Evaluation of Medication Errors in Hospitalized Patients

Hamoudi A. Mosah, *Ph.D.;* **Ahmed S. Sahib**, *M.Sc., Ph.D.;* **Haedar A. AL-Biati** , *B.Sc.,MSc*

Abstract

Objectives: Many medication errors occur in the hospital, and these can endanger patients. The purpose of this study was to evaluate the incidence of medication errors in hospitalized patients, and to categorize the most frequent types of errors, and to asses the possible measures that may prevent the occurrence of such errors.

Methods: A prospective, exploratory, and evaluative study, using direct observation method to detect medication errors in adult hospitalized patients in medical and surgical units in Baquba Teaching Hospital- Diyala-Iraq.. The files of 299 patients had been reviewed from July 2009 to September 2009, including medication orders and treatment sheets to detect existing errors. The detected errors were recorded and classified using special form designed according to standard classification of medication errors.

Results: During the study period, a total of 299 patient's files were reviewed and identified. The incidence of medication errors was 8.7%. The most common types of errors; where incorrect medication which includes 38.46% for not indicated drugs and 19.23% for drug-drug interaction. The incorrect dose represents the second common type of medication errors which include 15.38% for over dose and 3.85% for under dose. The classification of medication errors in this study were 61.54% prescribing errors, followed by 19.23% for each of dispensing errors and administration errors.

Conclusions: Medication errors occur for a variety of reasons, including inaccurate communications and deficits in knowledge and performance by and among all health care professionals. In this study we addressed and identified that prescribing errors are the most common type of medication errors followed by dispensing and admintration types, so, all health care professionals have a responsibility in identifying contributing factors to medication errors and to use obtained information to reduce further error occurrence.

Keywords: medication errors, patient safety, system errors.

Al-kindy Col Med J Vol.8 No.(2) 2012 P:75-79

Introduction:

The National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) represents 27 of the nation's leading health care and consumer organizations. It was established because its members recognized that the involvement of all health care system participants is needed to correct medication errors. The NCC MERP definition of a medication error is as follows: Any preventable event that may cause or lead to inappropriate medication use or patient harm, while the medication is in the control of the health care professional, patient, or consumer. Such events may be related to professional practice, health care products, procedures, and systems including prescribing; order communication; product labeling, packaging, and nomenclature; compounding; dispensing; distribution; administration; education; monitoring; and use (1).

Medication errors are broadly defined as any error in the prescribing, dispensing, or administration of a drug, irrespective of whether such errors lead to adverse consequences or not(2).

Classification of Medication Errors

The multiple steps in the medication chain, from when a drug is prescribed to when a patient receives the drug, leads to significant scope for error. However, significant improvements can be achieved from the prevention of medication errors, in terms of reduced patient morbidity, length of hospital stay, and healthcare costs. A classification system based on a psychological approach has been proposed which allows one to identify broad categories of error, quantify them, and develop an intervention to prevent them. This classification system divides errors into mistakes, slips, or lapses.

Mistakes may be defined as errors in the planning of an action and may be knowledge-based (e.g. giving a medication without having established whether the patient is allergic to that medication) or rule-based. Rule based errors can further be classified as either the misapplication of a good rule (e.g. injecting a medication into the non-preferred site) or the

application of a bad rule or the failure to apply a good rule (e.g. using excessive doses of a drug).

Slips and lapses are errors in the performance of an action. Medication errors may also be classified according to where they occur in the medication use cycle, i.e. at the stage of prescribing, dispensing, or administration of a drug (3).

PRESCRIBING ERRORS

Prescribing errors may be defined as the incorrect drug selection for a patient. Such errors can include the dose, quantity, indication, or prescribing of a contraindicated drug (4). Lack of knowledge of the prescribed drug, its recommended dose, and of the patient details contribute to prescribing errors (5).

DISPENSING ERRORS

Dispensing errors occur at any stage of the dispensing process, from the receipt of the prescription in the pharmacy to the supply of a dispensed medicine to the patient. Dispensing errors include selection of the wrong strength or product. This occurs primarily with drugs that have a similar name or appearance (6).

ADMINISTRATION ERRORS

Administration errors occur when a discrepancy occurs between the drug received by the patient and the drug therapy intended by the prescriber (7).

Drug administration has long been associated with one of the highest risk areas in nursing practice, with the 'five rights' (giving the right dose of the right drug to the right patient at the right time by the right route) being the cornerstone of nursing education (8). Drug administration errors largely involve errors of omission where the drug is not administered for a variety of reasons. Other types of drug administration errors include an incorrect administration technique and the administration of incorrect or expired preparations (9).

The purpose of this study is to evaluate and identify the type and frequency of factors and causes associated with medication errors in hospitalized patients.

Methods:

This is a prospective, exploratory, and evaluative study, using direct observation method to detect medication errors in adult hospitalized patients in medical and surgical units in Baquba Teaching Hospital- Diyala-Iraq.

The study focused on types, causes, contributing factors, frequency, and possible preventive measures of medication errors. The files of 299 patients had been reviewed from July 2009 to September 2009, including medication orders and treatment sheets to detect existing errors.

The detected errors were recorded and classified using special form designed according to standard classification of medication errors and include: incorrect patient, incorrect medication, incorrect time, incorrect dose (over dose, under dose, extra dose, wrong dosage form, and wrong strength) , incorrect route, gave expired medication, and forget to give medication.

Results:

During the study period, a total of 299 patient's files were reviewed and identified; among these, 26 patient's files had medication errors. The incidence of medication errors was 8.7% of which 76.92% occur in medical ward and 23.08% in surgical ward (table 1). Results showed (table 1) that the incidence of medication errors were 65.38% in male and only 34.62% in female.

Table 1: Incidence of medication errors in the studied group.

Patient criteria	**n**	**%**
Total number	299	100
Incidence of ME	26	8.7
Male	17	65.38
Female	9	34.62
Medical ward	20	76.92
Surgical ward	6	23.08

Results represent percent of total., ME: medication errors.

Table (2) showed the most common types of errors; where incorrect medication represents the highest percent type; and include 38.46% for not indicated drugs and 19.23% for drug-drug interaction. The incorrect dose represents the second common type of medication errors which include 15.38% for over dose and 3.85% for under dose.

The other types of medication errors identified in this study were 7.69% for incorrect route of administration, 7.69% for expired medication,

and 3.85% for other cause which is development of adverse drug reaction.

Table 2: Distribution of types of medication errors in the studied group.

Type	**n**	**%**
Incorrect medication		
Not indicated	10	38.46
Cause drug-drug interaction	5	19.23
Incorrect time	1	3.85
Incorrect dose		
Over dose	4	15.38
Under dose	1	3.85
Incorrect route	2	7.69
Gave an expired medication	2	7.69
others	1	3.85
Total	26	100%

The classification of medication errors in this study was shown in table (3); 61.54% prescribing errors, followed by 19.23% for each of dispensing errors and administration errors.

Table 3: Distribution of causes of medication errors in the studied group.

Causes	**n**	**%**
Prescribing	16	61.54
Dispensing	5	19.23
Administration	5	19.23
Total	26	100%

Discussion:

The institute of medication errors "To Err is Human" Building Safer Health System estimates that tens of thousands of people die and hundreds of thousands of people experience non-fatal injuries each year in the united state as a result of Medication Errors; so, reducing the incidence of drug related iatrogenic disease is a public health concern around the world (10).

Besides injuring patient, medication errors cost money and waste time and also cause loss of life-long productivity (11).

Medication usage is a multidisciplinary process, which begins with the doctor's prescription, and followed by the review and provision of medications by a pharmacist, and ends with the preparation and administration of the medication to the patient by a nurse (12). As a medication order travels through its many

communication stages, the opportunities for error increase, inadvertent errors or accidents are encountered if there is a breakdown at any stage in this process, which leads to overwhelming consequences for the patient

and for the career of the healthcare professional (13).

Evaluation of medication errors in hospitalized patients show that incorrect medication was the first common type in this study, second was incorrect dose, and the third was incorrect route of administration and gave an expired medication. In contrast to these data, results obtained by others showed that incorrect dose was the most common type of medication errors, followed by administration of incorrect drug and the last was incorrect route of administration (14). However, data obtained in this study are compatible with data in another study concerning the most common type of medication errors which is incorrect medication, followed by incorrect dose (15).

Results obtained in this study showed that physician had been committed most medication errors followed by pharmacists and nurses (Table 3) , this result was compatible with other results (15); which showed that the prescriber had the higher number of medication errors than pharmacists and nurses.

It has been found that the majority of errors were made by relatively medical staff, who are responsible for the majority of prescribing in hospitals (16). Medical graduate themselves feel unprepared to prescribe shortly after graduation; emphasizing the need to ensure sufficient education in prescribing skills (17).

It has been shown that dispensing errors occur at a rate of 1-24% and include selection of the wrong strength or product, and this occurs primarily with drugs that have a similar name or appearance; data obtained in this study as shown in table (3) showed that dispensing errors represents 19.23% of medication errors which is compatible with the above mentioned data. In case of drug administration, medication errors largely involve errors of omission where the drug is not administered to patient for a variety of reasons; other type includes incorrect administration technique and the administration of incorrect preparation (18).

If medication errors are to be prevented, the processes and systems for ordering, dispensing, and administering medicines must be analyzed (19). The goal is to reduce knowledge and performance deficits and to redesign and improve staff communications (20).

Health care providers can reduce medication errors associated with prescribing, dispensing, and administering orders if they:

1. Repeat the drug name and spell it when taking verbal orders, especially on the telephone;
2. Use computer entry for medication orders whenever possible (21);
3. Know the intended use of the medication for the patient's diagnosis and include this information in the medication order, on the chart, and in prescriptions;
4. Accept only those medication orders that include the product strength and route of administration;
5. Insist on clear directions for use, avoiding abbreviations or other shortcuts;
6. Communicate with the patient or care giver to intercept medication errors before they occur;
7. Ask the patient what the provider told him or her to expect while taking the medicine (22).

Conclusion:

Medication errors occur for a variety of reasons, including inaccurate communications and deficits in knowledge and performance by and among all health care professionals. In this study we addressed and identified that prescribing errors is the most common type of medication errors followed by dispensing and adminstration types, so, all health care professionals have a responsibility in identifying contributing factors to medication errors and to use obtained information to further reduce error occurrence. Furthermore, medication errors can be prevented and reduced if health care professionals and patients act responsibly, use proper techniques and procedures and use safety nets to avoid any and all medication errors possibilities.

References:

1. [NCC MERP] National Coordinating Council for Medication Error Reporting and Prevention [online]. Accessed on April 7, 2010. URL: http://www.nccmerp.org/councilRecs.html.
2. Ferner RE, Aronson JK. Errors in Prescribing, preparing and giving medicines: definition, classification and prevention [online]. Accessed on May 7, 2010. URL: www.hero.org.ph/files/pharmacovigilance.pdf.
3. Williams DJP. Medication errors. J R Coll Physicians Edinb 2007; 37**:**343–346.
4. Barber N, Rawlins M, Franklin BD. Reducing prescribing error: competence, control and culture. Qual Saf Health Care 2003, 12:129–32.

5. Lesar TS, Briceland LL, Delcoure K, , Parmalee CJ, MastaGorinc V,Pohl H. Medication prescribing errors in a teaching hospital. JAMA 1990; 263:2329-34.
6. Bohand X, Simon L, Perrier E, Mullot H, Lefeuvre L, Plotton C. Frequency, types, and potential clinical significance of medication-dispensing errors. Clinics. 2009;64(1):11-6.
7. Gladstone J. Drug administration errors: a study into the factors underlying the occurrence and reporting of drug errors in a district general hospital. J Adv Nurs 1995, 22:628–37.
8. Elliott M, Liu Y. The nine rights of medication administration: an overview. Br J Nurs. 2010, 19:300-5.
9. Hurley AC, Lancaster D, Hayes J, Wilson-Chase C, Bane A, Griffin M, Warden V, Duffy ME, Poon EG, Gandhi TK. The Medication Administration System-Nurses Assessment of Satisfaction (MAS-NAS) Scale. J Nurs Scholarsh 2006, 38:298–300.
10. Kohn L, Corrigan J, and Donaldson M. To Err is Human: Building Safer Health System. Washington (DC): National Academy Press; 1999.
11. Davis JT. Clinical pathway can be based on acuity not on diagnosis. Ann Thoracic Surg 1995, 59:1074–8.
12. Gladstone J. Drug administration errors: a study into the factors underlying the occurrence and reporting of drug errors in a district general hospital. J Adv Nurs1995 , 22:628–37.
13. Nancy B, and Carothers RN. Medication Errors: The Problem and Its Scope. Int J Trauma Nurs 1998; 4:104-8.
14. Jerry P, Sammie B, Allen B, Carol H, Peter H, Laureen YL, et al. Retrospective analysis of mortalities associated with medication errors. Am J Health Syst Pharm 2001; 158:1835-1841.
15. Lapointe NMA, and Jollis JG. Medication errors in hospitalized cardiovascular patients. Arch Intern Med 2003; 163: 1461-1466.
16. Dean B, Schachter M,Vincent C, Barber N. Causes of prescribing errors in hospital inpatients: a prospective study. Lancet 2002;359(9315):1373–8.
17. Van Doormaal JE**,** van den Bemt PM**,** Mol PG**,** Zaal RJ, Egberts AC, Haaijer-Ruskamp FM, Kosterink JG. Medication errors: the impact of prescribing and transcribing errors on preventable harm in hospitalised patients. Qual Saf Health Care. 2009, 18:22-7.
18. Esi Owusu Agyemang R, While A. Medication errors: types, causes and impact on nursing practice. Br J Nurs. 2010, 7; 19:380-5.
19. Paparella S. Choosing the right strategy for medication error prevention – part II. J Emerg Nurs 2008; 34:238-40.
20. Paparella S. Choosing the right strategy for medication error reduction: Part I. J Emerg Nurs 2008; 34: 145-6.
21. Agrawal A, Wu WY. Reducing medication errors and improving systems reliability using an electronic medication reconciliation system. Jt Comm J Qual Patient Saf. 2009 ,35:106-14.
22. Becker S. Common Causes for Medication Errors Identified. Int J Trauma Nurs 1999; 5:113-5.

.Department of Pharmacology, Al-Kindy College of Medicine, University of Baghdad, Baghdad, Iraq
.Department of Clinical Pharmacy, Ministry of Health, Baghdad, Iraq
Correspondence: Dr. Ahmed Salih Sahib, Department of Pharmacology, Al-Kindy College of Medicine, Baghdad, Iraq; E- mail: ahmedsalih73@yahoo.com