

Assessment of Drug Use Pattern Using WHO Prescribing Indicators

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ABSTRACT

Background: In order to promote rational drug use in developing countries, assessment of drug use pattern using the World Health Organization drug use indicators is important. The aim of this study was to assess the drug prescription patterns at Kathmandu Medical College Teaching Hospital, using some of the World Health Organization core drug use indicators.

Methods: A prospective cross-sectional study was carried out in order to determine current prescribing trends at Kathmandu Medical College Teaching Hospital. A total of 605 prescriptions were collected and analyzed in the study.

Results: The average number of drugs per prescription was 5.85 considering the total amount of prescriptions. Furthermore, assuming each prescription as an individual patient, 64.1% of patients received antibiotics, and 71% of patients received injectable form of drugs. Among antibiotics the most common antibiotics prescribed were Ceftriaxone, Amoxicillin/Cloxacillin, Azithromycin, Cefixime, and Cloxacillin. Only 16.94% of the medicines were prescribed in generic names with the rest 83.06% of the medicines being prescribed in brand names and 47.55% of medicines prescribed were from the National List of Essential Medicines-Nepal.

Conclusions: The current study revealed that polypharmacy and prescription writing using brand names were common. Prescriptions writing in generic name needs to be promoted and encouraged. There appears to be a crucial need for the development of prescribing guidelines when it comes to antibiotics.

Keywords: Drug prescription; drug utilization; prescribing practices; rational drug use; WHO prescribing indicators.

INTRODUCTION

Pharmacotherapy has been the mainstay of treatment since ages. However, despite this long practice, irrational use of medicines is a worldwide issue and therefore World Health Organization (WHO) is advocating the rational use of medicines.¹

One of the core policies to promote rational drug use is the supervision, audit and feedback.¹ Prescription audit and feedback consists of the analysis of prescription for appropriateness and then giving feedback. Evaluation of drug use patterns with WHO drug use indicators is an obligatory step for promoting rational use of drugs. In order to encourage rational drug use, it is necessary to find out and describe the various ways in which the drug use is irrational like the polypharmacy, overuse of antibiotics and injectables, to name a few. Merely listing out the irrational drug use may not be enough therefore it is also imperative to quantify them so as to note the frequency of irrational use of drugs. Being able to quantify the kind of irrational drug use behavior will

help decipher which areas should be focused to being about positive changes. Among various well-established survey methods available, one such evaluation method is patient care survey utilizing the WHO health facility drug use indicators. Such quantitative indicators are now accepted as a universal standard for problem detection and have been widely used in over 30 developing nations.²

METHODS

A prospective cross-sectional study was carried out on inpatient prescription data collected from December 2016 to July 2017. A total of 605 prescriptions were collected and evaluated as per WHO guideline on prescribing indicator study which states that at least 600 encounters should be included in a cross-sectional study. The data were collected at by random sampling techniques from patient medical records at different clinical departments in Kathmandu Medical College Teaching Hospital (KMCTH), Sinamangal. Information were obtained including patient sex, age and diagnosis, specialty, and the prescribed items related

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information such as medicines and the dosage forms. The prescriptions collected belonged to different departments ENT, Gynaecology, Medicine, Neurosurgery, Orthopaedics, Paediatrics, Psychiatry, and Surgery.

WHO prescribing indicators were used in the current study. It includes the average number of medicines per prescription, the percentage of prescription that includes at least one antibiotic medicine, the percentage of prescription that includes at least one injectable medicine, the percentage of drugs prescribed by generic name, and the percentage of medicines prescribed from National list of Essential Medications- Nepal (NLEM). The average number of medicines per prescription was calculated by assuming each medicine as an individual item, also the same generic drug in different dosage forms were taken as individual medicines.

Inpatients of both sexes who were admitted in different clinical departments at KMCTH were included in the study and the patients brought to the emergency department or the patients admitted to the Intensive Care Unit/Critical Care Unit and the patients who died or left against medical advice were excluded from the study.

An approval from the Institutional Review Committee of KMCTH was obtained prior to the study. Data collection form was prepared by using WHO designed criteria based data collection format. The specific type of data required to measure the prescribing indicators was recorded for every patient encountered and entered directly into a computer in Microsoft Office Excel. A total of 605 prescriptions were collected and analyzed in this study.

The data in Microsoft Office Excel was double checked and further analysis was done. Computations of drug use pattern were carried out as described earlier. The study data were analyzed by using parameters such as average and percentages.

RESULTS

A total of 605 prescriptions for inpatients were collected and analyzed in this study. The collected prescriptions belonged mostly to Gynaecology (31.4%), Medicine (17.5%), Paediatrics (16.9%), Surgery (15%), Orthopaedics (8.9%), ENT (4.9%), Neurosurgery (2.6%), and Psychiatry (2.5%). Figure 1 below depicts the department wise distribution of inpatients.

A total of 3531 medicines were prescribed. Thus, the mean number of medicines per prescription was 5.85 considering the total amount of prescriptions. Furthermore, assuming each prescription as an individual patient, 64.1% of patients received antibiotics, and 71% of patients received injectable form of drugs. Only

16.94% of drugs were prescribed in generic names with the rest 83.06% of the drugs were prescribed in brand names and 47.55% of drugs prescribed were from the NLEM-Nepal. A summary of the results stated above is also given in Table 1.

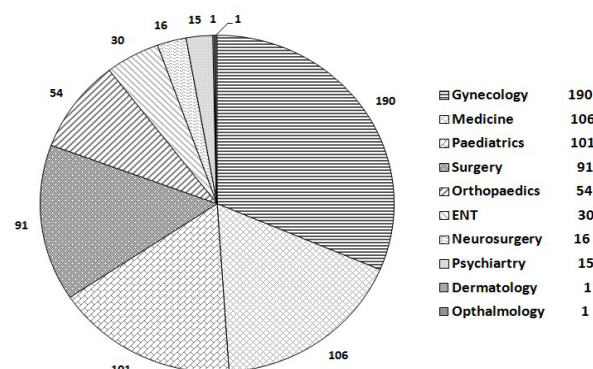


Figure 1- Department wise distribution of inpatients.

Table 1. Summary of results of an inpatient study at KMCTH.

Prescribing indicators	Total drugs/ encounters	Average/ percent
Average number of drugs per encounter	3531	5.85
Percentage of encounter with antibiotics	388	64.10%
Percentage of encounter with injections	430	71%
Percentage of drugs prescribed by generic names	597	16.90%
Percentage of drugs from National List of Essential Medicines	1681	47.60%

Table 2. Most commonly prescribed antibiotics for the inpatients at KMCTH.

S. No.	Commonly Prescribed Antibiotics	Frequency	Percentage
1	Ceftriaxone	108	16.8%
2	Amoxicillin + Cloxacillin	83	12.9%
3	Azithromycin	64	10.0%
4	Cefixime	41	6.4%
5	Cloxacillin	39	6.1%
6	Ciprofloxacin	34	5.3%
7	Cefpodoxime	29	4.5%

8	Amoxicillin + Clavulanic acid	28	4.4%
9	Amikacin	25	3.9%
10	Cefotaxime	23	3.6%
11	Cefuroxime	21	3.3%
12	Levofloxacin	20	3.1%
13	Amoxicillin	15	2.3%
14	Cephalexin	7	1.1%
15	Meropenem	7	1.1%
	Others	97	15.1%
	Total	641	100.0%

Out of the total 3531 medicines prescribed, 641 (18.1%) were antibiotics. Antibiotics were one of the mostly prescribed medicines, 388 patients out of 605 were given at least one antibiotic during their stay, rephrasing it, 64.1% of all cases received antibiotics during their treatment at the hospital. The most common antibiotics prescribed were Ceftriaxone, Amoxicillin/Cloxacillin, Azithromycin, Cefixime and Cloxacillin among others. A more detailed list of commonly prescribed antibiotics in our study is shown in Table 2.

The total number of injectable medicines prescribed was 1382 (39.1%). A total of 430 (71%) patients were given at least one medicine by injection route during their stay in the hospital. The most common injectables prescribed as shown in Table 3 were Ceftriaxone, Paracetamol, Ketorolac, Metronidazole, and Ondansetron. Ceftriaxone being the antibiotic only found in injectable form again was ranked as the most prescribed injectable which accounted for 3% of all prescriptions, the drug mostly being used by medicine, orthopaedics and paediatrics departments.

Table 3. Most commonly prescribed injectables for the inpatients at KMCTH.

S. No.	Commonly Prescribed injectables	Frequency	Percentage
1	Ceftriaxone	108	7.8%
2	Paracetamol	96	6.9%
3	Ketorolac	88	6.4%
4	Metronidazole	88	6.4%
5	Ondansetron	81	5.9%
6	Promethazine	80	5.8%
7	Diclofenac	78	5.6%
8	Pantoprazole	77	5.6%
9	Ranitidine	68	4.9%
10	Tramadol	65	4.7%
11	Pethidine	58	4.2%

12	Amoxicillin + Cloxacillin	50	3.6%
13	Vitamin K	49	3.5%
14	Amikacin	25	1.8%
15	Cefotaxime	24	1.7%
	Others	335	24.2%
	Total	1382	100.0%

Antibiotics were mostly included in prescriptions by gynaecology, medicine, surgery, paediatrics and orthopaedics. Likewise, injectables were mostly prescribed by surgery, gynaecology, medicine, orthopaedics and paediatrics.

DISCUSSION

It was observed in this study that an average number of items per prescription was 5.85, 18.1% of drugs prescribed were antibiotics, and the overall percentage of injectables prescribed was 39.1%. The relatively high figure is attributed to this study evaluating the prescription pattern in inpatients only. The number of medicines prescribed to a single patient ranges from 1 to 16 medicines. Polypharmacy is quite a common phenomenon in inpatient setting. The high number of prescribed drugs makes patients more prone to drug related adverse effects, similarly increases the likelihood of drug-drug interactions and causes an increased cost of therapy.³ This should be minimized by organizing grand rounds of interprofessional team including the pharmacists and pharmacologists where each member plays a role in reducing the medication use and monitoring the effects of drugs thereby increasing medication safety.⁴ The reason for polypharmacy should be properly scrutinized and where possible overutilization of drugs should be halted. Numerous studies have pointed out that the proton pump inhibitors have been over used in therapy.⁵

It was also found in this study that out of total 3531 medicines prescribed 311 (8.8%) belonged to the proton pump inhibitors (PPIs) group. Among them Pantoprazole, Esomeprazole and Rabeprazole were the mostly prescribed ones. In the wake of PPIs being linked with *Clostridium difficile* infections,^{6,7} other long term effects like reduced intestinal absorption of minerals and vitamins, and more recently noted kidney damage and dementia.^{8,9} In view of the widespread use of PPIs, It is advisable to use them responsibly only when required. Guidelines to help deprescribe proton pump inhibitors in the patients can be followed.¹⁰

Our study also pointed to polypharmacy issues in elderly, owing to comorbid conditions. This is in line with similar

studies which have stated that elderly population are at risk of high adverse effects as an outcome of polypharmacy.¹¹

The percentage of encounters involving antimicrobials prescribed at the Kathmandu Medical College Teaching Hospital was 64.1%. Looking at it another way round it was found that 18.1% of all the drugs prescribed were antibiotics. It was observed in this study that the antibiotics were used more in department of gynecology and surgery for prophylactic purposes. Finding that 64.1% of the patients were treated with some antibiotics indicates rather high use of antibiotics, which could point more towards use in prophylaxis rather than in definitive treatment.

Our study showed that the most common antibiotics prescribed were Ceftriaxone, Amoxicillin/Cloxacillin, Azithromycin, and Cefixime among others. Other studies have also similarly pointed out that Cephalosporins are the most widely utilized first line antibiotics.¹²

This sort of increasing use of antibiotics not only leads to increased cost of therapy, but also to leads to the development of drug resistant bacterial strains.¹³ We also cannot deny the fact that quite a number of patients by the time they require hospitalization are exposed to different antibiotics as a result of self medication.¹⁴ Various interventions so as to promote the rational antimicrobial use are essential for preserving the effectiveness of available antimicrobials available in the market today.¹⁵

The percentage of encounters involving injectables were prescribed was 71%. Possible reason may be that the study setting is inpatient ward where patients with critical illness are treated, and injection produces rapid action. Injections are costly as compared to other dosage form and their use is associated with variety of problems like local irritation, phlebitis, and extravasation. They also have a tendency to increase infections and lead to sepsis in a few cases.¹⁶ Our country largely lacks the concept of aseptic pharmacy services would ensure that the injectables are not prepared at patient bed side rather inside clean laminar flow hoods. Laminar flow hoods are devices for containment which work as barriers protecting the aseptic material from different sources of contamination or protect the staff from exposure to infectious and other hazardous materials. Use of such hoods decreases the chance of inducing infections, which would in turn decrease the need to rely on antibiotics.

The percentage of drugs prescribed in generics was 16.94 only which denotes that there is a trend in Nepal of prescribing in trade names rather than the

generic names. Prescribers are unsure that all the drug companies produce drugs of similar efficacy and hence the habit of sticking to trade names when it comes to prescribing. This may have led to physician's preference of medicines of a certain manufacturer over others as a result of past experience with the drug. It could also be because one may be accustomed to prescribing a certain drug product over others. It is also in part attributed to the lack of hospital formulary and inpatient drug distribution systems. A hospital formulary is a periodically revised compilation of medicines and ancillary supplies which reflect the current judgment of healthcare professionals of any institution. Such hospital formulary has been in use in Patan Hospital, Shree Birendra Army Hospital, and Palpa Mission Hospital among others. Only a handful of hospitals have been implementing the inpatient drug distribution system practices here like Norvic International Hospital, National Institute of Neurological and Allied Sciences, Patan Hospital, naming a few among a few others. The trend of prescribing in brand names is also high because the prescriber cannot be sure of the quality of medicines purchased by the patient party when medicines are prescribed in generic names, especially in view of the number of pharmacies mushrooming outside the hospital premises, most of which do not stick to the good pharmacy practices.

In our study, out of 3531 drugs used, 1679 drugs were included in National List of Essential Medicine of Nepal, 2011, i.e. 47.55%. Use of the medicines from NLEM should be promoted for the optimal use of limited resources. Selection of the essential drugs itself should be done based on the disease prevalence, proof of efficacy and safety and the current pharmacotherapy approaches.¹⁷

Irrational use of medicines is a worldwide issue and therefore to help rational drug use WHO has also published a practical manual titled "Guide to good prescribing".¹⁸ Besides WHO, an organization promoting the rational use of medicine by the name International Network for the Rational Use of Drugs (INRUD) has been active worldwide since 1989 with an aim is to design, test and promulgate useful strategies for improving the prescription, dispensing and use of drugs particularly in resource poor countries.¹⁹

In Nepal, the absence of a well functioning Drug and Therapeutics Committee (DTC) in hospitals and health centers is an issue. Absence of proper clinical guidelines, insufficient government expenditure on medicines and staff, lack of independent information providers on medicine, inadequate public education on medicine, inappropriate self medication are the main culprits behind the irrational drug use here.

The study has made use of WHO prescribing indicators which exactly records what is prescribed to the patients, but not the reason behind it, which would require use of other techniques. The study may not also reveal the exact scenario of drug use as the study is limited to inpatient settings only. This study has been an output of manual data entry and assessment hence the number of cases in the study is limited to a few hundred only. At the present age of technology if hospitals would have electronic database management system one would be able to carry on such studies on a much larger scale on thousands of patients.

CONCLUSIONS

The study gave us an overall pattern of drug use data in different departments of KMCTH. The current study showed that polypharmacy and prescription writing using brand names were frequent. Therefore, government and institutions should promote and encourage prescription writing in generic names.

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