Drug Prescribing Pattern Among the Inpatients in the Surgery Department of Tertiary Hospital of Eastern Nepal

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Keywords: General Surgery; Medication errors, Prescriptions; Quality indicators, Health Care; World Health Organization.

Abstract

Background: Prescription is a written instruction by a healthcare personnel to pharmacist to dispense drug(s). Irrational drug prescribing is a global problem, particularly in developing and transitional countries. This study was conducted to see the status of World Health Organization (WHO) core prescription indicators, complementary indices and prescription errors.

Methods: It was a quantitative cross-sectional descriptive study carried out among inpatients of general surgery of tertiary hospital in eastern Nepal. Ethical approval for the study was obtained from the Institutional Review Committee. It was a convenience sampling. Calculated Sample size was 224. Enrollment of patients started on 16 May 2018 with the last case being enrolled on 1 Oct 2019 after obtaining informed consent. Relevant data was entered in a semi-structured proforma. Microsoft excel 2016 and IBM Statistical Package for the Social Sciences (SPSS) v. 21 were used for descriptive statistics.

Results: Median age of inpatients was 40 (24 - 54) years with male: female ratio being 1.05. Total 1492 drugs were prescribed in 224 prescriptions. Mean number of drugs prescribed was 6.66 ± 2.33. Percentage of drugs prescribed by generic name was 25.60%. Prescriptions with at least one antimicrobial agent was 89.3%. Prescriptions with at least one injection was 92.9%. Percentage of drugs prescribed from the WHO Essential Medicine List was 66.48%. Other complementary prescribing indicators and prescription errors were also calculated.

Conclusions: Most prescription indicators were inadvertently deviated away from WHO standards. Prescription errors were comparable to other studies.

Citation


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Prescription is a written instruction by a healthcare personnel to pharmacist to dispense drug(s). Inappropriate/irrational drug prescribing is a global problem, particularly in developing and transitional countries [1]. Bad prescribing habits lead to ineffective and unsafe treatment, exacerbation or prolongation of illness, distress and harm to the patient, and higher costs. In general surgery, irrational prescription may further lead to severe complications in pre and postoperative management such as delay in relief, increased hospital days, increased morbidity, and even mortality. World Health Organization (WHO) has made standard validated prescribing indicators as a step towards rationalizing [2]. Prescribing patterns need to be evaluated periodically to increase the therapeutic efficacy, decrease adverse effects and provide feedback. Detecting complementary indices and prescription errors also have clinical, educational and economic implication. Therefore, we performed this study to see the status of WHO core prescription indicators, complementary indices and prescription errors.

**METHODS**

It was quantitative cross-sectional descriptive study carried out among inpatients of surgical ward of a tertiary hospital in eastern Nepal. Ethical approval for the study was obtained from Institutional Review Committee (IRC) of the Institute.

Enrollment of patients after obtaining informed consent started on 16 May 2018 with last case being enrolled on 1 Oct 2019. The confidentiality and anonymity of the participants were strictly maintained. Any prescription of the surgery inpatients were included except those having hepatic and renal diseases, those leaving the ward abruptly against medical advice, and those whose at least one family member works in health care facility to prevent any kind of bias during data collection of prescribed drugs.

Sample size was calculated to be 224. It took one and half years to collect the desired sample size. Relevant data was entered in a semi-structured proforma. Microsoft excel (Microsoft Office 2016) and IBM Statistical Package for the Social Sciences (SPSS) version 21 were used for descriptive statistics and data presented in the form of tables and graphs.

**RESULTS**

General information of the patients (Table 1), Indices regarding prescription errors/completeness of prescription (Table 2), WHO core prescribing indicators (Table 3), other complementary prescribing indicators (Table 4) and common drugs prescribed in General Surgery inpatients (Fig. 1) are depicted below.
Table 3: WHO core prescribing indicators. Values are presented as mean ± SD or number (%)

<table>
<thead>
<tr>
<th>WHO core prescribing indicators</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of drugs per prescription (mean ± SD)</td>
<td>6.66 ± 2.33</td>
</tr>
<tr>
<td>Drugs prescribed by generic name (iv fluid included) (n = 1492)</td>
<td>382 (25.60)</td>
</tr>
<tr>
<td>Drugs prescribed by generic name (iv fluid excluded) (n = 1213)</td>
<td>123 (10.14)</td>
</tr>
<tr>
<td>Prescriptions with at least one antimicrobial agents (n = 224)</td>
<td>200 (89.3)</td>
</tr>
<tr>
<td>Prescriptions with at least one injection (n = 224)</td>
<td>208 (92.9)</td>
</tr>
<tr>
<td>Drugs prescribed from an WHO Essential Medicine List (EML) (n = 1492)</td>
<td>992 (66.48)</td>
</tr>
</tbody>
</table>

WHO: World Health Organization

Table 4: Other Complementary prescribing indicators. Values are presented as number (%)

<table>
<thead>
<tr>
<th>Other Complementary prescribing indicators</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antimicrobial agents prescribed among total drugs prescribed (n = 1492)</td>
<td>18.63</td>
</tr>
<tr>
<td>Injection prescribed among total drug prescribed (n = 1492)</td>
<td>78.41</td>
</tr>
<tr>
<td>Prescription with at least one Generic name excluding iv fluids (n = 224)</td>
<td>20.53</td>
</tr>
<tr>
<td>Prescription with at least one Generic name including iv fluids (n = 224)</td>
<td>79.9</td>
</tr>
<tr>
<td>Prescription sheet with at least one NSAID (n = 224)</td>
<td>85.3</td>
</tr>
<tr>
<td>NSAIDs prescribed among total drug prescribed (n = 1492)</td>
<td>20.44</td>
</tr>
<tr>
<td>Prescription sheet with at least one FDC (n = 224)</td>
<td>67.0</td>
</tr>
<tr>
<td>FDC prescribed among total drug prescribed (n = 1492)</td>
<td>11.66</td>
</tr>
<tr>
<td>Prescription sheet with at least one multi-vitamin or mineral co-prescription (n = 224)</td>
<td>9.8</td>
</tr>
<tr>
<td>Multi-vitamins or minerals co-prescription prescribed (n = 1492)</td>
<td>2.28</td>
</tr>
<tr>
<td>Corticosteroid prescription prescribed (n = 1492).</td>
<td>1.14</td>
</tr>
<tr>
<td>Prescription sheet with at least one corticosteroid (n = 224)</td>
<td>7.59</td>
</tr>
<tr>
<td>IV fluid prescribed among total drugs prescribed (n = 1492)</td>
<td>18.70</td>
</tr>
<tr>
<td>Prescription sheet with at least one IV fluids (n = 224)</td>
<td>70.08</td>
</tr>
<tr>
<td>Prescription with at least one drug from WHO EML 2017 excluding iv fluids (n = 224)</td>
<td>94.64</td>
</tr>
<tr>
<td>Prescription with at least one drug from EML 2016 Nepal excluding iv fluids (n = 224)</td>
<td>97.77</td>
</tr>
</tbody>
</table>

EML: Essential Medicine List, FDC: fixed drug combinations, WHO: World Health Organization

DISCUSSION

Most of the WHO core prescription indicators were directed inadvertently away from normal values (Table 5), however it could also be attributed to variation of study population in regard to health care delivery site, socioeconomic profile and morbidity pattern of the study population.

Average number of drugs per prescription was highest in our study. Irrational polypharmacy could lead to dispensing error, reduction in quality of drug therapy, wastage of resources, increased cost of therapy, non-compliance, increased adverse reactions and drug interactions [11, 12]. It, however, may be justified in our setting because inpatients in surgery are mostly very sick with multiple co-morbidities requiring many drugs simultaneously to address different issues. To avoid irrational polytherapy, drugs should be selected based on their efficacy, safety, quality, and cost of use [13].

Generic molecule of most drugs are not available in our set-up so there is high chance of substituting drug of inferior quality at dispensing level, when generics are prescribed. Most clinicians, therefore, write brand of reputed pharmaceuticals. Nevertheless, there is high chance of “influence” so doctors should negate the gifts, samples, incentives and inducements by pharmaceuticals [13]. Hospital pharmacy should be built making “generic” available and hospital pharmacy guidelines, medical council ethical code and WHO manual should be strictly adhered to.

Though WHO advocates less than 3 out of 10 prescriptions should contain antibiotic, our study shows 9 out of 10 prescription has at least one antibiotic. Overall at least one antibiotics was present in 89.3% prescriptions (Table 5). Again, it is justifiable since the data represents that of general surgery of tertiary referral center. However, irrational over-prescription cannot be negated which may cause all harms of irrational polypharmacy including...
antimicrobial resistance which is a matter of global concern. Over-reliance on empiric antibiotics, fear of under-treatment without exactly knowing the severity of illness and lack of strict protocol/guidelines and possibly pressures from pharmaceuticals and dispensers could be the cause of antibiotic overuse.

Injectables were used in 92.9% (208/224) cases. Among all drugs, 78.41% (1170/1492) were injectables. It was far above WHO standard of < 10%. Again, it may be justifiable in the terms of site of our study. Antibiotics use is more in the inpatients. However, unnecessary injections have innumerable disadvantages like pain, chances of severe infection, high cost, and training of manpower etc. [13].

Two-third of drugs were from WHO Essential Drug List with 94.64% (212/224) prescriptions containing at least one drug form WHO Essential Drug List. Essential medicines, as defined by WHO, are those which satisfy the priority health care needs of the population [14]. There may be cases severe than the priority heath care needs in surgical bed, therefore, essential drugs being less than 100% is justifiable in our condition. However, every clinician should know the concept of Essential Drug List and prioritize them in place of new and costly drugs. And also selection of the essential drugs is a continuing process that should take into account the changing epidemiological conditions as well as the progress in the pharmacological and pharmaceutical knowledge [14].

In our study, most commonly prescribed drugs in surgical inpatients was Non-steroidal Anti-inflammatory Drugs followed by antibiotic (Fig. 1). Similar was the result of a cross-sectional survey conducted in 26 Primary Health Care (PHC) facilities of Madhya Pradesh, India [15]. Fixed Drug Combinations (FDC) prescribed was 11.66% (174/1492) in our study. In other studies FDC were 15.8% and 75.49% respectively [16, 17]. In our study, 9.8% (22/224) of our prescription sheets contained at least one multi-vitamin or mineral. It may be due to belief of the prescriber that these may induce or enhance the patient's appetite or relief from weakness [18]. In our study, corticosteroids were prescribed in 8.48%
prescriptions. Of total, 1.27% (19/1492) of drugs were corticosteroids. In another study done among Paediatric inpatients with lower respiratory tract infection at tertiary care hospital, steroids were prescribed in 18% cases [19].

Regarding Prescription error, in our study, sex of the patients was not mentioned in 11.16% (25/224) prescriptions. In another study, done in Manipal Teaching Hospital, Pokhara in surgery OPD, gender status of the patient was not mentioned in 9.26% (10/108) patients. In the same study, diagnosis was missed in 25.92% (28/108) which was 4.01% (9/224) in this study [20]. Again, in another study, diagnosis was missed in 17% prescription.

The study conducted in Internal Medicine, Pediatrics and Psychiatry inpatients of Pakistan Institute of Medical Sciences Islamabad [21]. In the same study, inappropriate dosage was seen in 30.6% cases but no inappropriate dosage was recorded in any prescription of our study. There was no brand substitution in our study whereas brand substitution was seen in 13% prescriptions in a study done in a multispecialty hospital in Western India. The wrong dose and wrong routes were seen in 56% and 6% respectively in the same study, both of which are nil in our case [22].

In a study done in OPD at a tertiary care district hospital of central Nepal, prescriber’s name and signature were missing in 87.5% and 19.2% prescriptions, respectively but nil in our study [13]. Prescribing errors done on behalf of doctors are translated in the form of high cost of health expenses to poor patients. All medication errors could be reduced if not eliminated by reducing reliance on memory, improved access to drug information, simplification, standardization, treatment protocol formation and training [22].

This is the first study of its kind which has simultaneously documented indices regarding completeness of prescription, WHO core prescription indicators, and other complementary prescribing indicators in one single setting. The feedback to the prescribers can have immediate impact.

Arguably, there were some limitations in our study, viz–this study was done in surgical inpatients and findings may not be generalized to other settings like OPD or PHC and other departments. Internal validity may suffer as the diseases might have seasonal variations. Economic analysis was not done due to various reasons though intended. Medication error was only seen but transcription error, dispensation error, and administration error were not seen. Other WHO patient-care indicators viz. Patient care indicator, Facility indicators were not calculated. The prescription errors were not categorized into omission errors and commission errors.

There may be few implications of the study. To rationalize the prescribing practices, all factors influencing drug prescribing, dispensing and administration should be addressed. Clinical Pharmacist and Pharmacologist should involve in periodic audit. Interventions are needed at educational, managerial and regulatory levels. Based on Essential Drug List and rational prescribing, institutional drug policy, hospital formulary, treatment guidelines and hospital pharmacy should be established and time to time reinforcement via Continuing Medical Education, group discussion, training and feedback should be conducted.

CONCLUSION

Most prescription indicators were inadvertently deviated away from WHO standards like many other studies because several factors influence these indicators like site of the study (OPD, inpatient department, and PHC etc), morbidity pattern, geography, economic status. Therefore, it’s high time that WHO should revise these values. Prescription errors were comparable to other studies. Time-to-time interventions at the level of all stakeholders may be necessary to improve the indices.
References