Auditing of outpatient prescriptions in selected primary healthcare centers in Tripoli, Libya

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Background
Irrational prescribing is a worldwide issue. Prescription auditing can assist in identifying medication errors caused by inappropriate prescribing. It is a systematic tool for analyzing the quality of medical care, including diagnostic and treatment procedures.
Objective
The present study aimed to assess the prescription quality and prescribing trends in selected primary healthcare centers in Tripoli.
Materials and methods
The study was conducted in the outpatient department at selected primary healthcare centers for the period of 2 months from 1st Feb to 30th March 2023 and included a total of 214 prescriptions. All collected prescriptions were analyzed for the presence or absence of essential prescription components such as prescriber information, patient information, and drug details such as dosage form, strength, frequency, and dosage form. The observed data was presented in the form of a number and a percentage.
Results and conclusion
A total of 214 prescriptions were collected and analyzed, out of which 863 prescription writing errors were noted with an average of 4.03 errors per each prescription, among them 767 errors of prescriber omission and 96 of drug-related errors. Most of these omissions were due to failure in mentioning the patient's address (*n*=211, 48.2%), followed by the prescriber's specialization (*n*=143, 43.5%), and the prescriber's name (*n*=112, 37.1%). Additionally, 96 omission errors related to drugs (0.44 errors per each prescription) were found being due to missing drug dosages (*n*=7, 7.3%) and strength of medication (*n*=10, 10.4%). The total number of drugs prescribed was 621, among them 129(20.8%) prescriptions were for analgesics, followed by 113(18.2%) were for antibiotics. There are some areas where the quality of prescription writing in the selected primary healthcare centers needs to be improved.

Keywords:
auditing, errors, prescription

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Introduction

After diagnosing a patient with a clinical concern, the practitioner usually chooses a drug therapy regimen from a variety of therapeutic approaches. This requires the inscription of a prescription, a written legal instruction generated by the medical practitioners with the involvement of pharmacist or nurse as a main decision-making body that authorize patients to be issued medications [1]. Prescription to be legible, it must contain the following fundamental information conferring to the World Health Organization (WHO): (a) prescriber details, including the name, designation, and signature of the prescriber; (b) patient data, including the patient's name, age, sex, weight, and address, in addition to the prescription date; and (c) information about the prescribed medication (drug name, drug concentration and frequency of administration) [2].

Medication errors can occur as a result of improper prescription writing that does not clearly communicate with the drug dispenser. It has serious consequences, ranging from increased hospitalization length and costs to undue distress and infirmity or increased mortality [3]. The incidence of suboptimal prescribing, such as inappropriate dosing and incorrect drug use, is widespread and has raise the risk of adverse drug reactions (ADRs), which are substantial factors in hospital admissions related to drug use [4].

Prescription auditing is a value enhancement method that aims to improve patient care and outcomes by conducting a systematic review of care against

predefined standards and applying change. This vigilance action is useful in clinical practice because it reduces the burden of disease caused by drug faults [5]. It has been reported clearly in previous local studies some deficits in the prescription writing quality [6–8]. The lack of a regulatory policy governing prescription standards, as well as increased pressure on physicians due to the heavy load of daily patient visits, may be the cause for such practices [6].

Prescription writing errors have been shown to be common, accounting for the majority of medication errors that could result in ADRs [9]. A recent cross-sectional study that carried out in Benghazi, Libya reported many writing errors in prescriptions [9]. Also in a prospective cross-sectional study preformed in Tripoli showed high level of prescription errors [6]. This shows that prescription writing errors are more to be encountered in various cities in Libya involving prescribing practice.

Due to the high incidence of such prescribing errors, various strategies have been taken to minimize prescribing errors. For example, generating electronic prescription is very helpful to tackle out any possible errors that could be occur with handwriting prescriptions [10]. However, in spite of the implementation of enhanced electronic technologies, prescribing errors still exist, giving rise to several new types [11].

To our knowledge, few prescribing validation studies have analyzed prescribing errors in Libya. Therefore, our study aimed to investigate the most common prescription writing errors and the prescribing physicians who make them at selected primary healthcare centers in Tripoli.

Materials and methods

Study design

This was a prospective cross-sectional study that was conducted for outpatient clinics at selected primary healthcare centers. Medication errors during prescription such as errors related to patient details (patients name, age, date, weight, and diagnosis); omission related to prescriber (prescribers name, signature, and specialty); and errors of omission linked to drugs (dose, frequency, strength, route of administration, dosage form, and quantity of doses) were assessed in a special document during the period from 1st Feb to 30th March 2023.

Data collection tools

Data was extracted from prescriptions using a checklist. The checklist was created to include all ideal prescription elements. It also included extra columns to record any incorrect drug information (i.e., wrong strength, frequency, and dosage).

Data gathering process

Between 1st Feb to 30th March 2023, prescription forms were obtained from different selected healthcare centers in Tripoli city where patients seek medical advices and consequently received medical prescription. The prescription form was immediately recorded after the patient handed it to the clinic's pharmacist or dispenser.

Every prescription that could be read was documented. The prescription was handed back to the dispenser so they could continue providing their services after recording a corresponding prescription details.

To identify errors of omission, the following information was gathered: the prescriber's name and signature, the date the prescription was written, the prescriber's specialty, the patient's name, age, weight, and Sex, the patient's diagnosis, and the drug dose, strength, route, frequency of administration, and dosage form. If theses variable were present in the prescription denoted by $\surd$ sign, and if missed denoted by X sign.

Data analysis

The collected data from all prescription were entered and analyzed in the Social Package for Social Science (SPSS) version 22. (SPSS Inc., Chicago, IL, USA). The results of the descriptive analysis were expressed as frequencies and percentages.

Ethical approval

The official ethical consent to perform the study was obtained from Ethics Committee of the Faculty of Medical Technology, University of Tripoli (IRB: MedTech-23301). Each clinic's Executive Director was asked for permission to access the prescription forms. The real names of prescribers and clinics were not included in the report to maintain confidentiality.

Results and discussions

A total of 621 drugs were prescribed in the 214 prescriptions, giving an average of 2.9 drugs per prescription that were collected from outpatient clinics at selected primary healthcare centers from 1st Feb to 30th March 2023.

Errors in prescription

A total of 214 prescriptions were collected and further analyzed, out of which 863 errors of prescription

writing were found with an average of 4.03 errors per each prescription, among them 767 errors of prescriber omission and 96 of drug-related errors (Table 1). These findings were in line with previous local study carried out in Tripoli reported 25% of prescriptions missed dosage form [6], whereas a study conducted in Benghazi by Benkhaial *et al*. reported 20.4% all prescription missed drug strength and 17.9% missed dosage form [9]. Another study conducted in Tanzania exhibited 46.4% omission errors related to route of administration and 67.1% due to missing drug dosages [12].

Out of 767 omission errors, 329 omission errors were due to missed prescriber details and 438 omissions errors of patients details (3.58 errors per prescription) were found (Table 1). Most of the existed omissions were due to missing patient's address (*n*=211, 48.2%), followed by prescriber's specialization (*n*=143, 43.5%), prescriber's name (*n*=112, 37.1%), patient's weight (*n*=112, 25.6%), diagnosis (*n*=98, 22.4%), data (*n*=41, 12.5%), prescriber's signature (*n*=23, 6.9%), patient's age (*n*=12, 2.5%), patient's Sex (*n*=4, 0.9%), and patient's name (*n*=1, 0.2%), respectively (Table 2). Additionally, 96 errors of omission correlated to drugs (0.44 errors per prescription) were reported due to absent of drug dosages (*n*=7, 7.3%), strength (*n*=10, 10.4%), frequency (*n*=13, 13.5%), dosage form (*n*=26, 27.1%), and route of administration (*n*=40, 41.7%), respectively (Table 3). These results were in agreement with previous findings from a study conducted at different community pharmacies in Tripoli, Libya where they stated that patients' name, physician name, and prescription date were not mentioned in 25.7%, 29.7% and 30% of all 106 prescriptions, respectively [13]. Similar findings were reported in a study conducted in Jazan, Saudi Arabia, at primary healthcare facilities, which revealed that data on patients' age (54.3%), weight (73.7%), diagnosis (28.8%), prescriber's name (6.1%), signature (3.4%), strength of medication (3.2%), dose information (5.0%), and instructions (6.2%) were absent [14]. Therefore, the prescription must be written precisely and thoroughly before dispensing; otherwise, errors cannot be traced and may have negative effects.

Table 1 Prescription errors (*N*=863)

Type of error	Number	Errors per prescription
Errors of omission	767	3.58
Prescriber details	329	1.53
Patient details	438	2.05
Errors of drug instruction	96	0.44

Table 2 Prescriber-related omission errors

Prescription-related omissions	*n* (%)
Prescriber details	
Specialization	143 (43.5%)
Name	122 (37.1%)
Date	41 (12.5%)
Signature	23 (6.9%)
Total	329
Patient details	
Name	1 (0.2%)
Sex	4 (0.9%)
Age	12 (2.7%)
Weight	112 (25.6%)
Diagnosis	98 (22.4%)
Address	211 (48.2%)
Total	438

Most frequently prescribed medicines

Overall, there was 621 prescribed drugs in the collected prescriptions, among them 129(20.8%) prescriptions were for analgesics, 113 (18.2%) were for antibiotics, 99 (15.9%) were for respiratory and antihistamines, 91 (14.7%) were for cardiovascular drugs, 66 (10.6%) were for gastrointestinal tract drugs, and 62 (10%) were for multivitamins and minerals (Table 4). Similarly, Nigerian study showed comparable findings and revealed that 19.7% of analgesics were the top prescribed drug, followed by antibiotics (13.0%), and antihypertensive medications (4.9%) [15]. Another study in Libya showed that analgesics were prescribed in 16.7%, GIT drugs in 13.9%, antibiotics in 11.2%, and antihypertensive drugs in 8.6% [13]. Likewise, a study in Ethiopia also revealed antibiotics 39.02%, analgesics 29.67%, and GIT drugs 10.64% were highly prescribed classes of medicine [16]. It's possible that prescribers' irrational prescribing habits contributed to the high number of antibiotic prescriptions found in this study.

Table 3 Drug instruction errors

Missing details	*n* (%)
Dose	7 (7.3%)
Strength	10 (10.4%)
Frequency	13 (13.5%)
Dosage form	26 (27.1%)
Route of administration	40 (41.7%)
Total	96

Table 4 Most frequently prescribed medicines

Drug category	*n* (%)
Analgesics	129 (20.8%)
Antibiotics	113 (18.2%)
Respiratory and Antihistamines	99 (15.9%)
Cardiovascular drugs	91 (14.7%)
Gastrointestinal Tract drugs	66 (10.6%)
Multivitamins and Minerals	62 (10%)
Others	61 (9.8%)

Additionally, due to a lack of such tests and a hospital antibiotic policy, empirical prescriptions of antibiotics without microbiological diagnostic sensitivity testing are made. Such practice may have encouraged more frequent use of antibiotics, which in turn causes bacterial resistance to develop and increases the need for expensive antibiotics. Thus, the patient's medication needs must be accurately assessed in order to avoid unfavorable side effects. Otherwise, medicine may cause more side effects than it cures.

Conclusion

The findings of this study showed that there were significant prescription errors at the study settings, stress the need for educational programs to be conducted among all prescribers in order to enhance their prescription writing abilities.

The study recommended the need for qualified clinical pharmacist to assess drug use, identify errors, and take appropriate management action. More studies are necessary to determine what factors lead prescribers to write prescriptions that contain errors, such as missing or incorrect information.

The limitation of the study is the fact that this study was a cross-sectional multicenter study carried out in Tripoli limited the generalizability of the findings.

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Conflicts of interest

The authors declare there are no conflicts of interest.

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