Medication Error

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Outline

- **Medication error:**

✓ **Evaluation & precautions of medication error.**

✓ **Role of pharmacist in controlling medication error.**

Medication errors

- A medication error can be defined 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 health care professional, patient, or consumer.

- Such events may be related to
  - Human-related.
  - System-related.
  - Medication-related.

Human-Related Factors

Providers

- Over-worked
- Under-trained
- Competence
- Distracted
- Illness
- Stressed

Patients

- In a hurry
- Health literacy level
- Do not understand the medication/use
- Trust providers to not make mistakes

System-Related Factors

- Lack of communication
- Poor workflow
- Disorganized workspace
- Inadequate tools to complete work
- Lack of supervision

Medication-Related Errors

- Look-alike/sound-alike medications
- Multiple dosage forms and strengths

Types of Medication Errors

- **Medication errors include:**
  - prescribing errors
  - dispensing errors
  - medication administration errors
  - patient compliance errors

Types of Medication Errors

1) Prescribing error

Incorrect drug selection (based on indications, contraindications, known allergies, existing drug therapy, and other factors), dose, dosage form, quantity, route, concentration, rate of administration, or instructions for use of a drug product ordered or authorized by physician (or other legitimate prescriber); illegible prescriptions (illegible handwriting) or medication orders that lead to errors that reach the patient

2) Omission error

The failure to administer an ordered dose to a patient before the next scheduled dose, if any. Omitted dose is not an error when:

- ✓ cannot take anything by mouth (NPO)
- ✓ providers are waiting for drug level results
- ✓ patient refuses

Types of Medication Errors

3) Wrong time error

Administration of medication outside a predefined time interval from its scheduled administration time (this interval should be established by each individual health care facility).

- ✓ Occasionally unavoidable
- ✓ patient is away care area for test
- ✓ medication is not available at time it is due

Types of Medication Errors

4) Improper dose error

Administration to the patient of a dose that is greater than or less than the amount ordered by the prescriber or administration of duplicate doses to the patient, i.e., one or more dosage units in addition to those that were ordered.

- ✓ can occur when additional dose is administered
- ✓ delay in documenting dose
- ✓ absence of documentation
- ✓ inaccurate measurement of oral liquid
- ➢ <u>Exclusions from this error type</u>
- ✓ topical applications
- ✓ variances that occur from apothecary to metric conversions

Types of Medication Errors

5) Unauthorized drug error

- ✓ Administration of medication to patient without proper authorization by prescriber
- ✓ Administration of medication outside established guidelines
- ✓ Medication for patient given to another patient
- ✓ Nurse gives medication without prescriber order
- ✓ Patients “share” prescriptions
- ✓ Refilling prescription that has no refills remaining
- ✓ Protocols may allow flexibility-not unauthorized

Types of Medication Errors

6) Wrong dosage-form error

- ✓ Doses administered as different form than ordered
- ✓ Depends on state laws & facility guidelines
- ✓ dosage form changes may be acceptable
- ✓ accommodate particular patient needs
- ✓ often acceptable

Types of Medication Errors

7) Wrong drug-preparation error

- ✓ Reconstituting oral suspension with incorrect volume
- ✓ Using bacteriostatic saline instead of sterile water to reconstitute lyophilized powder for injection
- ✓ Not activating an ADD-Vantage® IV admixture bag

8) Wrong administration-technique error

- ✓ subcutaneous injection that is given too deep
- ✓ intravenous (IV) drug is allowed to infuse via gravity instead of using an IV pump
- ✓ instilling eye drops in wrong eye

Types of Medication Errors

9) Deteriorated drug error

- ✓ Monitoring expiration dates is very important
- ✓ Drugs used past their expiration date
- ✓ may have lost potency
- ✓ may be less effective or ineffective
- ✓ Refrigerated drugs stored at room temperature may decompose & lose efficacy

Types of Medication Errors

10) Monitoring error

- ✓ ordering serum drug levels but not reviewing them
- ✓ not responding to level outside of therapeutic range
- ✓ not ordering drug levels when required
- ✓ prescribing antihypertensive agent & then failing to check blood pressure

11) Compliance error

- ✓ Detected when refill requests not on time

Example: patient does not complete antibiotics therapy-saves a few doses

- ➢ **Other medication error: a**ny medication error that does not fall into one of above predefined categories.

Incidence difficult to determine

- Few studies provide complete evaluation of errors.
- Different methods used to detect errors.
- Various definitions of errors.
- Large volumes of medications dispensed.
- Small percentage of errors can result in large number of medication errors.

Medication error reporting

- Medication error rates based on incident reports.
- Errors not always reported:

1) lack of knowledge to identify errors
2) lack of time to document errors
3) afraid of negative consequences

Impact of medication errors

- **Outcomes:** range from no effect to long-term disability or death
- **Significance:**

✓ type of medication error

✓ health status of patient

✓ pharmacologic classification of drug involved

✓ route of drug administration,

✓ timing of drug administration

✓ cost to health care system

✓ damage to patient's trust in care providers

Impact on patient factors

- **Factors:**

1. Health status of patients.

2. Magnitude of overdose.

3. Damage as result of omission.

Impact on patient factors

- Financial implications:

1. prolong hospital stays & increase health care expenses (estimated to cost billions of dollars annually)
2. Additional medical management
3. Loss of trust and faith in medical community: from either experience or knowledge of event

✓ may choose to switch pharmacies or physicians.

✓ hesitate to seek medical help.

✓ seek nonconventional treatments from outside medical community.

Causes of medication errors

1) Calculation errors: improper use of zeros and decimal points
2) Inappropriate use of abbreviations
3) Careless prescribing
4) Illegible handwriting
5) Missing information
6) Drug product characteristics
7) Compounding /drug preparation errors
8) Prescription labelling
9) Work environment & personnel issues
10) Deficiencies in medication use systems

Dangerous abbreviations

- “AZT” for zidovudine: could be azathioprine.
- “U” HAS been mistaken for “zero”: 10 U insulin order & patient received 100 insulin units.
- “QD” has been read as “QID” or “OD”.

High Alert Medications

- **High risk of causing serious harm to patients when given in error**

1. heparin.
2. narcotics and opiates.
3. potassium chloride injection.
4. insulin.
5. chemotherapeutic agents.
6. neuromuscular blocking agents.

High Alert Medications Strategies

- **Strategies might include:**

1) limiting number of strengths or vial sizes of medications.
2) special auxiliary labelling.
3) storage locations.
4) double-checks.
5) standardized or preprinted orders.

Prescribing Issues Verbal orders

- Confusion regarding concentration of product
- Illegible handwriting
- Missing information
- Use of apothecary system
- Writing doses based on course of therapy as opposed to daily dose

Verbal and Telephone Orders

- **Oral orders**
  - may be heard incorrectly.
  - may be transcribed to writing or entered into a computer incorrectly.
  - Use of cellular phones/poor quality connections.

- **Never use oral orders in chemotherapy prescribing.**

- **Telephone order should be:**
  - ✓ immediately written down then read back to prescriber.

Drug Concentration

- Failure to include concentration in prescription can result in wrong dose being dispensed
  - amoxicillin suspension 1/2 tsp (2.5 mL) TID.
  - Concentration?
- "1 amp," "1 vial," "1 cap" unclear
  - multiple strengths, doses, or vial sizes
- Order for one "vial" of magnesium sulfate?
  - 2 mL vial (8 mEq).
  - 20 mL vial (16 mEq).
  - 10 mL vial of 50% concentration (40 mEq).

Illegible Handwriting

- Unclear orders should be clarified
- Use standardized, preprinted order forms
- Computer generated and typewritten labels
- Use of upper- and lowercase lettering (TALLman)

Missing Information

- **Lack of medical information about patient may cause error:**

- age
- weight
- height
- allergies
- diagnosis
- indication and severity of condition

Access to Medical Information

- **Thorough and complete medication profiles:**

- current prescription and nonprescription medications
- allergies
- age
- height
- weight
- previous medication use

Apothecary System Outdated system

- use should be discouraged
- Unfamiliar to many health care personnel
- Must be converted to metric system
  - “1 gr” (grain) may be interpreted as 60 mg or 65 mg
  - 1 gr may be misread as “1 gm”
- Apothecary conversion charts should be readily available

UNIT	VOLUME	SYMBOL
Minim*	1 drop of water	m or min
Fluidram†	60 minims	f3
Fluidounce†	8 fluidrams	f3
Pint	16 fluidounces	pt or O
Quart	2 pints	qt
Gallon	4 quarts	gal or C

*The minim is the basic unit.

†When the substance is known to be a liquid, the term fluid does not have to be used.

Course Dose vs. Daily Dose

- Chemotherapy medication regimens are commonly prescribed on per course or cycle of treatment basis as opposed to per dose basis
- Increases risk of medication errors
- Example of a chemotherapy course dose is:

- Fluorouracil 4 g/m2 IV days one, two, three, and four order could be misinterpreted as 4 g/m2 of fluorouracil daily for four days—a total of 16 g/m2—or as 4 g/m2 to be divided into four daily doses (1 g/m2 daily on days one, two, three, and four

Drug Product Characteristics

- Hundreds of drug names either sound or look alike
- Institute for Safe Medication Practices (ISMP) maintains list of “confused” medication names
- Look & sound alike AND may be used to treat common condition
- nelfinavir (Viracept) & nevirapine (Viramune)
  - two antiretroviral agents
  - used in treatment of HIV infection
  - brand & generic names are similar, increasing risk for confusion

Look-alike, Sound-alike

Sloppy handwriting/misspelling: confusion

- Interferon 1 mL was confused for Imferon 1 mL.
- Lanoxin (digoxin) & Levoxine (levothyroxine).
- Levoxine changed name to Levoxyl.
- Quinine and quinidine.

Advertising

- Zyrtec oral products contain active ingredient cetirizine: Zyrtec Itchy Eye Drops contain active ingredient ketotifen.
- Claritin oral products contain loratadine as active ingredient: Claritin Eye contains ketotifen.
- Pepcid: contains active ingredient famotidine.
- Pepcid Complete: contains famotidine, calcium, magnesium hydroxide

Pharmacist role in reducing medications errors and improving medication safety

1) Automation and computerization of medication-use processes and tasks.

- Bar coding.
- Automated dispensing cabinets (ADCs).
- Robots.
- Pharmacy-generated Customized Medication Administration Records (MARs) and labels.
- Computerized physician order entry (CPOE).

✓ Decrease # of personnel involved in ordering process.

✓ Decrease medication errors in transcription process.

Pharmacist role in reducing medications errors and improving medication safety

2) Standardized order forms

- to guide the safe use of medications by eliminating problems with illegible handwriting and standardizing safe order communication.

- Medication orders easier for prescriber to read, pharmacist & nurse to interpret
- Chemotherapeutic agents designated as high alert
- Ideal drugs to be included on standardized order form
- Use for complicated drug therapies/high-risk drugs
- Informally educate prescriber about formulary

Pharmacist role in reducing medications errors and improving medication safety

3) Independent double-check systems

- These are tools that can reduce the risk of errors if one person independently checks another's work.
- The likelihood of two individuals making the same error with the same medication for the same patient is quite small.
- <u>Examples:</u>

  - pharmacist reviewing physician order
  - pharmacy technician preparing medication
  - nurse inspecting dose from pharmacy
  - patient asking questions & examining medication before taking it

Pharmacist role in reducing medications errors and improving medication safety

4) Staff education

It can be an important error-prevention strategy when it is combined with other approaches that strengthen the medication-use system.

- pharmacy calculations
- compounding techniques
- pharmacy abbreviations
- preparation of IV medications
- computer operation skills
- classes of medications
- generic & trade names
- forms & doses

Thank you

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