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Completeness and Legibility of Handwritten Prescriptions at Ethiopian General Hospital: Facility-based Cross-Sectional Study

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Abstract

In the dispensing process, the quality of handwritten prescriptions plays a crucial role to prevent medication errors. Good quality prescriptions are necessary for minimizing errors in the dispensing of medications. The study aimed to assess the legibility and completeness of prescription papers dispensed at an Ethiopian General Hospital outpatient department in Batu, East Shewa. A retrospective cross-sectional study was conducted in October 2018 on handwritten prescription papers prescribed from September 2017 to September 2018 at an outpatient pharmacy of Batu General Hospital, Ethiopia. Majority of the prescriptions had incorporated name of the hospital, 539 (96.6%), name of the prescriber, 352 (63.1%) and signature of the prescriber, 502 (90%). About 56 (10%) of the prescriptions were missing "strength of the drug" information while 102 (18.3%) of prescriptions were without "frequency of administration" information. From the total prescriptions collected, 126 (22.6%) and 337 (60.4%) of the prescriptions were within Grade D and C respectively. The study revealed that prescription errors are frequent and need to be taken care of. The overall completeness was 56.7%, which is low. Important details that are required for the identification of patients, as well as prescribers, were absent, and the majority of prescriptions were not clearly legible.

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Keywords

Prescription, Completeness, Legibility, Batu.

Introduction

In the dispensing process, the quality of handwritten prescriptions plays a crucial role to prevent medication errors(Mohammed Al-Worafi *et al.,* 2018). The inclusiveness and legibility of a prescription paper are the two essential elements to consider a prescription as one of good quality(Irshaid *et al.,* 2005). Communication with the dispenser is primarily via medicines containing paper that can possibly be misinterpreted if the center of the messages is inappropriately written(Akoria and Isah, 2008).

The majority of medication errors reported from the United States (US) family physician offices were interacted with prescribing writing errors and more than half of prescribing writing errors reached patients(Kuo *et al.,* 2008).The secreate harm to the patients and can adversely affect patients' confidence in their care(Franklin *et al.,* 2011; Woldie *et al.,* 2011).

Physicians should follow the guidelines for prescription writing (Irshaid *et al.,* 2005). Core information that should be included in the prescription order are the prescriber's name, address, telephone number and

signature; patient's name, address, age and weight (important at the extremes of age); prescription issuing date; drug name (preferably generic), formulation, strength, dose, frequency of administration, quantity prescribed, quantity of the prescribed drug, reason for prescribing and instructions for use(Mohammed Al-Worafi *et al.*, 2018; Irshaid *et al.*, 2005).The incorrect choice for the patient (due to allergies, interactions between two drugs, presence of liver or renal failure, wrong molecule, dose or route of administration, etc.) is also regarded as prescribing error (Calligaris *et al.*, 2009). The omission of any of this information in a prescription order could lead to misinterpretation (Akoria and Isah, 2008; Biswas *et al.*, n.d.).

Appropriate prescribing occurs when the prescriber actively involves achieving better prescribing (Velo and Minuz, 2009). Prescription writing is not just putting a few drug names on paper rather it can be obtained only after years of experience (Bhosale, Jadhav, and Adhav 2013). Good quality prescriptions are necessary for minimizing errors in the dispensing of medications (Irshaid *et al.*, 2005). Prescribing errors are the most important target for improvement since it is the main type of medication error that can be avoided (Bhosale *et al.*, 2013).

A study showed that prescription errors are preventable mainly at prescribing level by taking appropriate measurements by identifying the gaps exist in the field (Chen *et al.*, n.d.). However, evidences are rare showing problems associated with prescription errors in semi-urban and rural part of Ethiopia. This evidence gap indirectly leads to wrong medication dispensing and administration (Velo and Minuz, 2009), which could affect patients' safety and exposes them to drug side effects. In addition to this, patients may not receive the appropriate medication, so that it can result in poor outcome of the disease.

While observing the real problematic scenario in the prescribing process, one should consider contributing something to the health care system. The contribution of an individual is established on confirmed and evidenced data done in that specific study area. If these necessary inputs are lacking, it will be difficult to develop strategies and policies for the prescribing process and in general about patients' safety. In the last few years, few studies have been conducted at tertiary care level hospital in Ethiopia with similar aims (Bhosale *et al.*, 2013; Etefa, Teshale, and Hawaze, n.d.; Sisay *et al.*, 2017; Assefa *et al.*, 2018). Since data from primary health care settings are not available in Ethiopia, conducting this research has immense relevance to fill the evidence gap and to associate with the previous studies. Understanding the workloads, professional competency, and disease burden, there might be tangible medication errors that have a real connection with the prescribing process and left unnoticed because of the above-mentioned problems.

In addition, the study can offer a great value in determining what real gaps are there and in identifying the potential corrections measures to be done. Moreover, this observational study will be an input for further studies and its disseminations to different health authorities will create awareness of the general practice scenario and helps them to improve the care practice in rural hospital settings. So, this study aimed to assess the legibility and completeness of prescription papers dispensed at an Ethiopian general hospital outpatient department in Batu, East Shewa.

Materials and Methods

Study design and period

A retrospective cross-sectional study was conducted in October 2018 on handwritten prescription papers prescribed from September 2017 to September 2018 at an outpatient pharmacy of Batu General Hospital.

Data collection tool

The completeness of prescriptions was assessed using the checklist of essential elements as per the World Health Organization (WHO) standard guiding principles for prescription writing. The structured observational checklist contains the following information. Prescribers' information like name and address of the prescriber working hospital, department or unit, name of the prescriber, designation, and signature. Patients' information includes name, age, sex, weight and living address. Prescription details include the date of issuing the prescription, generic name, brand name, strength, frequency, quantity, route of administration, dosage form, abbreviations or acronyms use and instruction for use. For legibility assessment, an operational definitions and grading scores were given as Grade A (Illegible), almost all words are not clear to identify, Grade B (Barely legible), most words illegible; meaning of the whole unclear, Grade C (Moderately legible), some words are illegible, but prescription can be understood by

a pharmacist, and Grade D (Clearly legible), all words are clear (Mandal, 2013).

Sample size and sampling procedure

Systematic random sampling method was used to select the prescriptions and every other five prescriptions were picked and finally, a total of 558 handwritten prescriptions were included from 2800 prescriptions in our study.

Source and study populations

All prescriptions found in the outpatient pharmacy of Batu general hospital were the source population, while prescriptions selected by the sampling procedure were the study population.

Inclusion criteria

All prescriptions that were prescribed by physicians during the study period were included.

Exclusion criteria

Those prescriptions written for inpatient service were excluded.

Statistical analysis

The collected data were examined for its completeness and entered into a statistical package for social sciences (SPSS) version 25 software. Descriptive statistics were performed and results are depicted using tables 1-4.

Ethical approval

The study was conducted after obtaining ethical clearance and permission from Addis Ababa University College of Health Science, School of Pharmacy Ethical Review Board Office and Institutional Ethical Committee from Outpatient Pharmacy Department of Batu General Hospital, which is located in Batu town, Central Ethiopia.

Results and Discussions

Completeness of prescriber information

Majority of the prescriptions had incorporated name of the hospital, 539 (96.6%), name of the prescriber, 352 (63.1%) and signature of the prescriber, 502 (90%), while the rest figures are presented in Table 1.

Completeness of patient information

From the total prescriptions, only 5 (0.9%) and 10 (1.8%) of them had weight and address information respectively.

Completeness of medication information

About 56 (10%) of the prescriptions were missing "strength of the drug" information while 102 (18.3%) of prescriptions were without "frequency of administration" information. The rest figures are given below (Table 3).

Legibility of handwritten prescriptions

From the total prescriptions collected, 126 (22.6%) and 337 (60.4%) of the prescriptions were within Grade D and C respectively.

In this study, we analyzed the completeness and legibility of handwritten prescriptions at general hospitals. Most of the prescriptions lack the name of the department and unit, who had issued the prescription and address of the hospital unlike other studies where the department/unit of the prescriber and the hospital address, was included in almost all the prescriptions (Bhosale *et al.,* 2013; Vigneshwaran *et al.,* 2016). In contrast to our finding, the address of the hospital was mentioned in all the prescriptions, whereas the name of the prescriber was identified only in 17.8% of prescriptions (Dharmadikari *et al.,* 2014).

Absence of the prescriber's name or address on prescription orders may lead to problems if there was a need to confirm the origin of a prescription or to clarify any aspects of it. So, inadequacy on the prescriber's information made things hard for the dispensing pharmacists to contact the prescriber in case of any clarification. Concerning patient information, above 95% of the prescriptions in our study included the patient's name, age, and sex in contrast with the results of other findings (Irshaid *et al.,* 2005; Biswas *et al.,* n.d.). According to WHO, the inclusion of age and weight in the prescriptions especially for children and elderly is suggested (Albarrak *et al.,* 2014) due to the possible effect it has on drug pharmacokinetics and pharmacodynamics and to adjust dosage regimen (Irshaid *et al.,* 2005; Bhosale *et al.,* 2013).

Table.1 Completeness of prescriber information for handwritten prescriptions at Batu General Hospital, Batu, Ethiopia (N = 558)

Prescriber information		**N (%)**
Name of the hospital	**Yes**	**539 (96.6)**
	No	**19 (3.4)**
Address of the hospital	**Yes**	**84 (15.1)**
	No	**474 (84.9)**
Department/unit of the prescriber	**Yes**	**44 (7.9)**
	No	**514 (92.1)**
Name of the prescriber	**Yes**	**352 (63.1)**
	No	**206 (36.9)**
Designation of the prescriber	**Yes**	**173 (31)**
	No	**385 (69)**
Signature of the prescriber	**Yes**	**502 (90)**
	No	**56 (10)**

N = number of sample prescriptions taken, % = percentage

Table.2 Completeness of patient information for handwritten prescriptions at Batu General Hospital, Batu, Ethiopia (N = 558)

Patient information		**N (%)**
Name of the patient	**Yes**	**554 (99.3)**
	No	**4 (0.7)**
Age of the patient	**Yes**	**544 (97.5)**
	No	**14 (2.5)**
Sex of the patient	**Yes**	**532 (95.3)**
	No	**26 (4.7)**
Weight of the patient	**Yes**	**5 (0.9)**
	No	**553 (99.1)**
Address of the patient	**Yes**	**10 (1.8)**
	No	**548 (98.2)**

N = number of sample prescriptions taken, % = percentage

Table.3 Completeness of medication information for handwritten prescriptions at Batu General Hospital, Batu, Ethiopia (N = 558)

Medication information		**N (%)**
Date of issuing the prescription	**Yes**	**435 (78)**
	No	**123 (22)**
Drug generic name	**Yes**	**539 (96.6)**
	No	**19 (3.4)**
Drug brand name	**Yes**	**34 (6.1)**
	No	**524 (93.9)**
Both brand and generic	**Yes**	**8 (1.4)**
	No	**550 (98.6)**
Strength of the drug	**Yes**	**502 (90)**
	No	**56 (10)**
Frequency of administration	**Yes**	**456 (81.7)**
	No	**102 (18.3)**
Quantity to be dispensed	**Yes**	**353 (63.3)**
	No	**203 (36.7)**
Route of administration	**Yes**	**488 (87.5)**
	No	**70 (12.5)**
Drug dosage form	**Yes**	**209 (37.5)**
	No	**349 (62.5)**
Abbreviations/acronyms use	**Yes**	**331 (59.3)**
	No	**227 (40.7)**
Instructions for use	**Yes**	**261 (46.8)**
	No	**297 (53.2)**

N = number of sample prescriptions taken, % = percentage

Table.4 Legibility of handwritten prescriptions at Batu General Hospital, Batu, Ethiopia (N = 558)

Legibility grading	**N (%)**
Grade A	**9 (1.6)**
Grade B	**86 (15.4)**
Grade C	**337 (60.4)**
Grade D	**126 (22.6)**

N = number of sample prescriptions taken, % = percentage

Unfortunately, almost all of the prescriptions did not mention the patient's address and weight like a study done at tertiary care hospital, where almost all prescriptions lack information on address and weight of the patient (Dharmadikari *et al.,* 2014). Many other similar studies also revealed the incompleteness of these components (Irshaid *et al.,* 2005; Bhosale *et al.,* 2013; Vigneshwaran *et al.,* 2016). In terms of patient information, missing patient's body weight on prescriptions might lead to problems in dosage adjustment and may make confusion among dispensers especially if the prescription belongs to pediatrics. The absence of information about patients' addresses might bring difficulty to follow and monitor for safety and efficacy of the treatment taken by the patient (Vigneshwaran *et al.,* 2016).The address is also needed on the prescription order when problems in the prescription are discovered and the patient needs to be contacted to correct the problem.

Regarding completeness of Medication information's for handwritten prescription, we found that generic name use was very high similarly with the study done in tertiary care hospital of eastern Ethiopia, the percentage of drugs prescribed with a generic name was found to be 93.04% (Sisay *et al.,* 2017). Other findings are contrary to this where Generic drug names were used 39.49% (Bhosale *et al.,* 2013), 56.7% (Dharmadikari *et al.,* 2014) and 2.1% (Vigneshwaran *et al.,* 2016).The use of generic prescribing is encouraged. It will enable the pharmacist to maintain a more limited stock of drugs (all brands may not be available/may not be known by the pharmacist) and avoid the unnecessary cost burden for the patient. Generic drugs are relatively affordable and available compared to brand ones, so using generic names on prescription has several advantages in developing countries like Ethiopia (Sisay *et al.,* 2017).

We found that most of the prescriptions did include the strength of medication which is good; since many drugs are increasingly available in various strengths. On the other hand, the frequency, quantity, and route of administration of medications were deficient in 18.3%, 36.7% and 12.5% of prescriptions, respectively. In other studies, above 90% of prescriptions have frequency (Bhosale *et al.,* 2013; Dharmadikari *et al.,* 2014; Albarrak *et al.,* 2014). Dosage form was not generally specified in 62.5% of prescriptions. On the contrary, completeness of dosage form was good, 96.9% (Dharmadikari *et al.,* 2014) and 77.9% (Bhosale *et al.,* 2013) in previous studies.

Inappropriate medication use, with consequences such as toxicities, treatment failure, and drug resistance might have occurred in the absence of frequency of administration from prescriptions (Bhosale *et al.,* 2013). Route of administration should also be included to avoid misunderstanding by the patient and mentioning the route sometimes might help to identify the dosage form.

About half of the prescriptions were deficient in instructions for patient use. In contrast, other studies showed that above 80% of prescriptions lack instruction for use (Bhosale *et al.,* 2013; Vigneshwaran *et al.,* 2016), which is higher than our findings. Most of the time patients forget a large part of what has been talked about during consultation and often depend on the instructions given on the label of the drug (Courtenay, n.d.). The omission of instructions on medication use in the prescriptions possibly leads to reduced compliance. Thus, it is important that distinct and correct instructions about how to use the medicine are provided on the prescription.

Another important factor that causes misinterpretation of prescriptions is an abbreviation. Using Abbreviations/ acronyms was seen on 59.3% of prescriptions in our study similar to other study done at Yemen, which is 58.2% (abbreviations on drug name or units) (Mohammed Al-Worafi *et al.,* 2018). However, our finding is higher than other previous study done in India (Pragnadyuti *et al.,* 2017). In any way, drug name should not be abbreviated according to the Australian Commission on Health Care and Quality in Health care and this brought to 60% of medication name errors (Brits *et al.,* 2017).

In this study, in 60.4% of prescriptions, some words are illegible, but prescription can be understood by a pharmacist. On the other hand, 17% of prescriptions included in the current study were identified not to be fully legible, considered as illegible or barely legible which is lower than studies done in India (Bhosale *et al.,* 2013; Vigneshwaran *et al.,* 2016). On the contrary, no prescription scored as A or B in a previous finding (Pragnadyuti *et al.,* 2017). Poor quality of healthcare due to loss of time and money, medication errors and harm to the patient, ineffective or wrong communications and legal concerns can be caused by illegible prescriptions (Mandal, 2013). The illegible handwriting can bring ambiguity to the pharmacist and dispensing of wrong drug or wrong dose to the patient and leads to lower quality of healthcare. It is one of the causes, which can

raise the risk for medication errors prescription(Albarrak *et al.*, 2014).

Assessing legibility may be depends on the assessor's familiarity with the handwriting of the prescriber besides information given in the prescription (Bhosale *et al.*, 2013). But, prescriptions should be easily read by anyone involved in the dispensing activities otherwise it creates serious problems for the druggist/pharmacist who sometimes misinterpreted or even dispenses wrong medicine to the patient.

Handwritten prescriptions are the main tools for communicating therapeutic purposes in developing countries (Akoria and Isah, 2008). So, using computerized physician order entry than handwritten prescriptions can reduce the time spent by pharmacists for intervention and interpretation and has demonstrated to be effective to rule out prescribing errors (Mohammed Al-Worafi *et al.*, 2018).

Even though Computerized Physician Order Entry systems are expensive, they are important to improve the quality of prescribing and patient safety and avoid errors that arise due to difficulties in reading or understanding handwritten prescriptions.

A clinical pharmacist has also a role to play in eliminating prescription errors and enhancing the mechanism of patient care by working together with other health professionals and continuous professional educational programs for health professionals could improve the quality of prescription.

The study had some limitations. One of the limitations is that the prescriptions are collected within a single hospital in Ethiopia. Therefore, the use of single hospital sample confines the generalization of the findings of the study. The other one is, we did only descriptive research which cannot be used to correlate variables or determine any association. So, further studies are needed in this area.

In conclusion, this study revealed that prescription errors are frequent and need to be taken care of. The overall completeness was 56.7%, which is low. Important details that are required for the identification of patients, as well as prescribers, were absent, and the majority of prescriptions were not clearly legible. Hence, it suggests the prescribers be more professional, focused and concentrated during prescription for the patients.

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