Assessing Drug Utilization in the Emergency Medicine Department at a Tertiary Care Teaching Hospital Using WHO Drug Use Indicators

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ABSTRACT

Background

Patients might need urgent care in critical cases. Limited resources and limited manpower are limitations seen in developing countries. Very few studies have been conducted on drug utilization in the emergency department in Nepal.

Objective

To find out the drug utilization pattern and the cost of medicines in emergency medicine department as per WHO drug use indicators.

Method

The study design was a hospital based retrospective cross-sectional study done at the emergency department of KIST Medical College and Teaching Hospital, Lalitpur, Nepal. The study population were patients visiting the emergency department. The data was collected during the period from April to June 2023. Data was collected for one month from each quarter for the year 2023 from the medical records of the patients from the medical records section. A structured proforma was used for the data collection process. Census sampling method was used.

Result

Maximum patients, 257 (25.1%) were from age group 21-30 years. Females were slightly more than males, 537 (50.5%). The top three diagnosis among the admitted patients were soft tissue injury, 148 (13.9%), dengue fever, 138 (12.9%) and viral fever, 51 (4.7%). Maximum patients, 346 (32.5%) were given two therapeutic classes of drugs, followed by only one therapeutic class of drug for 251 (23.6%) patients. The common classes of drugs prescribed for the patients were analgesics, 639 (60.1%) followed by intravenous fluids, 410 (38.5%) and antiulcer drugs, 377 (35.4%). The total cost of drugs used was calculated as Rs. 305126.4 (2280.99 USD) and the average cost per patient was Rs. 297.97 NPR; 2.23 USD. The WHO drug prescribing indicators showed maximum percentage, (85.4%) of encounters with injection prescribed followed by the percentage of drugs prescribed from the Nepalese National List of Essential Medicines 81.71%.

Conclusion

On the basis of the findings from this study injection prescribing, and the number of drugs prescribed per encounter showed considerable deviation from the standards recommended by the WHO. Hence, it is important for the hospital to design and implement a system to promote judicious prescribing and injection medication administration.

KEY WORDS

Drug utilization, Emergency department, WHO core drug use indicators, Nepal

INTRODUCTION

Medicines are an important component of healthcare services and should be used appropriately for improving patients' health. Irrational use of medicines can prolong the duration of illness and can increase the risk of developing adverse effects.[1] Drug utilization studies analyse the prescribing patterns for medicines and evaluates the process of prescribing, consumption and dispensing of medicines for enhancing the quality of these processes.[2] World Health Organization (WHO) has defined rational use of drugs as 'patient receive medicines 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'.[3]

WHO developed the core drug use indicators for conducting drug utilization studies in a healthcare setting. WHO core drug use indicators include prescribing indicators (average number of drugs in prescriptions, percentage of drugs prescribed by generic name and facility-specific medicine list, percentage of encounters with an antibiotic and an injection prescribed); patient care indicators (average consultation and dispensing time, percentage of drugs dispensed, adequately labeled, and knowledge of patients, on dosage), and health facility indicators (availability of essential drugs list and key drugs).[3] This study assessed only the prescribing indicators.

Irrational use of medicine may be more common in developing countries. Many stakeholders are responsible for this including prescribers, patients, and the healthcare service delivery system.[4,5] Polypharmacy, and inappropriate use of antibiotics are some examples of the irrational use of drug that can lead to drug-drug interactions, therapeutic failure, high economic burden and poor treatment outcome.[1]

These indicators were developed by the WHO Action Program on Essential Drugs and International Network for Rational Use of Drugs to be used for drug use evaluations without further national validation.[6,7] The indicators for prescribing include an average number of medicines prescribed per encounter, the percentage of the medicines prescribed by the generic name and from the essential medicines list along with the encounters with injections and the antibiotics.

In the emergency department patients might need urgent care in critical cases.[8] Many decisions must be made quickly, and the medicines should be used with precision. Limited resources and limited manpower are limitations seen in the developing countries.[9,10] So, the physicians may struggle to select, initiate, and individualize appropriate drug therapy for the patients. Very few studies have been conducted on drug utilization in the emergency department in Nepal. Hence, this study was planned and conducted to find out the drug utilization pattern and the cost of medicines in emergency medicine department as per WHO indicators.

METHODS

Ethical approval was obtained before the conduct of the study. The study design was a hospital based retrospective cross-sectional study. The study site was the emergency department of KIST Medical College and Teaching Hospital, Lalitpur, Nepal. The study population were patients visiting the emergency department with different types of illness.

A one-year data was divided into three quarters. Data was collected for one month from each quarter from the medical records of the patients from the medical records section of the study site. Data were collected for the patients having a stay of at least 24 hours in the emergency department during the period selected. A structured proforma was used for the data collection process in the emergency department. Census sampling method was used for collecting data. The patient's records were used for obtaining the data about their diagnosis and the drugs details. All prescriptions of the selected one month, irrespective of patient's age, gender and diagnosis were included. Content validation of the proforma was done by sending it to the experts of the emergency department for validating the parameters mentioned in the proforma. The retrospective data was collected during the period from April to June 2023.

Data management and analysis was done by coding, entering, and analyzing using SPSS 16 and descriptive tests like mean and frequencies were calculated. The WHO drug prescribing indicators like average number of drugs per encounter, percentage of drugs prescribed by international non-proprietary name, percentage of encounters with injections prescribed, Percentage of encounters with antibiotics prescribed and percentage of drugs prescribed from Nepalese National List of Essential Medicines were also calculated.

RESULTS

The results showed that patients from all age groups were admitted to the emergency department. Maximum patients, 257 (25.1%) were from age group 21-30 years. Females were slightly more than males, 537 (50.5%). This has been shown in table 1 below.

The top three diagnosis among the admitted patients were soft tissue injury, 148 (13.9%), dengue fever, 138 (12.9%) and viral fever, 51 (4.7%). Some patients were having comorbidities, 133 (12.5%) like hypertension, diabetes, and chronic obstructive pulmonary disease. Most patients did not have past history of drug allergies, 974 (91.5%).

The commonly prescribed classes of drugs were also studied. Maximum patients, 346 (32.5%) were given two therapeutic classes of drugs, followed by only one therapeutic class of drug for 251 (23.6%) patients. The common classes of drugs prescribed for the patients were

Table 1. Demographic characteristics of patients admitted to the emergency medicine department (n=1064)

Characteristics	Number (%)
Age (in years)	
0-10	160 (15.1)
11-20	149 (14.0)
21-30	257 (25.1)
31-40	152 (14.3)
41-50	135 (12.7)
51-60	76 (7.1)
61-70	52 (4.9)
71-80	53 (5.0)
> 80 years	19 (1.8)
Gender	
Male	527 (49.5)
Female	537 (50.5)

Table 2. Commonly used drug groups

Name	Number (%)
Analgesics	639 (60.1)
Antiemetics	228 (21.4)
Intravenous fluids	410 (38.5)
Tetanus vaccine Solution	143 (13.4)
Antispasmodics	174 (16.4)
Antibiotics	113 (10.6)
Antiulcer	377 (35.4)
Antiplatelet	25 (2.3)
Anticoagulant	4 (0.4)
Corticosteroids	54 (5.1)
Antiamoebics	23 (2.2)
Antianxiety drugs	27 (2.5)
Antihypertensives	34 (3.2)
Diuretics	27 (2.5)
Antidiabetics	5 (0.5)
Antihistamines	19 (1.8)
Coagulants	32 (3)
Hypolipidemic drugs	20 (1.9)
Others	330 (31)

analgesics, 639 (60.1%) followed by intravenous fluids, 410 (38.5%) and antiulcer drugs, 377 (35.4%).

With regard to individual drugs, paracetamol was the most commonly used drug and pantoprazole was the most commonly used proton pump inhibitor. Similarly, Ondansetron was the commonly used antiemetics and hyoscine was the antispasmodic on an individual basis. Normal saline was the commonly used resuscitation fluid. Ceftriaxone followed by piperacillin and tazobactum were the commonly used antibiotics. Aspirin was the commonly given antiplatelet agent and Enoxaparin was the common anticoagulant. Hydrocortisone was the common corticosteroid and metronidazole was the common antiamoebic. Diazepam was the anxiolytic used and labetalol was the common antihypertensive. Furosemide was the frequently used diuretic and cinnarizine was the antihistaminic. Similarly, tranexamic acid was used as coagulants and atorvastatin as the antihyperlipidemic agent used.

The total costs of drugs used was calculated as Rs. 305126.4 (2280.99 USD) and the average cost per patient was Rs. 297.97 NPR; 2.23 USD. (The conversion rate for 1 USD to NPR is 133.01NPR) The WHO drug prescribing indicators showed maximum percentage, (85.4%) of encounters with injection prescribed followed by the percentage of drugs prescribed from the Nepalese National Formulary 81.71% as shown in table 3.

Table 3. WHO drug prescribing indicators

Prescribing indicator	Values
Average number of drugs per encounter	2.6%
Percentage of encounters with antibiotics prescribed	10.6%
Percentage of encounters with injection prescribed	85.4%
Percentage of drugs prescribed by international nonproprietary name	40.04%
Percentage of drugs from the Nepalese National List of Essential Medicines	81.71%

DISCUSSION

This study was done to assess the drug utilization in the emergency department of a tertiary care hospital using the WHO prescribing indicators. These indicators were used to assess the average number of drugs prescribed per encounter, percentage of drugs prescribed by international nonproprietary name, percentage of drugs prescribed from the Nepalese National List of Essential Medicines, percentage of encounters in which antibiotics were prescribed, and percentage of encounters in which injections were prescribed.

The current study shows the average number of drugs prescribed per encounter was 2.6 and this percentage was higher when compared to the guidelines given by WHO, which ranges from 1.6 to 1.8.[11] This increased value may be due to the patient's condition in the emergency department where the empirical therapy might be needed due to the critical condition of patients. This result is also lower than that reported in a meta-analysis study where the average number of drugs per encounter was 3.1.[12] However, the percentage is more as compared to another study from Ethiopia, where it was reported as 1.9.[13] The findings are also low as compared to a study done in India where the percentage was 6.76.[2]

This finding is also lower than that reported in a systematic review, where the percentage was 3.1 and higher than another study from Southern Ethiopia.[12,14] This deviation might be due to the difference in setting, where the studies conducted as the latter study evaluated the use of drugs across all wards of the hospital.

The percentage of antibiotics prescribed was 10.6% in this study. This was relatively less as compared to another study from the ER in Ethiopia. This might be due to differences in the types of patients treated in the emergency department. The top three diagnosis of the admitted patients were soft tissue injury, 148 (13.9%), dengue fever, 138 (12.9%) and viral fever, 51 (4.7%), which are often treated with antivirals and analgesics. This finding is also in accordance to the standards given by WHO, which recommends less than 20-26.8% of antibiotic use in countries where infectious diseases are prevalent.[7] This finding was less compared to another study done in Nepal, which showed 42% of antibiotics prescribed. This may be due to the difference in the patient population of respiratory tract infection.[15]

The percentage of injections prescribed in this study was 85.4%, which is marginally lower than the study done in Ethiopia where the percentage was 87.7%. This result is much higher than in studies conducted elsewhere, for example in Ghana, 14% in a systematic review on 11 African countries, 25.0%, in Saudi Arabia, 23%, in Yemen, 46.0%, and in Oman, 38%.[12,16-19] This higher percentage of injections may be due to the critical condition of patients requiring immediate care with a tendency to use parenteral medicines.

The drugs prescribed by the generic names was found to be 40.04% in our study. This result is in accordance with the results shown in a study done in Nepal.[15] Prescribers are encouraged to prescribe by international nonproprietary name since it has a major impact in terms of cost minimization. In this study, the percentage of drugs prescribed by international nonproprietary name was 40.04%, which is less as compared to the WHO recommendation, which specifies about 100% of medicines should be prescribed using INN. This may be due to the fact that the rule to prescribe in generic names has not been endorsed by the regulatory authorities till date in Nepal.[20]

Generic prescribing is helpful for the patients as these are cheaper and of good quality. However, the quality and safety issues might be of question in developing countries including Nepal. Generic prescribing can reduce the out-of-pocket expenses for the medicines for the patients. Currently, most of the Nepalese population relies on out-of-pocket (OOP) payment for their healthcare expenditure.[21,22] The health insurance has been initiated in some of the districts but has not covered all the parts of Nepal. Medicines are one of the major out of the pocket expenses in Nepal. Additionally, there is a wide variation in the price of medicines in Nepal.[20]

Lack of a guideline in Nepal is a limiting process for prescribing generic medicine prescribing in Nepal.[23] Generic prescribing should be encouraged by the regulatory authorities and there should be formulation of policies to promote the right of the patients towards receiving the cost effective and good quality medicines in low cost. Studies from Ethiopia shows high compliance, 98.7% and 98.1% towards prescribing the medicines in generic names.[1,14]

The number of drugs prescribed from the Nepalese National List of Essential Medicines was 81.71% in our study. This is a satisfactory result as maximum drugs should be prescribed from the formulary. This result is less than the other study done in Ethiopia, where the percentage of the drugs prescribed from the essential medicine list was 98.1%.[14] In Nepal, the Nepalese National List of Essential Medicines was developed back in 2016 by the drug regulatory authority. This was again revised and updated in 2021.[24,25]

Sticking to the essential lists for prescribing is always a good decision and also is in accordance to the WHO's recommendation. Prescribing medicines from the essential medicine list and has many advantages in terms of efficacy and safety for treating any diseases. This practice ultimately is beneficial for the patients. Not all the hospitals in Nepal have their own hospital formularies. There are only a few hospitals which do have their own formularies and thus sticking to the prescribing from those formularies and the Nepalese National List of Essential Medicines.[20]

The common classes of drugs prescribed for the patients were analgesics, (639, 60.1%) followed by intravenous fluids, (410, 38.5%) and antiulcer drugs, (377, 35.4%). This was comparable with another study done in Nepal in an Emergency Department, where analgesics were prescribed for (315, 30.8%) patients. This study also showed that (482, 47.2%) patients were given the antiulcer drugs.[15] Other drugs used were seen as antiemetics, vaccines and antibiotics. The least given drugs were the hypolipidemic.

An Ethiopian study also showed similar finding about the common medicine prescribed for the patients visiting Emergency Department. Analgesics were prescribed for (125, 36.5%) patients, followed by antibiotics for (120, 35%) patients. The incidences of serious and critically ill patients visit also determine the utilization of different types of medicines in the department.[1]

Seasonal variation may not be captured. The average cost of the antibiotics and the injections prescribed was not calculated. The WHO drug use indicators were primarily developed for use in primary care settings though, they are applicable at other levels also.

CONCLUSION

On the basis of the findings from this study, injection prescribing, and the number of drugs prescribed per encounter showed considerable deviation from the standards recommended by the WHO. On the other hand, generic prescribing and prescribing from the essential drug list were high. Hence, it is important for the hospital to design and implement a system to promote judicious medicine prescribing and injection medication administration.

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