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Original article

Medication errors in Najran, Saudi Arabia: Reporting, responsibility, and characteristics: A cross-sectional study

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ABSTRACT

Background: Medication error is a preventable adverse effect of medical care, whether or not it is evident or harmful to the patient. Disclosure of medication errors and improvement of patient safety are inexorably related, and they provide one of the strongest reasons to report and disclose errors, including near misses in which no harm comes to the patient. This study aimed to identify medication errors at the southern province of Saudi Arabia.
Methods: A cross-sectional retrospective study was conducted by reviewing all medical records in the King Khaled Hospital in Najran, Saudi Arabia. Medication errors related information were extracted from the electronic medical system for the duration between 2018 and 2020.
Results: During the study period of 2018 to 2020, a total of 4860 medication errors were identified. More than half of the reported medication errors (66.9%) were linked to ordering, prescribing, or transcribing medications. The most commonly reported medication errors connected to ordering/prescribing/tran scribing were inappropriate dosage, dosage units, and therapeutic duplication of medication. The most commonly reported medication errors linked to administration were missing documentation during administration, not performing independent double-checks during the administration of high alert medications, and the administration of look-alike sound-alike (LASA) medications. The intensive care unit (ICU), female medical ward, and male medical ward were the most commonly reported locations for medication errors. Pharmacists detected more than half of the reported medication errors. Physicians were found to be responsible for 66.0% of reported medication errors, followed by nurses.
Conclusion: Medication errors are common in hospital settings in Saudi Arabia's southern provinces. Efforts should be made to improve drug ordering, prescribing, and transcription in hospital settings. To guarantee optimum practices, the entire medical team should take responsibility for the patient's optimal medication administration.

1. Introduction

Medication errors are not reported sufficiently in all countries worldwide (Osborne et al., 1999), specifically in developing countries. Medication errors is a global problem and lead to serious consequences for large number of patients from all age groups, particularly those with complex medical conditions and comorbidities (Miller et al., 2007, Kozer 2009).

Reporting errors is fundamental to error prevention. Patient safety is the most important component of health care quality (World Health Organization, 2004), and it is a priority for every health care system to ensure good quality health care and to make improvements where necessary. The Institute of Medicine defines patient safety as "freedom from accidental injury because of medical care or medication errors". This includes delivering good care by preventing unnecessary injury to patients as far as possible (Everdingen et al., 2007). Instead of blaming healthcare workers

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for the errors, systems should be built to document, reduce or prevent the errors from occurring (Terzibanjan et al., 2007). Disclosure of medication errors and improvement in patient safety are related, and provide one of the strongest reasons to report and disclose errors, including near misses in which no harm comes to the patient. Medication errors reporting systems are still rare in all healthcare systems, though such systems have been fairly well established in some countries (Mrayyan et al., 2007). In Saudi Arabia, the National Drug Authority has recently made efforts to record and report such medication errors through national pharmacovigilance (Alshammari et al., 2017). However, these reports have mainly focused on a few drug-related adverse effects and maternal checks, leaving other medication errors underreported.

Despite the consensus that the reporting of medication errors is a vital aspect in ensuring the safety of patients (Terzibanjan et al., 2007), no system is perfect and, especially in developing countries such as Saudi Arabia, health systems require a lot of work. Nevertheless, efforts should be made at all levels to ensure an adequate system is implemented. If adequate systems are not in place, patients will lose trust in health service provision and will turn to unconventional and risky healthcare options, which will discourage progress. This will lead to worsening health service quality and will perpetuate the risk of near misses, adverse events, and other errors. In the case of medication errors going unreported, more socio-economic burdens will be added to individuals, families and the community via deaths and incapacitation (Council of Europe, 2006, Mauti and Githae, 2019). In the instance of underreporting, the health management information system will not completely address the problem of medication errors. Identifying and addressing the factors that influence medication errors reporting can lead to suitable managerial and individual steps to propagate error reporting concepts, reduce the number of errors, and enhance patient outcomes.

Previous research on medication errors in Saudi Arabia were restricted and focused on a specific group, such as children, and were mostly based in the central and western regions (Al-Jeraisy et al., 2011, Alshaikh et al., 2013, Aseeri et al., 2020). A study conducted by Egunsola et al. in 2021 at the King Saud Medical City (KSMC) in Riyadh looked into paediatric medication errors and found that transcribing errors accounted for more than half of the MEs. (Egunsola et al., 2021). Ali et al. conducted another study in Riyadh, Saudi Arabia, that looked at MEs in hospitalized patients. According to this study, 42.2 percent of MEs occur during the transcription stage, with incorrect frequency and concentration accounting for nearly half of all MEs (Ali et al., 2017). To the best of our knowledge, there are no previous studies that explored medication errors in the southern region of Saudi Arabia in the inpatient settings without restricting the study population to specific patients group. Therefore, this retrospective study aims to help improve patient safety by assisting policymakers in formulating and implementing better medication errors reporting policies. This study meant to describe the characteristics of medication errors reported at Najran main general hospital by identifying the most frequently reported medication errors, reviewing their locations, and identifying the healthcare professionals who were responsible for their occurrence and detection. It is believed that the study will disclose types and number of medication errors that have occurred over the study period in addition to those that could happen again in the future.

2. Methods

2.1. Study design and setting

An ecological cross-sectional retrospective study was conducted by reviewing all medical records in the King Khaled Hospital of Najran region in the southern province of Saudi Arabia. The systemic medical records were reviewed to investigate the types and frequency of errors among the healthcare professionals and departments that were studied and to establish factors that influence medication errors reporting in the hospital. Because data at patients' registry is only available at the population level, no information about individual patients, such as demographic characteristics, is available (such as age, gender, comorbidities, and medications history). We collected all information about medication errors, including the type of medication errors, the location of the medication errors, the health care professional who recognized the medication errors, and the health care professional who is responsible for the occurrence of medication error. According to the medication errors system of the hospital There are seven different types of medication errors, which are 1) ordering/prescrib ing/transcribing, 2) administration, 3) preparing/dispensing, 4) selection/procurement, 5) storage, 6) monitoring, and 7) compliance. Medication errors were identified by clinical pharmacists using medication errors system (MEDiERROR v1.2, by intwa.re) under the supervision of medication safety officer.

Identifying the responsible health care professional for medication errors begins with a revision of the physician prescription (which is done by clinical pharmacists) and checking its compatibility with the patient's medical history, as well as identifying any medication errors in the physician prescription, such as prescribing errors involving the medication's name, dose, dosage form, and drug-drug interaction. When a medication error is detected, the medical team notifies the prescribing physician, informing him or her that there is a medication error that needs to be fixed, while also documenting the error in the system and identifying the person responsible. Medication errors perpetrated by nurses and other healthcare professionals are frequently discovered after the prescription has been approved (which is prescribed by the physician and approved by the clinical pharmacists who monitor the medication errors system). The medication error is detected at this point, whether it is a wrong dose being provided or any other form of medication error that is not compatible with the physician's approved prescription, and the accountable individual is documented.

2.2. Data inclusion criteria

We extracted all data related to medication errors without any restriction on the type of medication errors or the location of occurrence.

2.3. Ethical approval

Ethical clearance for the study was first obtained from the Najran University research ethics committee (443-41-10232-DS). Permission to carry out the study in the selected study hospital was sought from the respective hospital and signed authorisation was given by the hospital administration. The data collection procedures were systematic and patients' information remained confidential throughout the study and data analysis. This study was conducted in compliance with the World Medical Association (WMA) Declaration of Helsinki: ethical principles for medical research involving human subjects, amended by 59th WMA (no. PHRC/HC/11/13), 2013, Seoul, Korea. Furthermore, no personal information about patients, prescribers, or pharmacists will be kept.

2.4. Data analysis

Categorical data were reported as percentages (frequencies). The statistical analysis was carried out using IBM's Statistical

Package for the Social Sciences (SPSS) version 25.0 software (Chicago, IL, United States).

3. Results

3.1. Types of medication errors

A total of 4860 medication errors were detected during the study period between 2018 and 2020. Antibiotics, anticoagulants, and antihypertensive are the most common therapeutic classes for which medication errors were identified. Table 1 below presents the type of medication errors reported at the participating healthcare centre.

3.1.1. Ordering/prescribing/transcribing related medication errors

The highest reported proportion of medication errors (66.9%; n = 3252) during the study period were related to the ordering/prescribing/transcribing of medications. The most commonly medication errors types included inappropriate dose, inappropriate dosage units, and therapeutic duplication of medication, accounting for 21.2% (n = 1032), 6.2% (n = 298), and 6.1% (n = 303), respectively.

3.1.2. Administration-related medication errors

Administration-related medication errors were the second most commonly identified type of errors with 28.8% of the total number of medication errors reported. The most common reported errors were due to administration were the absence of documentation during administration, a lack of independent double-checks during the administration of high alert medications, and a lack of independent double-checks during the administration of look-alike sound-alike (LASA) medications, which accounted for 8.4% (n = 409), 5.0% (n = 242), and 4.0% (n = 195), respectively of the number of errors related to administration.

3.1.3. Errors related to the preparation and dispensing of medications

Additionally, errors related to the preparation and dispensing of medications accounted for 2.9% of the number of medication errors. The most reported errors due to the preparation and dispensing of medications were the absence or delay in the dispensing of a prescribed medication, resulting in a dose being missed, incorrect dispensing of drug dosage, form or quantity, and the preparation or activation of incorrect medication, incorrect concentration, or incorrect quantity, which accounted for 0.5% (n = 26), 0.4% (n = 20), 0.3% (n = 14), respectively of the number of errors related to preparing/dispensing.

3.1.4. Errors related to the selection or procurement of medications

Errors related to the selection or procurement of medications were few with around 0.8% (n = 38) of the number of medication errors reported. This type of medication error was mainly related to the unavailability of certain medications from the hospital drug formulary.

3.1.5. Storage-related medication errors

Storage-related medication errors scored about 0.3% (n = 16) of the total number of medication errors reported. The most reported medication errors related to this type were insecure storage of medications, and inappropriate storage conditions concerning temperature, humidity and light, which accounted for 0.1% (n = 3) of the number of errors related to the storage of medications.

3.1.6. Monitoring-related medication errors

Monitoring-related medication errors were the lowermost in this study for 0.2% (n = 9) of the total number of medication errors reported. This type of medication error was mainly due to not reviewing medication orders properly for appropriateness. Failure to monitor medication effects including incorrect interpretation of laboratory data used to monitor medication effects, incorrect transcription of laboratory test values, incorrect timing of monitoring, and incorrect timing of serum concentration monitoring. Example monitoring of INR for warfarin.

3.2. The location of medication errors

Table 2 illustrates the specific location for the occurrence of such errors reported in the studied hospital. Data shows that the highest number of medication errors took a place in the following departments in order; intensive care unit (ICU), the female medical ward, and the male medical ward, which accounted for 18.5% (n = 842), 12.5% (n = 570), and 9.6% (n = 436), respectively.

3.3. Medication errors detection and responsibility

To prevent medication errors occurring in the future, the healthcare system in the participating healthcare centre should document the medical staff responsible for the occurrence of the medication error and the medical staff member who detected it. Fig. 1 demonstrates the percentage of medication errors discovered (reported) by some healthcare professionals. For example, about 67.0% (n = 3031) of the medication errors were detected by pharmacists, followed by nurses who reported around 31.0% (n = 1428) of errors.

In contrast, the percentage of healthcare professionals who is responsible for the occurrence of medication errors is displayed in Fig. 2. For example, physicians were found to be accountable for approximately 66.0% (n = 3020) of the reported medication errors, thereafter nurses came second with 31.0% (n = 1383).

4. Discussion

Medication errors may occur at any stage of the medication-use process from the initial prescribing stage of a drug to its administration (Hughes and Blegen, 2008, Velo and Minuz, 2009, Schnipper and Rothschild, 2012, World Health Organization, 2012, Abdel-Latif, 2016). The main types of medication errors reported in our study are ordering/prescribing/transcribing, preparing/dispensing, selection/procurement, administration, storage, and monitoring. This study aimed to describe the characteristics of medication errors reported at King Khaled Hospital, Najran, Saudi Arabia. This included identifying the most frequently reported medication errors, reviewing their locations and identifying the healthcare professionals who were responsible for their occurrence and detection. In our study most medication errors were related to ordering/prescribing/transcribing, administration, and preparing/dispensing of medications; the most reported medication errors related to ordering/prescribing/transcribing were inappropriate dose, inappropriate dosage units, and therapeutic duplication of medications; missed documentation during administration, and not performing independent double-checks during the administration of high alert medications; the ICU, female medical ward, and male medical ward were the most commonly reported locations for medication errors, and pharmacists discovered more than half of the reported medication errors, physicians were responsible for 66.0 % of the reported medication errors, followed by nurses, and medication errors related to the ordering/prescribing/transcribing

Table 1
Types of medication errors identified during the study period (n = 4860).

Error Type	Percentage from total number of errors
Ordering/Prescribing/Transcribing	**66.9%**
Inappropriate Dose	21.2%
Inappropriate Dosage Units	6.2%
Therapeutic Duplication Of Medication Present	6.1%
Inappropriate Route	4.2%
Inappropriate Frequency	4.2%
Inappropriate Duration	3.6%
Diagnosis/Provisional Diagnosis is Missing	3.0%
Prescribed a Medication Without Privilege of Prescribing	2.5%
Other Patient Information Missing/ Incorrect-Age/Weight/Sex/Nationality	2.1%
Prescribed A Drug Which is Not Indicated/Contraindicated	1.6%
Incorrect Transcription	1.4%
Medication Reconciliation Not Performed/Documented By Correct Way.	1.2%
Inappropriate Dosage Form	0.7%
Two or More Interacting Drugs Present In Same Prescription (Drug-Drug Interacting)	0.6%
PRN Medication Orders Incomplete	0.5%
Missing Patient Identifiers-Four Names/Medical Record Number	0.4%
Prescription is Unclear/Illegible	0.3%
Inappropriate Rate of Administration	0.3%
Missing Prescriber Information-Signature/Date/Time	0.2%
Used Prohibited Abbreviations	0.1%
Instructions For Use Are Incorrect/Incomplete	0.1%
Drug Allergies Information Missing	0.1%
Indication For LASA Medication Not Written By Physician	0.0%
Other	6.2%
Administration	**28.8%**
Missed Documentation of Administration	8.4%
Independent Double Check Not Performed During Administration Of High Alert Medications	5.0%
Independent Double Check Not Performed During Administration of LASA Medications	4.0%
Missed Administration of a Dose	2.8%
Delay In Documentation of Administration	1.5%
Incorrect Drug/Dosage From/Dose/Concentration Administered	0.9%
Route/Time/Rate of Administration is Incorrect	0.8%
Discrepancies in The Omnicell Medications (For Example Wrong Amount Of Medication Removed Etc)	0.8%
Medication Given Without Physician's Order/Even After The Physician Discontinued It	0.2%
Independent Double Check Not Performed/Documented While Discarding Narcotic/Prohibited Medications	0.1%
Medication Administered to a Wrong Patient	0.0%
Other	4.2%
Preparing/Dispensing	**2.9%**
Missed Dispensing a Prescribed Medication/Dispensing Delayed Resulting in Dose Administration Being Missed	0.5%
Dispensed Incorrect Drug/Dosage From/Dose/Quantity	0.4%
Prepared/Activated Incorrect Medication/Incorrect Concentration/Incorrect Quantity	0.3%
Dispensed an Expired Drug	0.1%
Discrepancy in Refilling Of Medication In Omnicell	0.1%
Delay in Refilling Omnicell	0.1%
Delay in Activation Of Order For Omnicell	0.1%
Drug Dispensed to A Wrong Patient	0.0%
Other	1.3%
Selection/Procurement	**0.8%**
Medication From The Hospital Drug Formulary Not Available	0.8%
Storage	**0.3%**
Storage Is Insecure	0.1%
Inappropriate Storage Conditions-Temp./Humidity/Light	0.1%
Stack Touching The Ceiling/Stored Directly on The Floor	0.0%
Near Expiry Date Medications Not Stored on A Separate Shelf	0.0%
Medications for Local Application Not Separated From Medications for Oral And Parenteral Use	0.0%
High Alert Medications Not Separated From Other Medications/Do Not Bear The Red Sticker "HIGH ALERT"	0.0%
Look-Alike Medications Not Separated From Each Other/Do Not Bear The Yellow Sticker "LASA"	0.0%
Opened Multi-Dose Containers Do Not Bear The Label For End of Stability (BUD)	0.0%
Food/Specimen For Laboratory Stored In The Medication Refrigerators	0.0%
Narcotic/Controlled Medications Not In Separate Locked Cabinet/ Narcotic/Controlled Medication Cabinet Key Not Available	0.0%
Crash Cart Without Numbered Lock/Broken Lock Without Reason	0.0%
Medications Not Arranged With Label Facing Out/ in The Order of Near Expiry First Out	0.0%
Monitoring	**0.2%**
Medication Order Not Reviewed Properly For Appropriateness	0.2%
Compliance	**0.0%**
Non-Adherence to A Prescribed Regimen Due to Inappropriate Patient Behaviour	0.0%

PRN order: Pro re nata medication (means medication given as needed); LASA medications: Look-alike sound-alike medications involve medications that are visually similar in physical appearance or packaging and names of medications that have spelling similarities and/or similar phonetics; BUD: Bear The Label For End of Stability.

Table 2
Prevalence of medications errors stratified by location (n = 4549).

Location	Percentage from total number of medications errors
Intensive Care Unit (ICU)	18.5%
Female Medical Ward	12.5%
Male Medical Ward	9.6%
Female Surgical Ward	8.5%
Emergency Department	7.1%
Outpatients Department Clinics	6.6%
Male Surgical Ward	6.0%
Male Special Surgical Ward	5.5%
Male Orthopaedic Ward	4.4%
Male intensive Cardiac Care (MICC)	3.7%
Cardiac Surgery (ICU)	3.2%
Pharmacy	2.5%
MCC	2.2%
Obesity	2.0%
Female Cardiac Care (FCC)	1.6%
Female Intensive Cardiac Care (FICC)	1.2%
Day Surgery Unit	0.9%
Diabetic centre	0.7%
Narcotics Unit	0.6%
Oncology Unit	0.5%
Recovery room	0.5%
Artificial Kidney Unit	0.4%
Operating Room (OR)	0.4%
Anaesthesia	0.4%
Burn unit	0.2%
Cardiac Surgery-OR	0.1%
Endoscopy	0.0%
Home care	0.0%
Male Prisoners General Ward	0.0%
Nursing Unit	0.0%
Physiotherapy Department	0.0%

of medications accounted for (66.9%) of the reported medication errors.

The most frequent medication errors related to the ordering/prescribing/transcribing of medications included inappropriate dose (overdose or under dose) followed by inappropriate dosage units (example using mg instead gm or mcg) and therapeutic duplication of medication, accounting for 21.2%, 6.2%, and 6.1%, respectively. Although these errors might be attributed to miscalculation of the appropriate dose or a wrong decision by the physician about the dosage form, they mainly occur because of a poor review (by the prescribing physician) of the prescription in the first place. A recent study in Kuwait has reported that prescribing error is the most common type of medication errors (Alsaleh et al., 2021). Illegible handwriting, the use of abbreviations in prescriptions, and a lack of knowledge of updates could all contribute to high prescribing error rates (e.g., using outdated therapeutic guidelines) (Neyaz et al., 2011). Because the multiple processes of prescription, transcription, dispensing, and administration occur in a chain, it's quite possible that a medication will reach the patient and cause harm if it's transcribed incorrectly. Previous study from Switzerland, Pakistan, and Iran (Pichon et al., 2002, Fahimi et al., 2009, Shawahna et al., 2013) found that errors are frequently occur throughout the transcribing stage of medicine. A recent study in Pakistan reported that medication transcription errors were detected in 16.9% of inpatient profiles and 13.8% of discharge charts (Shawahna et al., 2013).

In our study, administration-related medication errors accounted for 28.8% of the number of medication errors. This was consistent with the findings of previous study that was conducted in France, were it reported that the prevalence of medication administration errors was 27.0% (Prot et al., 2005). On the other hand, a previous study in Ethiopia reported a higher prevalence rate of medication administration errors with 62.7%, with the most common form of medication administration error, improper dose, accounting for 53.7% of all drug administration errors (Baraki et al., 2018).

The most commonly reported medication errors related to this type were missed documentation during administration, the absence of an independent double-check during the administration of high alert medications, and the absence of an independent double-check during the administration of LASA medications,

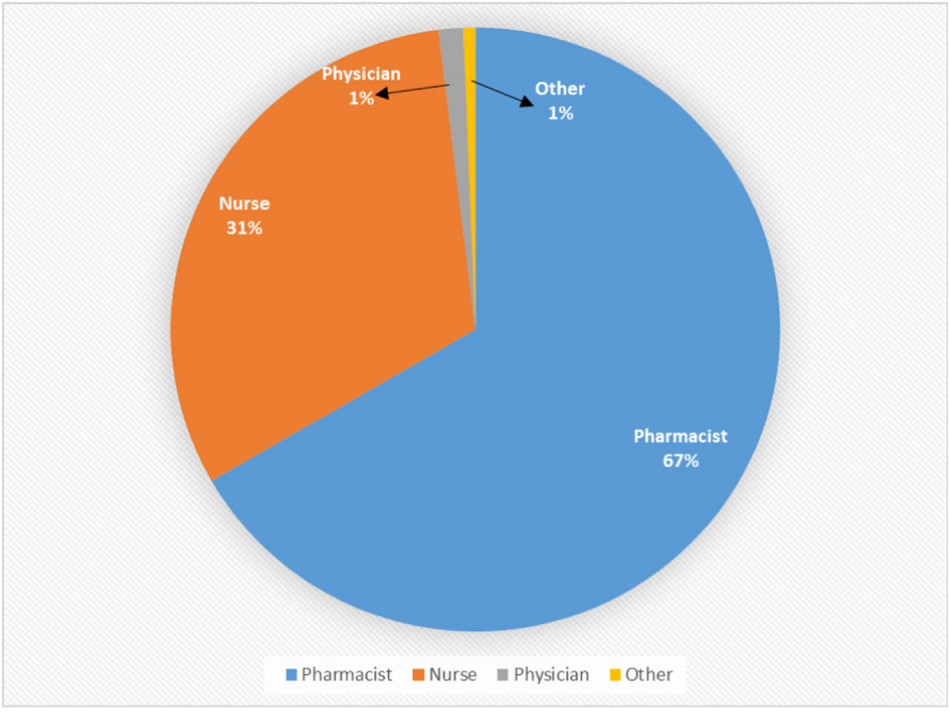

Fig. 1. Healthcare professionals responsible for medication error detection.

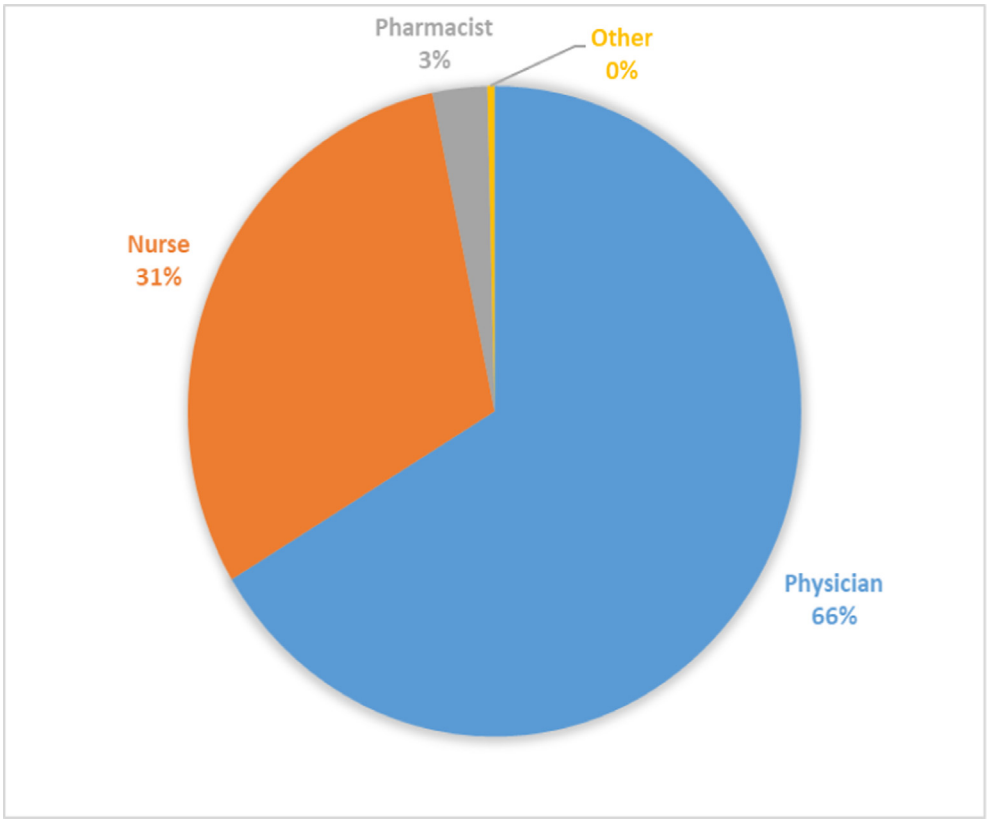

Fig. 2. Healthcare professionals responsible for medication errors.

which accounted for 8.4%, 5.0%, and 4.0%, respectively. As they say, "Not Documented, Not Done"; poor documentation is a leading cause of medication administration errors (Keers et al., 2013).

Double-check, monitoring and medication controls are as important as administrating the medication itself (Douglass et al., 2018) and are considered vital safety steps in the administration stage of high alert medications (Baldwin and Walsh, 2014) and LASA medications. These checks can be conducted by the health care professionals or the patients themselves. Patients run the risk of confusion over look-alike and sound-alike medications, leading to medication errors that may either harm the patient or delay the recovery and the treatment of the disease (Tuohy and Paparella, 2005).

Preparing/dispensing-related medications errors accounted for 2.9% of the number of medication errors identified in our study. The most reported medication errors related to this type were either the absence or delay in the dispensing of prescribed medication, resulting in dose administration being missed, which accounted for 0.5%, or errors in dispensing the incorrect drug form, dosage, or quantity and preparing/activating an incorrect medication/concentration/quantity, which accounted for 0.4%, 0.3%, respectively. These errors could be attributed to multiple factors that affect the preparing/dispensing procedures, which may include human error on the part of the pharmacist (Bohand et al., 2009) if they miss or delay the dispensing process or if they dispense medication in the incorrect dosage form/concentration and quantity. Additionally, failure to communicate drug orders, illegible handwriting, incorrect drug selection from a drop-down menu, confusion over similarly named drugs, confusion over similar packaging amongst products, or errors concerning dosing units or weight are prevalent causes of medication errors. Medication errors can occur owing to human error, but they are more typically the result of a defective system with insufficient backup to detect errors (Tariq et al., 2021).

Errors related to the selection and procurement of medications (medications from the hospital drug formulary not available) accounted for 0.8% of the number of medication errors in our study. This type of medication error was mainly related to the unavailability of certain medications from the hospital drug formulary. Other error factors related to the procurement/selection of medications include poor communication with the hospital warehouses and poor availability of medication products and their generic or trade alternatives, which are considered as pharmaceutical product tenders (Graudins et al., 2016).

In our study, storage-related medication errors accounted for 0.3% of the number of medication errors, such as segregate high-alert medications and LASA medication. The most commonly reported medication errors related to this type included insecure storage of medications, which may lead to a shortage and inaccuracy or credibility of medications stocks, or inappropriate storage conditions concerning temperature, humidity and light. These are considered as major errors that affect the validity and effectiveness of the medication, which consequently impacts the safety and the well-being of the patients by interfering with treatment plan results, either by delaying the desired recovery outcomes or worsening a patient's case (Tariq et al., 2021).

In our study, medication monitoring errors accounted for 0.2 % of errors identified. This type of medication error was primarily caused by a failure to adequately check drug orders for appropriateness. Meanwhile, a double-check has been found to be an effective method for detecting medication errors (Douglass et al., 2018), and a quality control system will help ensure the integrity of the results throughout the prescribing, dispensing, administration, and post-administration of medication processes.

In our study, the most common sites of medication errors were the ICU, female medical ward, and male medical ward, accounting for 18.5 %, 12.5 %, and 9.6 % of all medication errors, respectively. The ICU tops the list of units and wards responsible for the most medication errors, likely due to the severity of the context and other factors such as the urgency of the situations in the ICU (Escrivá Gracia et al., 2019); however, medication errors occur in inpatient wards regardless of gender, with female wards recording a higher percentage of medication errors than male wards, which could be due to the number or severity of cases admitted. Polypharmacy (using more than five medications), taking more than 12 drug doses daily, having more than four changes in the drug regimen in the previous 12 months, being non-adherent, having comorbidities (more than three concurrent diseases), and the presence of drugs that require therapeutic monitoring are all risk factors for medication errors (Koecheler et al., 1989).

With a substantial expansion in the scope of responsibility and increasing contact with medication prescription, preparation, and distribution (Keely and Medicine, 2002), pharmacists discovered more than half of the reported medication errors (67.0%), followed by nurses (31.0%). This supported the findings of a previous study conducted in Iran, which found that the presence of a clinical pharmacist was critical in early detection of prescription-related errors and, as a result, preventing negative outcomes from drug administration errors (Vessal, 2010). Our study results revealed that physicians were responsible for 66.0% of the reported medication errors, followed by nurses, who accounted for 31.0%. This was confirming the findings of a previous study that was conducted in Ethiopia, which reported that nurses had higher risk of causing medication errors compared to other healthcare professional (Feleke et al., 2015). This might be linked to the critical role played by physicians and nurses in the early phases of the therapy process. Furthermore, the significance and size of physician judgments made throughout the medication prescription process may contribute to an increase in the percentage of medication errors for which physicians are liable (Keely and Medicine, 2002, Chen et al., 2019). Despite the fact that most healthcare systems have digitized the medication administration process, the vast majority of medication documentation is still handwritten and paper-based (Hartel et al., 2011, Shawahna et al., 2013). Physicians give medications either on a specially designated sheet in the inpatient's settings or on separate paper sheets during daily practices in inpatient settings. Nurses then transcribe the drugs prescribed by doctors on specialized sheets (transcripts) in order to obtain them from a ward pharmacy or, in many situations, the hospital's central pharmacy (Pichon et al., 2002, Hartel et al., 2011, Shawahna et al., 2013). When these transcripts arrive at the pharmacy, pharmacists dispense the prescription drugs in the appropriate amounts and doses. After that, medications are delivered and administered to the patients.

Being held accountable and responsible for medication errors could be due to a variety of factors, including a failure to follow work procedures, inexperienced staff, or a heavy workload. A previous study in Kuwait reported that workload and lack of enough breaks were the most common causes of MEs, followed by miscommunication, either among medical staff or between staff and patients (Alsaleh et al., 2021).

The main limitation of this study is that it was conducted at a single healthcare facility (one hospital), limiting the generalizability of our findings. As a result, our findings should be interpreted carefully.

5. Conclusion

This study sheds light on common medication errors and offers some helpful tips for reducing medication errors and improving patient safety. Medication errors are common at hospitals in the Southern region of Saudi Arabia. Efforts should be directed towards enhancing ordering/prescribing/transcribing of medications at hospital settings. The whole medical team should take the responsibility of the optimal medication administration to the patient to ensure best practices. Future studies should explore in depth factors that increase the probability of encountering medication administration errors at hospital settings.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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