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Original Article

Dispensing Errors in Hospital Pharmacies in Yemen: An Exploratory Study

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ABSTRACT

***Aims**. This study aimed to describe the dispensing errors that occurred during the dispensing process in selected hospital pharmacies in Sana'a, Yemen, and to describe their types and causes. **Methodology**. A prospective study was carried out in selected hospital pharmacies in Yemen over 40 days using a validated tool. **Results**. A total of 9000 dispensed prescriptions were evaluated for the dispensing errors, and 2.13% dispensing errors were identified. Wrong dosage form (134/192), incorrect strength (24/192), wrong drug (18/192), incorrect quantity, wrong instructions written and drug available in the pharmacy but not given (6/192) and dispensing expired drugs (3/192) were the dispensing errors reported in this study. Poor handwriting, similar drug names, similar drug packaging, fatigue, heavy work, workforce issues, and poor communication were the most commonly reported causes of dispensing errors. **Conclusion**. There is a wide variation in the rates of prevalence of medication errors observed during this prospective study. Dispensing errors were the most common. This variation may be attributed to the nature and heterogeneity of the prescription's sources. Study results indicate that medication errors imposed an extraordinary challenge to the healthcare system in Yemen and post significant potential harm to the patient in light of the current economic, social and security conditions. Well-designed nationwide future studies aimed at investigating the causes of medication errors to guide the design of interventions aimed at reducing their burden on the national healthcare system is highly recommended.*

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INTRODUCTION

Good dispensing practice is a crucial part of the medication cycle, which requires dispensing prescribed medications, over the counter medications (OTC), herbal medicines and nutraceuticals to patients/customers with good pharmaceutical care services besides the dispensing practice [1, 2]. Medication errors are common in all healthcare settings and associated with greater morbidity and mortality, and not achieving the desired outcomes of treatment [1]. There are many definitions of dispensing errors such as: "a discrepancy between the prescriber's interpretable written order and the filled prescription including written modifications made by the pharmacist pursuant to contact with the prescriber or in compliance with pharmacy policy" [3], "errors that occur when distributing or selling prescriptions to patients or patients' agents" [4] "discrepancy between the prescriber's written order and the filled prescription" [5], or "error caught by a pharmacist observer after verification by the pharmacist." [6]. The most common types of dispensing errors reported in the literature are the wrong drug dispensed, the wrong strength dispensed, the incorrect form dispensed, the wrong quantity dispensed, a failure to supply the drug, labelling errors, incorrect drug name on the label, wrong strength on the label, wrong directions and warnings on the label, wrong quantity on the label, wrong patient name on the label and completely wrong label [3, 4, 7-19]. The literature reported the following causes of dispensing errors: similar drug names, similar packaging, staffing levels, poor handwriting, interruptions an distractions, the design of the dispensary, staff inexperience, ambiguous directions, failure to check, a lack of procedures, job dissatisfaction, poor communication, computer software issues, noise, the proximity of the drugs on shelves, no breaks, a failure to follow standard operating procedures, hunger, fatigue, stress, lack of training, lack of concentration, lighting, being a lone worker, complex prescriptions and lack of knowledge [1, 18, 20]. In general, factors that lead to medication errors contribute significantly to prescription errors [21]. Despite the shortage of articles examining the humanistic consequences of medication errors in developing countries, Yemen is no exception. The prevalence of medication errors is higher in developing countries than in developed countries [22,23]. Previous studies indicated that medication errors are generally not common and often trivial; they can sometimes be serious [24, 25]. The U.S. Food and Drug Administration literature shows that medication errors can cause serious health consequences, including death, life-threatening conditions, hospitalization, disability and defect from birth [26, 27].

There are many studies about medication errors in the Arab world [8-10, 20, 28, 29], but little is known about dispensing errors in the hospital setting in Yemen, and perhaps in the region; therefore, the aim of this study was to describe the dispensing errors that occurred during the dispensing process in selected hospital pharmacies in the capital Sana'a, Yemen, and to describe their types and causes.

METHODS

Study design and setting

A cross-sectional, prospective study was carried out in hospital pharmacies in the capital Sana'a, Yemen over 40 days in February and March 2019.

Data collection procedure

Data were collected over 40 days in February and March 2019. A standardized data collection form was adapted from previous studies [9, 10]. Furthermore, four lecturers with experience in medication errors validated the findings. The final data collection form contained the following information: date and time of dispensing errors; who made the dispensing error; who found the dispensing error; how the dispensing errors were discovered;

type of dispensing errors; cause of dispensing error; and other details. An invitation was sent to 20 hospital pharmacy managers. However, only nine hospital affiliated pharmacy managers were given consent to participate in the study. Dispensing errors that were detected during or after the dispensing process were recorded by the pharmacy dispensers using the data collection form. Detecting and reporting dispensing errors, types, and causes of dispensing errors were explained to the participating pharmacy dispensers before starting the study through workshops, educational materials, and training.
Dispensing errors in this study were defined as "errors that occur when distributing or selling prescriptions to patients or patients' agents" [4].

Statistical analysis
The data were descriptively analyzed using Statistical Package for the Social Sciences® [IBM SPSS] version 21 for Windows.

Ethical Approval
The study was performed following the ethical protocols outlined in the World Medical Association Declaration of Helsinki Guideline [30]. This study was approved by the University of Science and Technology, Yemen. Consent was obtained from the hospital/hospital pharmacy managers.

RESULTS
Prescriptions were dispensed and checked in all nine hospital affiliated pharmacies. A total of 9000 dispensed prescriptions were evaluated for dispensing errors. However, only 192 (2.13%) dispensing errors were identified and reported in this study. Table 1 shows the types of dispensing errors.

Table 1. Type of dispensing errors

Types of errors	N (%)
Wrong drug	18 (0.19)
Wrong strength	24 (0.25)
Wrong dosage form	134 (1.43)
Wrong quantity	6 (0.06)
Drug available in the pharmacy but not given	6 (0.06)
Expired drug taken	3 (0.03)
Wrong instructions written	6 (0.06)

Factors most commonly reported as contributing to dispensing errors in this study were poor handwriting, similar drug names, similar drug packaging, fatigue, heavy workload, workforce issues, and poor communication. All errors were made by pharmacy dispensers and discovered and corrected by the pharmacists at the final check.

DISCUSSION
The prevalence of dispensing errors in this study was 2.13%, which is different to that reported in India (17%), previous research in Yemen [0.80%] and Pakistan (3.6%) [1, 31, 32]. Despite the re being studies available about medication errors in many developing countries, there are few studies focusing on dispensing errors [33]. Differences in the study designs, sample sizes and study sites are factors that could make comparisons

inapplicable. The findings of this study showed that the wrong dosage form was the most common dispensing error type (134/192), followed by the incorrect strength (24/192), wrong drug (18/192)], and incorrect quantity, wrong instructions written and drug available in the pharmacy but not given (6/192). Finally, the least common dispensing error was expired drugs taken (3/192), which was consistent with previous studies in developing countries [1, 31, 32]. Factors most commonly reported as contributing to dispensing errors in this study were poor handwriting, similar drug names, similar drug packaging and poor communication, which was also consistent with previous studies in developing countries [1, 32, 33]. This study's findings show that dispensing errors were discovered and corrected by pharmacists, which is consistent with the pharmacists' impact on the prevention and minimization of medication errors.

CONCLUSION

There is a wide variation in the rates of prevalence of medication errors observed during this prospective study. Dispensing errors were the most common. This variation may be attributed to the nature and heterogeneity of the prescription's sources. Study results indicate that medication errors imposed an extraordinary challenge to the healthcare system in Yemen and post significant potential harm to the patient in light of the current economic, social and security conditions. Well-designed nationwide future studies aimed at investigating the causes of medication errors to guide the design of interventions aimed at reducing their burden on the national healthcare system is highly recommended.

Disclaimer

The article has not been previously presented or published, and is not part of a thesis project.

Conflict of Interest

There are no financial, personal, or professional conflicts of interest to declare.

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