9]. The use of injectable preparation is necessary in cases like insulin, Methyl prednisolone and benzathine penicillin. Elderly patients may like to have a tablet whereas for paediatric patients a liquid dosage form may be appropriate. Appropriate dosage form may also ensure the therapeutic efficacy of drugs and reduce toxicity in case of specialized dosage forms like film coated, enteric coated, timed release and controlled delivery preparations. Patient counselling is also essential for patients taking specialized dosage forms like retard preparations and Gastro Intestinal Therapeutic System (GITS) preparations.

Written information for drugs reflects the extent of pharmacist involvement while dispensing the drugs. Only 0.4% of medication envelopes had the patient name labelled on it which is awfully low. However 82.6% of the dispensed drugs had drug name and 87.7% had time of administration mentioned on the envelops. Overall adequate labelling was found only in 0.4% of the drugs which was much less than the 56.2% reported in a study conducted in Eastern India[8].

Several studies have acknowledged the improvement in patient knowledge about medications following counselling by pharmacists[19,20,21]. In our study only 53.8% of the patients/patient party knew the administration time and quantity of drugs to be taken. It was also evident that the age and sex did not influence the patient knowledge on correct use of drugs. The knowledge gained by the patients from the dispensing pharmacist is essential in ensuring patient adherence.

The average cost per prescription was found to be NRS 241.11 (US$ 3.26). A similar study in Western Nepal reported the average cost per prescription to be (US$2.75 ± 2.21)[18]. This shows a rise in prescription cost in the recent past in Western Nepal. Cost is a very important factor in developing countries like Nepal as it can be a major cause for non-adherence. The results of several studies suggest that up to 10% of hospital admissions and 23% of nursing-home admissions are related to non-adherence[22]. A review of published studies of drug-related hospital admissions reported that 22.7% of adverse drug reaction hospitalizations were induced by non-adherence.[23] Prescribing cheaper alternatives may be beneficial in this setting.

Limitations

The study was conducted during the period of June to August and thus the seasonal variation was not evaluated. We also had a limited sample size. The

selection of prescriptions from different departments may not be representative of the patient population attending the OPDs of the hospital.

Conclusion

The study suggests that there is immense scope of improvement in prescribing and dispensing in the hospital. Generic prescribing is urgently needed. The prescribers should be educated about generic prescribing which may have a multitude of benefits including cost minimization. The lacunae were noted in the labelling of drug envelopes by the pharmacists that needs managerial as well as educational interventions. The study also suggests that a hospital formulary encompassing national essential drug list is urgently required. The Drug and Therapeutics Committee of the hospital should take the leading role in rationalizing the prescribing and dispensing pattern in the hospital.

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Appendix 1

INRUD encounter form

ENCOUNTER FORM								
Hospital No	Patient Identifier (Name)	Age	Sex	Prescriber			Date	
Health problem	Health Problem Description/Diagnosis			Department				
Drugs	Prescription Character			Label			Patient Drug Knowledge	
	Drugs name, strength and dose	Dispensed Quantity		Patient Name	Drug Name	When	When	How Much
				(0/1)	(0/1)	(0/1)	(0/1)	(0/1)