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A SYSTEMATIC REVIEW OF MEDICATION ERRORS

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ABSTRACT
Medication errors (MEs) are a common cause of treatment response failure and iatrogenic adverse events. This can lead to patients harm or loss of life. Medications errors can occur due to administrating or taking the medicine by wrong route, dose, duration or frequency; prescription error such as writing prescription, fault prescribing; manufacturing the formulation; misleading packaging; dispensing the formulation; adulterant; failing to alter therapy when required; economically as well as nurses related problems. We included all types of medication errors that are classified according to physiological errors, reported the incidence of medication errors, Identified the causes of medication errors, knowledge, rule and therapeutic actions. Avoiding medication errors have the responsibility of all healthcare professionals to identifying contributing factors to medication errors to used that information to further reduce their occurrence.

KEYWORD: Medication Errors, Drug Prescription, Economic cost.

INTRODUCTION

Medication error is a significant source of preventable morbidity and mortality among patient.[1] The National Coordinating Council for Medication Error Reporting and Prevention defines a medication error as "any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the healthcare professional, patient, or consumer." The entire system for using medications is susceptible to medication mistakes. For instance, whether writing a prescription, putting data into a computer system, preparing or dispensing the medication, or giving or administering it to a patient.[2,3,4]

Each year, more than 100,000 reports of suspected drug errors are sent to the U.S. Food and Drug Administration (FDA). 7,000 to 9,000 persons each year in the US alone pass away as a result of drug mistakes. Additionally, millions of other people have negative drug reactions or other side effects but frequently fail to disclose them. Over 7 million individuals are affected, and treating patients with medication-related errors costs more than $40 billion annually.[3]

Prescription, preparation, dispensing, and administration of medications are all steps in the medication usage process. There are many different definitions of medication mistake in the literature2, and errors can involve doctors, pharmacists, and nurses in primary, secondary, and tertiary care settings at every stage of the medication use process.

OBJECTIVE

- To Understand the relationship between ME, ADE & ADR
- Identify the most common errors related to medications.
- Review some of the critical points at which medication errors are most likely to occur.
- To explain the terminology used in medication error review.
- Types of Medications Errors.
- To understand Failures & Barriers That Contribute to Medication Errors.
- Prevent Medication Errors.
- Monitoring & Managing Medication Errors.

SOME BASIC DEFINATIONS

A Medication

A medication (also known as a medicinal product) is defined as "a product that contains a compound with proven biological effects, plus excipients or excipients only; it may also contain contaminants; the active compound is typically a drug or prodrug, but may also be a cellular element."

According to a codicil to this definition, a medicinal product is one that is meant to be consumed by or administered to an animal or person for one or more of

the following purposes: as a placebo; to prevent a disease; to make a diagnosis; to test for the possibility of a negative effect; to alter a physiological, biochemical, or anatomical function or abnormality; to replace a missing factor; to ameliorate a symptom; to treat a disease; or to induce anesthesia. The act of administering a drug to a patient is known as medication (the procedure), and it might be done for any of these reasons.

MEDICATION ERROR

The National Coordinating Council for Medication Error Reporting and Prevention defines a medication error as: "...any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the healthcare professional, patient, or consumer." Medication errors do not have a single, agreed-upon definition. This includes prescribing, order communication, product labeling, packaging, and nomenclature, compounding, dispensing, distribution, administration, teaching, monitoring, and use, among other professional practice-related activities. There isn't a generally acknowledged standard definition, though. Unwanted medical mistakes and unreported drug errors, sadly, significantly increase morbidity and mortality.[3]

MEDICATION ERRORS CAN OCCUR IN

- Choosing a medicine—irrational, inappropriate, and ineffective prescribing, underprescribing and overprescribing;
- Writing the prescription—prescription errors, including illegibility;
- Manufacturing the formulation to be used—wrong strength, contaminants or adulterants, wrong or misleading packaging;
- Dispensing the formulation—wrong drug, wrong formulation, wrong label;
- Administering or taking the drug—wrong dose, wrong route, wrong frequency, wrong duration;
- Monitoring therapy—failing to alter therapy when required, erroneous alteration.

ADVERSE DRUG REACTION

According to the World Health Organization, an adverse medication reaction is "any response that is noxious, unintended, or undesired, which occurs at doses normally used in humans for prophylaxis, diagnosis, therapy of disease, or modification of physiological function." While medication errors may often be avoided, adverse drug reactions are expected undesirable effects that are part of the pharmacologic activity of the drug.

ADVERSE DEUG EVENT

An adverse drug event is a harm caused by a medication, or by a medication that was missed or dosed incorrectly. A patient experiences morbidity or mortality as a result of a drug reaction. An adverse drug event is distinct from an adverse drug reaction in that the patient must be exposed to a medication with a negative outcome that may or may not be anticipated. Some medication errors result in ADRs but many do not; occasionally a medication error can result in an adverse event that is not an ADR (for example, when a cannula penetrates a blood vessel and a haematoma results)

MEDICATION MISADVENTURE

A medication misadventure is an iatrogenic incident that is inherent to medication therapy. Medication misadventure includes medication errors, adverse drug reactions, and adverse drug events. It is created through omission or commission of medication administration. Medication misadventures always are undesirable and unexpected; they may or may not be independent of preexisting pathology; and might be due to human or system error, idiosyncratic, or immunologic response.[4]

TYPES OF MEDICATION ERRORS

- Prescribing
- Omission
- Wrong time
- Unauthorized drug
- Improper dose
- Wrong dose prescription/wrong dose preparation
- Administration errors include the incorrect route of administration, giving the drug to the wrong patient, extra dose, or wrong rate
- Monitoring errors such as failing to take into account patient liver and renal function, failing to document allergy or potential for drug interaction
- Compliance errors such as not following protocol or rules established for dispensing and prescribing medications

CAUSES OF MEDICATION ERRORS[4]

Expired Product

Usually occurs due to improper storage of preparations resulting in deterioration or use of expired products.

Incorrect Duration

This error usually occurs with compounding or some other type of preparation before the final administration. An example is choosing the incorrect diluent to reconstitute.

Incorrect Strength

Incorrect strength may potentially occur at many points in the medication process. It usually occurs due to human error when similar bottles or syringes with the incorrect strength is selected.

Incorrect Rate

Most often occurs with medications that are given as IV push or infusions. This is particularly dangerous with many drugs and may result in significant adverse drug reactions. Examples include tachycardia due to rapid IV epinephrine or red man syndrome due to the rapid administration of vancomycin.

Incorrect Timing
In both home and institutional settings, it is challenging to be completely accurate with scheduled doses. The concern is that some medication's absorption is significantly altered if taken with or without food. As such, it is important to adhere to scheduled times as commonly; this may lead to under or overdosing.

Incorrect dosage
This error consists of an additional dose, an underdose, and an overdose. Errors of omission occur when a planned medication dose is missed, when a drug is administered by the wrong route, and when an improper or different medication dose is administered than what was ordered. Errors resulting from wrong routes are typically caused by tubing that is adaptable to different connectors or lines of access, or by poor labeling. Taking the wrong paths frequently results in considerable morbidity and mortality.

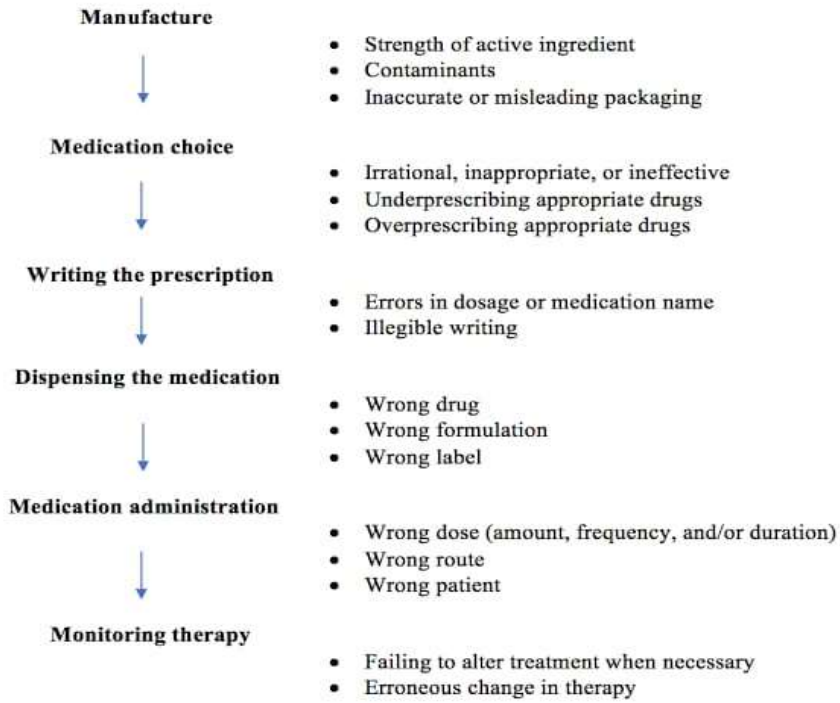
Incorrect Dosage Form
This occurs when a patient receives a dosage form different than prescribed, such as immediate-release instead of extended-release.

Incorrect Patient Action
This occurs when a patient takes a medication inappropriately. Patient education is the only way to prevent this type of error.

Known Allergen
Dispensing a drug that the patient has an allergy often due to failure to communicate with the patient, inappropriate chart review, inaccurate charting, or lack of technological interface.

Known Contraindication
This occurs when medications are not vigilantly reviewed for drug-drug, drug-disease, or drug-nutrient interactions.

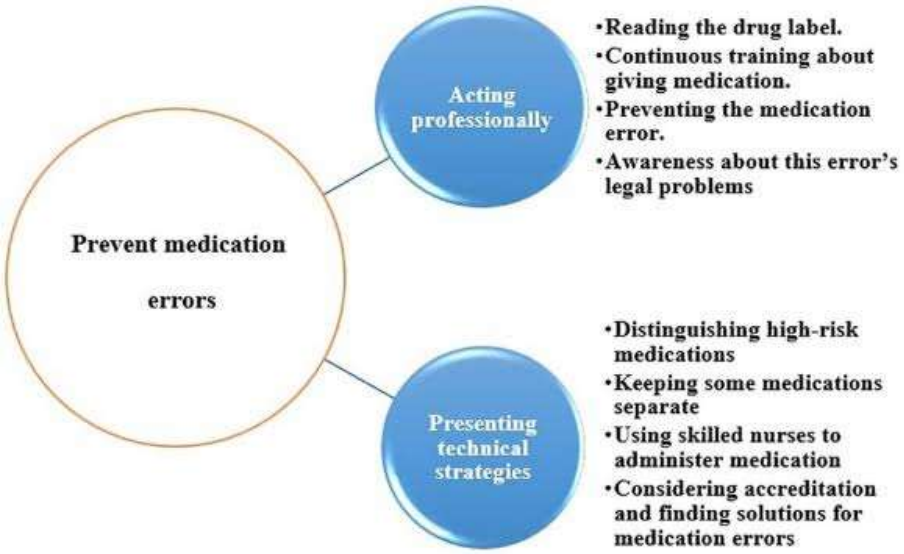
Pharmacist
Errors by pharmacists are usually judgmental or mechanical. Judgmental errors include failure to detect drug interactions, inadequate drug utilization review, inappropriate screening, failure to counsel the patient appropriately, and inappropriate monitoring. A mechanical error is a mistake in dispensing or preparing a prescription, such as administering an incorrect drug or dose, giving improper directions, or dispensing the incorrect dose, quantity, or strength.[9]



Medication error

AVOIDING MEDICATION ERRORS
Because the root causes of medication errors are diverse, multiple strategies are required to prevent them. The FDA has worked to review confusing drug names, improve packaging, require identification bar codes, and educate patients. Campaigns such as the "5 Rights of Medication Administration " right drug, right patient, right dose, right route, right time have been used with limited success. The elimination of cognitive bias in medicine is a difficult problem to overcome. Systems

thinking (ie, using quality improvement methodologies to discover and correct root causes of problems rather than blaming an individual), error proofing (ie, a lean methodology term that means to design an environment in which a mistake cannot happen, such as a cable that can only be plugged into an outlet in one direction), and training have been suggested methods to remediate drug errors or opportunities for drug errors.[7]



Information technology has been a mainstay for reducing medication errors. Computerized systems can eliminate illegible handwriting and confusing medical abbreviations. Drug databases can also help to identify drug-drug interactions. Computerized physician order entry can decrease medication errors by more than onehalf, although not all of these errors would have resulted in an adverse event. In other research, a computerized physician order entry system helped reduce nonemissed-dose medication errors in outpatients from 142 per 1000 patient-days at baseline to 26.6 per 1000 patient-days after the intervention. Bar codee assisted medication administration was reported to reduce the medication error rate in an intensive care unit from 19.7% to 8.7% (a 56% reduction).This medication error rate improvement was mostly due to reductions in errors of wrong administration time. Despite success at reducing medication errors, technology such as physician order entry and bar codeeassisted administration systems require considerable financial investment, health care professional training, and system maintenance.[4,7]

Education for both patients and health care professionals is an important component of medication error reduction. Programs have been deployed to teach patients to maintain an accurate medication list, know the indications for each of their medicines, and bring medication bottles to all physician appointments. Additionally, promotion of a culture of safety is important to improve error reporting. Preparation for medication error discovery and disclosure are now being taught to physicians and medical students. Real-time education by pharmacists may also decrease errors. Pharmacist participation as a full member of a health care team on hospital rounds also is reported to decrease adverse drug events caused by prescribing error.[7]

Role of pharmacist

- Refer back to doctor if any confusion
- Basic knowledge of dosing regimens for commonly used drugs
- Computer reminder for serious confusing name pairs to avoid errors in prescription
- Identify drug interactions and prevent medication-related adverse events.

Role of nurses

- Know the relevant legislation relating to medication administration
- Have adequate knowledge of the medication, its therapeutic purpose, usual dose, frequency and route of administration, specific precautions. contra-indications, side effects and adverse reactions. Nurses and midwives should also be aware of the correct storage requirements for medications.

Role of Doctors

- Specify dosage form, drug strength & complete directions on prescriptions
- Double-check doses and brand names
- Use both brand name & generic name on prescription
- Monitor patients for any adverse reaction
- Respect nurses & patients

Role of patients

- Patients are the last defense against medication errors
- Use written instructions, read-back strategies to reduce errors
- Educating patients about their medications is a key strategy for preventing medication errors

- Understand the instructions
- They can ask question about our medication
- It`s also essential to keep a record of all our medication and share that information with our healthcare providers.

CNCLUSION

Medication error is an important cause of morbidity and mortality, Any mistake that happens during the administration of a medicine is a medication error. The IOM estimates that 1 in 131 outpatient and 1 in 854 inpatient deaths are related to mediation errors. Medication errors can be caused by a variety of variables, including medication-related ones (such as similar-sounding names, low therapeutic index), patient-related ones (such as poor renal or hepatic function, decreased cognition, polypharmacy), and health care professional-related ones (such as use of abbreviations, cognitive biases).

Learning more about medication errors may enhance health care professionals' ability to provide safe care to their patients. Future research should focus on identifying the errors that most commonly lead to patient harm. Medication errors are a common problem that places a massive burden on healthcare systems and are frequently preventable with the use of practical preventive measures. Assessing how well the collected data is used to improve patient safety is a crucial component of evaluating a reporting system's efficacy.[7,8]

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