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MEDICATION ERROR

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ABSTRACT

Medication error is a preventable event that may be caused due to inappropriate medication. Generally medication should be in the control of health care professionals but factors like prescribing, dispensing, administration and patient errors leads to medication errors. Incidences of medication error rate vary widely. The majorities of medication errors occur as a result of poor prescribing and often involve relatively inexperienced medical staff. Most medication studies depends on an observation based methodology. Now electronic prescribing may help to reduce the risk of prescribing errors. Medication error can be avoided by the process of quality improvement and by redesigning the faulty systems. Computerized integrated medication delivery systems must be instituted by health care professionals, who are adequately trained to use such technological advances for the prevention of medication errors.

Key words: Medication error, Adverse drug events, Prescribing errors, Computerized technology.

INTRODUCTION

Medication error can cause serious adverse effect and potentially to evoke the fatal risk of the disease. Monitoring the safety and efficacy of the drugs adequately can prevent the occurrence of adverse effect. Most medication error studies have been based on an observation-based methodology where a statistically valid number of drug administration events are observed and the activity compared to the prescribers order.

Most studies of medication errors only analyzed hospital medication usage and there is a large volume of medication prescribed in doctors' offices and dispensed by pharmacies.

Adverse drug reactions are quite common. Estimated that 6.7% of hospitalizations resulted in an adverse drug reaction and 0.32% of cases were fatal. These extra palates to about 2,216,000 cases annually in hospitalized patients and 106,000 deaths.

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A recent study by Health grades found that an average of 195,000 hospital deaths in each of the years 2000, 2001 and 2002 in the U.S. were due to potentially preventable medical errors. The Zhan and Miller study supported the Institute of Medicine's (IOM) 1999 report conclusion, which found that medical errors caused up to 98,000 deaths annually and should be considered a national epidemic (medical news).

A 2009 meta-analysis identified the 5 most commonly miss-diagnosed diseases as: infection, neoplasm, myocardial infarction, pulmonary emboli, and cardiovascular disease (Schreier W *et al.*, 2009). Physician familiarity with this information is variable (Hardigan PC *et al.*, 2010)

CATEGURIES OF MEDICATION ERRORS

1. Prescribing errors
2. Omission errors
3. Unauthorized drug errors
4. Improper dose errors
5. Wrong dosage form errors
6. Wrong drug preparation errors
7. Wrong administration
8. Deteriorated drug errors
9. Monitoring errors
10. Compliance errors

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1. **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. Other contributing factors include:
   - Illegible handwriting
   - Taking inaccurate medication history
   - Confusion with the drug name
   - Use of abbreviations
   - Use of verbal orders

2. **Improper dose errors**
   Administration of a dose that is greater than or less than the prescribed.

3. **Wrong dosage form errors**
   Administration of a drug product in a different dosage form than prescribed.

4. **Wrong drug preparation errors**
   Drug product incorrectly formulated or manipulated before administration.

5. **Wrong administration or technique errors**
   Inappropriate procedure or improper technique in the administration of the drug.

6. **Deteriorated drug errors**
   Administration of a drug that has expired or for which the physical or chemical dosage form integrity has been compromised.

7. **Monitoring error**
   Failure to review a prescribed regimen for appropriateness or failure to assess response to prescribed therapy.

8. **Compliance error**
   Failure of the patient to adhere to prescribed medication regimen (Parthasarathi G *et al.*, 2004).

INCIDENCE OF MEDICATION ERROR

Incident rates of medication error vary widely. The reason for with can be explained by the different study methods and definition used. The rate of medication error varies between 2 and 14 of patients admitted to hospital with 1-2 of patients in the US being harmed as a result and the majorities are due to poor prescribing.

Sir – David Phillips and colleagues report an increase in medication- error deaths from adverse effects to deaths from error fell to about 0.03 to 1 in 1993. Medication errors (7% of all incidences) are the second most common incident report on patient safety (DJP willams, 2007)

ADVERSE DRUG REACTIONS

Adverse drug events (ADEs) usually defined as harm caused by the use of drug constitute a major health concern for the individual patient and the community (David M Benjamin).

An adverse drug reaction (ADR) is not necessarily a medication error although it can be. Adverse drug reactions are quite common.estimated that 6.7 % of hospitalizations resulted in an adverse drug reaction and 0.32% of assessor fatal. This extrapolates hospitalized patients and 106,000 deaths (DJP willams, 2007; David M Benjamin)

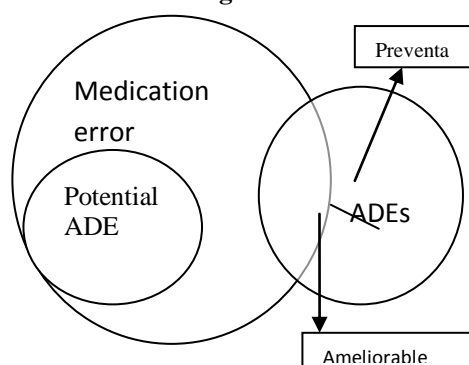## RELATION BERWEEN THJE ADVERSE DRUG AND ADVERSE DRUG EVENTS

Medication errors can occur at any stage of the medication use process and may or may not lead to an adverse drug event. Depending on the clinical setting, about one –third to one half of adverse drug events is associated with medication errors.

Adverse drug events are dose dependent and potentially predictable and constitute the greatest percentage of error that result in clinical harm. They also note that a smaller number of adverse drug events are unpredictable, idiosyncratic or allergic reactions to drugs (Beat Hardmerier *et al.*, 2004).

Potential adverse drug events which is refer to the medication error with the potential for injury, but in which no injury occurs (Parthasarathi G *et al.*, 2004)

The relationship between medication errors adverse drug events and potential adverse drug events in shown figure.

Figure:1

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MEDICATION ERROR RATE

Medication error rate is determined by calculating the percentage of errors numerator in the ratio is the total number of errors (Vijay Roy *et al.*, 2005).

$$\text{Medication error Rate} = \frac{\text{Number of errors observed}}{\text{Opportunities for error}} \times 100$$

Prevention of Medication error

The National Coordinating Council for Medication Error Reporting and Prevention and Institute for Safe Medication Practices emphasizes that illegibility of prescriptions and medication orders has resulted in injuries to, or deaths of patients. The following recommendations to help minimize errors.

1. The Institute for Safe Medication Practices suggests a number of error prevention tools ranging from forcing functions to independent double- check systems. Prescription orders should include a brief notation of purpose (e.g. for cough), unless considered inappropriate by the prescriber. Notation of purpose can help further assure that the proper medication is dispensed and creates an extra safety check in the process of prescribing and dispensing a medication Independent double-check systems can reduce the risk of error by way of having one person independently check another's work. When this procedure is properly carried out, the likelihood that two individuals would make the same error with the same medication for the same patient is quite low.

2. Forcing functions and constraints they allow for designing processes to ensure that errors are virtually impossible or at least difficult to make. Examples include software programs with "forcing functions "that require the entry of additional pertinent patient information before the order is completed and the medication is dispensed. Automation and computerization of medication use processes and tasks can lessen human fallibility by limiting reliance on memory. Examples include use of technologically and clinically sound computerized drug information system.

3. All prescription orders should be written in the metric system except for therapies that use standard units such as insulin, vitamins, etc. Units should be spelled out rather than writing "U". The change to the use of the metric systems from the archaic apothecary and avoirdupois systems will help avoid misinterpretations of these abbreviations and symbols, and miscalculations when converting to metric, which is used in product labeling and package inserts.

4. Prescribers should include age, and when appropriate, weight of the patient on the prescription or medication order. The most common errors in dosage result in pediatric and geriatric populations in which low body weight is common. The age (and weight) of a patient can help dispensing health care professionals in their double check of the appropriate drug and dose.

5. The medication order should include drug name, exact metric weight or concentration, and dosage form. Strength should be expressed in metric amounts andconcentration should be specified. Each order for a medication should be complete. The pharmacist should check with the prescriber if any information is missing or questionable (shouryadeep srivastava *et al.*, 2005).

Methods to improve safety

1. patient's informed consent policy
2. patient's getting a second opinion from another independent practitioner with similar qualifications
3. voluntary reporting of errors (to obtain valid data for cause analysis)
4. root cause analysis
5. Electronic or paper reminders to help patients maintain medication adherence
6. systems for ensuring review by experienced or specialist practitioners
7. hospital accreditation (Thomas Nolan et al., 2000)

Computerized Physician Order Entry (CPOE)

Studies have shown that CPOE is effective in reducing medication errors. It involves entering medication orders directly into a computer system rather than on paper or verbally.(health and human services, FDA) Hospital computerized physician order entry (CPOE) systems are widely regarded as the technical solution to medication ordering errors, the largest identified source of preventable hospital medical error. Published studies report that CPOE reduces medication errors up to 81%. Few researchers, however, have focused on the existence or types of medication errors facilitated by CPOE. As CPOE systems are implemented, clinicians and hospitals must attend to errors that these systems cause in addition to errors that they prevent.

Advantage of COPE system compared with paper based system

- Free of handwriting identification problems.
- Faster to reach the pharmacy.
- Less subject to error associated with similar drug names.
- More easily integrated into medical records and decision-support systems.
- Less subject to errors caused by use of apothecary measures
- Less subject to errors caused by use of apothecary measures
- Easily linked to drug-drug interaction warnings.
- More likely to identify the prescribing physician
- Able to link to ADE reporting systems.

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- Able to avoid specification errors, such as trailing zeros.
- Available and appropriate for training and education.
- Available for immediate data analysis, including postmarketing reporting.
- Claimed to generate significant economic savings.
- With online prompts, CPOE systems can
    Link to algorithms to emphasize cost-effective medications
    Reduce underprescribing and overprescribing
    Reduce incorrect drug choices

Abbreviations: ADE, adverse drug event; CPOE, computerized physician order entry (Ross koppel *et al*., 2005).

CONCLUSION

The safety of all healthcare have a responsibility in identifying contributing factors to medication error an to use that information provide to further reduce their occurrence. Repeated that the medication errors were common in outpatient setting in the government hospital. Mostly common type of error was prescribing error.Takining a leader ship role for in this multi displinary process will reduce care fully improvement goals. Creating measurement system to document improvement and tinting innovative change concept. Medication use system can be made safe by making them resistant to error and by adding important. The pharmacist role should be intended to decrease the rate of medication error.

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