

Role of drug information centre in detecting medication errors in a tertiary care hospital, central region, Saudi Arabia

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Abstract

Objective: To identify the incidence of medication errors in a tertiary care hospital and to document the role of drug information centre to prevent such errors.

Methods: The retrospective cross-sectional study was conducted at the Security Forces Hospital, Riyadh, Saudi Arabia, and comprised a review of secondary data collected from the Drug Information Centre from March 2013 to February 2016. The errors were categorised as prescribing, dispensing, administering and transcription, while the received inquiries were classified according to the inquirer; physicians, pharmacists and nurses. The score was given according to the Grade of Severity scale. Data was analysed using IBM SPSS Statistics for Windows, version 20. Armonk, NY: IBM Corp. Categorical variables were presented as frequency and percentage.

Results: Among the 2800 drug-related inquiries received, 238(8.5%) medication errors were detected. The inquirers of these queries included 108(45.4%) nurses. Administration errors were the highest 113(47.5%), while the least were transcription errors 31(13%). Majority of errors were committed by nurses 113(47.5%). Grade 2 errors were the most common 86(36.10%), while grade 4 life-threatening errors were minimal 2(0.8%). There were significant differences in the number of received questions based on the speciality ($p < 0.05$), staff having committed the error ($p < 0.01$) and the type of errors detected ($p < 0.01$).

Conclusion: The prevalence of medication errors committed by healthcare providers was high.

Keywords: Medication error, Drug information centre, Administration, Physician, Pharmacist. (JPMA 73: 755; 2023)

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Introduction

Medication errors are extremely prevalent, happening in any phase of the drug-use practices, including prescribing, dispensing, medication administration and monitoring.¹ Medication errors represent a foremost cause of illness and death, yet they have persisted.^{2,3} Medication error is defined as any avoidable pharmacological incident that is detrimental to patient or may bring about improper use of medication.^{4,5} Potential error (near-miss) is defined as the error detected before reaching the patient.⁵ Different kinds of medication errors are recognised globally, including prescription errors, dispensing errors, transcribing errors, and administration errors.⁶ Prescription errors occur due to omissions or oversights, improper selection of drugs or doses, prescribing brand names, erroneous writing and illegible handwriting.⁷ Discrepancy or incongruity between prescription order or instruction and the medication delivered to the patient or ward is called dispensing error.⁸ Illegible handwriting, unit misinterpretation, abbreviation usage, and mistakes in reading may lead to transcription errors.⁹ The disparity

between the originally-planned prescription order and what the patient receives or was supposed to be given is referred to as an administration error.¹⁰ Administration errors may include wrong dose, wrong timing, wrong patient or omission of doses.⁷

Medication errors can result in higher costs, protracted hospital stays or lethal harm.¹¹ The schedule of antibiotic administration, drugs with higher risk and the variable routes used for drug delivery are significant risk areas with regard to medication errors.¹² Therefore, it is imperative to detect, classify and analyse medication errors and initiate proper steps to minimise them. Approximately 30% of damaging incidents during hospital stay are due to medication errors.¹³ Current evidence shows that adverse drug reaction associated morbidity occurs at a median rate of 20%.¹⁴ However, there is dearth of information in Saudi Arabia regarding the level and outcome of medication errors. A study in Riyadh reported that 18.7% of prescriptions were found to have medication errors which is an alarming and anomalous rate that must be emphasised and controlled.¹⁵

The Drug Information Service (DIS) offers objective, coherent, independent, accurate and evidence-based information, largely as a response to healthcare providers concerning existing patient-oriented problems.¹⁶ Drug information centres (DICs) in hospitals contribute

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significantly towards improving the safety of medications by avoiding potential medication errors in addition to developing management strategies to resolve actual medication errors.¹³ The detection of potential or actual medication errors aids the development of effective and safe practices that guarantee sufficient, reasonable and logical use of drugs, thus improving patient safety.¹³ Several studies have assessed and analysed medication errors.¹⁷⁻²⁰ Likewise, a few studies in Saudi Arabia have emphasised the issue of medication errors.^{15,21,22}

However, to the best of our knowledge, there has been no study conducted in Saudi Arabia to evaluate the role of DICs in detecting medication errors. The current study was planned to fill the gap by describing the type of medication errors detected by the Drug Information Centre (DIC) and to unravel the sources of errors.

Materials and Methods

The retrospective, quantitative, analytical, cross-sectional study was conducted at the Security Forces Hospital (SFH), Riyadh, Saudi Arabia, which is a 600-bed tertiary care facility. The SFH DIC is run by two specialised pharmacists. DIS is accessible from 8 am to 5 pm during working days; from Sunday to Thursday. On-call service is also provided by the DIC after working hours and on weekends. After approval from the institutional ethics review committee, the current study used secondary data collected from the documented DIC answers reported from March 2013 to February 2016. The DIC used updated reference books and Micromedex and Lexicomp databases as resources to answer the users' questions and enquiries. The inquiries were received from the hospital staff either by telephone, e-mail, or in person. The received inquiries were classified according to the inquirer; physicians, pharmacists and nurses. The errors were categorised to prescribing, dispensing, administrating and transcription, using the Grade of Severity Scale²³ (New South Wales Health Department), according to which, 0=No error; 1=the incident is likely to have little or no effect on the patient; 2=the incident is likely to lead to an increase in the level of care, like reviews, investigations, or referrals to another clinician; 3=the incident is likely to lead to permanent reduction in bodily functioning leading to increased length of stay, surgical intervention, major errors; 4=the incident is likely to lead to a major permanent loss of function; and 5=the incident is likely to lead to death.

Data was analysed using IBM SPSS Statistics for Windows, version 20. Armonk, NY: IBM Corp. Categorical variables were presented as frequency and percentage.

Results

Among the 2800 drug-related inquiries received, 238(8.5%)

Table: Frequency of Medication Errors.

Investigated Parameter	Characteristics	n (%)
Type of detected errors	Administration	113 (47.5)
	Dispensing	51 (21.4)
	Prescription	43 (18.1)
	Transcription	31 (13.0)
Speciality of staff who asked drug information center	Physicians	32 (13.4)
	Pharmacists	98 (41.2)
Speciality of staff who committed medication errors	Nurses	108 (45.4)
	Physicians	43 (18.1)
	Pharmacists	82 (34.5)
Severity of the medication errors	Nurses	113 (47.5)
	Grade 0	45 (18.90)
	Grade 1	58 (24.40)
	Grade 2	86 (36.10)
	Grade 3	47 (19.70)
Detection of the medication errors according to years of the study	Grade 4	2 (0.80)
	2013	61 (25.6)
	2014	75 (31.5)
	2015	102 (42.9)

medication errors were detected. There was an increasing trend of medication errors over the duration of the study; 61(25.6 %) in 2013, 75(31.5%) in 2014, and 102(42.9%) in 2015.

The inquirers of these queries included 108(45.4%) nurses. Administration errors were the highest 113(47.5%), while the least were transcription errors 31(13%). Majority of errors were committed by nurses 113(47.5%). Grade 2 errors were the most common 86(36.10%), while grade 4 life-threatening errors were 2(0.8%) (Table).

There were significant differences in the number of received questions based on the speciality ($p<0.05$), staff having committed the error ($p<0.01$) and the type of errors detected ($p<0.01$).

Discussion

Medication errors are frequently unreported due to reasons associated with fear of being reprimanded by the authorities, feelings of culpability, and anxieties related to the severity of the error.²⁴ In a study, only about 25% of the errors were reported by staff members.²⁵

The current study detected four types of medication errors, which is consistent with earlier studies.^{5,26} The administration errors ranked the highest (47.5%), while the lowest were transcription errors (13%). These results contradict some international studies. Mathaiyan et al. demonstrated that prescription errors were the most frequently occurring errors (54.8%), with only 20.7% administration errors. Lisby et al. also reported that ordering errors were the fourth highest (39%), whereas transcription errors were the second highest.²⁷ These variations in findings can be attributed to differences in the

level of education, qualifications and training of healthcare providers from one country to another.

The majority of questions in the current study were asked by the nursing staff (45.40%), followed by pharmacists (41.20%) with a significant difference among healthcare providers ($p < 0.05$), which may be due to the relatively higher number of nurses in the hospital compared to other categories of healthcare providers. Nurses were found to have committed most medication errors (47.5%) with a significant difference in comparison with other healthcare professionals ($p < 0.01$). These findings are in line with other studies indicating that nurses' knowledge of pharmacology and drug management is insufficient.²⁷ Language barrier and poor communication between staff, such as physicians and nurses, were also considered to be the reasons behind the highest number of errors being committed by nurses.^{26,28,29} Furthermore, the pharmacists committed a higher number of errors (34.5%) compared to physicians (18.1%) in the current study, which can be attributed to the low number of pharmacists in the hospital that leads to deficient performance due to work overload.

In terms of severity of medication errors, most errors in the current study were of grade 2 (36.10%), while grade 4 life-threatening errors were $< 1\%$. A study performed in north-western England found that 54.1% of errors were significant, 41.9% were minor errors, while life-threatening errors constituted $< 1\%$.³⁰

In the current three-year study, the number of detected errors increased with every passing year. The expansion of services in the hospital, like the increased number of clinics and recruitment of fresh staff who are not familiar with practice settings in the facility as well as low concern for pharmacovigilance educational courses and training in the hospital might be the possible reasons for such proportional relationship.

Based on the findings, the study recommends encouraging medical staff to contact DIC to clarify any medication-related ambiguity. Educational sessions and training for healthcare professionals, especially nurses, will also be rewarding in terms of decreasing the number of medication errors. DICs should be established at all hospitals and should be managed by well-trained and well-informed pharmacists having advanced resources to provide accurate and evidence-based drug information. Applying a computerised physician order entry system, and unit dose-dispensing cabinet (Pyxis machines) is also necessary. Having an electronic detecting system that may guard against missing any error will also be beneficial.

The current study has certain limitations, like under-

detection of medication errors, incomplete question logs, unanalysed medication errors, and difficulties in tracking the electronic drug information in question log systems. Future studies should be mindful of these limitations.

Conclusion

The prevalence of medication errors committed by healthcare providers was high. The role of DICs was found to be vital in detecting medication errors.

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