

Medication Errors

دکتر فرنگیس صادقی

فلوشیپ سم شناسی بالینی و مسمومیت

استادیار دانشگاه علوم پزشکی گلستان

Medication Errors

□ Definitions :

- Side effect of a drug
- Adverse reaction of a drug
- Adverse event
- Medication Error
- Adverse Drug Event
- Adverse reaction
- Near Miss

Medication Errors

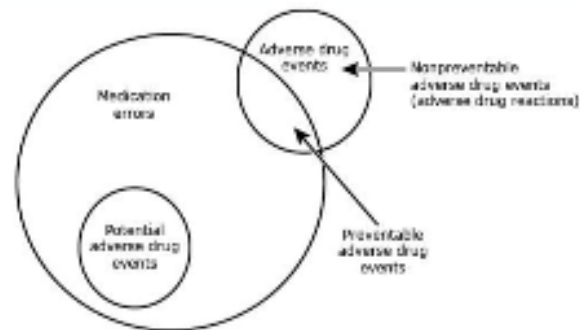
- **Adverse drug event :**
 - May be preventable
 - May not be preventable

Medication Errors

- Medication error may result in
- An adverse event if a patient is harm
- A near miss if a patient is nearly harmed or
- Neither harm nor potential for harm
- Medication errors are preventable

Relationship among medication error

Relationship among medication errors, adverse drug events, preventable adverse drug events, close-call adverse drug events, and adverse drug reactions



Steps In Using Medication

- I. Prescribing
- II. Preparation & Dispensing (Pharmacists role)
- III. Administration (Patient or nurse role)
- IV. Monitoring (Doctors)

Medication Prescription

- Choosing an appropriate medication
- Selecting the administration
- Communicating details of the plan with
- Documentation

Sources Of Error In Prescribing

- Inadequate knowledge
- Not considering individual patient factors
- Wrong
- Mathematical error
- Inadequate communication
- Documentation
- Incorrect data entry

Calculation Errors

- A patient needs 300 micrograms of a medication that comes in a 1 ml ampoule containing 1 mg of the drug.

What volume do you draw up and inject ?

300 microgram = 0.3 mg....draw up 0.3 ml

1 ml = 1mg = 1000 microgram so , the correct dose = 0.3 mg

which is = 300 microgram “ **if there is preprinted chart , there is no need for calculation**

Calculation Errors

- A 12 Kg, 2-year-old boy requires 15 mg/ kg of a medication that comes as a syrup with a concentration of 120 mg /5 ml.

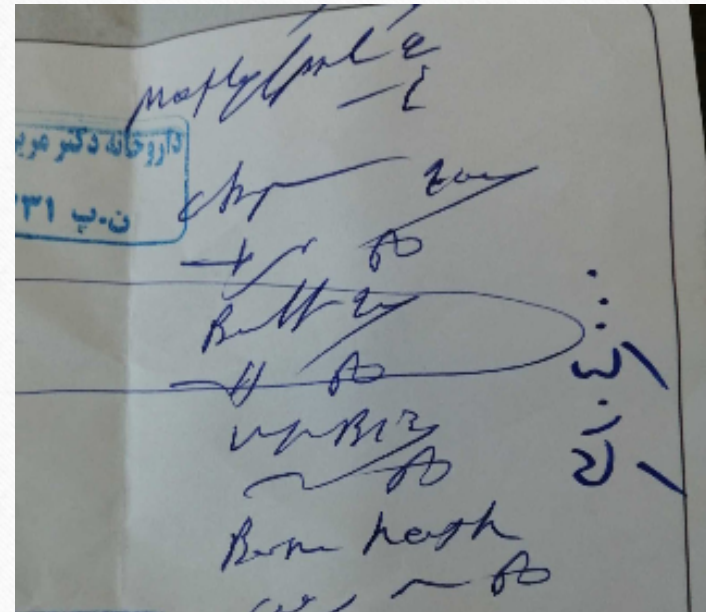
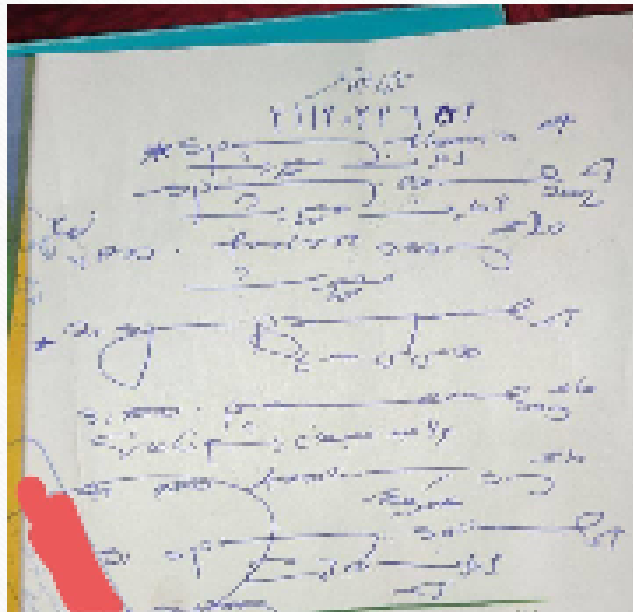
How many mls do you prescribe ?

$$12 \text{ (weight)} * 15 \text{ (the dose / kg)} = 180 \text{ mg}$$

$$180/x = 120/5 \text{ } 180*5/120 = X \text{} X = 7.5 \text{ ml}$$

“it is preferable to use calculator “

Example For Prescribing Error-illegible Handwriting



U (for units)	Mistaken for : “0”, “4”	Write “unit”
Ug (for micrograms)	Mistaken for mg(resulting in one thousand-fold overdose)	Write “mcg” or “micrograms”
OD, O.D ,od , or o.d (for daily)	Mistaken as “right eye”	Write “daily”
IU (for international units)	Mistaken for : “IV”, “10”	Write “international unit(s)”
QD,Q.D.,qd , q.d(for daily)	Mistaken as “qid”	Write “daily”
Trailing zero AFTER decimal point (ex: 2.0 mg)	Decimal point can be missed leading to a 10-fold increase in dose (ex: 20 mg)	Do not use
No leading zero BEFORE decimal point (ex : .5 mg)	Decimal point can be missed (ex : 5 mg)	Use a leading zero when a dose is less than a whole unit (ex; 0.5 mg)
Ms, MSO, and MaSO	Can mean morphine sulfate or magnesium sulfate Confused for one another	Write “morphine sulfate” Write “magnesium sulfate”
Abbreviation for drug names	Misinterpreted due to similar write full drug names abbreviations for multiple drugs	Write full drug names
CC	Mistaken for U(units)when poorly written	Write “ml”or “milliliters” “ml”is preferred

Strategies To Reduce Prescribing Errors

- 1. Avoid illegible handwriting
- 2. Write complete Information
- 3. Look at Patient-Specific Information
- 4. Do Not Use Abbreviations
- 5. Decimals 2 mg not 2.0 mg, 0.5 mg not .5 mg
- 6. Be alert to drug name, use generic name rather than trade names
- 7. Write the Medication reconciliation
- 8. Know the high alert medications
- 9. More attention to dosage calculations
- 10. Verbal orders

Medication Errors

○ DO Not Use Abbreviations :

- Drug names
- “QD” or “OD” for the word daily
- Letter “U” for unit
- “μg” for microgram (use mcg)
- “QOD” for every other day

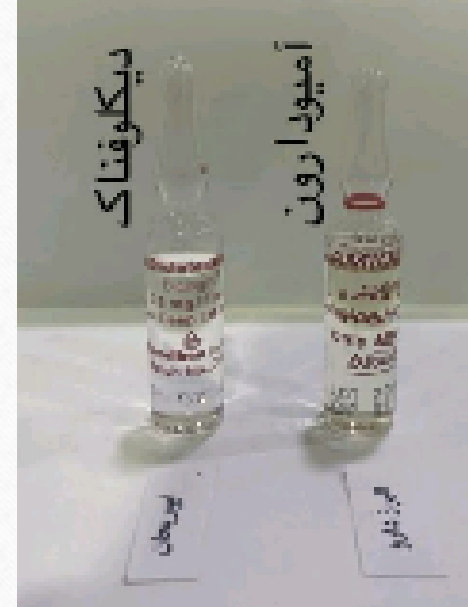
Medication Errors

- **Decimal :**
- Avoid whenever possible
 - Use 500 mg for 0.5 g
 - Use 125 mcg for 0.125 mg
- Never Leave a decimal point “naked”
 - Haldol .5 mg → Haldol 0.5 mg
- Never use a terminal zero
 - Colchicine 1 mg not 1.0 mg
- Space between name and dose
 - Inderal40 mg → Inderal 40 mg

Medication Errors

- **Be alert to Drug Name :**
- “Look-Alike” or “Sound-Alike” Drug Names
 - Celebrex (celecoxib , anti-inflammatory)
 - Cerebryx (fosphenytoin, anticonvulsant)
 - Celexa (Citalpram, antidepressant)

Medication Errors



Medication Errors



Medication Preparation & Dispensing Strategies To Reduce **Dispensing** Errors

- Standardized concentration for all IV medication
- Use commercially prepared solutions
- Dispense a unit of use

Medication Administration

- Obtaining the medication in a ready-to-use form; calculating, mixing, labeling or preparing in some way
- Checking for **allergies**
- Giving the right medication to the right patient, in the right dose, via the right route , at the right time.
- Documentation

How Can Drug **Administration** Go Wrong ?

- Wrong patient
- Wrong route
- Wrong time
- Wrong dose
- Wrong drug
- Omission, failure to administer
- Inadequate documentation

the **5** Rs

1. **R**ight Drug
2. **R**ight Dose
3. **R**ight Route
4. **R**ight Time
5. **R**ight Patient

Medication Monitoring

- Observing the patient to determine if the medication is working, being used appropriately and not harming the patient
- Drugs Need Blood Tests To Monitor Levels :

Warfarin

Antiepileptic Agents

Lithium

Aminoglycosides

Digoxin

How Can **Monitoring** Go Wrong ?

- Lack of monitoring for side-effect
- Drug not ceased if not working, or course completed
- Drug ceased before course completed
- Drug levels not measured, or measured but not checked or acted upon
- Communication failures

Which Patients Are Most At Risk Of Medication Errors ?

- Patients on multiple medication
- Patient with another condition e.g. renal impairment
- Patient who can't communicate well
- Patient who have more than one doctor
- Children and babies (dose calculations required ?)
- Previous history of medication allergy.

Medication Errors

- How can medication **presentation** contribute to medication errors ?
 - Look-alike , sound-alike medications
 - Ambiguous labeling

Case Study

- A 38-year-old woman comes to the hospital with 20 minutes of itchy red rash and facial swelling; she has a history of serious allergic reactions
- A nurse draws up 10 mls of 1:10,000 adrenaline (epinephrine) into a 10 ml syringe and leaves it at the bedside ready to use (1 mg in total) just in case the doctor requests it
- Meanwhile the doctor inserts an intravenous cannula
- The doctor sees the 10 ml syringe of clear fluid that the nurse has drawn up and assumes it is normal saline

Case Study

- There is no communication between the doctor and the nurse at this time
- The doctor gives all 10 mls of adrenaline (epinephrine) through the intravenous cannula thinking he is using saline to flush the line.
- The patient suddenly feels terrible, anxious, becomes tachycardia and then becomes unconscious with no pulse
- She is discovered to be in ventricular tachycardia, is resuscitated and fortunately makes a good recovery
- Recommended dose of adrenaline (epinephrine) in anaphylaxis is 0.3 - 0.5 mg IM, this patient received 1mg IV

Can you identify the contributing factors to this error?

- Assumptions “ doctor mistake” (in medicine there is no assumptions)
- Lack of communication
- Inadequate labeling of syringe “ nurse mistake “
- Giving a substance without checking and double checking what it is
- Lack of care with a potent medication “ I have to be careful with epinephrine “

How could this error have been prevented?

- Never give a medication unless you are sure you know what it is; be suspicious of unlabeled syringes
- Never use an unlabeled syringe unless you have drawn the medication up yourself
- Label all syringes
- Communication - nurse and doctor to keep each other informed of what they are doing e.g. nurse: "I'm drawing up some adrenaline"
- Develop checking habits before administering every medication ... go through the 5 Rs e.g doctor: "What is in this syringe?"