RESEARCH ARTICLE

PRESCRIBERS` ADHERENCE TO BASIC PRESCRIPTION WRITING IN REFERRAL HOSPITALS IN ETHIOPIAN: THE CASE OF AYDER REFERRAL HOSPITAL

* Birhanu Demeke [1], Periasamy Gomathi [2]

[1]Pharmacoepidemiology and Social Pharmacy Course and Research Unit, Department of Pharmacy, College Health Sciences, Mekelle University P.O.Box 1359, Mekelle, Ethiopia

[2]Pharmacognosy Course and Research Unit, Department of Pharmacy, College Health Sciences, Mekelle University, P.O.Box 1871, Mekelle, Ethiopia

ABSTRACT

Background: Though there is no global standard for prescription writing, all prescriptions are fundamentally required to contain some basic elements and failure to include these can cause medication errors and poor treatment outcomes that can lead to economic crisis and death of patients.

Objective: To evaluate adherence of prescribers towards basic prescription writing in Ayder Referral Hospital, Northern Ethiopia.

Methods and Materials: A cross-sectional study was conducted retrospectively by reviewing sampled prescriptions written from Juanary1 to May 30, 2014 using checklist. Systematic random sampling was used to select 384 prescriptions. Data entry and analysis were done using SPSS version 20.

Results: A total of 384 prescriptions were evaluated for adherence of prescribers to the basic elements of prescription writing. Among analyzed prescriptions, 367(95.6%), 368(95.8%) and 363(94.5%) of them recorded sex, age and card number of the patients respectively. Weight and address of patients were indicated in none of prescriptions. Prescribers` names, qualifications and signatures were written on 291(75.8%), 131(34.1%), 370(96.4%) of the prescription orders, respectively. Dose, frequency of administration and quantity of drugs for treatments were omitted in 1(0.3%), 3(0.8%) and 12(3.1%) of the prescriptions respectively. Of 1003 drugs, 430(83%) were prescribed in their generic names. The prescriber's handwriting was illegible in 69(18%) of prescriptions. Only, 10(2.6%) of the prescriptions contained diagnosis and 369(96%) of the prescriptions were dated.

Conclusion: The proportion of prescribers adhering towards completing components of prescriptions ranged from 0% for weight to 100% for names of patients. The drug and therapeutic committee in ARH should also be strengthened to improve prescription writing skills and practice.

Keywords: Prescribers, Adherence, Prescription writing, Ayder referral hospital

INTRODUCTION

A prescription is an important therapeutic transaction between the prescriber and drug consumer through a dispenser and prescription writing is one of core competencies of a qualified prescribers.[1] It is also considered to be a medico-legal document that should be written legibly, accurately and completely and should indicate precisely what should be given to patients so that it can be correctly interpreted by dispensers leaving no doubt about the intension of the prescriber.[2,3] Prescribing is thus a complex and challenging duty that requires diagnostic experience, knowledge of medicines, communication skills and professional competencies. [2]

Though prescriptions could be communicated via various ways, they usually have been written on printed forms that contain blank spaces for the required information. These forms are said to be prescription blanks and are supplied in the form of pad. Prescription formats varies slightly from country to county and from institution to institution as long as there is no global standard for prescription writing but all prescriptions are fundamentally required to contain some basic elements.[4]

These elements are so crucial in creating common understanding and communications among different parties involved in the medical care process like authorized prescribers, transcribers, dispensers and consumers of the services. The component parts of most prescription blanks include patient related information, date, the symbol R_x, medication(s) prescribed, prescribers' information, dispensers' information and directions/advice to the dispensers or patients.[5] Some prescription blanks used by medical specialists particularly pediatricians include a space for insertion of the patient's age, weight or body surface area which are needed for dose calculation and adjustment. This information is placed on the prescription by the physician when medication dosage is an important function of age and weight of patients/clients.

*Corresponding author
Birhanu Demeke
Pharmacoepidemiology and Social Pharmacy Course and Research Unit, Department of Pharmacy, College Health Sciences, Mekelle University
Email: birdpharma@gmail.com

This information assists the dispensers in interpreting the prescription and computing the dose of prescribed drugs.[5] A recent approach coming to scene in medical practice is computerizing prescription having an advantage over hand-written prescription in that; it enables the transmission of legible and accurate prescription, which in turn greatly minimizes prescription related errors and associated hospitalization, poor clinical outcome, low credibility of patients towards prescribers and health care system and morbidity and mortality of patient.[6] In Ethiopia, referral hospitals are also teaching hospitals serving population of 3.5-5 million and wide ranges of prescribers with different levels of specializations have been prescribing drugs. Except in few of the hospitals, prescription writing is manual. For example, ARH has begun introducing computerized prescribing system, named "Smart Care" since 2011 but it failed to continue using this electronic prescribing (e-prescribing) in spite of its recognized advantage over the conventional hand-written prescribing systems. On the hand, literatures revealed that hand-written prescribing decreases prescription legibility and interpretational errors by dispensers so that it affects safety of patients and quality of the prescribing process. [7]

Prescription error is defined as a failure in the prescription writing process that results in a wrong instruction about one or more of the normal features of a prescription. [1] Broadly speaking, errors in prescribing may be classified into two main types, errors of omission and errors of commission. Errors of omission refer to missing essential information in a prescription whereas errors of commission involve addition of wrongly written information in prescriptions. Errors of omission include absence or incomplete specification of dosage form or strength, dose or dosage regimen, quantity of drug(s) to be supplied as well as prescriptions that are illegible and violating legal requirements. On the other hand, errors of commission include wrong dose, dosage regimen, wrong drug or its indication, wrong duration of therapy, incorrect patient's name on the prescription, duplicate therapy and drug-drug interactions. Noncompliance with prescription writing requirements involves mainly errors of omission.[7, 8]

Literatures showed that some of the possible causes for omissions of essential components of the prescription order include tiredness because of workload, neglecting the importance of writing every information on the prescriptions , carelessness and/or because of unavailable measuring device nearby to prescribers (e.g. for weighing balance). [3, 6, 9]

Generally, adherence to basic prescription writing order delivers appropriate information to dispensers by which they deliver appropriate drugs and information for the treatment of patients while failure to adhere to standard prescription writing order can cause drug-drug interaction, toxicity, exacerbation of the illness, and poor treatment outcomes that can lead to high economic crisis and lose of the patients' life.[10,11] Therefore, auditing prescription is important to give appropriate feedback and to ensure rational prescribing among prescribers; however, there is no such kind of study in ARH. Hence, the main aim of this study was to evaluate prescribers` adherence to the basic prescription writing.

MATERIALS AND METHODS

The study was conducted at Ayder Referral Teaching Hospital in Mekelle University which is 783 km away from Addis Ababa towards Northern Ethiopia. The hospital serves above five million people in Tigray and neighboring regions. It has 500 beds with many specialty units and its pharmacy department has been organized in four units: Inpatient pharmacy, ART pharmacy, Outpatient pharmacy and Emergency pharmacy. The study was conducted from May 1 to May 30, 2014.

A cross-sectional study was employed to collect data from prescription organized and documented systematically in outpatient pharmacy department of ARH. During the study, 384 prescriptions of ambulatory patients of all categories of diseases and age groups were audited and analyzed critically. Data was collected retrospectively using data abstraction form/checklists. The components of prescriptions were analyzed separately. Presence of patient identifiers, drug related information and physician identifiers were checked.

Sample was taken from prescription written during January 1 to May 30, 2014 using systematic random sampling. After counting the monthly-organized prescriptions since January 1, 2014 for five months, the first prescription paper was taken randomly from the first 61 prescriptions and every 61th prescriptions were selected until predetermined size was attained. The sample size thus was determined using single population proportion formula; the level of significance taken as 95%, (Z_α=1.96), margin of error,5% and P assumed to be 50% since there is no study that estimate the level of adherence of prescribers to basic prescription writing in the study area. Accordingly, the minimum sample size was fixed to be 384.

$$n = \frac{(z_\alpha)^2 \, p(1-p)}{d^2}$$

Where, p= Extent of adherence of prescribers to standard prescription writing.

z = critical value at 95% confidence level of certainty (1.96).

d= the margin of error, 5%

n= the required sample size

Therefore, the sample size was n = $\dfrac{(1.96)^2 \,(0.5)\,(0.5)}{(0.05)^2}$,

n = 384

Data Quality and Analysis

Data checking and cleaning was done by the principal investigator on a daily basis during data collection. The collected data was entered and analyzed using SPSS version 20.

Ethical Consideration

Permission from the head of pharmacy in ARH was secured for collecting the data after official communication was made between Department of

Pharmacy, Mekelle University and Medical Director of ARH. In addition, personal identifiers in the prescriptions were not used and confidentiality of information was maintained.

Operational Definitions

- Outpatient department (OPD) pharmacy is largest section of hospital pharmacy where most patients of hospital would get pharmaceuticals services.
- Illegibility refers to one or more of the contents of prescription that were unreadable by the data collectors and principal investigator.
- Basic prescription writing is completing prescription that contained essential information related with patients, medications, prescribers and dispensers as defined by FMHACA, Ethiopia.

RESULTS

Three hundred eighty four prescriptions were collected from five month pools of monthly organized prescriptions in ARH. The total number of drugs prescribed in these prescription orders was 1003 resulting in an average number of drugs per prescription, 2.61. Among these 384 prescriptions, all of them had names of the patients while none of them recorded weight. At same time, 367 (95.6%), 368 (95.8%) and 363 (94.5%) of the analyzed prescriptions recorded sex, age and card number of the patients respectively (Table 1).

Table 1: The number and percentage of prescription orders containing patient related information in Ayder Referral Hospitals, 2014 (N=384).

Variables	Number	Percentage
Name of the patient	384	100.0
Sex	367	95.6
Age	368	95.8
Weight	0	0
Address	3	0.8
Medical Record number (MRN)	363	94.5

Prescribers` information showed that 291(75.8%), 131(34.1%), 370(96.4%) of the prescription orders completed the names of the prescribers, educational qualifications and signatures in the order given. None of the prescribers wrote their address on prescriptions (Table 2).

Table 2: The number and percentage of prescription orders containing prescribers' related information in Ayder Referral Hospitals, 2014(N=384).

Variables	Number	Percentage
Name of the prescribers	291	75.8
Qualification	131	34.1
Signature	370	96.4
Address	0	0

As to the information related with drugs, 383(99.7%), 381(99.2%) and 372(96.9%) of prescriptions indicated the doses, frequency of administrations and duration of treatments (Table 3).

Table 3: The number and percentage of prescription orders containing drugs with some important drug information and other relevant parameters in Ayder Referral Hospitals, 2014**.**

Variables	Number	Percentage
Drugs with dose	383	99.7
Drugs with frequency of administration	381	99.2
Drugs with duration of treatments	372	96.9

Regarding legibility, 69(18%) of the prescription orders were found to be illegible where as 10(2.6%) of prescription orders contained diagnosis or international code of diseases (ICD). About 369(96%) of the prescriptions were dated (Table 4).

Table 4: The number and percentage of prescription orders containing drugs with other relevant parameters in Ayder Referral Hospitals, 2014

Variables	Number	Percentage
Date of prescription	369	96.1
Illegibility	69	18.0
Diagnosis (ICD code number)	10	2.6

Out of the 1003 drugs prescribed, 832(83%) were prescribed in their generic names while 87(9%), 49(5%), 35(3%) were written in their brand names, chemical names like $FeSO_4$ and H_2O_2 and using abbreviations like TTC, CAF, ASA and HCTZ respectively (Figure 1).
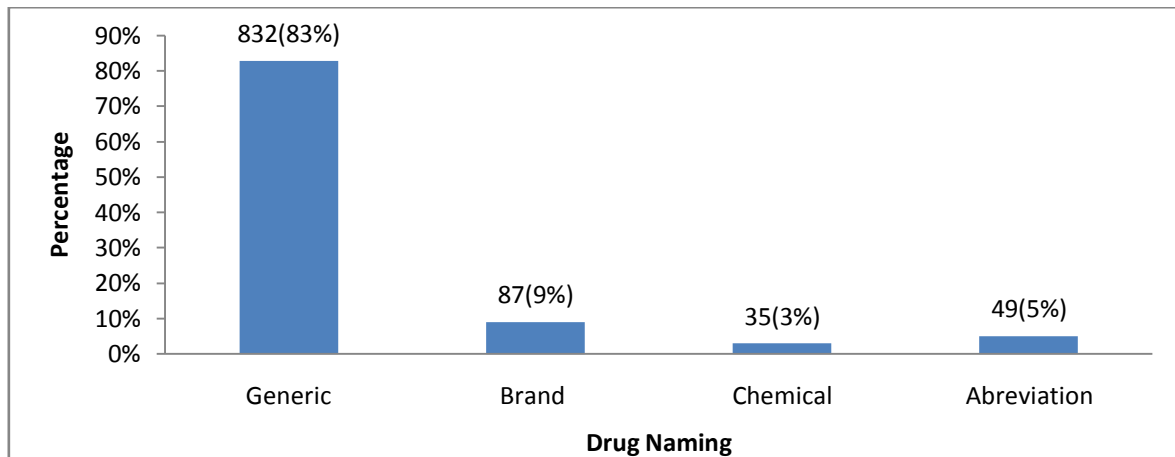

Figure 1 Number and percentage of prescription orders containing drugs with different nomenclatures in Ayder Referral Hospitals, 2014(N=384).

DISCUSSION

Prescription writing constitutes a significant part of the medical care process in health facilities. Although contents in the prescriptions could vary slightly from country to country and health facility to health facility, they should include basic and pertinent information which enable to convey key therapeutic message(s) from prescribers to patients via dispensers. In Ethiopian, Food, Medicine and Health Care Administration and Control Authority (FMHACA) is the responsible organ in the government health structure to develop and standardize prescriptions and to enforce their utilization at the different levels of health care facilities in the country.[11] In Ethiopian health care facilities, physicians, health officers, nurses and dentists are authorized to prescribe drugs to patients or clients. Ayder referral hospital is one of the few teaching and referral hospitals in the country where there are different prescribers of various educational level and experience issuing prescriptions. Hence, this study attempted to evaluate adherence of prescribers to the basic prescription writing in ARH, Northern Ethiopia.

This study found out some inconformity with basic prescription writing. In relation to prescription orders containing patient information, the proportion of adherence of prescribers ranged from 0% for prescriptions with no records about patients` weight to 100% of the prescriptions with complete information about patients` names compared to 0% for weight and 93.23% for patients` names in Jimma University Specialized Hospital, Southwest Ethiopia respectively.[3] Patients` names, address and MRN are vital identification information which helps the delivery of right medication or medical assistance to the right recipients or patients. These are also very important for reviewing medical histories of patients and tracing for lost ones in the medical follow-up; however, in this study MRN was written in 94.5% but only 0.8% of the prescriptions contained patients` addresses. The probable reasons for those discrepancies from the expected completeness could be related with different degree of qualifications. Medical students at intern level were also practicing prescription writing in ARH with possibility of committing such errors.

Drug response in different patients can be affected by various factors including age, sex, weight, change in renal function and co-medication etc. Traditionally, these factors are considered by clinicians prior to issuing a prescription.[12] Age, for instance, is one of the most important patients' profiles in prescriptions that assist the calculation of doses, selection of dosage forms and route of administration of drugs for the general population in general and geriatric/pediatric groups in particular. Weight could affect the pharmacokinetic and pharmacodynamic effect of drugs, especially in patients at the extremes of age.[2] In addition, prescribers should also consider sex of patients before prescribing to optimize clinical decision making process for medication therapy. For example, drugs like Diclofenac are contraindicated for pregnant women while it remains safe for male adult patients. In the present study, none of the prescriptions contained weight where as 95.8% and 95.6% of the prescriptions recorded age and sex of patients. These findings for age and sex in this study were higher than results documented in Gonder (86.6%, 67.9%) and Jimma (60.2%, 66.1%) teaching hospitals in Ethiopia respectively.[3,9] Failure to account these particulars might lead to incorrect dose calculation which in turn resulted in toxicity thereby endangering safety of patients.

Date is relevant information to verify whether the prescription is new or not. It is thus important to discontinue processing old prescriptions and keeps patient profiles up-to-date as well as to back-track the patient's profile. The time elapse between the date of issuing prescription and its presentation to the dispensary should be taken into account by the dispensers in order to synchronize the intention of the prescribers and clinical need of the patients.[3] In this study, about 96% of the prescriptions were dated which is higher than the

findings in Jimma (75.5%) and in Gondar (72.56%) University Teaching Hospitals, Ethiopia.[6, 9] However, it is slightly lower than findings in Beit Jala Hospital, West Bank. [13]

Writing prescriber's name, qualification, signature and address are among essential elements in prescriptions for identification purpose so that it would be possible for patients or dispensers to contact and communicate the prescriber for any clarification or potential problems with the prescriptions. About 76.0%, 34.1% and 96.4% of the prescriptions recorded full information about prescriber` name, qualification and signature in order. The adherence of prescribers in completing their identifications in ARH, for example, writing name is higher than findings in a similar study in India (46.25%) and in Gonder/Ethiopia (32.66%). [9, 14] Address of the prescriber is completely absent implying that it could be difficult to clear any ambiguity and illegibility problems as well as to identify and/or trace liable prescribers for medico-legal reasons. The possible reason for omitting address of prescribers is that the medico-legal system is in its infancy stage in the country. In addition, there is weak enforcement of FMHACA for complying with standards in place in Ethiopia about prescriptions writing.

Getting the right drug, with the right dose via the right route of administration at the right time to the right patient is a complex quest for each prescriber. In daily practice, clinicians consider all these specifics prior to issuing a prescription.[12] In this study, the sampled prescriptions contains a total of 1003 drugs. The average number of drugs per prescription was found to be 2.61 ranging from minimum of one to a maximum of six drugs in ARH. This average is higher than acceptable and WHO ideal ranges (1.6-1.8)[15] but lower than the findings of Balbirk and Rani in India (8.8%) [16]. Out of all prescription orders, 99.7%, 99.2% and 96.9% of them contained complete information about dose, frequency of administration and quantity of drugs for entire course of treatments. This information is so crucial for assisting dispensers to reduce irrational dispensing practices as well as to counsel patients about optimal use of drugs. Comparatively, these findings for drug related variables are higher than result of study in Jimma, South west Ethiopia.[6] Naturally, all energies and attempts exerted to rule out and diagnose the clinical cases should reasonably lead to prescribing right medications for the right patients. If there is a failure in communicating these medications appropriately, efforts of health care team would be worthless.

This study also showed that 83% of all prescribed drugs were generic and 9% and 3% of them were written in brand and chemical names respectively while 5% of the drugs were abbreviated. Drugs prescribed in generic names in ARH is higher than that of similar studies in India (39.4%, 0%) and Jimma ,Ethiopia (52.57%) but less than that of the finding in Gonder, Ethiopia (99.16 %).[3,9,14,17] WHO recommended that percentage of drugs prescribed using generic names should be nearly 100% since the existence of numerous branded products for a single pharmaceutical product could cause a significant

confusion among health care providers. On the other hand, use of generic products is more affordable and submissive of generic prescribing policy in Ethiopia. [18]

As to legibility of prescriptions are concerned, about 69(18%) of the prescription orders was found to be illegible in this study. At the time when companies produce pharmaceuticals with name look alike and sound alike that could leads to confusion among prescribers and dispensers, illegible hand-written prescriptions would further aggravate the problem. In Ethiopia, anecdotal evidences showed that hand-writings of medical doctors shouldn't be read by laypersons to clinical arena. This culture is still prevailing in the current clinical practice. The problems associated with this illegibility are multifaceted in that dispensers could make medication errors in an attempt to understand the intension of prescribers. [19] Moreover, the patients might receive wrong medications leading to medication errors, progression and complication of diseases with no appropriate interventions. On top of that, wasting scarce health care resources shouldn't be disregarded. The fact that illegibility is subjective and reliant on familiarity of the assessor with the hand writings of prescribers, the principal investigator, who had no exposure for hand writings of prescribers, has evaluated the prescriptions claimed to be illegible by data collectors in order to avoid, otherwise to minimize the subjectivity.

Generally, most health facilities in Ethiopia shared similar setups and previous studies on issues related to prescribers` adherence to basic prescription writing revealed that the probable reasons for missing essential components of the prescription orders might be due to too hasty prescribing, fatigue because of workloads, discounting the relevance of writing every component on the prescription or because of negligence. [3, 6]

CONCLUSION

Some of the essential elements of prescriptions were omitted with likelihood of contributing to prescription errors while others were completed encouragingly. Accordingly, the proportion of prescribers adhering towards completing components of prescriptions ranged from 0% for weight and address to 100% for names of patients. FMHACA should work very hard to enforce adherence of prescribers to basic prescription writing. The drug and therapeutic committee in ARH should also be strengthened to improve prescription writing skills and practice.

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DISCLOSURE

No conflict of interest has been shown in this work.

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