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RESEARCH ARTICLE

Assessment of drug use pattern using World Health Organization prescribing indicators in a tertiary care hospital in Mangalore: A cross-sectional study

Akshitha S Ragam[1], Swathi Acharya[2], Rajendra Holla[2]

[1]MBBS Student, K. S. Hegde Medical Academy, Deralakatte, Mangalore, Karnataka, India, [2]Department of Pharmacology, K. S. Hegde Medical Academy, Deralakatte, Mangalore, Karnataka, India

Correspondence to: Swathi Acharya, E-mail: acharyaswathi4@gmail.com

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ABSTRACT

Background: Irrational prescription being a global problem leading to ineffective, unsafe treatment. Aiming to measure the performance of a health-care provider in key dimension related to appropriate use of drugs, the World Health Organization (WHO) has developed set of core prescribing indicators. **Aims and Objectives:** The aim of this study is to assess the drug use pattern using WHO core prescribing indicators. **Materials and Methods:** This was a prospective, cross-sectional study conducted at K.S. Hegde Charitable Hospital. Around 900 prescriptions from the outpatients attending the Department of Medicine from January to March 2016 were analyzed for WHO core prescribing indicators and was compared with the standard WHO values. **Results:** Polypharmacy being the common finding, the concept of generic prescribing was negligible. There was reduced prescription of drugs from the National List of Essential Medicines, but the prescription of antibiotics and injections was within normal limits. **Conclusions:** There was moderate compliance with WHO prescribing indicators.

KEY WORDS: Core Prescribing Indicators; World Health Organization; National List of Essential Medicines; Antibiotics; Injections

INTRODUCTION

Drugs play an important role in protecting, maintaining, and restoring health. The drug therapy is mainly aimed at prevention, cure, or control various disease states.[1] The rational use of medications is a worldwide concern. The World Health Organization (WHO) defined rational use of drugs as patients receiving medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period and at the lowest cost to them and their community.[2] More than half of all medicines that are prescribed, dispensed, or sold are improper and 50% of patients take them incorrectly and about one-third of the world's population lacks access to essential medicines.[3]

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Drug utilization study as defined by the WHO, is a structured process which is used to assess the quality of drug therapy by engaging in the evaluation of data on drug prescribing, dispensing, and patient use in a society with special emphasis on the resulting medical, social, and economic consequences.[4] These studies seek to monitor, evaluate, and suggest modifications in the prescribing practices with the aim of making the medical care rational and cost-effective. A study of prescription patterns is an important to determine rationality of drug therapy and to maximize the utilization of resources.[4] Prescription is a critical issue in the rational treatment.[5] The prescribing pattern reflects the physician's

knowledge about the disease process and application of pharmacotherapeutics.[6]

Irrational prescribing is a global problem. Ineffective treatment, exacerbation of illness,[7] reduction of medical care quality, development of drug resistance, increased toxicity risks, and loss of faith in medical profession are the important consequences of bad prescription. It also leads to the higher therapeutic costs and wastage of resources;[8,9] the other problem frequently encountered is polypharmacy.[10]

The WHO has developed various indicators to evaluate about the condition of the services offered to the population concerning medication, among which the core prescribing indicators are aimed at measuring the degree of polypharmacy, tendency to prescribe drugs by generic name, overall level of use of antibiotics and injections, and the degree to which drugs are prescribed from the essential drug list.[11]

However, the periodic assessment of the prescribing practices in a health-care facility is necessary to identify specific drug use problems, to sensitize practitioners on rational drug prescription, and to provide policy makers with relevant information that could be useful in review of drug procurement policies and policies on drug prescribing practices in the affected institutions.

Hence, this study was planned to assess the drug use pattern using the WHO prescribing indicators in our setup which includes parameters such as the number of drugs prescribed per encounter which measures the degree of polypharmacy, the tendency to prescribe the drugs by generic name, to measure the level of two important but commonly overused and costly forms of drug therapies: Antibiotics and injections, and to measure the degree to which practices confirm an implement of national drug policy, as indicated by prescribing drug from national essential list of medicine.

MATERIALS AND METHODS

The present study was a prospective, observational, and cross-sectional study conducted at Justice K.S. Hegde Charitable Hospital. This study was approved by the Institutional Ethics Committee. Prescriptions from the patients attending the Outpatient Department of Medicine from January 2016 to March 2016 were included in this study.

Data collected from 900 prescriptions during the study period was entered in detailed indicators encounter form which was transferred to a master chart later subjected to the analysis.

Each prescription was analyzed for the WHO/International Network for the Rational Use of Drugs Health Facility - Prescribing indicators as primary end points, which includes:

1. Average number of medicines per encounter: Average, calculated by dividing the total number of different drug products prescribed, by the number of encounters surveyed combination drugs were counted as one
2. Percentage of medicines prescribed by generic name: Percentage, calculated by dividing the number of drugs prescribed by generic name, by the total number of drugs prescribed, multiplied by 100
3. Percentage of encounters with an antibiotic prescribed: Percentage, calculated by dividing the number of patient encounters during which an antibiotic is prescribed, by the total number of encounters surveyed, multiplied by 100
4. Percentage of encounters with an injection prescribed: Percentage, calculated by dividing the number of patient encounters during which an injection is prescribed, by the total number of encounters surveyed, multiplied by 100. Immunization not counted as injections
5. Percentage of medicines prescribed which are from the essential medicines list or formulary list: Percentage, calculated by dividing the number of products prescribed which are listed on the essential drugs list, the National List of Essential Medicines (NLEM) 2015 by the total number of products prescribed, multiplied by 100.

The values were compared with the optimal level prescribed by the WHO.

Each prescription was also analyzed for the completeness of prescription by analysing for other important components such as the presence of demographic data, diagnosis, doses of drugs, dosage forms, duration of treatment, and amount of fixed-dose combinations (FDCs) prescribed.

Descriptive statistical analyses were performed.

RESULTS

Primary end points analysis showed that with 2730 total number of drug products being prescribed, the average number of medicines per encounter was 3.033, with 42 drugs being prescribed in generic names; the percentage of medicines prescribed by generic name was 1.53%. The antibiotics were prescribed in 175 encounters hence the percentage of encounters with an antibiotic prescribed was 19.44%. 75 prescriptions had injections amounting to 8.33% of encounters. Among 2730 products, 1346 were listed in the essential drugs list, NLEM 2015 was amounting to 49.30% (Table 1).

Other components analyzed for the completeness of prescriptions were demographic data including patient name, age, and sex which were present in all the prescription (100%). Diagnosis was present in 79.44% (715) of prescription.

Dosage forms of drugs were mentioned in 99.63% (2720) of them. Dose of the drugs was present for 65.82% (1797) of them. Duration of treatment was present in all the prescription and the 29.15% (795) of the prescribed products were FDCs (Figure 1).

DISCUSSION

Prescription auditing is an important tool for quality assurance with regard to rational use of drugs in hospital. The WHO core indicators of prescribing practices measure the performance of health-care providers in key dimensions related to the appropriate use of drugs. Hence, this study was aimed to analyze the prescribing indicator which will help to promote rational use of drugs so as to improve the quality of treatment given.

In our study, average number of drugs per encounter was 3.03, which was far more when compared with the standard WHO recommended value of 1.6-1.8.[12] This finding was similar to the finding from Hazra et al. (3.2)[13] but was less compared to some of the international studies, Wang et al. (3.52),[14] Bimo et al. (3.8)[15] and was more than other studies conducted in India such as Rehan et al. (2.4),[16] Tripathy et al. (2.9).[17] The number of drugs in each encounter was ranging from one drug to maximum number of 11 drugs and 32.98% of encounters had four or more drugs prescribed suggesting a trend of polypharmacy (Table 2). This was more compared to findings from Tripathy et al. (30%).[17] Polypharmacy leads to many consequences such as adverse drug reactions, drug-drug interactions leading to therapeutic failure or toxicity, reduces the compliance of the patients, unnecessary drug expenses, and risk of emergence of bacterial resistance in case if antibiotics from different classes are prescribed to the same patient without rationale.

Drugs prescribed by generic names were only 1.53% in our study, which is too low compared to the standard WHO ideal value of 100%. It was more than findings from the study by Chandelkar and Rataboli (0.05%)[18] and it was comparable to findings from Rehan et al. (1.5%)[16] but much low compared to other studies by Tripathy et al. (68%),[17] Hazra et al. (46.2%),[13] and other international studies.[19,20] This indicates that prescribing habits are directly influenced by representatives of drug companies. Impressive and continuous communication with doctors by pharmaceutical companies made doctors more likely to use non-generic (brand names) than generic names. Generic prescribing reduces the chances of dispensing errors which may be due to misinterpretation of like-sounding names of the drugs and reduces the economic burden to the patient because generic drugs are available for lesser prices compared to various brands of drugs.

The analysis of two common expensive mode of drug administration such as antibiotics and injections showed that percentage of encounters with antibiotics prescribed was 19.44%, which is within the standard range of 20-26.8% of the WHO prescribed values. There was huge variation in this finding from other studies carried out in India compared to our study results such as in Hazra et al. (72.8%),[13] Tripathy et al. (47.7%).[17] Low rates of prescribing of antibiotics in our study may be attributed to the presence of antibiotic policy explaining the specific antibiotic prescription to the specific site of infection and reduced the generous use of antibiotics to viral illness and symptomatic approach without proper diagnosis. Proper use of antibiotics will prevent the development of drug resistance and also reduces the cost of drug therapy.

Table 1: Indicating WHO core prescribing indicators

Core indicators	Results (%)
Average number of drugs prescribed per encounter	3.033
Percentage of encounter with antibiotic	19.44
Percentage of encounter with injection	8.33
Percentage of drugs generic name	1.53
Percentage of drugs from EML	49.30

EML: Essential medicine list, WHO: World Health Organization

Table 2: Indicating degree of polypharmacy

Number of drugs	Number of encounters (%)
One	181 (20.11)
Two	241 (26.77)
Three	181 (20.11)
Four or more	297 (32.98)

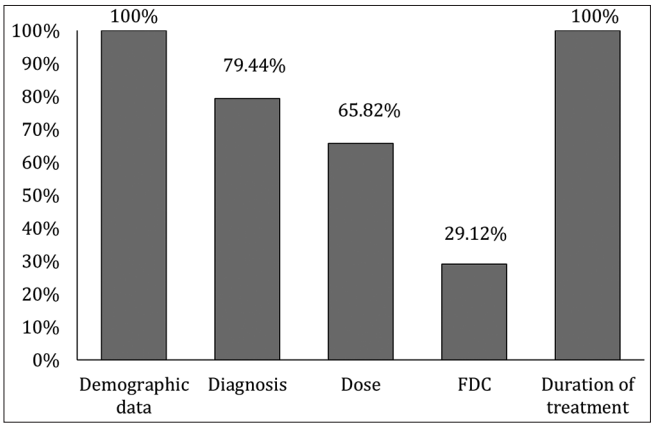

Figure 1: Secondary parameters of prescription

Percentage of encounters with injections in our study was 8.33% which was clearly lesser than the standard range of WHO ideal value (13.4-24.1%). It was comparable to the findings from Tripathy et al. (8%)[17] but very low compared to other region, South Ethiopia (38.1%)[19] and Uganda (48%).[21] The lower rate of use of injections would reduce the incidence of bloodborne pathogenic infections, reduces the transmission of HIV infection, and reduces the cost of the treatment which in turn reduces the economic burden to the patient and reduces the non-compliance of the patient to the treatment.

The percentage of drugs prescribed by the NLEM in our study was 49.30%, which was lower when compared to the ideal standard value of 100%. This finding was almost similar to findings from studies of other parts of India such as Hazra

et al. (45.71%).[13] The percentage of prescribing drugs from essential drug list is lower in India compared to the other countries such as Ethiopia (99%), South Ethiopia (99.6%),[19] and Nepal (88%).[15] This difference may be due to the lack of awareness of the essential drug list. This brings a need of presence facility indicators such as the presence of essential drug list or formulary and availability of key drugs in the dispensing pharmacy. The increase in prescriptions from essential drug list will enhance the compliance of patient to the treatment due to reduced cost.

Among the secondary parameters assessed, demographic data were present in all of them which were similar to other study results.[22] Compared to studies from Dubai where patient name was missing in 2.9%, age in 9.7%, and sex in 12%.[23] Lack of demographic indicators will lead to source of serious medication error such as dispensing of medication to the wrong patients. The mentioning of age facilitates selection of correct dose of drug to be dispensed to any patient and helps in dispensing correct dosage form of drug.

The diagnosis was mentioned in 79.44% of prescriptions which was slightly more than other study results Shipra et al. (64.66%).[22] It is important to mention the diagnosis as it facilitates the dispensing of correct medication by the pharmacist which will reduce medication errors and adverse consequences of dispensing of wrong medication.

The doses of drugs were mentioned for 65.82% of the drugs which was much less compared to other study results such as Shipra et al. (100%).[22] Dosage form was mentioned in 99.63% compared to other study results Shipra et al. (98.66%).[22] Duration of treatment was mentioned in 100% compared to 92.66% in Shipra et al.[22] These parameters are important to assist the drug dispenser to dispense the correct drug in exact amount and proper dosage form to the patient. It is mainly important when drugs such as steroids, narcotics, and antibiotics are prescribed.

FDCs are another important form of drugs being prescribed nowadays. In our study, a total of 29.12% of the prescribed drugs were FDCs which was comparable to findings from 22.5% in Goel et al.[6] FDCs are found to have advantage of increasing patient compliance by bring about synergistic action which can reduce the dose of the individual component and reduce adverse effects. However, many of the marketed FDCs do not contain the required amount of most of the drugs and the combination is not synergistic always. The rationality of the many FDCs is still a controversial issue, Hence, when prescribing FDCs prescriber should have complete knowledge about all these aspects of the drugs. FDCs are usually prescribed by the brand name and this may be another factor responsible for the low percentage of drugs prescribed by generic name.

There are few limitations in our study as it is a time bound study with a small sample size it cannot detect seasonal variations in the pattern of drug use, and other indicators such as health facility indicators are not assessed which would have been able to explain the poor prescription of drugs from NLEM. The differences between individual prescribers have also not been assessed.

CONCLUSION

There was moderate compliance with the WHO core prescribing indicators. With polypharmacy being common, the concept of generic prescribing negligible, and reduced prescription of drugs from NLEM, the prescription of antibiotics and injections was within the normal limits. This suggests the need of seminars, workshops, and regular training programs to get the values of core prescribing indicators within standard values led by the WHO to ensure rational drug use. Regulation regarding prescription of drugs by generic drugs should be strictly implemented. There is a need for standard treatment guidelines, availability of essential drug lists, and drug information centers.

REFERENCES

1. Finkel R, Clark MA, Cubeddu LX. Lippincott's Illustrated Reviews: Pharmacology. 4th ed. Baltimore: Lippincott Williams & Wilkins; 2009. p. 1.
2. Rational Use of Medicines by Prescribers and Patients. Geneva: World Health Organization; 2005. Available from: http://www.apps.who.int>WHOIRIS>Headquarters>Governingbodies>EB115. [Last assessed on 2017 Mar 10].
3. WHO. World Health Organization Promoting Rational Use of Medicines: Core Components. WHO Policy and Perspectives on Medicine No. 5. Document WHO/EDM/2002.3. Geneva: WHO; 2002.
4. Introduction to Drug Utilisation Research@WHO. Defination and Domains; 2003. p. 8.
5. Akoria OA, Isah AO. Prescription writing in public and private hospitals in Benin City, Nigeria: The effects of an educational intervention. Can J Clin Pharmacol. 2008;15(2):e295-305.
6. Goel RK, Bhati Y, Dutt HK, Chopra VS. Prescribing pattern of drugs in the outpatient department of a tertiary care teaching hospital in Ghaziabad, Uttar Pradesh. J Appl Pharm Sci. 2013;3 4 Suppl 1:S48-51. Available from: http://www.japsonline.com. [Last accessed on 2016 Aug 10].
7. Food, Medicine and Healthcare Administration and Control Authority (FMHACA) of Ethiopia. 2nd ed. Addis Ababa: Manual for Medicines Good Prescribing Practice; 2012. Available from: http://www.fmhaca.gov.et/Documents/Medcines%20Good%20Prescribing%20Manual%20second%20edition%202012.pdf. [Last accessed on 2016 Aug 10].
8. Devries TP, Henning RH, Hogerzeil HV, Fresle DA. Guide to Good Prescribing. Geneva: World Health Organization Press; 1994.
9. Hogerzeil HV. Promoting rational prescribing: An international perspective. Br J Clin Pharmacol. 1995;39(1):1-6.
10. Aronson JK. Medication errors: What they are, how they

happen, and how to avoid them. QJM. 2009;102(8):513-21.
11. WHO. How to Investigate Drug Use in Health Facilities: Selected Drug Use Indicators. Geneva: WHO; 1993. p. 1-92.
12. Isah AO, Ross-Degnan D, Quick J, Laing R, Mabadeje AF. The Development of Standard Values for the WHO Drug use Prescribing Indicators. ICUM/EDM/WHO. Available from: http://www.archives.who.int/prduc2004/rducd/ICIUM_Posters/1a2_txt.htm. [Last accessed 2016 Aug 10].
13. Hazra A, Tripathi SK, Alam MS. Prescribing and dispensing activities at the health facilities of a non-governmental organization. Natl Med J India. 2000;13(4):177-82.
14. Wang H, Li N, Zhu H, Xu S, Lu H, Feng Z. Prescription pattern and its influencing factors in Chinese county hospitals: A retrospective cross-sectional study. PLoS One. 2013;8(5):e63225.
15. Bimo. Report on Nigerian field test, INRUD news. In: How to Investigate Drug Use in Health Facilities. Vol. 3. Geneva: WHO; 1992. p. 9-10.
16. Rehan HS, Singh C, Tripathi CD, Kela AK. Study of drug utilization pattern in dental OPD at tertiary care teaching hospital. Indian J Dent Res. 2001;12(1):51-6.
17. Tripathy R, Lenka B, Pradhan MR. Prescribing activities at district health care centres of Western Odisha. Int J Basic Clin Pharmacol. 2015;4:419-21.
18. Chandelkar UK, Rataboli PV. A study of drug prescribing pattern using WHO prescribing indicators in the state of Goa, India. Int J Basic Clin Pharmacol. 2014;3:1057-61.
19. Desalegn AA. Assessment of drug use pattern using WHO prescribing indicators at hawassa university teaching and referral hospital, South Ethiopia: A cross-sectional study. BMC Health Serv Res. 2013;13:170.
20. Menik HL, Isuru AI, Sewwandi S. A survey: Precepts and practices in drug use indicators at Government Healthcare Facilities: A Hospital-based prospective analysis. J Pharm Bioallied Sci. 2011;3:165-9.
21. Bannenberg WJ, Forshaw CJ, Fresle D, Salami AO, Wahab HA. Evaluation of the Nile Province Essential Drug Project. Geneva: WHO; 1991.
22. Shipra J, Zafar YK, Prerna U, Kumar A. Assessment of prescription pattern in a private teaching hospital in India. Int J Pharm Sci. 2013;3(3):219-22.
23. Sharif S, Al-Shaqra M, Hajjar H, Shamout A, Wess L. Patterns of drug prescribing in a hospital in Dubai, United Arab emirates. Libyan J Med. 2008;3(1):10-2.

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