Original Article

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

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Abstract

Background: Prescription is a written instruction by a health care 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.

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

Declarations

Ethics approval and consent to participate: This study was conducted with prior ethical approval from Institutional Review Committee of BPKIHS (Code: IRC/1221/ 018) and informed consent has been obtained from participants prior to the enrollment.

Consent for publication: Not applicable

Availability of data and materials: The full data set supporting this research is available with the corresponding author upon request by the readers.

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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 1: General information of the patients

Demographic Characteristics	Value
Mean age of inpatients (y)	39.42 ± 20.50 range 1-89
Median age of inpatients (y)	40 (24-54)
Male female ratio	(1.05:1) 102/97
Average duration of hospital stay (days)	3.63 ± 12.54
Total General Surgery inpatient prescription sheets or cardex studied	224
Total Number of drugs prescribed (including IV fluids)	1492
Total Number of drugs prescribed (excluding IV fluids)	1492-279 = 1213

Table: 2 Indices regarding prescription errors/ completeness of prescription (n = 224) [12]. Values are presented as number (%)

Indices of Prescription Errors/ Completeness of Prescription	No. of prescriptions (%)
Sex of the patient not specifically mentioned	25 (11.16)
Age was not mentioned	30 (13.39)
Diagnosis was not written	9 (4.01)
Name of the patient not written	4 (1.79)
Date of prescription not written	7 (3.13)
Inpatient number absent	163 (72.76)
Drug(s) prescribed being inappropriate* or missing	0 (0)
Dosage Form inappropriate* or missing	0 (0)
Dose inappropriate* or missing	0 (0)
Route of administration inappropriate* or missing	0 (0)
Advice being inappropriate* or missing	0 (0)
Signature of prescriber inappropriate*/ missing	0 (0)

Inappropriate*-as judged by a faculty in Department of General Surgery. Allergy was not mentioned in any prescription

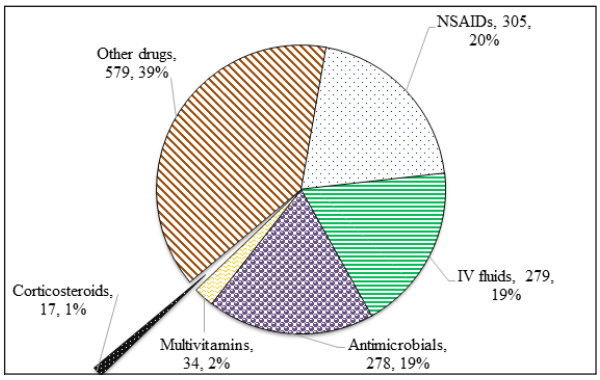

Figure 1: Common Drugs prescribed in General Surgery Inpatients

Table 3: WHO core prescribing indicators. Values are presented as mean ± SD or number (%)

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

WHO: World Health Organization

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

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

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

Table 5: Comparison of WHO Core-Prescription Indicators across different past studies

Study	Site/ total prescription	Average number of drugs per encounter	Drugs prescribed by generic name (%)	Encounters with an antibiotic prescribed (%)	Encounters with injection prescribed (%)	Drugs prescribed from WHO essential drugs list or formulary (%)
Afsan M et al., Bangladesh [3]	OPD/ 300	3.22	5.33	48.67	6.67	26.09 (national)
Lalan BK et al., Maharashtra [4]	OPD/ 1200	3.62	100	46.17	0.17	81.6 (India) 48.26 (WHO)
Ghosh, R., Nepal [5]	Hospital Ward/ 204	4.34	22.57	72.05	66.66	41.76 (WHO)
Ghimire, S. et al., Western Nepal [6]	OPD/ 3959	2.5	13	28.3	3.1	21.7 (WHO)/ 32.80 (national)
Our study	Surgery ward/ 224	6.66 ± 2.33	25.60 (382/ 1492) (without IV fluids: 5.42)	89.3 (200/ 224) (without IV fluids: 10.14)	92.9 (208/ 224)	66.48 {(1492-500)/1492}
WHO standard [7]	-Standard-	1.6	100	< 30	< 10	100
Dahal P et al., Western Nepal (Kaski) [8]	Visiting PHC/ 301	2.29	59.02	57	3	85.19 (WHO)
Erah PO et al. Southern Nigeria [9]	Public Hospital/ 1000	3.9	54	75	-	-
Tamuno I et al., Nigeria [10]	Tertiary Hospital/ 500	3.0 ± 1.4	42.7	34.4	4	94.0 (WHO)

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. In a study done in outpatient department (OPD) of Bangladesh, 39.37% prescriptions 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 multi-specialty 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 assess 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

1. Enwere OO, Falade CO, Salako BL. Drug prescribing pattern at the medical outpatient clinic of a tertiary hospital in southwestern Nigeria. Pharmacoepidemiol Drug Saf. 2007;16(11):1244–9. DOI: 10.1002/pds.1475
2. Laing RO. Rational drug use: an unsolved problem. Trop Doct. 1990;20(3):101–3. DOI: 10.1177/004947559002000303
3. Afsan M, Alam MM, Noor N, Ahmed AH. Prescribing practices in the outpatient department in a tertiary care teaching hospital in Bangladesh. Update Dental College Journal. 2013;2(2):13-7. DOI: 10.3329/updcj.v2i2.15483
4. Lalan BK, Hiray RS, Ghongane BB. Drug prescription pattern of outpatients in a tertiary care teaching hospital in Maharashtra. Int J Pharm Bio Sci. 2012;3(3):225–9.
5. Ghosh R, Neogi JN, Srivastava BS, Sen P. Prescribing trends in a teaching hospital in Nepal. J Nepal Med Assoc. 2003;42(150):346-9. DOI: 10.31729/jnma.615
6. Ghimire S, Nepal S, Bhandari S, Nepal P, Palaian S. A prospective surveillance of drug prescribing and dispensing in a teaching hospital in western Nepal. J Pak Med Assoc. 2009;59(10):726–31. PMID: 19813695
7. WHO. How to Investigate Drug Use in Health Facilities: Selected Drug Use Indicators - EDM Research Series No. 007. 1993, p. 92. Available from: https://apps.who.int/iris/handle/10665/60519
8. Dahal P, Bhattarai B, Adhikari D, Shrestha R, Baral SR, Shrestha N. Drug use pattern in Primary Health Care facilities of Kaski District, Western Nepal. Sunsari Technical College Journal. 2012; 1(1):1-8. DOI: 10.3126/stcj.v1i1.8652
9. Erah PO, Olumide GO, Okhamafe AO. Prescribing practices in two health care facilities in Warri, Southern Nigeria: A comparative study. Trop J Pharm Res. 2003;2(1):175–82. DOI: 10.4314/tjpr.v2i1.14583
10. Tamuno I, Fadare JO. Drug prescription pattern in a Nigerian Tertiary Hospital. Trop J Pharm Res. 2012;11(1):146-52. DOI: 10.4314/tjpr.v11i1.19
11. Tripathi KD. Essentials Of Medical Pharmacology. 7th ed. New Delhi: Jaypee Brothers Medical Publishers, 2013.
12. Brunton L, Chabner B, Knollman B. Goodman and Gilman's The Pharmacological Basis of Therapeutics. 12th ed. USA: Mcgraw-hill, 2010.
13. Shrestha R, Prajapati S. Assessment of prescription pattern and prescription error in outpatient department at Tertiary Care District Hospital, Central Nepal. J Pharm Policy Pract. 2019;12:16. DOI: 10.1186/s40545-019-0177-y
14. Shankar PR. Essential medicines and health products information portal. J Pharmacol Pharmacother. 2014;5(1):74–5. DOI: 10.4103/0976-500X.124434
15. Bhartiy SS, Shinde M, Nandeshwar S, Tiwari SC. Pattern of prescribing practices in the Madhya Pradesh, India. Kathmandu Univ Med J (KUMJ). 2008;6(1):55–9. PMID: 18604116
16. Lamichhane DC, Giri BR, Pathak OK, Panta OB, Shankar PR. Morbidity profile and prescribing patterns among outpatients in a teaching hospital in Western Nepal. Mcgill J Med. 2006;9(2):126–33. PMID: 18523618
17. Pramila Y, Vanita K, Preety L, Siddharth J. Drug utilization trends in ENT out patient department in a teaching hospital. Int J Pharma Bio Sci. 2010;1(4):153-60.
18. Alam M, Parveen F, Ara F, Iqbal MJ, Saha RR. Prescribing trends in the out patient department in a tertiary hospital in Bangladesh. Bangladesh Med J. 2014;40(2):8-12. DOI: 10.3329/bmj.v40i2.18496
19. K.V S, Bhandare B, E A. Prescribing pattern of drugs in paediatric in-patients with lower respiratory tract infection at a tertiary care hospital. World J Pharm Pharm Sci 2016;5(4):2396–2405. DOI: 10.20959/wjpps20164-6582
20. Shankar PR, Pranab KS, Upadhyay DK, Dubey AK, Palaian S. Drug utilization among surgical outpatients. Timisaura Med J. 2006;56(2-3):230–4. Available form: https://www.researchgate.net/publication/274085439_Drug_utilization_among_surgical_outpatients
21. Najmi MH, Hafiz RA, Khan I, Fazli FR. Prescribing practices: an overview of three teaching hospitals in Pakistan. J Pak Med Assoc. 1998;48(3):73–7. PMID: 9783032
22. Solanki N, Shah C. Root cause analysis of medication errors at a multi-specialty hospital in Western India. Int J basic Clin Pharmacol. 2013;2:823. DOI: 10.5455/2319-2003.ijbcp20131228