LESSON THREE
PHARMACOLOGY BASICS

CHAPTER 3 PHARMACOLOGY BASICS

OBJECTIVES'

3.1 Define key pharmacology terms, medical terminology and abbreviations associated with medication administration.

3.2 Explain how drugs are classified.

3.3 Identify factors that affect drug action.

3.4 Facilitate the client's awareness of the purpose and effects of medications.

3.5 Demonstrate how to use drug information sources.
3.6 Identify drug labeling requirements in Virginia.

PERFORMANCE OBJECTIVE Upon completion of this chapter, the student will demonstrate an understanding of basic pharmacology for Medication Aides by completing a written test with a minimum score of 80%

Absorption
Administration route
ADR
Biotechnology
Chemical name
Contraindication
Controlled substance
DEA
Distribution
Dosage
Excretion

FDA,

Distribution
Dosage
Excretion
FDA
Generic
Indication
Metabolism
Over -the-counter
Pharmacology
Physical dependence
Poly- pharmacy

Precautions
prescription drug
Psychological Dependence
Synthetic drug
Therapeutic range
Toxicity
Trade Name

3.1 Define Key Pharmacology Terms, Medical Terminology and Abbreviations Associated with Medication Administration

INTRODUCTION: An understanding of basic pharmacology will enable the Medication Aide to communicate effectively with pharmacists, physicians, and other health care providers. The terms and definitions in this objective will provide the foundation for an understanding of pharmacology that the Medication Aide will build on in practice.

Abbreviations are a shorthand form used to write medication orders. They are a quick way for the HCP to summarize information. Medical abbreviations are standardized and it is important that the Medication Aide know them and to know that it is unacceptable, possibly dangerous, to make up abbreviations. While the pharmacist will not use, abbreviations on the medication label, they are often seen on the HCP prescription.

TOPICAL OUTLINE

A. Key pharmacology terms

1. Agency definitions & abbreviations

DEA - Drug Enforcement Administration is the federal agency which regulates and enforces laws on drugs in Schedules I-V; determines on a federal level which Schedule classification is most appropriate for drugs.

FDA - Food and Drug Administration is the federal agency which determines when a manufacturer can market its drug based on safety and efficacy data; determines if a generic drug is therapeutically equivalent to a brand name drug.

2. Pharmacy definitions

a. ADR
b. chemical name
c. contraindication
d. controlled substance
e. generic name
f. indication
g. over-the-counter
h. precaution
i. prescription drug
j. toxicity
k. trade name

3. Terms related to body systems

a. absorption
b. distribution
c. metabolism
d. excretion

What is Contraindication

A contraindication is a specific situation in which a drug, procedure, or surgery should not be used because it may be harmful to the person.

There are two types of contraindications:

Relative contraindication

Relative contraindication means that caution should be used when two drugs or procedures are used together. (It is acceptable to do so if the benefits outweigh the risk.)

Absolute contraindication

Absolute contraindication means that event or substance could cause a life-threatening situation. A procedure or medicine that falls under this category must be avoided.

Some treatments may cause unwanted or dangerous reactions in people with allergies, high blood pressure, or pregnancy. For example, isotretinoin, a drug used to treat acne is absolutely contraindicated in pregnancy due to the risk of birth defects.

B. Abbreviations associated with Medication forms.

1. tab. — tablet
2. cap. — capsule
3. sol. — solution
4.. syr. — syrup
5. oint. — ointment
6. crm. — cream
7. supp. — suppository
8. inh. — inhaler

C. Routes of administration and associated abbreviations

1. Abbreviation and meanings associated with routes of administration

ROUTE	MEANING	ABREVIATION
Buccal	Inside the cheek	buc.
Eye	Right eye	od
	Left eye	os
	Both eyes	ou
Oral	By mouth	p.o.
Per rectum	By rectum	pr., rec.
Subcutaneous	Under the skin	subcu., SQ.
Sublingual	Under the tongue	subling., SL.
Topical	On the skin	top.
Vaginal	By vagina	vag.

Measurements and associated abbreviations

MEASURE	ABBREVIATION	MEASURE	ABBREVIATION
Centimeter	cm	Milliliter	mL
Cubic Centimeter	cc	Ounce	oz
Drops	gtt	Pound	lb
Gram	gm	Tables poon	Tbs
Milligram	mg	Teaspoon	tsp
Fluid ounce	Fl oz	Units	u
Spray	SP		

MEASUREMENT EQUIVALENTS

I cc = I ml

I Tsp = “5 ml

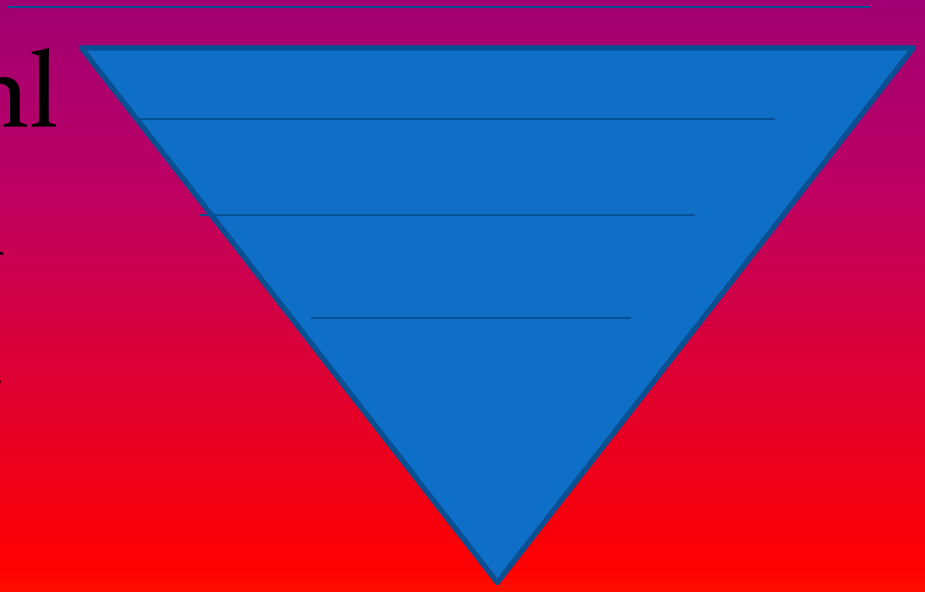
3 tsp = I Tbsp

I oz = 30 ml

30 ml

15 m

5 ml



2 tbs = 1 oz

1 tbsp= 1/2oz

1 tsp

E. Times of administration and associated abbreviations

MEANING		ABBREVIATION
Before meals		ac
After meals		pc
Morning		pm
Afternoon		as
Ad lib		much as needed
AS necessary	pni	Pni
Hour of sleep	hs	Hs
S tat		immediately

MEANING	ABBREVIATION
Every	Q
Every other day	qod
Every morning	Clam
Once daily	qd
Two times daily	bid
Three times daily	tid
Four times daily	qid
Every hour of sleep	Qhs
Hour	h, hr
Every hour	qh
Every two hours	q2h
Every three hours	q3h
Every four hours	q4h

.F. Medical terms and associated abbreviations

MEANING	ABBREVIATION
By means of	per
Complaints of	c/o
Label	sig.
Nothing by mouth	Npo
Vital signs	TPR/BP
With	c
Without	s
No known allergies	NKA

3.2 Identify How Drugs Are Classified

INTRODUCTION: Drugs are classified in different ways.
Two of these ways are by the body system which the drug affects and by the therapeutic action of the drug.
The therapeutic action of the drug involves the process of treating, relieving, or obtaining results through the action of the medication on the body

The goal of this objective is for the student to identify how drugs are classified, Examples are provided under each class.

A student who commits to learning about different drugs every day will, over time, gain a deeper understanding of drugs and how they affect the body.

A. Drug sources

1. **Natural sources**

a. Plants

Examples:

Digitalis - derived from the foxglove

Flower Morphine - Derived from the poppy plant

Aspirin - derived from willow bark

b. Animal

Examples:

insulin — derived from pancreas of pigs and cattle

heparin — derived from the intestinal lining of pigs and cattle

c. Minerals

Examples: dietary supplements (iron, iodine, calcium) epsom salts — magnesium sulfate

milk of magnesia — magnesium hydrochloride

2. Chemical sources

a. Chemical (synthetic- created in a laboratory; how many drugs are made today).

Examples: Bactrim® - Sulfamethoxazole and trimethoprim
Prozac® - fluoxetine

b. Biotechnology
Examples: Humulin®- a synthetic insulin

B. Drug names

1. **Generic name** — the official name of the active ingredient used by all manufacturers.

a. Non-proprietary — means no one manufacturer can own the name. Example: Ciprofloxacin is the generic name for Cipro®

2. **Trade name** - also called the brand, or product name.

a. Proprietary — means the name may be used by a specific manufacturer.

b. Indicated by the symbol:
Examples: Amoxil® is the registered trade name for amoxicillin

Tylenol® is the registered trade name for acetaminophen

C. How drugs are classified

1. By the body system affected by the drug: a. Cardiovascular system drugs

1. Used to treat conditions of the heart or to prevent heart attack.

2. Potential side effects:

- dizziness
- headaches
- weakness
- decreased heart rate
- nausea

Orthostatic hypotension (dizzy upon rising from sitting position)

3. Can cause toxicity (poisoning) in the body
4. Signs of toxicity:

- loss of appetite
- nausea & vomiting
- irregular heartbeat or very slow rate
- irritability
- confusion

Examples

- Lanoxin® (digoxin)
- Corgard® (arniodarone)

Observe & Report:

Take the client's pulse for one full minute before giving digoxin.

If the pulse is below 60, (or rate specified by HCP), do not give the medication. Notify the HCP immediately.

Observe for signs of toxicity (see above). Notify the HCP or supervisor of any signs of toxicity or of unusually low pulse rate or heart 'flutters'.

b. Respiratory system drugs

1. Used to treat asthma or other breathing problems such as asthma.

2. Available for administration in different forms:

- inhalers and tablets
- in dry powder diskus• nebulizer treatments

3. Potential side effects

- throat irritation and cough
- nervousness

Examples:

- Ventolin® (albuterol)

Advair Diskus® (fluticasone/salmeterol)

- Singulair® (montelukast)

Observe & Report:

To maximize the benefit of the drug, always observe whether the client is using good technique when using an inhaler, diskus or nebulizer.

Poor technique frequently causes the drug to hit the back of the throat instead of reaching the lungs.

It may be necessary to remind the client frequently of how to use good technique.

Storage tip:

Be sure to store any drugs which arrive in a foil packaging in this package until time to administer the drug.

An example would be drugs for nebulizers.

These are light-sensitive and will degrade if not stored properly.

c. Gastrointestinal system drugs

1. Used to treat stomach and intestinal conditions.

2. Potential side effects

- nausea
  constipation
- diarrhea

Examples of antacids:

- Maalox ® (aluminum hydroxide, magnesium hydroxide, simethicone)

Prilosec® (omeprazole), Pepcid® (famotidine) or Zantac® (ranitidine)

Example of laxatives:

- Miralax® (polyethylene glycol 3350)

Example of stool softeners:

- Colace® (docusate sodium)

Observe & Report:

Report to the supervisor or the HCP if you observe a client needing an unusual amount of antacids such as Turns®, Rolaids®, Maalox®, etc.

There may, be a more serious, undiagnosed, condition than simply indigestion.

Antacids frequently interfere with other drugs and may need to be given 2 hours apart from other drugs.

Constipation is a common problem in the elderly_ Often, administering stool softeners and laxatives requires the client to drink large amounts of liquid.

Encourage the client to exercise, as appropriate,. and to drink the recommended amount of liquid because, if they don't these drugs may worsen the problem.
In addition, it is important to maintain physical activity to avoid constipation and maintain regularity.

Report to the supervisor or HCP if the prescribed stool softeners or laxatives do not alleviate the constipation within the prescribed time that the medication should act.

Chronic constipation can lead to a serious condition called fecal impaction.

Impaction can cause bleeding, hemorrhoids, and stress to the heart.

One complication of fecal impaction is the possibility of bowel perforation, a dangerous event which can lead to infection of the abdominal cavity, and possibly death, if not treated.

Endocrine system drugs

1. Hormones control and regulate normal body functions.
2. When glands produce too little or too much they can produce life-threatening disorders such as diabetes.
3. Potential side effects:

- anxiety
- excitability
- irritability
- sweating
- headache

Examples: Synthroid (levothyroxine) & Humulin® (insulin)

Observe & Report:
These drugs may impact the client's behavior.

Report any unusual behavior.

The dose may need to be adjusted.
Report unusual weight loss or gain.

The dose may need to be adjusted.

These drugs frequently require routine blood work to ensure that the client is receiving the correct dosage.

Missing a dose may affect these blood levels. (See Chapter 8, Objective 8.3 for signs and symptoms of hyperglycemia and hypoglycemia.)

Encourage the client to take these drugs as prescribed.

2. By the action of the drug in the body:

a. Anti-coagulants

1. Used to treat or prevent thrombosis (blood clotting)
2. Potential side effects :

- bleeding nausea
- itching
- abdominal cramping

Examples :

- Coumacline (warfarin sodium)

Observe & Report:

Watch for signs of excessive bleeding or unusual bruising. Check stools and urine for blood.

Be aware that this drug can cause the urine to have a red-orange discoloration.

Client should avoid pm use of aspirin in combination with anticoagulants unless prescribed by HCP as aspirin has mild anticoagulant effects.

Antihypertensives

1. Used to lower blood pressure
2. Lowering BP reduces risk of heart attack or stroke
3. Potential side effects

- orthostatic hypotension (esp. when rising quickly from sitting or lying position).
- dizziness
- nausea

- decreased heart rate

Examples:

- Lopressor® (metoprolol)
  Prinivil® (Iisinopril)
- Calan® (verapatnil HCL)
- •HCTZ (hydrochlorothiazide

Observe &. Report:

Report the clients non-adherence to the drug regimen.

Explain to the client that he should take the medicine, even if he feels better.

Antihypertensives help control (they do not cure) high blood pressure. OTC medications should be avoided (especially cough, cold, and allergy medications which contain a decongestant) unless ordered by the HCP.

Antihyperlipidemics

1. Used to lower cholesterol
2. Lowering cholesterol reduces risk of heart attack or stroke
3. Potential side effects

- flatulence (gas)
- diarrhea
- headache
- muscle aches Examples:
- Lipitor® (atorvastatin calcium)
- Mevacor® (lovastatin)
- Tricor® (fenofibrate)

Observe & Report:

Report any side effects, especially muscle aches or cramps.

There is a small chance that these drugs can damage muscle tissue which may be irreversible.

Notify physician or supervisor immediately if a client who is taking these medications complains of muscle aches.

Antibiotics

1. Used to treat bacterial infections
2. Important not to miss doses
3. Administer on time and the entire course
4. Not effective against viral infections such as the common cold or flu
5. Potential side—effects

- allergic reactions-(itching, rash, difficulty breathing, wheezing, etc.)
- anaphylaxis
- diarrhea

- photosensitivity (light)
- nausea

Bactrim DS® (sulfamethoxazole & trimethoprim)

- Zithromax® (azithromycin)
- Levaquin® (levofloxacin)

Observe & Report:

This class of drugs poses a higher risk for severe allergic reaction.

Report any signs of allergic reaction (itching, rash, difficulty breathing).

The drug may need to be changed or discontinued.

Encourage the client to complete the entire course of the antibiotic, even if he feels better.

A relapse is possible if the full course is not taken. It is also possible that the infecting organism may become resistant to the antibiotic causing the drug to become ineffective against the illness.
If the client has had a fever, this usually subsides in a day or two after starting the antibiotic. If the client 'spikes' a fever in the middle of the course of taking the antibiotic, report immediately to the HCP.

e. Anticonvulsants

1. Used to treat seizures. May also be used to treat certain types of pain.
2. Increasingly used for bipolar disorder and behavioral management in dementia.
3. Important NOT to miss doses.

4. Potential side effects
slurred speech
decreased coordination
headaches
insomnia
muscle twitching Examples:
•Dilantin® (phenytoin. sodium

4. Potential side effects slurred speech

- decreased coordination
- headaches
- insomnia
- muscle twitching Examples:
- Dilantin® (phenytoin. sodium)
- Neurontin® (gabapentin)
- Depakote® (divalproex sodium)

Observe & Report:

These drugs have a narrow therapeutic range which means that it takes just the right amount of the drug to create the desired therapeutic effect. A variation from the right amount of the drug will fail to protect the client from seizures. Seizures can be harmful, even life-threatening. Notify the HCP or contact emergency services if a client experiences seizures. If the level of the drug in the blood is too high, the client may experience toxicity.

f. **Hypnotics**

1. A drug used to induce sleep
2. Generally intended for short-term use (these drugs may be addictive)

3. Potential side effects

- agitation
- confusion.
- nightmares
- nausea
- rash Examples
- Ambien ® (zolpidem tartrate)
- Sonata ® (zaleplon)
- Lunesta® (eszopiclone)

Observe & Report:

Report excessive drowsiness or dizziness during waking hours. This may indicate a need for dosage adjustment.

These drugs may increase the risk for fall. Report any changes in the way the client walks. Implement careful fall prevention measures.

Note: Diphenhydrainine (Benadryl, Tylenol PM) should not be used to induce sleep in the older adult.

Antianxiety Drugs

1. Used to reduce anxiety, stress or agitation
2. Potential side effects:

- drowsiness
- dizziness
- increased risk of falls

Examples:

- Ativan® (lorazepam)
- Xanax® (alprazolam)

Antidepressants

1. Used to treat depression
2. Also used to treat pain in some clients
3. Potential side effects:

- drowsiness
- fatigue
- confusion
- constipation
- increases risk of falls

Examples:

- Zoloft® (sertraline)
- •Wellbutrin® (buproprion)
- Prozac® (fluoxetine)

Observe & Report :

Report excessive drowsiness or dizziness. This may indicate a need for dosage adjustment. Report any changes in the way the client walks. Doses should not be missed.

These drugs should not be discontinued abruptly.
They are frequently tapered on and tapered off over a few weeks or as prescribed.

Note changes in the dosage accurately on the MAR.

i. **Antimanic agents**

1. Used to treat

n bipolar disorders (previously called manic-depressive disorder)

2. Potential side effects

- fine tremors in the hands
- general discomfort
- mild thirst
- frequent urination
- mild nausea (usually transient)

Examples:

- Lithium
- anti-convulsants

Observe & Report : Report complaints of abdominal pain or any changes in the way the client walks. Report involuntary jerking movement of the eyes. Report slurred speech or difficulty swallowing. Report any complaints of 'ringing in the ears'.

Antipsychotic agents (also called neuroleptics)

1. Used to treat

- acute and chronic schizophrenia
- psychoses (caused by biochemical changes in the brain)

the manic phase of bipolar disorder a psychotic disorders

2. Potential side effects

- blurred vision
- constipation
- convulsive seizure
- dizziness
- drowsiness
- dryness of the mouth
- orthostatic hypotension
- movement disorders

Examples:

- Haldol® (haloperidol)
- Zyprexa® (olanzapine)
- Risperdal® (risperidone)

Observe & Report :

Report any abnormal body movements such jerking of the neck, tongue thrusting, or rigidity in the hands and feet.

Note: Psychotropic drugs are used to reduce and control symptoms of mental or emotional illness.

The four classes of psychotropic medications are Antianxiety drugs, antidepressants,
antimanic agents,
and antipsychotic agents.

See Chapter 7, Objective 7.2 for additional training on psychotropic drugs.

3. Classification by disease that the drug is intended to treat a.

Osteoporosis drugs

1. Used to prevent and/or treat osteoporosis
2. Commonly administered to the elderly

- Potential side effects:
- nausea
- constipation

Examples

- Fosamax® (alendronate sodium)
- MiaCakino (calcitonin-salmon)
- Actonel® (risedronate)
- Turns®, Caltrate®, Citracal®

Observe & Report:

Some of these drugs must be given first thing in the morning, upon arising. The client must take some of these drugs with a full glass of water (8oz.), while sitting up, and then cannot drink, eat, or lie down for 30 minutes. It is very important to follow these instructions. Missing the dose or not having the client remain upright may result in the drug not achieving the desired effect and can potentially harm the esophagus.

These drugs are more effective if the client is also taking a calcium supplement and Vitamin D.

b. Pain medications

Used to treat moderate and severe pain or a combination of both.

Many used to treat moderate to severe pain are Schedule II to VI drugs which require special record keeping. (Discussed in detail in Chapter 6)

Many used to treat mild pain are sold over-the-counter.

Potential side effects
upset stomach ~ gastric ulcers
drowsiness
constipation

Examples:

- Lortab® (hydrocodone/acetaminophen)
- Percocet® (oxycodone/acetaminophen)
- Roxanol® (morphine)
- Ultram® (tramadol)
- Advil® (ibuprofen)
- Tylenol® (acetaminophen)- sold as over-the-counter drug
- Tylenol with codeine —dispensed pursuant to a prescription

Note: The elderly do have some issues with NSAIDs (Non-steroidal anti-inflammatory drugs- Motrin, Advil, etc) such as hypertension, gastrointestinal toxicity, etc, but they are still frequently used for pain.

Observe & Report: Clients who are taking acetaminophen (Tylenol®), should not exceed 4,000mg in 24 hours. Some drugs are combination products which . include acetaminophen such as Vicodin® and Lortab® and must be taken into consideration when totaling the milligrams consumed. Report observations of excess dosing.

Report any complaints of constipation, itching, blurred vision, nausea or signs of blood in the stool.
Report any "yellowing" of the skin and of the whites of the eyes, which could be a sign of liver problems.
Also report any signs of decreased urine output.

WARNING: Exceeding 4,000 mg of acetaminophen per day may result in liver damage.

Note: It is important to know that acetaminophen is in some of the prescription pain medications such as Percocet, Lortab, etc. Therefore, it must be included in the calculations of the daily close of acetaminophen.

c. Dementia medications

1. Drugs which slow the progression of memory loss
2. Potential side effects

- headache
- nausea & vomiting (especially during dose titration)
- dizziness
- fatigue
- itching
- depression
- Most common side effect is nausea and vomiting.

Examples:

- Namenda® (memantine)
- Reminyl® (galantamine)
- Aricept® (donepezil hydrochloride)
- Exelon® (rivastigmine tartrate)

Observe-8z Report: It is important that all doses be given as prescribed. Missed doses can alter the therapeutic effect and defeat the purpose of taking the medication.

D. Dispensing classification

1. Prescription drugs designated as:

a. Schedule II

- Have a high potential for abuse, especially Schedule II drugs
- Require special storage and reporting procedures
- Cannot be dispensed without a prescriber's prescription. Schedule II examples:
- Percocet®
- morphine
- Oxycontin®

b. Schedule VI in Virginia

- Have the least potential for addiction and abuse
- Cannot be dispensed without a prescriber's prescription Schedule VI examples:
- antibiotics such as Penicillin® and Keflex®;
- blood pressure lowering drugs such as Atenolol®;
- cholesterol lowering drugs such as Lipitor® & Mevacor®

Note: Schedule I drugs are not legal prescription drugs. This designation is for illicit, street drugs such as heroine, LSD, "Ecstasy", etc.

2. **Over-the-counter drugs including** herbal medications

n Must have MD order to administer

• Can be purchased without a prescription

•• Should not be viewed as less important or less potent than a prescription drug

• Can cause harm, produce unwanted effects and drug interactions just like prescription drugs

3. 3 Identify Factors That Affect Drug Action

INTRODUCTION: The body has many complex, integrated systems. If one system is injured or not functioning, all systems are affected. Medication is a substance that changes how one or more of the body systems work. This objective identifies how drugs are processed in the body and which internal and external factors affect that process.

TOPICAL OUTLINE

A. Absorption — First step

1. When a drug is introduced in the body through the gastrointestinal tract, skin, lungs.
2. The speed of absorption influences how quickly the drug acts.
3. The rate of absorption is affected by multiple factors.

B. **Distribution — Second step**

1. When the drug is moving into body fluids and tissues.

2. Some drugs penetrate certain tissues better than others and therefore are more effective on some parts of the body compared to others.

C. Metabolism — Third step

1. When the body is trying to rid itself of the drug it often needs to break it down before it can be eliminated.

2. Sometimes changed to a less potent form.

3. Affected by many factors including age and the existence of some chronic health conditions.

Example: An elderly adult cannot metabolize many drugs as quickly as the young.

If the drug is metabolized slower, it means that the drug will stay in the body longer and can have a longer effect.

Toxicity or a build-up of a drug can result if the body cannot metabolize the drug at an appropriate rate.

(More on this in Objective 7.1)

D. Excretion — Final step

1. Most metabolized drugs, after filtering through the kidneys, are excreted in the urine.
Age associated reduction in renal function is the most common reason for dose adjustment in the elderly. Kidney function declines with increasing age, so medications that depend on the kidney to get out of the body, may show toxicity if the dose is not adjusted appropriately.

2. Some drugs are excreted in feces or through expired air.

E. Factors that affect drug action

1. Physical factors

a. age

- Liver and kidney function may decrease with age and alter the body's ability to metabolize and excrete drugs.

- The very young and very old require age appropriate dosages.

C. Gender

- Women may react differently to certain drugs than men.
- All drugs should be administered with extreme caution in pregnant women.
- d. disease states
- Disease may impair organs necessary for metabolism and excretion.

Clients who must take a drug over a long period of time may develop a tolerance which requires increasing dosage. (Example: severe cancer pain may require stronger dosage of narcotic pain medication to achieve a therapeutic effect.)

e. genetic factors

- Each person's individual makeup causes slight differences in basic processes like metabolism and excretion which affects drug action.

- Some are more sensitive to a drug because they lack naturally occurring enzymes to metabolize the drug.

2. Psychosocial factors

a. Diet

Combining certain drugs with certain foods can alter the drug's effects. - Example: effects of tetracycline are decreased when taken with milk products.

b. **Exercise**

- Increases muscle mass and circulation which may alter absorption.
- Strengthens the heart and improves circulation which may improve distribution or elimination of drugs.

c. Mental state

Could affect the success or failure of a drug because of failure to comply with the prescribe drug regimen.

Might produce a placebo effect. A placebo effect is when relief comes from the perception of the patient thinking that the drug provided relief.
For example, a patient might be convinced that a certain pill provides pain relief. In reality, it might be a sugar pill, but the patient "thinks" the pill brought relief.

d. past history of response to drugs

Many drugs have a time factor and should not be taken within a certain number of days or weeks from when another drug was discontinued.

One drug may speed, slow, or negate the action of another.

Over time a cumulative effect could cause toxicity.

3. Drug administration factors

a. dosage form

Drugs can come in more than one form. Example: aspirin can be taken orally, rectally or topically. The steps in the process of absorption, distribution and metabolize may be altered when the dosage form is changed.

b. route of administration

Drugs are absorbed, distributed and metabolized differently when given by different routes. Example: an intravenous dose would act quicker than an intramuscular or oral dose of the same drug.

c. **time of administration**

Some drugs must be administered at certain times to get the desired therapeutic effect. Example: antacids taken before meals to prevent indigestion.

Some drugs must be administered at certain times to prevent unwanted side effects that the drug might cause. Example: Fosamax® given in the morning in an upright position to prevent acid reflux

3.4 Facilitate Client's Awareness Of The Purposes And Effects Of Medications.

INTRODUCTION: It is important for the Medication Aide to respond appropriately to the client when he/she has questions about a medication. The purpose of this objective is to provide general information on the purposes and effects of medications which can be used to assist the clients to better understand their medications.

TOPICAL OUTLINE

A. Communicating with the client regarding purpose and effects of medication

1. The client has a right to know what medication he/she is taking and why.
2. The behavior, attitude and approach of the Medication Aide has an impact on the clients' attitude and behavior regarding medication compliance.

TOPICAL OUTLINE

A. Communicating with the client regarding purpose and effects of medication

The client has a right to know what medication he/she is taking and why.

The behavior, attitude and approach of the Medication Aide has an impact on the clients' attitude and behavior regarding medication compliance.

The Medication Aide should use every opportunity to help the client understand the purpose and effects of their medications.

B. Purpose of medication

I. Prevent illness (e.g.- vaccines)

2. Eliminate illness (e.g.- antibiotics)

3. Control disease (e.g.- insulin)

4. Relieve symptoms related to illness (e.g. - cough suppressant, aspirin)

5. Alter behavior (e.g. - tranquilizers, mood elevators)

C. Effects of medication

1. Desired (therapeutic) effect

a. Drug acts in the manner for which it was prescribed

b. Always observe closely when a client starts taking a new drug.

2. Undesired effect

a. Side effect — an unwanted action that does no harm to the body but may limit the usefulness of the drug

- Usually not therapeutically desirable
- Can occasionally be useful, (e.g.— sedative effects of a drug may help with sleep)
- Initial side effects may subside over time

b. Drug interaction is the effect which results from taking two or more drugs at the same time.

Types of interactions:

One drug increases the effect of another (potentiate)

One drug decreases the effect of another (antagonist)

Two drugs combine to produce a new, different, unwanted effect.

c. Examples of most common unwanted effects:

- Rashes
- Diarrhea
- Vomiting
- Fainting
- Lightheadedness
- Falling
- Blurred vision
- Confusion
- Irritability
- Agitation
- Lethargy

Note: Unwanted effects in the elderly may be mistaken for normal aging or worsening of chronic disease. Therefore, must note what is normal for that individual patient.

3. No effect

a. If the client has no response, notify HCP.

b. Continuing the drug places unnecessary stress on the kidneys and liver.

c. Also represents unnecessary cost and no benefit for the condition being treated.

D. Drug dependency

1- **Physical Dependency** — one or more of the body's functions becomes dependent on the presence of a drug. Without it, the body does experience withdrawal symptoms.

2- **Psychological Dependency** — a mental or emotional craving for the effects produced by a substance. Without it, the body does not experience withdrawal symptoms.

E Drug Allergies

1. **Hypersensitivity** - the body's immune system mistakes the medication for a harmful substance.
2. **Symptoms of allergic reactions:**

a. Usually appear within the first few doses

b. Sometimes delayed and may occur over the course of the person's life

c. Observe for:

- Hives or rash
- Nausea and/or vomiting
- Itching
- Swelling, especially around the eyes

3. Anaphylaxis

a. Anaphylaxis is a severe allergic reaction, usually to a substance to which a person has become sensitized. Symptoms include:

- Difficulty breathing
- Difficulty swallowing
- Facial or tongue swelling

b. Treatment:

emergency intervention — 911

- May be treated with an injection of epinephrine. (See EpiPen® administration)

Observe & Report: Record known allergies in bold letters on the Medication Administration Record (MAR).

Always provide any history of allergies to pharmacist and other health care providers as appropriate. Notify physician immediately when signs of a drug allergy are observed.

3.5 Identify How To Use Drug Information Sources

INTRODUCTION:

When a client requests information about medication education, the Medication Aide is responsible for assisting him or her.

A pharmacist or the client's HCP are the best choices of licensed health care professionals to consult

Facilities are required to make reference materials available to persons who administer medications.

It is important that Medication Aides know how to use these references.

A. Common drug reference sources

1. Physician's Desk Reference (PDR) - commonly used in HCP's offices.

2. United Stated Pharmacopeia Dispensing Information (USPDI)—commonly used by pharmacists

3. Nurses Drug Handbook -- commonly used by nurses

4. The Pill Book -- popular with the lay person

B. Using drug reference books

1. Information found in drug reference books:

a. **Description** – what the drug is made of.
b. **Action** – how the drug works.
c. **Indications** – what conditions the drug is used for.
d. **Interactions** – undesirable effects produced when drugs are taken with food or other drugs or disease states.

e. **Contraindications** – conditions under which the drug should not be used.

f. **Precautions** – specific warnings to consider when administering drugs to patients with specific conditions or diseases.

g. **Adverse Reactions** – unintended and undesirable effects.

h. **Dosage and administration** – correct dose for each possible route of administration.

i. **How supplied** – how the drug is packaged and stored.

Note: The Internet is an excellent source of information

However, be CAREFUL, choose reputable sources.

1, Consult a pharmacist for drug-related questions and/or questions about other appropriate sources of information.

2. When there is a question about a medication

a. The cardinal rule of medication is that when there is any doubt about the drug do NOT give the drug

b. Remember: WHEN IN DOUBT, DON'T!!

c. It is important to resolve an issue as timely as is possible.

Drug-Labeling Requirements

INTRODUCTION: Prescription drugs are prepared and labeled by a pharmacist licensed by the Virginia Board of Pharmacy.

Federal and state regulations provide guidelines to the pharmacist as to how to dispense the medication.
Medication Aides must be able to read and assist the client to accurately interpret the drug label.

In Virginia, all drugs labeled and dispensed by a pharmacist will generally contain:

a. Pharmacy name, address, telephone number, and DEA number
b. Prescription number and name of the physician
c. Clients' name and the date the prescription was filled, ordered without a new prescription.

d. Directions for taking the medication

e. Name of the drug, the strength and count of the medication.

f. Number of times the drug may be re-ordered without a new prescription

EXAMPLE:

SCHOOL OP PHARMACY ,...,
VIRGINIA COMMONWEALTH UNIVERSITY
112, W. Clay Street Richmond, VA 23298
DEA # AV 8967451 (804) 555-1234
KEEP OUT OF REACH OF CHILDREN

RX 379485 01/01/07
JOHN FREEMAN

TAKE ONE (I) TABLET BY MOUTH EVERY DAY.
Dr. Mark Rigsby
ABS. LEVOTHYROXINE 0.125 MG # 30 REFILL: 1.0)

TEST/QUIZ

PERFORMANCE EVALUATION

1. Absorption is:

a. How a drug is taken into the blood stream.

b. How wet something is.

c. How dry something is.

d. How something smells.

a. How a drug is taken into the blood stream

2. Administration route is how a drug is taken into the body, e.g.: oral, rectal, etc.

a. True
b. False

a. True

3. ADR is:

a. Adult Daily Requirement.

b. Actual Dose Required.

c. Adverse Drug Reaction.

d. Activity Daily Required.

c. Adverse Drug Reaction

4. Contraindication is a condition in which the use of a drug is dangerous or inadvisable.

a. True
b. False

a. True

5. Controlled substances are substances not often used.

a. True

b. False

b. False

6. Generic drug is a less expensive drug that is the same as a trade drug.

a. True
b. False

a. True

7. Therapeutic range is the level of a drug in the blood required for the desired outcome.

a. True
b. False

a. True

8. Drugs are classified by
a. the action that they perform in the body
b. the system of the body that they affect
c. how they may be purchased
d. all of the above

d. all of the above

9. An example of a cardiovascular drug is
a. dilantin
b. furadantin
c. digoxin
d. acetaminophen

c. digoxin

10. Maalox is an example of which of:

a. respiratory drug

b. neuroleptic drug

c. gastrointestinal drug

d. cardiovascular drug

c. gastrointestinal drug

11. A controlled substance is one which
a. has a high potential for abuse
b. requires special storage
c. requires special documentation
d. all of the above

d. all of the above

12. Which of the following is true of antibiotics:

a. It is important not to miss a dose

b. The entire course of the drug must be administered

c. It is effective against viral infections

d. Both a and b

d. Both a and b

13. Drug classes which have high incidence of allergic reactions are:

a. cardiovascular drugs
b. pain medication
c. antibiotics
d. both b & c

d. both b & c

14. Which of the following are examples of psychotropic drugs:

a. antidepressants
b. antianxiety drugs
c. antipsychotic drugs
d. all of the above

d. all of the above

15. Which of the following is true of anticonvulsant drugs:

a. They have a narrow therapeutic range

b. The level of the drug in the blood must be monitored

c. They are used to prevent psychotic episodes

d. Both a and b

d. Both a and b

16. Some drugs used to treat osteoporosis require that:

a. the client not eat, drink or lie down for 30 minutes after administration

b. they be given with a full 8 oz. glass of water

c. they be given first thing in the morning

d. all of the above.

d. all of the above.

17. Which of the following is TRUE of antihypertensive drugs:

a. they can cause a drop in blood pressure when rising quickly

b. they are used to lower blood pressure

c. they help lower the risk of heart attack or stroke

d. all of the above

d. all of the above

18. The four steps that occur in the body when a drug is taken are:

a. Absorptiond. d. Excretion
b. Distribution e. All of the above
c. Metabolism f. None of the above

e. All of the above

19. Four physical factors affect drug action. Which of these are not included in the four.

a. Age
b. Weight
c. Hair Color
d. Gender

c. Hair Color

20. Three psychosocial factors affect drug action in the body. They are:

a. Diet
b. Exercise
c. Mental State
d. A, B and C
e. None of the above

d. A, B and C

21. Three drug administration factors that affect drug action.

a. Dose, route of administration, day given.

b. Dose, color of pill, time given.

c. Dose, route of administration, time of administration

d. Time given, temperature of patient, dose

c. Dose, route of administration, time of administration

22. PRN means to give a medication as needed.

a. True
b. False

a. True

23. q4h means to give every

a. 4 days
b. 4 mins
c. 4 hours
d. 4 weeks

c. 4 hours

24. bid means to give twice a day.

a. True
b. False
c. 4 hours
d. 4 weeks

a. True

25. There are six labeling requirements for medications. They include all EXCEPT:

a. Pharmacy name, address, phone number and DEA number.

b. All side effects and contraindications to administration.

c. Number of times the drug may be reordered without a new prescription.

d. Directions for taking the medication.

b. All side effects and contraindications to administration.