EVALUATION OF RATIONAL PRESCRIBING AND PRESCRIPTION ERRORS IN MIZAN-TEPI UNIVERSITY TEACHING HOSPITAL: A CROSS-SECTIONAL RETROSPECTIVE STUDY

Oliyad Kebede[1]*, Abdulaziz Abajebel[2] and Diriba Feyisa[3] and Fikadu Ejeta[4] and Temesgen Aferu[5]

[1]Department of Social Pharmacy and Pharmaceutics, Mizan-Tepi University, Mizan-Aman, Ethiopia

[2]Federal Ministry of Health, Mega Hospital, Ethiopia

*Corresponding e-mail: oliyadkebede@gmail.com

ABSTRACT

Background: The rational prescribing of medicines allows patients to get medicines based on their clinical indication, at the lowest possible cost in appropriate doses that fulfills individual requirements. The current study aim is to investigate prescribing pattern and prescription errors in Mizan–Tepi university teaching hospital, which in found in southwest Ethiopia. methods: A retrospective cross-sectional study was conducted from January 1, 2021 to January 30, 2021. Six hundred prescriptions papers ordered from January 01, 2020 to December 30, 2020 were randomly selected and evaluated against WHO rational prescribing indicators and standard prescription paper. The data was entered into SPSS version 23 and descriptive statistics were computed. The total, mean, standard deviation, and percentage were calculated. Results: From 600 prescriptions evaluated, there was 1.98+0.89(mean + SD) number of drugs per prescription. Among these 343(57.33%) had one or more antibiotics and 81(13.5%) had injections prescribed. Regarding prescription errors, 2355 omission errors (3.9 errors/prescription) and 535 commission errors were found on the evaluated prescriptions. Among Omission errors 1086 errors were omission of patient information and 968 were omission of prescriber information and 301 were omission of drug information. The identified commission errors were wrong spelling of drug (35.5%), illegible handwriting (45.5%) and use of unauthorized abbreviations (8.2%). Conclusion: Even though, prescribing poly-pharmacy and injections were good, there were antibiotics overuse and numerous errors in writing the prescriptions. Diagnosis and patient addresses are commonly missing. Therefore, the Mizan-Tepi University Teaching hospital management and pharmacy department should take appropriate actions.

Keywords: Prescription, Antibiotics, Errors, injections, Rational use

INTRODUCTION

About 60% of medicines in government health facilities and more than two third of medicines in private health facilities were prescribed and dispensed inappropriately in developing countries. This reduces safety and quality of health care services and leads to loss of enormous health care resources1. In African region the medication prescribing pattern deviates from the reference values proposed by World Health Organization2. The rational prescribing of medicines allows patients to get medicines based on their clinical indication, at the lowest possible cost in appropriate doses that fulfills individual requirements3[1-4]

A prescription is a legal document used for communication between physicians, pharmacists, and the patient4. Prescriptions should be: written legibly, free from writing errors, non-official abbreviations, and contain all information. The correct prescription writing habits can affect the drug therapy as well as patients outcome5. Erroneous substitutions of entire drug regimens and serious errors may occur due to prescription writing errors. Since illegibility and mistaken translations of

symbols or abbreviations cause many distortions, they are also some of the most easily corrected sources of medical errors6. Prescribers' handwritten prescriptions are often difficult to read and understand. As a result, prescription errors may occur at any point of the drug process, including decision-making, prescribing, transcribing, dispensing, administering, documenting, and reporting.

Therefore, writing medical prescriptions is critical for ensuring patient safety and reducing drug errors. In addition to adding financial burden on patients and the health care, errors in medication writing harm the hospital's overall credibility. It may also endanger the patient's life7. Studies reveal that there is a problem of prescription errors that needs to be attended and serve to sensitize stakeholders in health delivery8. Half of prescription errors are due to four categories: not writing the order according to the formulary, ambiguousmedication order, non-standard nomenclature and illegible handwriting 9.The current study aim is to investigate prescribing pattern and prescription errors in Mizan–Tepi university teaching hospital, which in found in southwest Ethiopia. The hospital is serving relatively high number of populations. But the prescriptions were not evaluated and there is no previous data regarding the prescribing pattern and quality of prescriptions. Therefore, this study can be used as a reference for continuous quality improvement and to conduct further studies. It showed the magnitude of the prescription errors, which is neglected and not studied in Ethiopia.

MATERIALS AND METHODS

Study Setting, Design and Period

The study was conducted in Mizan-Tepi University teaching hospital (MTUTH), which is found in Mizan-Aman town, Southern Nations, Nationalities and Peoples Regional (SNNPR) State and located at 569 KM from the capital city of Ethiopia, Addis Ababa. It was serving more than eight hundred thousand inhabitants. The hospital had different dispensing units including; emergency pharmacy, outpatient pharmacy, inpatient pharmacy, Gynecology/obstetrics pharmacy, and ART pharmacy. The study was conducted on randomly selected prescription papers prescribed from January 1, 2020 to December 30, 2020, at Outpatient pharmacy department. The data was collected from January 1, 2021 to January 30, 2021. The study design was retrospective cross-sectional quantitative study[5-7]

Sample Size, Sampling Techniques and Procedures

Based on WHO recommendation at least 600 prescriptions should be included to evaluate prescriptions retrospectively10. Therefore, 600 prescriptions were evaluated. 50 prescriptions were randomly selected from each month's prescriptions using lottery method.

Inclusion and Exclusion Criteria

All prescriptions presented at MTUTH OPD Pharmacy withinthstudyperiod, except anti-tubercular and anti-retroviral drugs, were included in this study.Theseprescriptions were not included because their prescription is different and they contain fixed combination therapies.

Method of Data Collection

Data on patient information (patient's name, age, sex, diagnosis, and registration number), prescriber's information (name of prescriber, qualification, date and signature) and drug information (name of drug, strength, dosage form, quantity, dose, frequency and the route of administration) were collected using the format designed using standard prescription paper as a reference [8-10].

Data Management, Processing & Analysis

The data were collected by trained pharmacy professionals, entered into SPSS version 23 and the analysis was made. Then, total, mean, and standard deviations were calculated and presented in tabular form. The percentage of errors were calculated using number of prescriptions and total number of drugs prescribed, whichever is appropriate as denominator.

Operational Definition

Prescription: Is a written document that engages the medical and Legal responsibility not only of the physician but of all those subsequently involved in its execution.

Outpatients: A patient who attends hospital during the day but does not stay overnight (e.g. for minor surgery or specialist clinics)

Prescription Error: The failure of the prescriber to fulfill all requirements listed on prescription form which may or may not harm the patient.

Legibility: Easily readable by someone who is not familiar with the context examined.

Completeness: Having all necessary parts or components.

Rational Drug use: Requires that patients receive medications 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 [11-13]

Duration: The length of time for which a patient will take a medication (e.g. 1 week).

Frequency: How often a patient should take their medication (e.g. twice a day).

Monitoring: The process of assessing the response of a patient to a medicine or other treatment.

Strength: The amount of drug contained in a given dosage unit (e.g. a 50 mg tablet, or a 5 mg/mL liquid).

Patient: A person who possesses a unique set of needs, values, and beliefs that are brought to an interaction with a health care practitioner.

RESULTS

Six hundred prescriptions which contained 1185 drugs were assessed to evaluate rational prescribing and errors during prescription writing. This indicates that average number of drugs per prescription is 1.98 with the standard deviation of +0.89. All of the prescribed drugs were from Ethiopian essential drug list. From assessed prescriptions most of them (45.8%) contained 2 drugs per prescription and there was no prescription without medication. Out of 600 prescriptions 2 of them holds 6 drugs, which is maximum number of drugs per prescription. Regarding prescriptions with antibiotics, 343(57.33%) of prescriptions had antibiotics prescribed. From this 275(45.8%) prescriptions had 1 antibiotic per prescription and 64(10.7%) had 2 antibiotics per prescription. The percentage of encounters with injection was 81(13.5%) (**Table 1**).

Table 1 Number of drugs, number of injections, and number of antibiotics per prescription at MTUTH, 2020

No of drugs	Frequency	Percent	Injections	Percent	Number of antibiotics	Percent
0	0	0	519	86.5	256	42.7
1	192	32	58	9.67	275	45.8
2	275	45.8	23	3.83	64	10.7
3	98	16.3	0	0	5	0.8
4	28	4.7	0	0	-	-
5	5	0.8	0	0	-	-
6	2	0.3	0	0	-	-
Mean ± SD	1.98 ± 0.894				0.70 ± 0.690	
Total	600	100			100	100

Errors of Omission

A total of 2355 omitted errors were noticed in assessed prescriptions, which accounts 3.9 average errors per prescription related to omission. Among these, 1086 errors were omission errors related to patient information, from which 544(90.7%) failed to mention diagnosis.

Prescription errors related to drug information were assessed and the most omitted error related to drug information was not mentioning dosage form with 217(36.2%), and least omitted error was not mentioning the duration of therapy.

The prescription errors related to prescriber information were assessed, and 68.3% of the prescription lack the registration number and 35.5% lack name of the prescriber.

DISCUSSION

Rational Prescribing

The present study demonstrated important issues regarding rational prescribing based on WHO/INRUD recommendations and prescribing errors. These indicators are helpful in evaluating the rationality of prescriptions by measuring polypharmacy, Antibiotics and injection overuse, and appropriateness of prescription writing. The appropriateness of the prescription is evaluated using omission or commission of errors. From this finding, the extent of polypharmacy was above the WHO recommended range (1.6-1.8)11. This result is comparable with the study conducted in Ethiopian five national regional

states12 and Study conducted in Mekelle general hospital, North Ethiopia13. But the result is better than the results of studies conducted in West Ethiopia public hospitals which 2.114, Ayder Referral Hospital (2.61)13, and Debremarkos Hospital (2.4)15. However, other studies conducted in this country showed smaller number of drugs per prescription; Felege-Hiwot Referral Hospital (1.83)16, Northeast Ethiopia Boru-Meda Hospital (1.88)17, and Hawassa University Teaching and Referral Hospital (1.9)18.

Regarding percentage of antibiotics and injections per encounter, majority of the prescription contained antibiotic drugs. This indicates that there is antibiotic over prescribing compared to WHO/INRUD recommendation(less than 30%)19. But it is difficult to label it as irrational since majority of the prescriptions didn't mention diagnosis. This finding is similar to study conducted western Nepal and Mekelle General Hospital13,20. But it is less than the results of studies conducted in Kenya (74%) and Tanzania (67.7%) 21,22. The percentage of encounters with injections was 13.5%. This result is greater than the finding of the studies done in Tanzania and Kenya21,23. But less than studies conducted in Libya (Pediatric Teaching Hospital) and Ethiopia (Hawassa referral Teaching Hospital) 18,24.

Prescription Errors

In addition to rational prescribing the current study identified prescription errors. It revealed that almost all of the prescriptions had at least one error. This result is similar to a study done in Nepal25. Majority of these errors were errors of omission, which were 3.9 errors per prescription. This result is worse when compared to studies conducted in India5,26 and central Nepal27. Writing the diagnosis on prescription helps pharmacy professionals to evaluate, whether the prescribed drugs are for correct indication or not. But, in current study majority of the prescriptions fails to mention diagnosis. This finding is in contrast to study done in India Basaveshwar teaching and general Hospital, which stated diagnosis was mentioned in majority of prescriptions (94.55%)26.

Prescription should contain: Generic name, strength and dosage form of the medicine, dose, frequency and duration of use of the medicines, quantity of medicine dispensed, how to take route of administration, and storage conditions28. But in current study 50.2% of the prescriptions missed one of the information related to drug. These errors can lead to dispensing wrong dosage form, erroneous substitution, wrong duration which in turn can harm the patient29.

Prescribers are legally expected to write prescriptions legibly11,28. But the current study finding shows that 45.5% of the prescriptions were illegible, 35.5% had spelling error and 8.2% used unauthorized abbreviation. This result is by far greater than the results of studies conducted in Nepal25 and in Indian teaching hospital which is 10.34%5. Illegible handwriting may result in substitution of drug with similar spelling, especially when there is queues and the dispensers hurry, that lead to adverse events, increase cost of treatment, or worsening of the condition4.

Limitation Since the study was conducted retrospectively from prescriptions, the actions taken by pharmacy professionals and weather the error had harmed the patient or not were not assessed.

CONCLUSION

From this study it can be concluded that the extent of poly-pharmacy and injections were improved in current study, whereas there were antibiotics overuse and errors in writing the prescriptions. Especially, diagnosis and patient addresses are commonly missing. Therefore, the hospital management and Pharmacy department should take appropriate action to correct this. Again, MTUTH should give emphasis to Drug and Therapeutics Committee and give awareness for prescribers. Finally, the Ethiopian Ministry of Health should try to introduce and establish electronic prescribing.

DECLARATIONS

Conflict of Interest

The authors declare that they have no competing interests.

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