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Original Research

Occurrence and types of drug errors in voluntary reported incidents at a tertiary hospital in Jordan

Faris El-Dahiyat, Khawla Abu Hammour, Qusai Manaseer, Aya Allan, Yafa Rimmawi, Ola Maaitah

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Abstract

Objectives: Drug incident reports may help organization avoid drug errors and enhance patient outcomes. Therefore, the goal of this research is to, using a voluntary, non-punitive reporting strategy, determine the number, origin, type, and severity of reported medication events at Jordan University Hospital (JUH). **Methods:** The quality division in the JUH provided all reports submitted between June/2020-Decemebr/2021 for review. To gather all the necessary information, a comprehensive content analysis was conducted. The SPSS version 20 program was used to anonymously code the data and conduct the analysis. **Results:** A total of 74 reports of medication errors involved mistakes in the administration, prescribing, and dispensing of medications. More than half (56.8%) of those reports came from the surgical department and the intensive care units. Anti-infective, antiviral, antifungal, and chemotherapeutic medicines were the pharmacological classes most frequently linked to those reports (49.2%). Most of the errors (85.2%) happened during the administration process, where missed dosages and improper scheduling were responsible for almost half (48.6%) of the reported occurrences. The majority of incidents that were recorded reached the patient, but they didn't hurt them. **Conclusion:** the study's results indicated a low percentage of reported incidents. The majority of them didn't cause harm to them.

Keywords: medication error; tertiary hospital; Jordan

INTRODUCTION

For the majority of illnesses, pharmacotherapy aims to improve the quality of life related to health. But using medications improperly could be harmful and result in new signs and symptoms. As pharmacological therapy becomes increasingly complex, the process of successful drug prescribing, distribution, and administration is becoming more challenging. As a result, several medication mistakes could happen in clinical practice. Medication errors, according to researchers, are "errors occurring at any stage in the ordering or delivery systems of drugs".[1] They additionally defined them as the medication's failure to carry out the intended planned activity or the application of the wrong strategy to achieve the desired result. One to ten percent of pharmacological errors lead to patient harm, according to research.[2-4]

Faris EL-DAHIYAT*. Clinical Pharmacy Program, College of Pharmacy, Al Ain University, Al Ain, United Arab Emirates. faris.dahiyat@aau.ac.ae
Khawla Abu HAMMOUR. Department of Biopharmaceutics and Clinical Pharmacy, Faculty of Pharmacy, The University of Jordan, Amman, Jordan.
Qusai MANASEER. Orthopedic Department, Jordan University Teaching hospital, Amman, Jordan.
Aya ALLAN. Pharmacy Department, Jordan University Teaching Hospital, Amman, Jordan.
Yafa RIMMAW. Pharmacy Department, Jordan University Teaching Hospital, Amman, Jordan.
Ola MAAITAH. Pharmacy Department, Jordan University Teaching Hospital, Amman, Jordan.

These errors are thought to be a common issue, even in industrialized nations like the United States of America (USA). For example, according to the Joint Commission on Accreditation of Healthcare Institutions, the errors of medication were the eighth most common sentinel incident.[5] In order to create international patient safety standards that are supported by evidence, the World Health Organization (WHO) World Alliance for Patient Safety was founded in 2004. These guidelines covered a range of patient care-related concerns, including the usage of the medications, and were developed to represent the significance of this problem and its global reach.[6]

The bulk of errors happen at the phases of prescribing, dispensing, and most crucially, the administration of the medication. For instance, Pharmaceutical errors were detected at a rate of 16% in drug prescribing, 18% in the distribution of medications and preparation, and over 50% in medication administration across all care settings, according to the National Patient Safety Agency in the United Kingdom (UK).[7]

The American Society of Health-System Pharmacists (ASHP) classifies medication errors into nine categories: omission, incorrect administration methods, incorrect timing, incorrect dosage form, unauthorized drug, incorrect dose, incorrect drug preparation, deteriorated drug, and other medication errors that don't fit into the predefined categories.[8]

Data on the prevalence and forms of pharmaceutical errors in healthcare settings have been documented in a number of countries, particularly high income countries like the USA, the UK, and other European countries. There aren't many reports, nevertheless, coming from developing nations like Jordan.[9] Therefore, it might not be possible to extend the effectiveness of different methods employed in high income nations to prevent

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pharmaceutical errors to other countries without such exact fundamental data. Therefore, it may be possible to improve the quality of care and promote patient safety by looking into the type and epidemiology of medication errors in a local environment. These initiatives ought to be comprehensive and appropriate for the particular circumstance.

The inability to prevent drug errors reflects both an individual and a system failing. Even though Medication error reports submitted by physicians, nurses, and pharmacists are a crucial instrument for error reduction. Based on site-specific factors, an integrated system of error reporting needs to be developed in each country and in every institution.

Middle Eastern nation of Jordan is recognized for its advanced medical facilities and knowledgeable medical personnel, which has attracted patients from various adjacent nations.[10] As a result, In Jordanian hospitals, numerous protocols to enhance reporting of pharmaceutical errors have been implemented. The Jordan University Hospital's (JUH) quality division developed and put into place a voluntary event reporting scheme with no penalties in 2012. The method for reporting incidents is typically overseen by the quality department or the patient safety office. They create projects for quality improvement and conduct research and analysis.

Medication mistakes have only been the subject of a few studies in Jordan.[11-14] In order to better understand the reasons for medication errors, the variations in medication errors between various hospital types (such as governmental vs. university hospitals), and the reporting hurdles, these research mainly entailed asking nurses to complete surveys and questionnaires. By initially examining the volunteer incidence reports at JUH, the current study expands the corpus of information. The necessity for a standardized classification of errors was recognized by the National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP). Based on the severity of the outcomes, the NCC MERP approved a classification system for medication errors on July 16, 1996. The index considers factors such as whether and to what extent the patient was affected by the error.[15] (Figure 1).

Examining voluntary incident reports of drug mistakes was the main objective of the current investigation. The goals were to count the number and kinds of pharmaceutical errors that were voluntarily disclosed in incidents and to categorize them into different categories based on their seriousness using the classification index that is described in the methodology section below.

METHODS

This study examines medication errors that were freely reported and occurred in the 620 -bed teaching hospital Jordan University Hospital (JUH) between June/2020 and December/2021. The institutional human research review board at JUH gave the project its approval in terms of ethics.

The location of the error, its category, and the drug that was linked to it were all categorized accordingly.

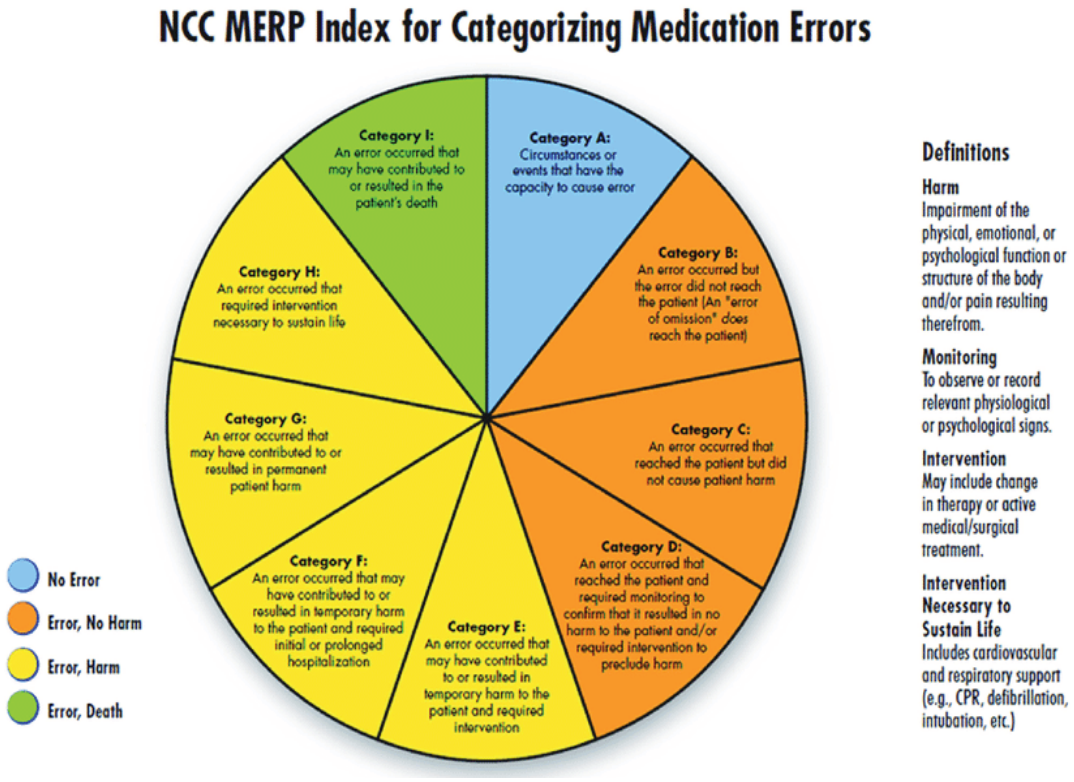

Figure 1. NCC MERP index for categorizing medication errors

The first author of this study and the person who reported the incident were two healthcare professionals who, according to Westbrook et al.[14] independently determined the episode's clinical importance. If there was a disagreement, the drug mistakes were discussed until an agreement was reached. When there was disagreement, it was settled by consensus and, if necessary, with the aid of a clinical pharmacologist. The NCC MERP index for categorizing pharmaceutical mistakes was then used to classify medication errors.[15]

Data Analysis

The data were coded and analyzed using IBM Corp.'s Statistical Package for Social Sciences version 20.[17] Data from categories were expressed as (number, percent).

RESULTS

Between June 2020 and December 2021, there were 74 reports of medication errors. More than half of the included patients in the study aged more than 45 years old (56.8%), Surgical departments and intensive care units were the source of two-thirds of the incident's reports (66.37%) (Table 1).

Table 1. Characteristic of patients exposed to medication errors

Parameter	**N (%)**
Age (year)	
Less than 5	12 (16.2)
5-12	2 (2.7)
13-18	3 (4.1)
19-25	4 (5.4)
26-35	9 (12.2)
36-45	2 (2.7)
More than 45	42 (56.8)
Department	
Surgical department	27 (36.5)
Outpatient and emergency department	9 (12.2)
Intensive care units	15 (20.3)
Pediatric department	7 (9.5)
Medical department	9 (12.2)
Neonatal intensive care unit	7 (9.5)
Medication associated with reported error	
Anti-infective drugs	19 (25.7)
Chemotherapeutic agents	10 (13.5)
Anticoagulants	8 (10.8)
Intravenous fluids and electrolytes	8 (10.8)
Steroids	7 (9.5)
Antiplatelet	4 (5.4)
Antihypertensive drugs	4 (5.4)
Biological drugs	3 (4.1)
Antiemetic medications	3 (4.1)
Anticonvulsants	2 (2.7)
Vaccines	2 (2.7)
Anti-arrhythmic medications	2 (2.7)
Insulins	1 (1.4)
Opioids	1 (1.4)

Analysis of the incident reports revealed that anti-infective drugs, chemotherapeutic drugs, anticoagulants and intravenous fluid with electrolytes were the most common drugs associated with these reports (60.8%). The majority (85.2%) of medication errors were discovered during the administration phase, 8.1% during the dispensing phase, and 6.8% during the prescribing phase. Medication errors were recognized more frequently during the administration phase. The precise types of medication errors are illustrated in Table 2. As seen in the table, missed doses (14, 18.9%) and improper time (22, 29.7%) accounted for the bulk of reported medication errors (Table 2).

Table 2. Types of reported medication errors during June/2020-2021

Type of error	**N (%)**
Wrong time	22 (29.7)
Wrong rate	8 (10.8)
Omission of medication	14 (18.9)
Wrong dose	6 (8..1)
Wrong patient	7 (9.5)
Wrong route	3 (4.1)
Wrong medication	7 (9.5)
Wrong frequency	4 (5.4)
Monitoring	3 (4.1)
Stage of error	**N (%)**
Prescribing	5 (6.8)
Dispensing	6 (8.1)
Administration	63 (85.2)

According to the NCC MERP index, the severity of reported pharmaceutical mistakes was evaluated, results revealed that one-third of reports were classified as C category (28, 37.8%), and 45.9% as category D. Only few cases were classified as category E (8, 10.8%), or F (4,5.4%) (caused the patient temporary harm and necessitated intervention or extended hospitalization). None caused death to any patient (Table 3)

DISCUSSION

Mandatory reporting may be scarcy to healthcare professionals; a survey of Scottish general practitioners (GPs) revealed that up to 75% of them preferred a local, anonymous reporting system, suggesting that mandatory reporting may be rare among healthcare professionals. They also discovered how uncomfortable obligatory reporting is, with 73% of general practitioners claiming they would offer misleading information under a system that compelled it.[18] Moreover,

Table 3. classification of medication errors according to NCC MERP index	
Type of error	**N (%)**
A (circumstances or occurrences that could lead to errors)	0 (0)
B (A mistake happened, but it didn't reach the patient)	0 (0)
C (Despite reaching the patient, the error did not affect the patient)	28 (37.8)
D (An error was made that reached the patient, necessitating either monitoring to ensure the patient was not harmed or intervention to prevent harm from occurring.)	34 (45.9)
E (A mistake happened that may have caused the patient's momentary injury or caused it, necessitating intervention)	8 (10.8)
F (A mistake happened that may have caused the patient's momentary injury or resulted in it, necessitating the patient's initial or extended hospitalization)	4 (5.4)

at King Fahd University Hospital Saudi Arabia has the lowest percentage of pharmaceutical errors at 0.15 percent, according to a study that looked into drug errors using mandatory event reports.[19] The authors claim that underreporting in mandatory and punitive reporting systems is the cause of this low occurrence. In Denmark, where the reporting system is mandated and doctors are protected, almost 50% of reported adverse events were provided by medical professionals.[20]

Although it has been demonstrated that volunteer reporting systems tend to underreport occurrences[21], a critical analysis of the data from voluntary, non-punitive reports may be able to spot true medication errors. They could also aid in enhancing error-prone procedures. To increase the quality of healthcare services, additional strategies like chart reviews, automated monitoring, or audits may be combined with voluntary reporting systems.[22]

According to numerous studies, many medication errors are not identified because of the context and different persons, so they go unnoticed.[23] Healthcare professionals in Jordan worry about punishment or being labelled as incompetence, just as those in other nations.[12-24] Hospitals must change their protocol for dealing with drug errors in order to put a stop to this "shame and blame" mentality. The number of reported medication errors rose annually from 33 in the year 2013, to 74/18 months in the current study, despite the fact that there were relatively few reported prescription errors during the research period. (There were 33% more reports than in 2013).

This significant rise may indicate that the voluntary reporting technique without punishments has thus far been successful. We may need to maintain a voluntary, non-punitive reporting policy in order to maintain this increase, at least until the reporting culture at JUH has become sufficiently entrenched to trigger a fundamental transition toward a safer setting where medical staff can learn from their mistakes.

In this study, medication errors were most frequently reported by nurses at the administration stage. This finding was consistent with earlier research, [13] and it may be related to the fact that nurses are typically the healthcare workers who have the closest contact with patients when it comes to administering medications.

A number of factors, including a lack of time to complete the paperwork, have been cited elsewhere as contributing to doctors' inability to report occurrences. Doctors are not reporting drug errors frequently enough.[25,26] It is obvious that more needs to be done to motivate physicians and pharmacists to go beyond simply reporting errors and instead look for ways to prevent them. Drug mistakes are not being reported by doctors frequently enough. The most common reason for medication errors was forgetting to take a dosage. In his thorough examination of pharmaceutical errors in Middle Eastern countries The most typical medication errors, according to Alsulami et al,[9] were inappropriate dosage, incorrect strength or frequency, incorrect route, and incorrect length of therapy. Direct comparison with the findings of the present investigation is particularly difficult because the studies included in the review utilized a variety of definitions of medication errors and a diversity of reporting procedures, and none of these studies used voluntary data.

There are similarities to earlier analyses when assessing the drug classes linked to the recorded medication error in the present study.[9-27] Anti-infective drugs were found to be the most frequently prescribed drug classes linked to prescription errors, as was already mentioned by the investigation's findings. The cardiovascular system, the central nervous system, and infections were named as the top three classes associated with pharmaceutical administration errors in a global systematic study of ten studies 50% (n=10). In contrast, 40% of the literature under consideration identified medications used to treat infectious disorders and the central nervous system as top classes related with medication administration errors.[28]

The study's findings, which are analogous to those of Jylha et al.[29] who reported that more than 80% of adverse drug events were associated to inpatient services, show that almost all of the reports were connected to inpatient services. This observation may be attributable to the unit dose system utilized for drug prescription, distribution, and administration to inpatients. Compared to adult patients, neonatal patients present a special challenge to medical professionals in terms of drug prescription, dispensing, and administration. For instance, choosing the right dose for a newborn might be challenging for clinicians because it sometimes necessitates doing several mathematical equations. Because it is usually essential to dilute pharmaceuticals in order to give the newborn a modest amount, pharmacists may encounter difficulties while giving medications to infants. Because infants are unable to alert medical staff to administration problems, giving medications

to infants carries a risk of error that could have major harmful effects. It makes complete sense that around fifteen percent of the reports in the current study came from the newborn critical care unit. Since prior studies have demonstrated that the presence of a clinical pharmacists in neonatal/pediatric intensive care units can significantly reduce serious prescription errors, there may be a strategy to decrease these errors by adding a full-time clinical pharmacist to those units.[30]

While the majority of reported medication errors did not have an impact on patients, a closer look found that they might have if they had not been stopped before they did. Miller et al., as well as Harkanen et al., agreed with these findings.[31-32] Less than 10% of instances resulted in substantial injury to patients, according to both investigations, while the majority had no such effects. When assessing the study's conclusions, the following limitations must be taken into consideration: Because the information was gathered via incident reports, there can be gaps in the record-keeping. Since information was only gathered from one institution, conclusions drawn without further study may not be applicable to other situations. Utilizing the collected data, quality improvement initiatives can be created at the JUH to reduce medication errors.

CONCLUSION AND IMPACT FOR PRACTICE

There are certain important findings in the current study that should be taken into account in order to raise the standard of healthcare provided at JUH, despite the study's limitations. Even though the majority of reported medication mistakes are not thought to be substantial or harmful, some of these errors can nonetheless have catastrophic consequences if they go uncorrected.

The findings of this study imply that concentrating on two strategies can reduce medication mistakes. The first is education, and continual awareness initiatives are vitally important. These activities should inspire medical professionals to recognize and report drug mistakes as soon as they happen. Then, until reporting evolves into a culture free of blame and a teaching opportunity, they should be repeated as necessary. The second strategy involves the creation of reliable, compliant reporting systems that are supported by suitable infrastructure and enable rapid feedback and responses from accountable staff. According to the hospital's experience over the past few years, an integrated penalty-free voluntary reporting system is being employed more and more in the health care sector.

Experts from JUH will report drug mistakes. It is crucial to carefully examine this first result in order to identify any potential areas for improvement, such as if computerizing incidence data may motivate more medical professionals to report drug errors. Would it give feedback more quickly and hurt fewer patients? It is clear that more research-based site-specific methods are required to reduce medication errors and deliver safe and efficient treatment to patients.

SOURCE OF FUNDING

The preset study received no specific grant from any.

CONFLICT OF INTEREST

None

ETHICAL APPROVAL

Data collection was performed after obtaining the approval of the IRB committee at the JUH (Approval No. 8379/2022).

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