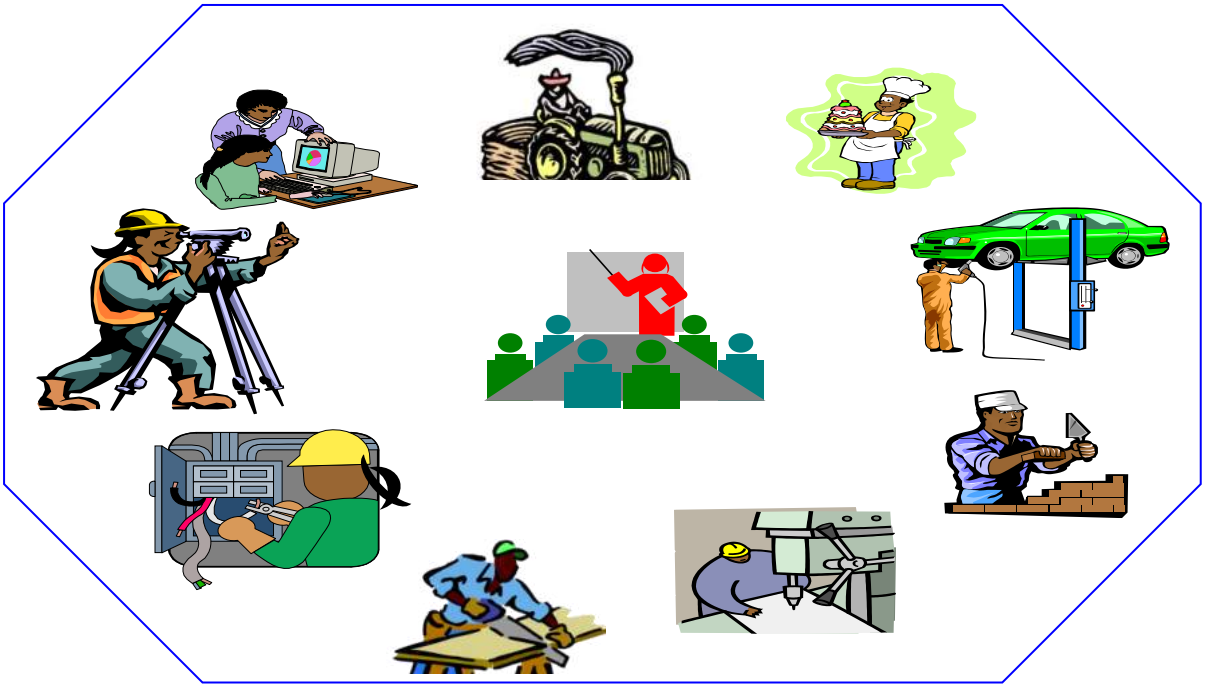
NURSING LEVEL IV

Based on Dec, 2018 Version OS and Dec, 2018 Version Curriculum



MODULE TITLE: Administering and Monitoring Medications in the Work Environment

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L G #17	LO #01- Minimize potential risk to safe administration of medications

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Checking client medication chart
- Raising issues to drug and poison
- Checking and confirming any known allergies
- Checking contraindications and adverse reactions
- Determining drugs and poisons schedules and classifications
- Ensuring infection prevention and control methods
- Identifying pharmacology and substance incompatibilities
- Checking expiry dates prior to administration

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Check client medication chart
- Raise issues to drug and poison
- Identify and confirm any known allergies
- Check and identify contraindications and adverse reactions
- Determine drugs and poisons schedules and classifications
- Ensure infection prevention and control methods
- Identify pharmacology and substance incompatibilities
- Check expiry dates prior to administration

Learning Instructions

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 6.
3. Read the information written in the information “Sheet 1-8
4. Accomplish the “Self-check 1 up to Self-check 8.
5. If you earned a satisfactory evaluation from the “Self-check” proceed to the next.

Information Sheet-1 Checking client medication chart

1.1. Checking client medication chart

A health-care facility should maintain a current, accurate and reliable record of the drugs prescribed and given to a patients. The correct use of a medication chart can meet this requirement. The hard-copy National Residential Medication Chart aims to provide a standard form for the prescription, dispensing and administration of drugs. In addition to providing a comprehensive record, it should facilitate communications between health professionals who are unlikely to visit health-care facilities at the same time.

The chart will also enable pharmacists to supply most drugs without the need for a separate prescription. This should reduce transcription errors and avoid delays in the supply of medicines. There are concerns about the efficiency of using the chart. These could possibly be addressed if an electronic version was developed. A medication chart in a health-care facility serves as a communication tool between doctors, nurses, pharmacists, other health professionals and hospitals regarding a patient's medicines. It is used to direct how and when drugs are to be administered and as a record of their administration. The Department of Health has published 'Guiding principles for medication management in health care facilities'. This states that 'facilities should ensure all residents have a current, accurate and reliable record of all medicines selected, prescribed and used, to support safe prescribing and administration'.

The correct use of an appropriately designed medication chart, either hard copy or electronic, addresses this requirement. Most facilities use proprietary printed medication charts available from commercial printers, health-care service companies, or electronic versions from agencies whose charts are able to be printed on site.

1.2. Issues with medication charts in health care

The proprietary printed charts used in health-care facilities are usually multiple-page booklets designed to last for periods of up to five years. Whereas patients, doctors, nurses and pharmacists are usually co-located in hospitals and can physically use the same chart, this is not the case in health-care facilities. Their differing locations result in all paperwork needing to be copied and faxed or shared electronically between the facility, doctors and pharmacists. The multiple-page booklet format of the charts used in health care complicates transmitting a comprehensive record of a resident's current treatments.

1.3. Conclusion

Some of the inefficiencies and risks associated with the ordering and supply of drugs in residential health-care facilities, arising from the external location of doctors and pharmacists, are resolved by the capacity to work from a single data source in the form of the National Residential Medication Chart. Problems associated with implementation of the chart may be due to both the format of the chart and the change in practices associated with its use. An electronic version of the National Residential Medication Chart may address the operational problems that have been noted with the introduction of the paper version. *Jackson J, Welsh E. Medication charts in residential aged-care facilities. Aust Prescr. 2017;40(1).*

Self-Check-1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I. Choose the best answer

1. Problems associated with implementation of the chart may be due to both the format of the chart and the change in practices associated with its use.

A. True B. False

2. A medication chart in a health-care facility serves as a communication tool between doctors, nurses, pharmacists, other health professionals and hospitals regarding a patient's medicines. **(2points)**

A. True B. False

Note: **Satisfactory rating – 5-6and points Unsatisfactory - below 4points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

1. _____

2. _____

Name: _____

Score = _____
Rating: _____

Information sheet-2	Raising issues to drug and poison

1.2. Raising issues to drug and poison

A poison is any substance, including any drug that has the capacity to harm a living organism. The Renaissance physician Paracelsus (1493-1541) is famously credited with offering the philosophical definition of poisons: "What is there that is not poison? All things are poison and nothing is without poison. In the past poisons were considered harmful biological chemicals secreted by plants and animals. These poisons produced a number of medicinal remedies that later evolved to become drugs we know today. These drugs were usually considered harmless substances, but in reality, even a drug can become a poison. Initially, scientist thought that only dose greater than therapeutic range can convert it into a poison, but recent researches changed this former concept and highlighted various other contributing factors. In order to counter all these factors, we need to assess keenly these poisonous agents biologically and clinically to be used effectively.

What is the difference between a drug and a poison?

Any chemical substance (natural or synthetic) capable of producing psychological and physiological effects is a drug, on contrary poison is capable of causing illness and even death when enters or absorbed. So, we can say neither all drugs are poisonous, nor all poisonous substances are drugs

1.2.3. Drug use, or misuse, includes

- Using illegal substances, such as
  - ✓ Anabolic steroids, Club drugs, Cocaine, Heroin, Inhalants, Marijuana, Methamphetamines
- Misusing prescription medicines, including opioids. This means taking the medicines in a different way than the health care provider prescribed. This includes
  - ✓ Taking a medicine that was prescribed for someone else
  - ✓ Taking a larger dose than you are supposed to

- ✓ Using the medicine in a different way than you are supposed to. For example, instead of swallowing your tablets, you might crush and then snort or inject them.
- ✓ Using the medicine for another purpose, such as getting high
- ✓ Misusing over-the-counter medicines, including using them for another purpose and using them in a different way than you are supposed to.

Self-Check -2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I. Choose the best answer

1. A drug can become a poison **(3points)**

   A. True B. False

2. What is Misuse of prescribed drug? **(2points)**

Note: Satisfactory rating – 5 points Unsatisfactory - below 4points

Answer Sheet

1. _____

2. _____

Name: _____

Score = _____
Rating: _____

Information sheet-3 checking any known allergies

1.3. Checking any known allergies

What Are Allergies? Allergies are abnormal immune system reactions to things that are typically harmless to most people. When a person is allergic to something, the immune system mistakenly believes that this substance is harming the body. Substances that cause allergic reactions — such as some foods, dust, plant pollen, or medicines — are known as allergens. Allergies are a major cause of illness in the United States. Up to 50 million Americans, including millions of kids, have some type of allergy. In fact, allergies cause about 2 million missed school days each year.

1.3.1. How Do Allergies Happen? An allergy happens when the immune system& overreacts to an allergen, treating it as an invader and trying to fight it off. This causes symptoms that can range from annoying to serious or even life-threatening. In an attempt to protect the body, the immune system makes antibodies called immunoglobulin E (IgE). These antibodies then cause certain cells to release chemicals (including histamine) into the bloodstream to defend against the allergen "invader. “It’s the release of these chemicals that causes allergic reactions. Reactions can affect the eyes, nose, throat, lungs, skin, and gastrointestinal tract. Future exposure to that same allergen will trigger this allergic response again. Some allergies are seasonal and happen only at certain times of the year (like when pollen counts are high); others can happen anytime someone comes in contact with an allergen. So, when a person with a food allergy eats that particular food or someone who's allergic to dust mites is exposed to them, they will have an allergic reaction.

1.3.2. Who Gets Allergies?

The tendency to develop allergies is often hereditary, which means it can be passed down through genes from parents to their kids. But just because you, your partner, or one of your children might have allergies doesn't mean that all of your kids will definitely get them.

And someone usually doesn't inherit a *particular* allergy, just the likelihood of *having* allergies. Some kids have allergies even if *no* family member is allergic, and those who are allergic to one thing are likely to be allergic to others.

1.3.3. What Things Cause Allergies?

1.3.3.1. Common Airborne Allergens: - Some of the most common things people are allergic to are airborne (carried through the air):

- Dust mites are microscopic insects that live all around us and feed on the millions of dead skin cells that fall off our bodies every day. They're the main allergic component of house dust.
- Pollen is a major cause of allergies (a pollen allergy is often called hay fever or rose fever). Trees, weeds, and grasses release these tiny particles into the air to fertilize other plants. Pollen allergies are seasonal, and the type of pollen someone is allergic to determines when symptoms happen.
- Molds are fungi that thrive both indoors and outside in warm, moist environments. Outdoors, molds can be found in poor drainage areas, such as in piles of rotting leaves or compost piles. Indoors, molds thrive in dark, poorly ventilated places such as bathrooms and damp basements.
- Pet allergens are caused by pet dander (tiny flakes of shed skin) and animal saliva. When pets lick themselves, the saliva gets on their fur or feathers. As the saliva dries, protein particles become airborne and work their way into fabrics in the home. Pet urine also can cause allergies in the same way when it gets on airborne fur or skin, or when a pet pees in a spot that isn't cleaned.
- Cockroaches are also a major household allergen, especially in inner cities. Exposure to cockroach-infested buildings may be a major cause of the high rates of asthma in inner-city kids.

1.3.3.2. Other Common Allergens

- Insect allergy. For most kids, being stung by an insect means swelling, redness, and itching at the site of the bite. But for those with insect venom allergy, an insect sting can cause more serious symptoms.

- Medicines. Antibiotics are the most common type of medicines that cause allergic reactions. Many other others, including over-the-counter medicines (those you can buy without a prescription), also can cause allergic reactions.
- Chemicals. Some cosmetics or laundry detergents can make people break out in hives. Usually, this is because someone has a reaction to the chemicals in these products, though it may not always be an allergic reaction. Dyes, household cleaners, and pesticides used on lawns or plants also can cause allergic reactions in some people.

Some kids also have what are called cross-reactions. For example, kids who are allergic to birch pollen might have symptoms when they eat an apple because that apple is made up of a protein similar to one in the pollen. And for reasons that aren't clear, people with a latex allergy (found in latex gloves and some kinds of hospital equipment) are more likely to be allergic to foods like kiwi, chestnuts, avocados, and bananas.

1.3.4. What Are the Signs and Symptoms of Allergies?

The type and severity of allergy symptoms vary from allergy to allergy and person to person. Allergies may show up as itchy eyes, sneezing, a stuffy nose, throat tightness, trouble breathing, vomiting, and even fainting or passing out. Kids with severe allergies (such as those to food, medicine, or insect venom) can be at risk for a sudden, potentially life-threatening allergic reaction called anaphylaxis.

Anaphylaxis can happen just seconds after being exposed to an allergen or not until a few hours later (if the reaction is from a food).

So doctors will want anyone diagnosed with a life-threatening allergy to carry an epinephrine auto-injector in case of an emergency.

Epinephrine works quickly against serious allergy symptoms; for example, it reduces swelling and raises low blood pressure.

1.3.5. Airborne Allergy Symptoms

Airborne allergens can cause something known as allergic rhinitis, which usually develops by 10 years of age, reaches its peak in the teens or early twenties, and often disappears between the ages of 40 and 60.Symptoms can include:

- Sneezing, itchy nose and/or throat, stuffy nose, coughing.

When symptoms also include itchy, watery, and/or red eyes, this is called **a**llergic conjunctivitis. (Dark circles that sometimes show up around the eyes are called allergic "shiners.")

1.3.6. Food, Medicines, or Insect Allergy Symptoms

wheezing, trouble breathing, coughing, hoarseness, throat tightness, stomachache, vomiting, diarrhea, itchy, watery, or swollen eyes, hives, swelling, a drop in blood pressure, causing lightheadedness or loss of consciousness. Allergic reactions can vary. Sometimes, a person can have a mild reaction that affects only one body system, like hives on the skin. Other times, the reaction can be more serious and involve more than one part of the body. A mild reaction in the past does not mean that future reactions will be mild.

1.3.7. How Are Allergies Diagnosed?

Some allergies are fairly easy to identify but others are less obvious because they can be similar to other conditions. If your child has cold-like symptoms lasting longer than a week or two or develops a "cold" at the same time every year, talk with your doctor, who might diagnose an allergy and prescribe medicines, or may refer you to an allergist (a doctor who is an expert in the treatment of allergies) for allergy tests. To find the cause of an allergy, allergists usually do skin tests for the most common environmental and food allergens. A skin test can work in one of two ways:

A. A drop of a purified liquid form of the allergen is dropped onto the skin and the area is scratched with a small pricking device.

B. A small amount of allergen is injected just under the skin. This test stings a little but isn't painful. After about 15 minutes, if a lump surrounded by a reddish area (like a mosquito bite) appears at the site, the test is positive. Blood tests may be done instead for kids with skin conditions, those who are on certain medicines, or those who are very sensitive to a particular allergen. Even if testing shows an allergy, a child also must have symptoms to be diagnosed with an allergy. For example, a toddler who has a positive test for dust mites *and* sneezes a lot while playing on the floor would be considered allergic to dust mites.

1.3.8. How Are Allergies Treated?

There's no cure for allergies, but symptoms can be managed. The best way to cope with them is to avoid the allergens. That means that parents must educate their kids early and often, not only about the allergy itself, but also about the reactions they can have if they consume or come into contact with the allergen. Telling all caregivers (childcare staff, teachers, family members, parents of your child's friends, etc.) about your child's allergy is also important. If avoiding environmental allergens isn't possible or doesn't help, doctors might prescribe medicines, including antihistamines, eye drops, and nasal sprays. (Many of these also are available without a prescription.)

In some cases, doctors recommend allergy shots (immunotherapy) to help desensitize a person to an allergen. But allergy shots are only helpful for allergens such as dust, mold, pollens, animals, and insect stings. They're not used for food allergies.

Self-Check -3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What is allergies? **(2points)**
2. List the most common sign and symptoms of allergies? **(5points)**

Note: **Satisfactory rating – 5-7and points Unsatisfactory - below 5points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

1. _____

2. _____

Name: _____ Date _____

Score = _____
Rating: _____

1.4. Checking contraindications and adverse reactions

1.4.1. Drug interactions overview

Whenever two or more drugs are being taken, there is a chance that there will be an interaction among the drugs. The interaction may increase or decrease the effectiveness of the drugs or the side effects of the drugs. The likelihood of drug interactions increases as the number of drugs being taken increases. Therefore, people who take several drugs are at the greatest risk for interactions. Drug interactions contribute to the cost of healthcare because of the costs of medical care that are required to treat problems caused by changes in effectiveness or side effects. Interactions also can lead to psychological suffering that can be avoided. This review discusses the issue of drug interactions and several ways to avoid them.

1.4.2. Drug interactions

A drug interaction can be defined as an interaction between a drug and another substance that prevents the drug from performing as expected. This definition applies to interactions of drugs with other drugs (drug-drug interactions), as well as drugs with food (drug-food interactions) and other substances. There are several mechanisms by which drugs interact with other drugs, food, and other substances. An interaction can result when there is an increase or decrease in:

A. the absorption of a drug into the body;
B. distribution of the drug within the body;
C. alterations made to the drug by the body (metabolism); and
D. Elimination of the drug from the body.

Most of the important drug interactions result from a change in the absorption, metabolism, or elimination of a drug. Drug interactions also may occur when two drugs that have similar (additive) effects or opposite (canceling) effects on the body are administered together.

For example, there may be major sedation when two drugs that have sedation as side effects are given, for example, narcotics and antihistamines. Another source of drug interactions occurs when one drug alters the concentration of a substance that is normally present in the body. The alteration of this substance reduces or enhances the effect of another drug that is being taken. The drug interaction between warfarin (Coumadin) and vitamin K-containing products is a good example of this type of interaction. Warfarin acts by reducing the concentration of the active form of vitamin K in the body. Therefore, when vitamin K is taken, it reduces the effect of warfarin.

1.4.3. Change in absorption

Most drugs are absorbed into the blood and then travel to their site of action. Most drug interactions that are due to altered absorption occur in the intestine. There are various potential mechanisms through which the absorption of drugs can be reduced. These mechanisms include:

A. an alteration in blood flow to the intestine;
B. change in drug metabolism (breakdown) by the intestine;
C. increased or decreased intestinal motility (movement);
D. alterations in stomach acidity, and
E. a change in the bacteria that reside in the intestine.

Drug absorption also can be affected if the drug's ability to dissolve (solubility) is changed by another drug or if a substance (for example, food) binds to the drug and prevents its absorption.

1.4.4. Change in drug metabolism and elimination

Most drugs are eliminated through the kidney in either an unchanged form or as a by-product that results from the alteration (metabolism) of the drug by the liver. Therefore, the kidney and the liver are very important sites of potential drug interactions. Some drugs are able to reduce or increase the metabolism of other drugs by the liver or their elimination by the kidney.

Metabolism of drugs is the process through which the body converts (alters or modifies) drugs into forms that are more or less active (for example, by converting drugs that are given in inactive forms into their active forms that actually produce the desired effect) or that are easier for the body to eliminate through the kidneys. Most drug metabolism takes place in the liver, but other organs also may play a role (for example, the kidneys, intestine, etc.). The cytochrome P450 enzymes are a group of enzymes in the liver that are responsible for the metabolism of most drugs. They are, therefore, often involved in drug interactions. Drugs and certain types of food may increase or decrease the activity of these enzymes and therefore affect the concentration of drugs that are metabolized by these enzymes. An increase in the activity of these enzymes leads to a decrease in the concentration and effect of an administered drug. Conversely, a decrease in enzyme activity leads to an increase in drug concentration and effect.

1.4.5. Consequences of drug interactions

Drug interactions may lead to an increase or decrease in the beneficial or the adverse effects of the given drugs. When a drug interaction increases the benefit of the administered drugs without increasing side effects, both drugs may be combined to increase the control of the condition that is being treated. For example, drugs that reduce blood pressure by different mechanisms may be combined because the blood pressure lowering effect achieved by both drugs may be better than with either drug alone.

The absorption of some drugs is increased by food. Therefore, these drugs are taken with food in order to increase their concentration in the body and, ultimately, their effect. Conversely, when a drug's absorption is reduced by food, the drug is taken on an empty stomach. Drug interactions that are of greatest concern are those that reduce the desired effects or increase the adverse effects of the drugs. Drugs that reduce the absorption or increase the metabolism or elimination of other drugs tend to reduce the effects of the other drugs. This may lead to failure of therapy or warrant an increase in the dose of the affected drug. Conversely, drugs that increase absorption or reduce the elimination or metabolism of other drugs - increase the concentration of the other drugs in the body - and lead to increased amounts of drug in the body and more side effects.

Sometimes, drugs interact because they produce similar side effects. Thus, when two drugs that produce similar side effects are combined, the frequency and severity of the side effect are increased.

1.4.6. Occurrences of drug interactions

The prescribing information for most drugs contains a list of potential drug interactions. Many of the listed interactions may be rare, minor, or only occur under specific conditions and may not be important. Drug interactions that cause important changes in the action of a drug are of greatest concern. Drug interactions are complex and chiefly unpredictable. A known interaction may not occur in every individual. This can be explained because there are several factors that affect the likelihood that a known interaction will occur. These factors include differences among individuals in their:

- genes, physiology, age, lifestyle (diet, exercise), underlying diseases, drug doses, the duration of combined therapy, and the relative time of administration of the two substances. (Sometimes, interactions can be avoided if two drugs are taken at different times. Nevertheless, important drug interactions occur frequently and they add millions of dollars to the cost of health care.
- Moreover, many drugs have been withdrawn from the market because of their potential to interact with other drugs and cause serious health care problems.

1.4.7. Avoiding drug interactions

a. Give health care practitioners a complete list of all of the drugs that you are using or have used within the last few weeks. This should include over-the-counter medications, vitamins, food supplements, and herbal remedies.
b. Inform health care practitioners when medications are added or discontinued.
c. Inform health care practitioners about changes in lifestyle (for example, exercise, diet, alcohol Intake).
d. Ask your health care practitioners about the most serious or frequent drug interactions with the medications that you are taking.
e. Since the frequency of drug interactions increases with the number of medications, work with your health care practitioners to eliminate unnecessary medications.

This brief overview of drug interactions does not cover every possible scenario. Individuals should not be afraid to use their drugs because of the potential for drug interactions. Rather, they should use the information that is available to them to minimize the risk of such interactions and to improve the success of their therapy.

1.4.8. Identifying a Contraindication to the Administration of a Medication to the Client:- Like indications, virtually all medications have contraindications against their use. Some of the most commonly occurring contraindications for medications include:

- Sensitivity or allergy to the medication
- Pregnancy
- Lactation
- Renal disease
- Hepatic disease

Prior to the administration of medications, the nurse must be fully knowledgeable about the contraindications of the medications, the client's condition and determine whether or not the ordered medication is contraindicated for this client. When a nurse identifies that fact that a medication is contraindicated for a client, the nurse must communicate with the ordering physician in order to clarify this medication order

1.4.9. Assessing the Client for Actual or Potential Side Effects and Adverse Effects of Medications

Nurses collect, analyze and document objective and subjective data from clients in reference to any actual or potential side effects and adverse reactions, in addition to the allergies as discussed immediately above, relating to prescribed medications, over the counter preparations, and herbal supplements as part of the client's medical history. There are times when a client may state that they are allergic to something, including foods and medications, when indeed, they may not be. For this reason, nurses will, therefore, record the client's subjective comments about this "allergy" and also how they know or believe that they are allergic to something or that they have had an adverse reaction to a medication, an herbal supplement. Whenever a questionable allergy is identified by the client, this "allergy" must be further explored before it is given.

Providing Information to the Client on Common Side Effects/Adverse Effects/Potential Interactions of Medications and Informing the Client When to Notify the Primary Health Care Provider. In addition to other patient and family education, clients and family members should be given complete information about all the drugs that they are or will be taking. The contents of this education should minimally include:

- The name and purpose of the medication
- The dosage of the medication
- When and how often the medication should be given
- The contraindications of the medication
- The possible side effects of the medication and the signs and symptoms of these side effects.
- The possible adverse effects of the medication and the signs and symptoms of these side effects
- How the medication can interact with other medications, including prescription and over the counter medications, foods, and supplements
- Special instructions including things like taking the medication with a meal or taking the medication between meals
- When to notify the primary health care provider including when a possible allergic response, an adverse action, or a side effect has occurred

Notifying the Primary Health Care Provider of Side Effects, Adverse Effects and Contraindications of Medications and Parenteral Therapy

Nurses who assess that the client has been affected with a side effect or adverse effect to mediations and parenteral therapy must report and record this data immediately and they should hold the medication until a response from the ordering physician gives the nurse further instructions. At times, the medication may be continued and, at other times, the medication may be discontinued and replaced with another medication.

1.4.10. Documenting the Side Effects and Adverse Effects of Medications and Parenteral Therapy

As stated immediately above, nurses who assess that the client has been affected with a side effect or adverse effect to mediations and parenteral therapy must report and record this data immediately. Monitoring for Anticipated Interactions among the Client's Prescribed Medications and Fluids. In addition to the nurse's awareness of and knowledge about the interactions that can occur among medications in all routes and forms, the nurse must also be knowledgeable the interactions of medications and fluids. Based on this knowledge, the nurse monitors and assesses clients for all anticipated interactions and intervenes accordingly.

1.4.11. Evaluating and Documenting the Client's Response to Actions Taken to Counteract the Side Effects and Adverse Effects of Medications and Parenteral Therapy

In addition to all the other roles and responsibilities of the nurse in reference to medication and fluid administration, the nurse must evaluate and document all client responses to interventions that were implemented to counteract any side effects and adverse reactions to medications and parenteral therapy. For example, a client who is given a new medication that leads to nausea and vomiting may get an antiemetic medication to counteract these side effects; and a client who has anaphylactic shock to a medication and is given epinephrine and a bronchodilator to preserve life during this life threatening emergency as they are closely reassessed and monitored for their responses to these emergency interventions.

Self-Check -4	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I. Choose the best answer

1. An interaction can result when there is an increase or decrease in? **(2points)**

A. Absorption of a drug into the body;
B. Distribution of the drug within the body;
C. Wt. of the clients
D. Elimination of the drug from the body

2. How can we avoided drug interaction? **(3points)**

Note: **Satisfactory rating – 5and points** **Unsatisfactory - below 4points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

1. _____

2. _____

Name: _____

Score = _____
Rating: _____

Information Sheet-5 Scheduling and classifying drugs and poisons

1.5. Scheduling and classifying drugs and poisons

Scheduling is a national classification system that controls how medicines and poisons are made available to the public. Medicines and poisons are classified into Schedules according to the level of regulatory control over the availability of the medicine or poison required to protect public health and safety.

1.5.1. Importance of schedule

The schedule is designed to protect public health and safety. Some medicines have a higher risk of causing harm than others. Also, some medicines are more likely to be misused, such as medicines that can cause dependence or addiction. Scheduling is a way of sorting out which medicines or poisons need to be more tightly controlled, and which don't. Some poisons are so dangerous that they are not to be used at all.

Each category has different rules for how a medicine or poison should be labelled, sold, bought, stored and thrown away. These categories also tell you if you need a prescription to buy a certain medicine. A specific medicine will fall into the same category across all Australian states and territories.

There are 10 categories ('schedules') arranged from least tightly controlled to most tightly controlled. Medicines are usually in Schedules 2, 3, 4 or 8

Table-1 Schedules drugs and Poison

Schedule 1	Not currently in use
Schedule 2	Pharmacy Medicine
Schedule 3	Pharmacist Only Medicine
Schedule 4	Prescription Only Medicine OR Prescription Animal Remedy
Schedule 5	Caution
Schedule 6	Poison
Schedule 7	Dangerous Poison
Schedule 8	Controlled Drug
Schedule 9	Prohibited Substance
Schedule 10	Substances of such danger to health as to warrant prohibition of sale, supply and use

The Schedules are published in the Poisons Standard and are given legal effect through state and territory legislation. The Poisons Standard is also referred to as the Standard for the Uniform Scheduling of Medicines and Poisons (SUSMP).

Self-Check -5	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I. Choose the best answer

1. What is scheduling of drugs? **(3points)**
2. List the importance of scheduling? **(3points)**

Note: **Satisfactory rating – 6and points** **Unsatisfactory - below 5points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

1. _____

2. _____

Name: _____

Score = _____
Rating: _____

1.6. Perform infection prevention technique

Hand hygiene is a general term that applies to hand cleansing either using an alcohol-based hand rub/gel or washing with a plain liquid soap or an antimicrobial liquid soap (e.g. chlorhexidine 2%). Hand hygiene must be performed prior to preparing medications or IV fluids. Hand hygiene must be performed at each patient care opportunity as identified in the 'The 5 Moments for Hand Hygiene' (see diagram):

A. before patient contact
B. before a procedure or aseptic technique
C. after a procedure / aseptic technique or body fluid exposure risk
D. after patient contact and After contact with patient surroundings prior to undertaking a procedure or aseptic technique hand hygiene must be performed using the alcohol hand gel or hands washed using an antimicrobial soap.

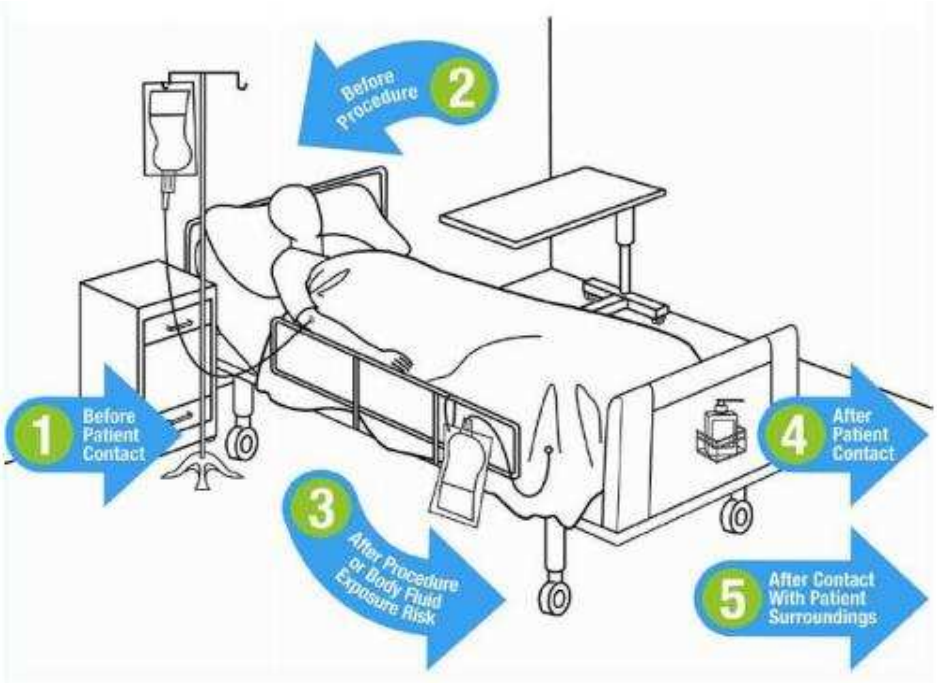


Figure-1 Indication of hand washing

1.6.1. Standard Precautions

Non-sterile gloves should be used when there is potential for contact with blood or body fluids e.g. inserting a cannula or changing a dressing. Hand hygiene must be performed prior to donning and following removal of gloves. Other personal protective equipment e.g. mask, eye protection, disposable gown/apron should be used as part of Standard Precautions. Sharps must be disposed of safely at point of use. Safety engineered devices are provided to minimize needle stick injuries or blood and body fluid exposures.

1.6.2. **Aseptic Non-Touch Technique**

ANTT is a standard for safe and effective aseptic practice which aims to prevent the contamination of susceptible sites, by ensuring that only uncontaminated equipment, referred to as 'key parts' or sterile fluids come into contact with susceptible or sterile body sites during clinical procedures. ANTT should be used during any invasive procedure that bypasses the body's natural defenses, e.g. cannulation, vine puncture, administration of intravenous (IV) medication, central and peripheral line management.

The key principles of ANTT are**:**

- Always clean hands effectively
- Never contaminate 'key parts'
- Touch none 'key parts' with confidence.
- Take appropriate infection prevention precautions (use of standard precautions)

Staff must always decontaminate hands before and after a procedure using ANTT and when putting on and removing gloves. If hands are contaminated during a procedure then gloves must be removed and hands decontaminated prior to donning new gloves. Staff must consider whether the procedure can be performed with or without touching the key parts of the equipment or the key sites of the patient. If it is possible to undertake the procedure without touching the key parts/sites then non sterile gloves can be used. If it is not possible to perform the procedure without touching the key parts/sites then sterile gloves must be used.

Examples of procedures that usually require non sterile gloves include I.V. medicine administration, vine puncture, and cannulation.

A non-touch technique must be used. Only non-key parts of the equipment must be handled. Only sterile items come in contact with the susceptible site. Sterile items do not come in contact with non-sterile objects

Appropriate infection prevention and control precautions must be taken. Personal protective equipment must be worn following an individual risk assessment of the clinical procedure, the patient, the level of exposure and risk of splashing of bodily fluids. Skin antisepsis prior to injection, therapeutic intramuscular injection, cleanse with a chlorhexidine and alcohol swab and allow to dry prior to injection Measurement/Evaluation Compliance with this policy will measured through quality improvement and infection prevention & control audits. References Wilson, J. (2006). Infection Control in Clinical Practice.

Self-Check -6	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I. Choose the best answer

1. Donning of glove is not necessary during medication administration. **(2points)**

A. True B. False

2. Describe the importance of IP in medication administration **(3points)**

Note: **Satisfactory rating – 5-6and points Unsatisfactory - below 4points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

1. _____

2. _____

Name: _____

Score = _____
Rating: _____

Information Sheet-7 identifying pharmacology and substance incompatibilities

1.7. Identifying pharmacology and substance incompatibilities

1.7.1. Drug Incompatibility

Incompatibility is an undesirable reaction that occurs between the drug and the solution, container or another drug. The two types of incompatibilities associated with intravenous administration are physical and chemical. A drug interaction describes the alteration of a drug effect due to the influence of another substance (i.e. drug, chemical substance, nutrition) resulting in a solution that is no longer optimal for the patient after the substances are mixed.

1.7.2. Causes: - Incompatibilities of drugs in standard IV therapy can occur between:-

- drugs and inappropriate IV solutions as diluent two drugs (drug-drug incompatibility) when they are mixed together, e.g. within the same infusion line (simultaneous infusion) and/or IV container
- administered one after the other, but within the same infusion line
- drugs and adjuvants (preservative, buffer, stabilizer, solvent)

- Drugs and materials of IV containers (e.g. PVC) or medical devices, which can concern the nature of the material used and/or reactions at the inner surface (e.g. adsorption).

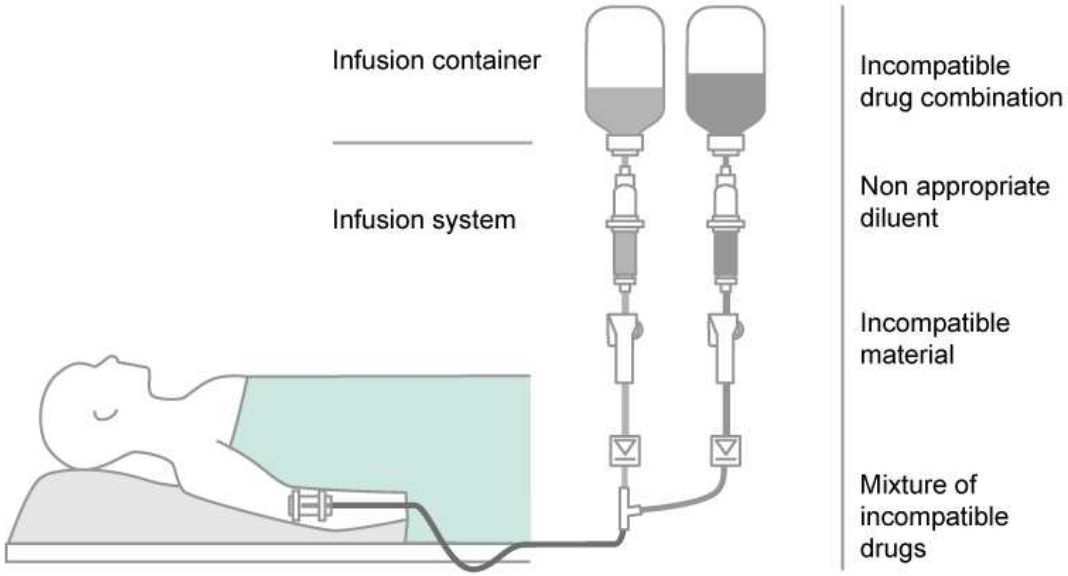


Figure-2 Health Consequences of mixing incompatible drugs

The unintended presence of precipitation and toxic products can cause various negative consequences for the patient.

- damage from toxic products
- particulate emboli from crystallization and separation
- tissue irritation due to major pH changes
- therapeutic failure

The extent of the damage mainly depends on the patient's condition (age, weight, nature, severity of the disease etc.) and on the type of drug administered. Consequences of physicochemical drug incompatibilities are particularly severe in neonate and pediatric patients. There is little published scientific information about the frequency of drug incompatibility reactions.

In one study, incompatibility was investigated in a pediatric intensive care ward showing that 3.4% of drug combinations were incompatible and thus potentially dangerous. A life threatening nature was found for 26% of incompatibilities in an intensive care unit (ICU).

Another survey collected 78 different medication regimes and found 15% with incompatibility reactions. Taxis and Barber reported that in the ICU clinical incompatibilities can contribute to 25% of medication errors. Further publications showed that, depending on the ward type, up to 80% of IV drug doses were prepared with the wrong diluents. To prevent dangerous incompatibilities and ensure safe patient treatment, it is important to combine various actions in different processes. Dangerous incompatibilities can be prevented by a plausibility check regarding the SPC and available sources on compatibility information, also considering the material used for therapy (e.g. diluent, IV container, IV lines) and the infusion regimen.

Assessment and planning of regimes to avoid mixing of drugs, which have to be administered separately.

- Individual labelling for each drug preparation (including drug, concentration, patient name).
- Separating the drug doses by time and place. This can include the rinsing of the infusion system with a neutral IV solution prior to the application of another drug.
- Consistently checking alternative modes of administration and/or using multi-lumen catheters.
- Use of appropriate in-line filters can reduce influx of particles which result from incompatibilities. In-line filters are able to retain solid particles of at least 0.2 µm. As a consequence, the filter may block. This is not a malfunction of the filter, but should initiate a check of the medication in order to eliminate any incompatibility.

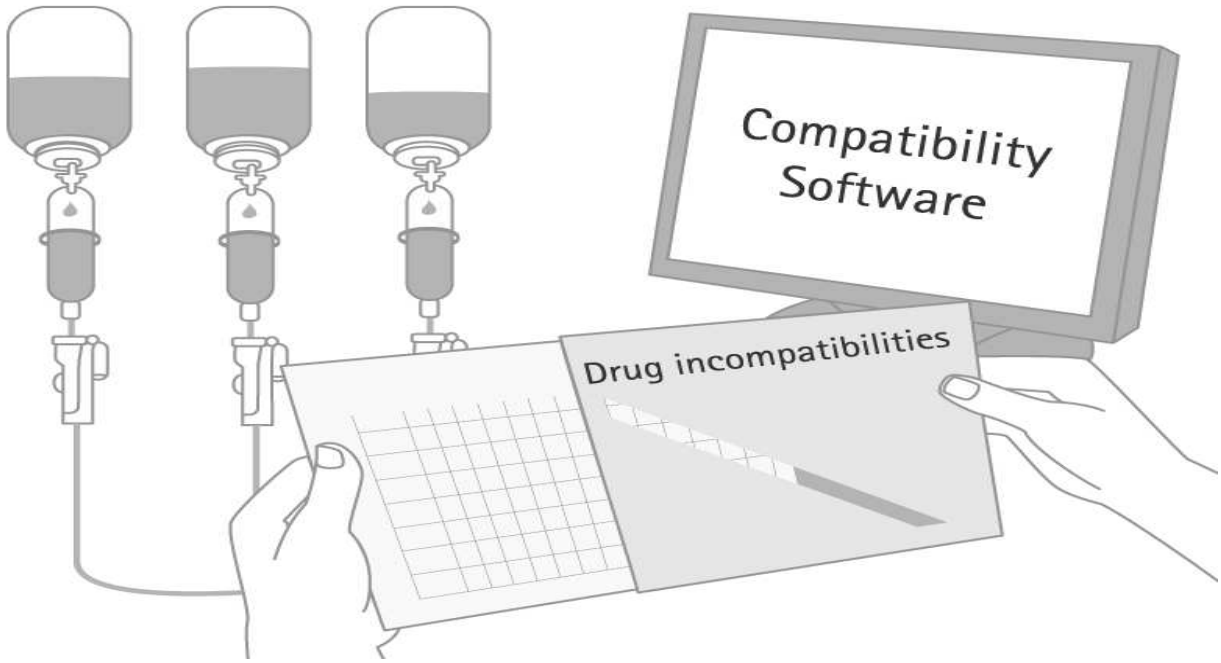


Fig. 3: Compatibility check using available literature, databases, services and information material

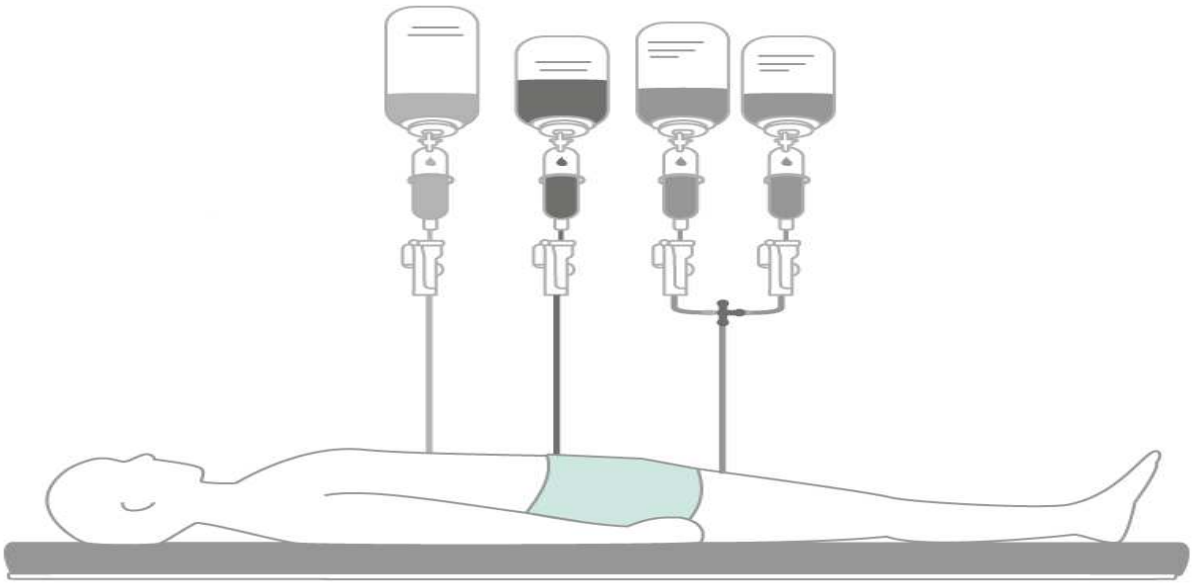


Fig. 4: Color coding and drug separation to prevent drug incompatibilities through a clear indication of the drug.

Self-Check -7	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I. Choose the best answer

1. Incompatibility is an undesirable reaction that occurs between the drug and the solution, container. **(2points)**

A. True B. False

2. The extent of the damage due to incompatibility mainly depends on the patient's

A. age B. weight C. severity of the disease D. All. **(2points)**

Note: **Satisfactory rating – 4and points Unsatisfactory - below 4points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

1. _____

2. _____

Name: _____

Score = _____
Rating: _____

Information Sheet-8 Checking expiry dates

1.8. **Checking expiry dates**

Medicines have expiry dates so you know when to use them by. After the expiry date medicines may not be safe or as effective. You should not take medicines after their expiry date. If you've had a medicine for a while, check the expiry date before using it. You should also make sure that you've stored the medicine properly, as described on the packaging or leaflet. If your medicine looks, tastes or smells different to when you first got it, even if it's within the expiry date, take it to your pharmacist for advice. You can find the expiry date on the medicine packaging or on the label. This may say:

- Expiry, expiry date, expires, exp, exp date, use by, use before.

Expiry dates are put on medicines by:

- the manufacturer that produces the medicine
- the pharmacist who supplies the medicine

The expiry date usually means that you should not take the medicine after the end of the month given. For example, if the expiry date is July 2020, you should not take the medicine after 31 July 2020. If your medicine has a use by or use before date instead of an expiry date, this usually means that you should not take the medicine after the end of the previous month. For example, if the use by date is July 2020, you should not take the medicine after 30 June 2020. If a doctor or pharmacist has given you any other instructions about using or disposing of your medicine, you should also follow these. For example, your pharmacist may label a medicine: "discard 7 days after opening". You should take any medicine that's left after this time back to your pharmacist to dispose of, even if it's within the manufacturer's expiry date.

1.8.1. Short expiry dates

Some medicines are given a short expiry date, such as:

- prepared antibiotic mixtures: when the pharmacist adds water to powdered antibiotic, it changes the stability of the product, and the pharmacist will give it an expiry date of 1 or 2 weeks, depending on the product
- Eye drops: these are usually given an expiry date of 4 weeks after first opening the container, because your eyes are particularly sensitive to any bacteria that might get into the eye drops.
-

1.8.2. Dispose of expired medicine

If you have medicines that have passed their expiry date, take them to your pharmacist, who can dispose of them safely for you. You should never throw unused or expired medicines in the rubbish bin or flush them down the toilet.

Self-Check -8	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I. Choose the best answer

1. If the expiry date is July 2020, you should not take the medicine? **(3points)**

   A. After 31 July 2020

   B. Before 31 July 2020

   C. Before and after July 2020

   D. No need to check

2. Expired medical products can be less effective or risky due to? **(2points)**

   A. Change in chemical composition

   B. Decrease in strength

   C. Expired medications are risk for bacterial growth and can fail to treat **infections**

   D. All

Note: **Satisfactory rating – 5and points** **Unsatisfactory - below 4 points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

1. _____

2. _____

Score = _____

Rating: _____

Name: _____

L G #18	LO#02-Prepare for medication administration within scope of enrolled nurse

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Explaining and ensuring readiness of client for medication administration
- Positioning the client appropriately for administration of medication.
- Identifying correctly administration route for each medication.
- The effect of commonly used medications on the body
- Calculating drug dosages accurately for administration
- Preparing medications in accordance with legislative requirements and organization guidelines.
- Applying medication administration techniques and precautions.
- Ensuring medication storage and disposal in accordance with medical instructions

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Explain and ensure readiness of client for medication administration
- Position the client appropriately for administration of medication.
- Identify administration route for each medication.
- Describe effect of commonly used medications on the body
- Calculate drug dosages accurately for administration
- Prepare medications in accordance with legislative requirements and organization guidelines.
- Apply medication administration techniques and precautions.
- Ensure medication storage and disposal in accordance with medical instructions

Learning Instructions

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 6.
3. Read the information written in the information “Sheet 1 up to Sheet 6
4. Accomplish the “Self-check 1 up to Self-check 6.
5. If you earned a satisfactory evaluation from the “Self-check” proceed to next LO.
6. Do the “LAP test” on page –.

Information Sheet-1 Explaining procedure

2.1. Explaining procedure

2.1 Introduction

Clients and significant others should be taught about all aspects of the medications that they are taking. The content of this teaching and education should minimally include:

The purpose of the medication

The dosage of the medication

The side effects of the medication

The possible adverse effects of the medication

How and where the medication should be safely stored, such as in the refrigerator or in a dark place, for example. The importance of and the method for checking the medication's label for the name, dose, and expiration date. Special instructions such as shaking the medication, taking the medication with meals or between meals and on an empty stomach, for example

When to call the doctor about any side effects

The importance of taking the medication as instructed

The need to continue the medication unless the doctor discontinues it

Information about foods, supplements and other medications, including over the counter medications and preparations that can interact with the ordered medication

The safe disposal of unused and expired medications

The importance of keeping medications in a secure place that would not place a curious child or a cognitively impaired adult at risk for taking medications not intended for them. The proper and safe disposal of any biohazardous equipment such as used needles that

the client uses for insulin and other medications. The administration of medicines is one of the most common procedures nurses undertake and the process is often complex and time consuming. Organisations will have their own policies and procedures that govern the administration of medicines and nurses should be familiar with these; staff who administer medicines should receive appropriate training and have a competency assessment before carrying out the procedure.

The administration of prescribed medicines can be carried out by any suitably trained and competent member of staff in health or social care. Registered health professionals, such as nurses and doctors, are accountable for tasks they delegate to non-registered staff and must ensure that non-registered staff who administer medicines are competent. It is important to remember that when a task is delegated, non-registered staff are also accountable for their own practice (Royal Pharmaceutical Society and Royal College of Nursing) Knowledge needed for medicines being administered.

The reason the medicine is prescribed (therapeutic use) Several systems have been devised to help health professionals consider the key aspects of medicines administration in which an error(s) can occur. These are often referred to as 'rights'; one commonly used version – 'the five rights'.

Administration of oral medicines

The oral route is the most frequently used route of medicine administration, as well as being the most convenient and cost-effective (Dougherty and Lister, 2015).

Many oral medicines are given in solid-dose forms such as tablets and capsules, which have a high degree of stability and provide accurate dosage. However, the oral route can be problematic because of the unpredictable nature of gastrointestinal absorption (see Part 1). Some patients find tablets and other solid-dose forms difficult to take and, on occasion, a liquid formulation might be more appropriate or an alternative medicine may need to be considered. This should be discussed with the prescriber and pharmacist. If a patient finds oral doses difficult to tolerate, it can be tempting to crush tablets.

However, this is usually outside of the product licence and nurses must seek advice from a pharmacist or the prescribing doctor to ascertain whether it is safe to do so.

Modified-release tablets must not be crushed or broken as the medicine which should be released over a period of time may be absorbed immediately, leading to toxicity, or not absorbed at all, leading to suboptimal treatment. Non-sterile gloves are not required routinely for this oral administration procedure. Nurses need to assess individual patients for the risk of exposure to blood and body fluids (Royal College of Nursing, 2018) and to be aware of local policies for glove use.

Medicines to be administered. The Procedure Review the patient's notes and prescription. Check that the details on the prescription are complete, including the patient's name, hospital number, date of birth and allergy status.

Fig 4. **Check patient's identity**

Take the medicine and prescription to the patient and check the patient's identity. Check their wristband according to local policy and ensure they state their name and date of birth, rather than simply confirming any details they are given

Check that the prescription is unambiguous/legible and includes the medicine name, form (and/or route of administration), strength and dose of the medicine to be administered.

Check the date and time when it should be administered, that the prescription is signed and includes a start and finish date, if appropriate. A medicine should not be administered if there are any concerns about the prescription; any such concerns should be discussed immediately with the prescriber. Ensure you know why the medicine is being administered and are aware of potential complications associated with administration. If necessary, ask for advice from the prescriber or a pharmacist. Check the medicine has not been given to the patient and signed for by another member of staff.

Decontaminate your hands in line with local policy. Discuss with the patient the medicine you are going to give to them and gain their verbal consent to administer it. This is an ideal opportunity to answer any questions the patient has about their treatment and check their understanding of the medicine regimen. Position the patient comfortably so they can swallow the medicine. Decontaminate your hands. Select the medicine and check the expiry date. If calculations are required and you are concerned about accuracy, these should be double-checked by a second person and any concerns raised with the prescriber or a pharmacist. Decant the required dose into a medicine pot, avoiding touching the medicine. Take the medicine and prescription to the patient and check the identity of the patient against the prescription using their name, hospital number and date of birth. Check their wristband according to local policy. It is important to ask the patient to state, rather than confirm, their name and date of birth. Check whether the patient has any allergies or previous adverse drug reactions. If you have concerns, discuss these with the prescriber before administering the medicine. Administer the medicine. Offer a drink of water to help the patient swallow the medicine if this is allowed, and ensure they have swallowed it. Dispose of the medicine pot according to local policy. Decontaminate your hands. Immediately record that the medicine has been administered. If the patient refuses or is unable to take their medicine, this should be documented along with the reason for omission; the prescriber should also be informed. Professional responsibilities

. The ‘5 rights’ of medicine administration

Right patient, Right medicine, Right route, Right time, and Right dose.

Self-Check -1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1 Clients and significant others should be taught about all aspects of the medications that they are taking. The content of this teaching and education should minimally include:

2 The '5 rights' of medicine administration are?

3 The .....route is the most frequently used route of medicine administration, as well as being the most convenient and cost-effective

Note: Satisfactory rating - 2 points Unsatisfactory - below 2 points

Answer Sheet

Name: _____ Date: _____

Answer sheet

1_____

2_____

3_____

Score = _____

Rating: _____

Information Sheet-2 Positioning of client

2.1. Positioning of client

Educate client on medication self-administration procedures. Prepare and administer medications, using rights of medication administration. Review pertinent data prior to medication administration (e.g., contraindications, lab results, allergies, potential interactions)

Mix medications from two vials when necessary (e.g., insulin).

Administer and document medications given by common routes (e.g., oral, topical)

Administer and document medications given by parenteral routes (e.g., intravenous, intramuscular, subcutaneous)

Participate in medication reconciliation process

Titrate dosage of medication based on assessment and ordered parameters (e.g., giving insulin according to blood glucose levels, titrating medication to maintain a specific blood pressure)

Dispose of unused medications according to facility/agency policy

Evaluate appropriateness and accuracy of medication order for client

Educating the Client about Medications. Clients and significant others should be taught about all aspects of the medications that they are taking. The content of this teaching and education should minimally include:

- The purpose of the medication
- The dosage of the medication
- The side effects of the medication
- The possible adverse effects of the medication
- How and where the medication should be safely stored, such as in the refrigerator or in a dark place, for example
- The importance of and the method for checking the medication's label for the name, dose, and expiration date

Special instructions such as shaking the medication, taking the medication with meals or between meals and on an empty stomach, for example

When to call the doctor about any side effects

The importance of taking the medication as instructed

The need to continue the medication unless the doctor discontinues it. Information about foods, supplements and other medications, including over the counter medications and preparations that can interact with the ordered medication

The safe disposal of unused and expired medications

The importance of keeping medications in a secure place that would not place a curious child or a cognitively impaired adult at risk for taking medications not intended for them

The proper and safe disposal of any biohazardous equipment such as used needles that the client uses for insulin and other medications

Educating the Client about the Medications Self-Administration Procedures

The client should be educated about the safe and correct method of self-administration of medications. In addition to the education discussed immediately above, some clients may also have to be instructed about special procedures like the proper use of an inhaler, taking insulin, mixing insulins, giving oneself an intramuscular injection or self-administering tube feedings. All of these procedures are fully discussed below in the sections entitled "Preparing and Administering Medications and Using the Rights of Medication Administration" and "Mixing Medications from Two Vials When Necessary".

Preparing and Administering Medications and Using the Rights of Medication Administration. The "Ten Rights of Medication Administration" are the right, or correct:

Medication	Client education
Dose	Documentation
Time or frequency	Right to refuse
Patient	Assessment and
Route	Evaluation

In addition to the Ten Rights of Medication Administration and identifying the patient using at least two unique identifiers, nurses must also insure medication safety in respect to the storage of medications, the checking for expiration dates, checking for any patient allergies, and checking for any incompatibilities.

Nurses must use at least two (2) unique identifiers, other than room number, prior to all procedures including the administration of medications. Some examples of unique identifiers include the client's first, middle and last name, a unique password or code number assigned to that person upon admission, the client's complete birthday in terms of the month, the day and the year, a photograph, and an encoded bar code containing two (2) or more unique identifiers.

Narcotics must be in a locked and secured in a safe place; other medications must be stored in a place that is secure and one that prevents accidental poisonings among the pediatric population and also among those who are confused and/or cognitively impaired. Additionally, medications that need refrigeration must be refrigerated.

2.2. Clients at Risk for Medication Errors and Other Medical Errors

The risk factors associated with medication errors and other medical errors such as wrong patient or wrong site surgery are discussed below:

a. **Developmental disorders**: The same concerns and interventions described above for infants and children apply to those with developmental disorders, as specific to the degree of their developmental delay.
b. **Psychiatric disorders**: Patients/residents/clients with a psychiatric disorder are at risk for medications as based on their psychiatric mental health disorder and the medications that they may be taking. Some psychotropic medications have sedating effects and the client may be delusional and out of touch with reality.
c. **Infants and children**: These young children are at risk for medication errors because they are not able to ask questions about medications and procedures; they may not even be able to state their name. The support and presence of the family is one way to prevent medication errors among this high risk population.
d. **Language barriers**: People with language barriers may not understand what you are saying or asking and, you may not know what they are saying or asking you in another language, therefore, the use of interpreters, family or friends, pictures and drawings should be used to overcome a language barrier.

e. **Cognitive impairments**: Clients who are confused, disoriented, demented or with delirium are at risk for all types of errors because of the challenges associated with accurate patient identification and the hazards of impaired cognition. Again, patient identification is highly important, and it is also beneficial to communicate with the client in a way that is understandable to them using pictures and drawings and to encourage the participation of the significant other(s) in all aspects of care.

f. **Decreased levels of consciousness**: Patients who are not alert, awake and oriented to time, place and person are also at high risk. At times, a family member or friend who is visiting this patient/resident/client can assist with the two unique identifier processes and also serve as a person to question you about questionable medications and to ask questions of you.

g. **Sensory disorders**: Assistive devices, such as eyeglasses and hearing aids, must be consistently provided to the sensory impaired person in order to protect their safety. Additionally, the use of large print or Braille reading materials and magnifying glasses may be helpful for the visually impaired; and speaking loudly while facing the patient with an auditory impairment may offer some protection against medication errors.

The oral route of administration is the preferred route of administration for all clients but the oral route is contraindicated for clients adversely affected with a swallowing disorder or a decreased level of consciousness.

Oral medications can, at times, be crushed and put into something like apple sauce, for example, for some clients who have difficulty swallowing pills and tablets, but, time release capsules, enteric coated tablets, effervescent tablets, medications irritating to the stomach, foul tasting medications and sublingual medications should not be crushed. An alternative route for some clients is a liquid form of the medication.

2.3. Age Specific Route, Form and Dosage Considerations

Infants: Use a syringe, dropper or nipple for oral liquid medications, use the vastus lateralis, rectus femoris and ventro-gluteal muscle sites for intramuscular injections and not the deltoid or the gluteus maximus muscles because these muscles have not yet developed in the infant and dosages are based on the infant's weight in kilograms (kg).

Toddlers: Liquid oral medications are given with a spoon or a cup, the vastus lateralis, rectus femoris and ventrogluteal sites are used for intramuscular injections, the gluteus maximus muscle can be used after the toddler has been walking for at least a year, flavors can be used to improve the taste of oral medications, and the dosages continue to be based on kilograms of weight.

Preschool and school age children: These children are usually able to take capsules and tablets, the gluteus maximus muscle and the deltoid muscle can now be used for intramuscular injections, in addition to the vastus lateralis, rectus femoris and ventrogluteal intramuscular injection sites, and dosages continue to be based on kilograms of weight.

Adolescents: Adolescents get adult dosages, routes and forms of medications.

The Elderly: Adult dosages may be decreased because the normal physiological changes of the aging process make this age group more susceptible to side effects, adverse drug reactions, and toxicity and over dosages. Renal function is decreased which can impair the elimination and clearance of medications, the liver function can be decreased, absorption in the gastrointestinal tract may be decrease, and the distribution of medications can be decreased because the elderly client may have decreased serum albumin, for example.

All of these factors increase the elderly client's risk for side effects, adverse drug reactions, and toxicity and over dosages. For example, the risk of toxicity is increase when the elderly client is taking aminoglycosides, thiazides, a nonsteroidal anti-inflammatory medication, heparin, long acting benzodiazepines, warfarin, isoniazid and many anti-arrhythmic. Nurses must, therefore, begin a new medication with the lowest possible dosage and then increase the dosage slowly over time until the therapeutic effect is achieved.

The initial dosage may be as low as ½ of the recommended adult dosage.

Self-Check -2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Review pertinent data prior to medication administration (list what we should check)

2. Nurses must use at least two (2) unique identifiers, other than room number, prior to all procedures including the administration of medications

3. The "Ten Rights of Medication Administration" are the right, or correct: explain all the following

Medication
Dose
Time or frequency
Patient
Route
Client education
Documentation
Right to refuse
Assessment and
Evaluation

Note: Satisfactory rating - 2 points Unsatisfactory - below 2 points

Answer Sheet

Name: _____

Date: _____

Answer sheet

1._____

2._____

3._____

Score = _____

Rating: _____

Information-3	Identifying route of administration

3.1. Identifying route of administration

3 Route of administration

Enteral Route: - through the gastrointestinal tract

The enteral routes are: - Oral, Rectal, Directly in to the stomach by means of gastric tubes.

Parenteral Route: - through other than gastro intestinal tract.

- Intradermal: in to dermis.
- Subcutaneously: in to cutanuese.
- Intravenously: in to venous.
- Intramuscularly: in to muscle.
- Intrathecal: in to subarachnoid space.
- Intraosseous: in to bone.
- Intra-articular: in to joint

Topical (in to the eyes, ears, nose or on the skin)

2.4.1 Oral Administration

Definition: - Oral medication is drugs administered by mouth.

Advantage, Disadvantages& contra-indications

Most drugs are administered by the oral route because it is the safest, most convenient, and least expensive method. The disadvantage of the oral route is that it is slower acting than the other routes, such as injectable. Drugs may not be given orally to clients with gastrointestinal intolerance or those on NPO (nothing by mouth) status. Oral drugs should be given with caution to clients who have difficulty swallowing, such as a patient who has had a cerebro vascular accident (stroke). Oral administration is also precluded by unconsciousness. When small amounts of drugs are required, the buccal (cheek) or sublingual route is used. Drugs administered through these routes act quickly because of the oral mucosa's thin epithelium and large vascular system, which allows the drug to quickly be absorbed by the blood. Certain oral drugs are prepared for sublingual or buccal administration to prevent their destruction or transformation in the stomach or small intestines.

Buccal drugs are designed to be placed in the buccal pocket (superior-posterior aspect of the internal cheek next to the molars) for absorption by the mucous membrane of the mouth.

Sublingual medications are designed to dissolve quickly when placed under the tongue. For example nitrate (anti-angina) can be given either sublingually or buccal as prescribed, whereas isoproterenol hydrochloride (a bronchodilator) and nitroglycerin (anti-angina) are given sublingually, and methyltesterone (an androgen) is given only buccal.

When digestive juices inactivate the effect of the drug, we do not give. Also when there is inadequate absorption of the drug, which leads to inaccurate determination of the drug absorbed. When the drug is irritating to the mucus membrane of the elementary canal.

Types of oral medications:

1. Lozenges (troches)
2. Tablets
3. Capsules
4. Syrups
5. Tinctures
6. Suspensions
7. Pills & gargle
8. Effervescent
9. Power
10. Oily medication

2.4.2 Suppositories:

Purpose:

a. To produce a laxative effect. (Bowel movement). Suppository is use frequently instead of enema since it is inexpensive.
b. To check diarrhea
c. To produce local sedative in the treatment of hemorrhoids or rectal abscess.
d. To produce general sedative effects when dedications cannot be taken by mouth.
e. To check rectal bleeding

2.4.3. Kinds of suppositories used:

a. Bisacodyl (Dulucolax) is commonly ordered for its laxative action. It stimulates the rectum and lubricates its contents. Normally15 minutes are needed to produce bowel movement.

b. Glycerin or soap for bringing about bowel movement. If soap suppository is use, cut a split of soap 2-6cm and wash it on hot water to smooth the rough edges before administration.
c. Bismuth – to reduce symptoms of vomiting and diarrhea.
d. Opium, sodium barbital etc. for sedation.

2.4.4 Intradermal injection:

Definition: It is an injection given into the outer layer of the skin. (Corneum: most outer layer of the dermis)

Purpose: For diagnostic purpose

A) Tine test (Monteux test): to test for the presence of tuberculosis infection.
B) Allergic reaction. Intradermal injection may also be given for therapeutic purpose,

2.4.5 Sub-cuteness injection (SC, SQ)

Definition: Injection of drug under the skin in the sub-cuteness tissue

Purpose: - To obtain quick absorption than oral administration and when it is impossible to give medicines orally.

2.4.6 I.V. Injections:

Definition: It is the introduction of a drug in solution form into a vein. Often the amount is not more than 10ml. at a time.

Purpose*:*

- When the giving drug is irritating to the body tissue if given through other routes.
- When quick action is desired.
- When it is particularly desirable to eliminate the variability of absorption.
- (to make absorption uniform)
- When blood drawing is needed (exsanguinations).

2.4.7 Intra-muscular injection:

Definition: It is an introduction of a drug into a body's system via the muscles.

Purpose: - To obtain quick action next to the intra-venous route. To avoid an irritation from the drug if given through other route.

2.4.8 Blood Transfusion

Definition: - It is the giving of blood to a patient through a vein.

Purpose:-To counteract severe hemorrhage and replace the blood loss.

To prevent circulatory failure in operation. Where blood loss is considerable, such as in rectal resection, hysterectomy and arterial surgery.

In severe burns to make up for blood lost by burning but only after plasma and electrolytes have been replaced. For severe anemia from cancer, marrow aphasia and similar conditions. To provide clotting factors normally present in blood which may be absent as a result of disease.

Table 2: Routes of Administration, Bioavailability, and General Characteristics.

Route	Bioavailability (%)	Characteristics
Intravenous (IV)	100 (by definition)	Most rapid onset
Intramuscular (IM)	75 to ≤100	Large volumes often feasible; may be painful
Subcutaneous (SC)	75 to ≤100	Smaller volumes than IM; may be painful
Oral (PO)	5 to <100	Most convenient; first-pass effect may be significant
Rectal (PR)	30 to <100	Less first-pass effect than oral
Inhalation	5 to <100	Often very rapid onset
Transdermal	80 to ≤100	Usually very slow absorption; used for lack of first-pass effect; prolonged duration of action

Self-Check -3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1**.....** It is an injection given into the outer layer of the skin. (Corneum: most outer layer of the dermis)

2. .....It is the giving of blood to a patient through a vein.

3..... is commonly ordered for its laxative action. It stimulates the rectum and lubricates its contents. Normally15 minutes are needed to produce bowel movement.

Note: Satisfactory rating - 2 points Unsatisfactory - below 2 points

Answer Sheet

1._____

2._____

3._____

Score = _____

Rating: _____

Name: _____ Date: _____

Information sheet-4	Adverse drug reactions (ADR)

4.1. Adverse drug reactions (ADR)

The drugs that produce useful therapeutic effect may also produce unwanted or toxic effects. It has been estimated that about 0.5% of patients who die in hospitals do so as a result of their treatment rather than the condition for which they were being treated. Serious systemic drug toxicity may result from overdoses. There is always an exaggeration of a drugs pharmacological action and sometimes it is predictable, e.g. Hypotension following antihypertensive drugs, Hypoglycemia following insulin. ADR Is defined as any response to a drug that is noxious and unintended and that occurs at doses used in man for prophylaxis, diagnosis or therapy (WHO).

The adverse effects are:

- Side effects;
- untoward effects;
- allergic reactions;
- idiosyncratic reactions; and,
- teratogenic effects.

4.2. Side effects: - Side effects are in fact pharmacological effects produced with a therapeutic dose of the drug. E.g. Dryness of mouth with atropine which is troublesome in peptic ulcer patients and useful when used as a pre anesthetic medication.

4.3. Untoward effects: - Untoward effects develop with therapeutic dose of a drug.

They are undesirable and if very severe, may necessitate the cessation of treatment.

E.g.**:** Diarrhoea with ampicillin and potassium loss with diuretics.

4.4. **Teratogenic effect:** - Some drugs given in the first three months of pregnancy may cause congenital abnormalities and are said to be teratogenic. The best known example is thalidomide which results in early easily recognizable abnormalities such as absent or grossly abnormal limbs.

Other drugs with teratogenic potential are androgens, steroids, anticonvulsants, anti-neoplastic drugs, cortisone, lithium, pencil amine, tricyclic antidepressants and warfarin

4.5. Mechanism of Drug action:-the fundamental mechanism of drug action can be distinguished in to four categories

- **Physical action**:- Physical property of the drug is responsible for its action
  E.g. Osmotic activity- Magnesium sulphate
- **Chemical action**: - the drug reacts according to simple chemical equation

  E.

  g. Anti-acids ($AlOH_3$ and other) neutralize gastric HCl
- **Through enzymes**: - Almost all biological reaction are carried out under catalytic influences of enzymes are a very important target of drug actions. Drugs can either increase or decrease the rate of enzymatically immediate reactions; which can be Stimulation by increasing the affinity of an enzyme for substrates. Enzyme induction i.e. synthesis of more enzyme proteins Inhibition
- May drugs inhibit a particular enzyme without affecting others. This inhibition is either competitive or non-competitive

i. Competitive:- The drug competes with the normal substrate or co-enzyme

ii. Non-competitive:- The drug reacts an adjacent sit and not with catalytic site, but alters the enzyme catalytic property

- **Through receptors**:- A Drug receptor is a specialized target macro molecule, present on the cell surface or intracellularly, that binds a drug and mediates its pharmacological action

4.6. Toxicology is that branch of pharmacology which deals with the undesirable effects of chemicals on living systems, from individual cells to complex ecosystems. Prepare the top of the longer acting insulin vial with an alcohol swab. Inject air that is equal to the ordered dosage of the longer acting insulin using the insulin syringe. Do not withdraw the longer acting insulin yet. Prep the top of the shorter acting insulin with an alcohol swab Inject air that is equal to the ordered dosage of the shorter acting insulin using the same insulin syringe. Withdraw the ordered dosage of the shorter acting insulin using the same insulin syringe. And, then lastly, withdraw the ordered dosage of the longer acting insulin using the same insulin syringe.

For example, if the client has an order for 10 units of NPH insulin in the morning and they also need 3 units of regular insulin according to their sliding scale for coverage, the client will draw up both insulins according to the above procedure and then inject 13 units total for the NPH and the regular insulins. Administering and Documenting Medications Given by a Common Route. The procedures for the administration of medications using different routes are briefly described below. Note that the verification of the order, its appropriateness for the client, client identification using at least two unique identifiers, and explaining the medication and the procedure for it administration is done BEFORE any medication is given to a client.

Oral Route Administration

Give the patient the medication.

Remain with the patient until the medication is swallowed; some clients may pocket and store medications in their cheeks rather than swallow them.

Buccal and Sublingual Route of Administration

Buccal medications are placed between the teeth and the inner aspect of the client's cheek. Sublingual medications are administered under the back of the tongue:

Don gloves.

Place the buccal medication in the buccal pouch and the sublingual medication under the client's tongue. Instruct the client to not chew or swallow the medication but, instead, to leave the drug in its position until it is completely dissolved.

Topical Route Administration

Some topical medications are only suitable on intact skin and others that contain a medication are used for the treatment of broken skin or a wound. Open the tube or container. Place the top upside down on a table top to prevent contamination to the inner aspect of the cap.

Don gloves.

Apply the topical medication onto the ordered area(s) using the gloved hand, a tongue depressor, a cotton tipped applicator or sterile gauze. Apply the topical medication in long and even strokes following the direction of hair growth when the ordered bodily area has hair.

Transdermal Route Administration

Transdermal medications are absorbed from the surface of the skin.

The site should be without hair so it may be necessary to shave the area and these medications are applied on the client's upper arm or chest. Some transdermal medications are commercially prepared with the ordered dosage and others require the nurse to measure and apply the ordered dosage on a transdermal patch.

This procedure is described below. Remove the old transdermal patch if there is one. Wash the site with soap and water. Dry the site.

Don gloves.

Measure the ordered dose onto the patch or strip without letting the medication to touch your own skin because this medication can also be absorbed by the nurse's skin. With the medication against the skin gently move the strip over a 3 inch area to spread it out. Do not rub the medication into the skin.

Secure the site with a plastic wrap or another semipermeable membrane specifically made for this use.

Tape the patch in place if it is not surrounded with an adhesive. Write the date, time and your initials on the dressing.

Ophthalmic Route Medication Administration

Ophthalmic eye medications are applied using sterile technique which is one of the few routes that require more than medical asepsis or clean technique.

Don gloves.

Position the patient in a sitting position or in a supine position. Have the patient tilt their head back and toward the eye getting the drops or ointment in order to prevent the medication from entering and collecting in the client's tear duct.

Have the patient look up and away to prevent the tip of the tube or dropper from touching the client's eye. Rest your hand against the client's forehead to steady it. To administer drops, pull down the lower lid and instill the ordered number of drops into the conjunctival space.

To administer an ointment, pull down the lower lid and squeeze the ointment into the conjunctival space from the inner to the outer canthus of the eye without letting the tip of the tube or dropper from touch the client's eye. Instruct the client to close their eyes, roll their eyes and blink. Blinking will spread the drops and rolling the closed eyes will spread the ointment over the eye. Clean off any excess drops or ointment gently using a facial tissue from the inner to the outer canthus of the client's eye(s).

Otic Route Administration

Warm the ear drops to body temperature. Instruct the person to lie on their side so that the ear to receive the medication is upright.

Straighten out the ear canal by pulling the auricle up and back for the adult and down and back for the infant and young child less than 3 years of age. Administered the ordered number of drops against the side of the inner ear and hold the auricle in place until the medication is no longer visible. Release the auricle of the ear. Instruct the client to remain in the side lying position with the treated ear up for at least 10 minutes so that the medication gets a chance to enter the ear.

Inhalation Route Administration

The two different types of inhalers that administer medications via the inhalation route are a metered-dose inhalers and a turbo inhaler. The procedure for using a metered dose inhaler is: Shake the bottle and remove the cap. Instruct the client to exhale as fully as possible. Have the client then firmly place their lips around the mouthpiece immediately after the strong exhalation. Press the bottle against the mouthpiece to release the medication while the person is taking in a long, slow inhalation. Instruct the client to hold their breath for a couple of seconds and then slowly exhale. Have the client rinse their mouth with water and then spit it out to prevent a fungal infection of the mouth.

The procedure for using a turbo inhaler is: Slide the sleeve away from the mouthpiece. Turn the mouthpiece counter-clockwise to open it.

Place the colored part of the medication into the stem of the mouthpiece. Rescrew the inhaler. Slide the sleeve all the way down to puncture the capsule. Instruct the client to fully exhale and then to deeply inhale and hold their breath for several seconds. Repeat inhalations until all of the medication has been used. The patient can then gargle and rinse their mouth.

Nasogastric Tube Route Bolus Administration Using Gravity

Position the patient in a Fowler's position and up at least at a 30 degree angle. Insure proper tube placement by aspirating the residual and checking the pH of the aspirate or by auscultating the epigastric area with the stethoscope to hear air sounds when about 30 ml of air are injected into the feeding tube. A pH > 6 indicates that the tube is improperly placed in the respiratory tract rather than the gastrointestinal tract.

Prepare the medication(s) to be administered. Insert the syringe without the piston into the end of the nasogastric tube. Pour the medications into the syringe and allow them to flow with gravity.

Follow the administration with about 30 to 50 ml of water for an adult and 15 to 30 ml for children to clear the tube and to maintain its patency. Leave the person in a Fowler's position for at least 30 minutes after instillation. If the person cannot remain in a Fowler's position, place the patient on the right side with the head elevated.

Vaginal Route Administration

Assist the client into the lithotomy position. Drape the patient exposing only the perineum. Remove the suppository from the wrapper and lubricate it with a water soluble jelly.

Don gloves.

Spread the labia and insert the suppository about 3 to 4 inches into the vagina. If an applicator was used, wash it or discard it if the applicator is for a single use.

Rectal Route Suppository Administration

Position the patient on their left side in the Sim's position. Drape the patient exposing only the buttocks. Remove the suppository from the wrapper and lubricate it with a water soluble jelly.

Don gloves.

Lift the person's upper buttock with the non-dominant hand and insert the suppository with the tapered end first into the rectum for about 3 inches beyond the rectal sphincter while the patient is taking deep breaths to relax the sphincter. Instruct the person to lie still so the suppository can be retained. If the person has the urge to defecate, place a gauze pad over the rectum and gently press the area until the urge to defecate passes.

Rectal Ointment Administration

Drape the patient exposing only the buttocks. Don gloves.

Place the ointment on a gauze pad and apply to the rectum.

Subcutaneous Route Injections

Subcutaneous injections can be given in the abdomen, upper arms and the front of the thighs. Subcutaneous injections are used for the administration of insulin, heparin and other medications. The sites for these injections should be rotated. Select the site.

Don gloves. Clean the injection site with an alcohol swab in an outward circular pattern of about 2 inches around the selected site.

Gently pinch the site so a 1 inch fat fold appears. Position the needle with the bevel up and insert at a 45 degree angle unless you CANNOT pinch an inch or more. In this case, use a 90 degree angle with the exception of heparin. Heparin is always injected at a 90 degree angle.

Release the skin pinch. Pull the plunger back to check for blood. If blood appears withdraw the needle and start again.

Slowly inject the medication.

Withdraw the needle and cover the site with an alcohol swab. Gently massage the site, except if you are injecting heparin. Discard the needle and syringe in the proper container.

Intramuscular Route Administration

The sites for intramuscular medications are the gluteus maximus, the deltoid muscle, the vastus lateralis, the rectus femoris muscle, and the ventrogluteal muscle. The gluteus maximus muscle and the deltoid muscle are NOT used for infants or young children who are less than 3 years of age.

Select the appropriate intramuscular injection site using bony landmarks. Position the client as indicated.

Don gloves.

Clean the injection site with an alcohol swab in an outward circular pattern of about 2 inches around the selected site.

Position the needle with the bevel up and insert at a 90 degree angle.

Pull the plunger back to check for blood. If blood appears withdraw the needle and start again. Slowly inject the medication. Withdraw the needle and cover the site with an alcohol swab. Gently massage the site.

Discard the needle and syringe in the proper container.

Z Track Intramuscular Injections

Z tract injections are a special type of an intramuscular injection that is used for iron administration, for example, to avoid any staining of the skin as the result of the medication. This route is also advantageous to insure that the injected medication is completely injected into the muscle and not into the subcutaneous tissue.

Select the appropriate intramuscular injection site using bony landmarks.

Position the client as indicated.

Don gloves.

Controlled substances and narcotics are immediately documented on the narcotic record when they are taken from their secure and double locked cabinet. This documentation is NOT done after the medication is administered. Narcotics and controlled substances are then documented in the patient's medication record as soon as they are administered. During the change of shift, two nurses perform a complete count of all narcotics and controlled substances. If a discrepancy occurs, it is immediately reported for further investigation. Evaluating the Appropriateness and Accuracy of Medication Orders for the Client. All medication orders are evaluated by the nurse in terms of their accuracy and appropriateness of the order. Some of the things that are considered and evaluated include:

- The completeness of the medication order
- The accuracy of the medication order
- The appropriateness of the medication order
- Client allergies
- The client's health condition

The client's pertinent laboratory findings other client data like vital signs, for example; - Safety considerations:

Plan medication administration to avoid disruption Dispense medication in a quiet area. Avoid conversation with others. Follow agency’s no-interruption zone policy.

Prepare medications for ONE patient at a time.

Follow the seven rights of medication preparation (see below).

Check that the medication has not expired.

- Perform hand hygiene.
- Check room for additional precautions
- Introduce yourself to patient.
- Confirm patient ID using two patient identifiers (e.g., name and date of birth) AND check against MAR.
- Check allergy band for any allergies, and ask patient about type and severity of reaction.

- Complete necessary focused assessments, lab values, and/or vital signs, and document on MAR.
- Provide patient education as necessary. If a patient questions or expresses concern regarding a medication, stop and do not administer.

Steps

Additional Information

Check MAR against doctor's orders. Check that MAR and doctor's orders are consistent. Compare physician orders and MAR Compare MAR with patient wristband. Night staff usually complete and verify this check as well.

Perform the seven rights x 3 (this must be done with each individual medication):

The right patient

The right medication (drug)

The right dose

The right route

The right time

The right reason

The right documentation

2.8. Medication calculation

D/H x S = A

(D or desired dosage/H or have available x S or stock = A or amount prepared). The right patient: check that you have the correct patient using two patient identifiers (e.g., name and date of birth).

Compare MAR with patient wristband. The right medication (drug): check that you have the correct medication and that it is appropriate for the patient in the current context.

The right dose: check that the dose makes sense for the age, size, and condition of the patient. Different dosages may be indicated for different conditions.

The right route: check that the route is appropriate for the patient's current condition.

The right time: adhere to the prescribed dose and schedule.

Check the right patient, medication, dose, route, time, reason, and documentation.

The right reason: check that the patient is receiving the medication for the appropriate reason.

The right documentation: always verify any unclear or inaccurate documentation prior to administering medications. Never document that you have given a medication until you have actually administered it. The label on the medication must be checked for name, dose, and route, and compared with the MAR at three different times:

- When the medication is taken out of the drawer
- When the medication is being poured
- When the medication is being put away/or at bedside

Perform seven checks three times before administering medication. These checks are done before administering the medication to your patient. If taking the drug to the bedside (e.g., eye drops), do a third check at the bedside.

Circle medication when poured. Pour medication. Circle MAR to show that medication has been poured. Circle medication once it has been poured

5. Positioning:-Position patient appropriately for medication administration. Ensure proper body mechanics for health care provider. Position patient safely and appropriately once medication is administered. This ensures patient safety and comfort.

Position patient appropriately for medication administration

Post-medication safety check:

Complete post assessment and/or vital signs (if applicable). Sign MAR; place in the appropriate chart. Perform hand hygiene. This ensures patient safety. This step prevents the transfer of microorganisms. Hand hygiene with ABHR

Self-Check -4	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. The drugs that produce useful therapeutic effect may also produce ..... effects.
2. .....Is defined as any response to a drug that is noxious and unintended and that occurs at doses used in man for prophylaxis, diagnosis or therapy (WHO).
3. The fundamental mechanism of drug action can be distinguished in to four categories

Note: Satisfactory rating - 2 points Unsatisfactory - below 2 points

Answer Sheet

2. _____
3. _____
4. _____

Name: _____ Date: _____

Score = _____

Rating: _____

Information Sheet-3	Dosage calculation

3.1 Dosage calculation

There are times when you may be required to calculate the correct dosage for the administration of medications. If one dose is ordered and you do not have the exact dosage on hand, you can set up an easy equation to determine the correct dosage.

Formula for calculation of drug dosages

Formula = (D) Dose Required H (Dose available) (X) Units to be administered= (Number of units containing dose available)

To solve for "x," the unknown, cross-multiply and divide.

Example:

The physician orders 16 mg of an elixir. The dose on hand is 4 mg/4 ml. How many ml should be administered?

16 4 64x=4

4x = 64 ml x =4

= 16 ml

Another way to solve this problem is by using "Math Magic," developed by Susan G. Moore (1986). Multiply the doctor's order by what is on hand. Doctor's order Form (tablet, capsule, ml) 1x Dosage (grains, grams, mg) 16 mg 4 ml 1x4 mg=Cancel out "words" to determine how to label your answer. 16 mg 4 ml 64 ml 1=4 mg=4= 16 ml

Examples:

1. Order reads: "Gentamycin 40 mg IM." On hand you have a vial labeled Gentamycin 80 mg/2 cc. You would give ____ cc.

40 mg 80 mg=2 cc

80 x = 80 x = 1 cc

40 mg 2 cc 80 cc

OR 1x100 mg=80= 1 cc

2. Order reads: "Demerol 75 mg IM." On hand: Demerol 100 mg/2 cc. How many ml would you give?

75 mg 100 mgx=2 cc

100 x = 150 x = 1.5 cc

75 mg 2 cc 150 cc

OR 1x100 mg=100= 1.5 cc

3. Order reads: “Penicillin 600,000 units IM.” On hand: Penicillin 2,000,000 units per 5 ml. How many ml would you give?

6000,000 u 2,000,000 mgx=5 ml

2,000,000 x = 3,000,000 x = 1.5 ml

600,000 u 5 ml 3,000,000 ml

OR 1x 2,000,000 u=2,000,000= 1.5 ml

Conversions

On occasion, you may need to convert from one form of measurement to another in calculating drug dosages. For example, the physician may order a medication in milligrams, and you find your stock drug is in grams. The following table contains equivalencies that will help you in determining a dosage when conversion is necessary.

1 Gram (Gm) = 1000 milligrams (mg.)

1 mg = 1000 micrograms (mcg) 1 kilogram (kg) = 1000 Gm = 2.2 lb.

1 milliliter (ml) = 1 cubic centimeter (cc)

1000 ml = 1 liter (L.)

60 mg = grain (gr)

·111 mg = gr 60

1 Gm = gr XV (grain 15)

Examples: - Order reads: “Thyroid tablets 120 mg daily.” On hand: Thyroid tablets gr1.” How many ml. would you give? (Remember 60 mg = gr1.)

Setting the problem up as an equation: 60 mg 120 mg1 tablet=x60x = 120 x = 2 tabs

Or, using the “Math Magic” concept, look at the physician’s order and what you have on hand:

120 mg 1 tab1x1 gr

You must add an equivalent in order to solve the problem; all words must cancel out except the units of the medication we are to give. The equivalent you need here is 60 mg = gr ·1

120 mg 1 tab 1 grain1x1 grainx60 mg

Now cancel out the words,120 mg 1 tab 1 grain 120 tab1x1 grainx60 mg=60= 2 tabs

2. Order reads: “Codeine 60 mg po q 4h prn.” On hand: Codeine tablets gr ½. How many tablets would you give? (Remember 60 mg = gr1.)

gr ½ gr. /11=x

X 1/2x =1 x = 2 tabs

60 mg 1 tab 1 gr

OR1x½ grx60 mg=60 tabs30= 2 tabs

3. Order reads: “Demerol gr ¾ q 4 h prn.” On hand: Demerol 75 mg/cc. How many ml. would you give?

60 mg x Step 1: gr 1=gr ¾

x = 60 x 3/4 = 45 mg 75mg 45 mg

Step 2:1 cc=x

75x = 45 x = 0.6 cc

¾ gr 1 cc 60 mg

OR1x75 mgx1 gr=45 cc75= 0.6cc

3.2. Pediatric dosages

Because children and infants are different from adults, a simple linear reduction in the adult dose is rarely adequate in achieving a safe and effective pediatric dose. The most reliable information for figuring a dosage for a pediatric patient is provided by the manufacturer in the package insert. If this information is not available, an approximation can be made using one of the following equations:

Clark’s Rule

Wt. in pounds x adult dose

150= safe dosage for individual child

Example: Clark’s Rule

Adult dose of Ampicillin is 600,000 u. What is the correct dosage for a child weighing 90 lb? 90 x 6000,000150

= 360,000 u

Young’s Rule

Used for computation of pediatric dosage for a child over 2 years of age:

Age in years x adult dose

Age in years +12 = safe dosage for child

Example: Young's Rule

The adult dose of Erythromycin is 250 mg. How many mg would be appropriate for an 8 year-old child?

8 x 250 2000

8 x 12=20

100 mg

Note: Clark's Rule is somewhat more precise than Young's Rule. Pediatric dosages are often ordered according to the child's weight.

Example:

The doctor ordered Garamycin IV piggyback 7.5 mg/kg/day. The child weighs 30 lb. How many mg should he receive per day?

2.2 lb 30 lb.

1 kg=x2.2x = 30

x = 13.6 kg 7.5 mg

13.6 kg xkg= 102 mg/day

Dosages can also be calculated using nomograms for determining body surface area from height and weight. If available, these are more likely to be adequate and safe than using one of the above formulas.

None of these formulas and calculations should be used if the manufacturer provides a pediatric dosage. Most drugs approved for use in children have doses recommended. Generally, these doses are stated as so many milligrams per kilogram or per pound. When pediatric doses are calculated, the pediatric dose should never exceed the adult dosage no matter what method is used to calculate the dosage.

Self-Check -5	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. The physician orders 16 mg of an elixir. The dose on hand is 4 mg/4 ml. How many ml should be administered?

2. Order reads: “Codeine 60 mg po q 4h prn.” On hand: Codeine tablets gr ½. How many tablets would you give? (Remember 60 mg = gr1.)

3. Order reads: “Thyroid tablets 120 mg daily.” On hand: Thyroid tablets gr1.”
How many ml. would you give? (Remember 60 mg = gr1.)

Note: Satisfactory rating - 2 points Unsatisfactory - below 2 points

Answer Sheet

1.

2.

3.

Name: _____

Date: _____

Short Answer Question

Score = _____

Rating: _____

Information Sheet-4	Medication administration techniques and precautions

4.1. Medication administration techniques and precautions

Prior to the administration of medications, the nurse must check and validate the medication order, and also apply their critical thinking skills to the ordered medication and the status and condition of the client in respect to the contraindications, pertinent lab results, pertinent data like vital signs, client allergies, and potential interactions of the medication that is to be given.

A complete medication order must include the client's full name, the date and the time of the order, the name of the medication, the ordered dosage, and the form of the medication, the route of administration, the time or frequency of administration, and the signature of the ordering physician or licensed independent practitioner's signature.

The four general types of medication orders are stat orders, single orders, standing orders and prn orders. Stat medication orders are administered immediately and only once; single orders are also given only once but not necessarily immediately; a standing order is an order for a medication that will be given at specific times until it is discontinued by a doctor's order or by default when a facility's policy states that all standing orders are automatically discontinued after 7 days unless the physician has reordered the medication. A prn order indicates that the ordered medication is only given when a specified condition, like pain or nausea, is present.

All incomplete, questionable and/or illegible orders must be questioned and validated by the nurse transcribing the order before it is administered to the client. This questioning and validation requires that the registered nurse use, integrate and apply their critical thinking and professional judgment skills. Automated order entry using a computer eliminates some medication order errors including those that result from illegibility of handwriting and ordering a medication with which the client is allergic to, however, nurses should never assume that this is the case. For example, medications that have sound alike names and medications that are similar in terms of their correct spelling can remain at risk even when computerized, automatic order entry is used.

Medication orders are often transcribed by hand onto a medication administration record (MAR) or Medex, when the facility is not using computerized order entry.

The client's allergies are determined, all contraindications for the medication as based on the client's health problems and disease conditions are determined, pertinent diagnostic laboratory results such as checking the client's prothrombin time and partial thromboplastin time prior to the administration of heparin, client data like a blood pressure and a pulse rate prior to the administration of an anti-hypertensive medication and digoxin, for example, are assessed and any possible interactions with other medications, foods and alternative and over the counter preparations are assessed in order to determine whether or not the medication should be administered. The doctor must be notified whenever the nurse has any concerns or problems with these things.

Mixing Medications from Two Vials When Necessary

Medications can only be mixed together when they are compatible with each other. Many diabetic clients who take two forms of insulin can mix these medications from two vials so that they will only have to use one, rather than two, subcutaneous injection sites. For example, a client who takes NPH insulin in the morning and also takes regular insulin prior to breakfast for the coverage of hyperglycemia can mix the NPH insulin and the regular insulin in the same syringe. The procedure for this mixing insulins is as below. Prep the top of the longer acting insulin vial with an alcohol swab. Inject air that is equal to the ordered dosage of the longer acting insulin using the insulin syringe. Do NOT withdraw the longer acting insulin yet. Prep the top of the shorter acting insulin with an alcohol swab

Inject air that is equal to the ordered dosage of the shorter acting insulin using the same insulin syringe. Withdraw the ordered dosage of the shorter acting insulin using the same insulin syringe. And, then lastly, withdraw the ordered dosage of the longer acting insulin using the same insulin syringe. For example, if the client has an order for 10 units of NPH insulin in the morning and they also need 3 units of regular insulin according to their sliding scale for coverage, the client will draw up both insulins according to the above procedure and then inject 13 units total for the NPH and the regular insulins.

Administering and Documenting Medications Given by a Common Route

The procedures for the administration of medications using different routes are briefly described below. Note that the verification of the order, its appropriateness for the client, client identification using at least two unique identifiers, and explaining the medication and the procedure for it administration is done BEFORE any medication is given to a client.

Oral Route Administration

Give the patient the medication. Remain with the patient until the medication is swallowed; some clients may pocket and store medications in their cheeks rather than swallow them.

Buccal and Sublingual Route of Administration

Buccal medications are placed between the teeth and the inner aspect of the client's cheek. Sublingual medications are administered under the back of the tongue:

Don gloves.

Place the buccal medication in the buccal pouch and the sublingual medication under the client's tongue. Instruct the client to not chew or swallow the medication but, instead, to leave the drug in its position until it is completely dissolved.

Topical Route Administration

Some topical medications are only suitable on intact skin and others that contain a medication are used for the treatment of broken skin or a wound.

Open the tube or container. Place the top upside down on a table top to prevent contamination to the inner aspect of the cap.

Don gloves.

Apply the topical medication onto the ordered area(s) using the gloved hand, a tongue depressor, a cotton tipped applicator or sterile gauze. Apply the topical medication in long and even strokes following the direction of hair growth when the ordered bodily area has hair.

Transdermal Route Administration

Transdermal medications are absorbed from the surface of the skin. The site should be without hair so it may be necessary to shave the area and these medications are applied on the client's upper arm or chest.

Some transdermal medications are commercially prepared with the ordered dosage and others require the nurse to measure and apply the ordered dosage on a transdermal patch. This procedure is described below. Remove the old transdermal patch if there is one. Wash the site with soap and water. Dry the site.

Don gloves.

Measure the ordered dose onto the patch or strip without letting the medication to touch your own skin because this medication can also be absorbed by the nurse's skin. With the medication against the skin gently move the strip over a 3 inch area to spread it out. Do not rub the medication into the skin. Secure the site with a plastic wrap or another semipermeable membrane specifically made for this use.

Tape the patch in place if it is not surrounded with an adhesive.

Write the date, time and your initials on the dressing.

Ophthalmic Route Medication Administration

Ophthalmic eye medications are applied using sterile technique which is one of the few routes that require more than medical asepsis or clean technique.

Don gloves.

Position the patient in a sitting position or in a supine position.

Have the patient tilt their head back and toward the eye getting the drops or ointment in order to prevent the medication from entering and collecting in the client's tear duct. Have the patient look up and away to prevent the tip of the tube or dropper from touching the client's eye. .

Rest your hand against the client's forehead to steady it.

To administer drops, pull down the lower lid and instill the ordered number of drops into the conjunctival space. To administer an ointment, pull down the lower lid and squeeze the ointment into the conjunctival space from the inner to the outer canthus of the eye without letting the tip of the tube or dropper from touch the client's eye. Instruct the client to close their eyes, roll their eyes and blink. Blinking will spread the drops and rolling the closed eyes will spread the ointment over the eye.

Clean off any excess drops or ointment gently using a facial tissue from the inner to the outer canthus of the client's eye(s).

Otic Route Administration

Warm the ear drops to body temperature.

Instruct the person to lie on their side so that the ear to receive the medication is upright. Straighten out the ear canal by pulling the auricle up and back for the adult and down and back for the infant and young child less than 3 years of age.

Administered the ordered number of drops against the side of the inner ear and hold the auricle in place until the medication is no longer visible.

Release the auricle of the ear.

Instruct the client to remain in the side lying position with the treated ear up for at least 10 minutes so that the medication gets a chance to enter the ear.

Inhalation Route Administration

The two different types of inhalers that administer medications via the inhalation route are a metered-dose inhalers and a turbo inhaler.

The procedure for using a metered dose inhaler is:

Shake the bottle and remove the cap.

Instruct the client to exhale as fully as possible.

Have the client then firmly place their lips around the mouthpiece immediately after the strong exhalation. Press the bottle against the mouthpiece to release the medication while the person is taking in a long, slow inhalation. Instruct the client to hold their breath for a couple of seconds and then slowly exhale. Have the client rinse their mouth with water and then spit it out to prevent a fungal infection of the mouth.

The procedure for using a turbo inhaler is: - Slide the sleeve away from the mouthpiece. Turn the mouthpiece counter-clockwise to open it. Place the colored part of the medication into the stem of the mouthpiece.

Rescrew the inhaler.

Slide the sleeve all the way down to puncture the capsule. Instruct the client to fully exhale and then to deeply inhale and hold their breath for several seconds.

Repeat inhalations until all of the medication has been used. The patient can then gargle and rinse their mouth.

Nasogastric Tube Route Bolus Administration Using Gravity

Position the patient in a Fowler's position and up at least at a 30 degree angle. Insure proper tube placement by aspirating the residual and checking the pH of the aspirate or by auscultating the epigastric area with the stethoscope to hear air sounds when about 30 mLs of air are injected into the feeding tube. A pH > 6 indicates that the tube is improperly placed in the respiratory tract rather than the gastrointestinal tract.

Prepare the medication(s) to be administered.

Insert the syringe without the piston into the end of the nasogastric tube. Pour the medications into the syringe and allow them to flow with gravity.

Follow the administration with about 30 to 50 ml of water for an adult and 15 to 30 ml for children to clear the tube and to maintain its patency.

Leave the person in a Fowler's position for at least 30 minutes after instillation. If the person cannot remain in a Fowler's position, place the patient on the right side with the head elevated.

Vaginal Route Administration

Assist the client into the lithotomy position. Drape the patient exposing only the perineum. Remove the suppository from the wrapper and lubricate it with a water soluble jelly.

Don gloves.

Spread the labia and insert the suppository about 3 to 4 inches into the vagina. If an applicator was used, wash it or discard it if the applicator is for a single use.

Rectal Route Suppository Administration

Position the patient on their left side in the Sim's position. Drape the patient exposing only the buttocks. Remove the suppository from the wrapper and lubricate it with a water soluble jelly.

Don gloves.

Lift the person's upper buttock with the non-dominant hand and insert the suppository with the tapered end first into the rectum for about 3 inches beyond the rectal sphincter while the patient is taking deep breaths to relax the sphincter. Instruct the person to lie still so the suppository can be retained. If the person has the urge to defecate, place a gauze pad over the rectum and gently press the area until the urge to defecate.

Rectal Ointment Administration

Drape the patient exposing only the buttocks. Don gloves and Place the ointment on a gauze pad and apply to the rectum.

Subcutaneous Route Injections

Subcutaneous injections can be given in the abdomen, upper arms and the front of the thighs. Subcutaneous injections are used for the administration of insulin, heparin and other medications. The sites for these injections should be rotated. Select the site.

Don gloves.

Clean the injection site with an alcohol swab in an outward circular pattern of about 2 inches around the selected site. Gently pinch the site so a 1 inch fat fold appears.

Position the needle with the bevel up and insert at a 45 degree angle unless you cannot pinch an inch or more. In this case, use a 90 degree angle with the exception of heparin. Heparin is always injected at a 90 degree angle. Release the skin pinch. Pull the plunger back to check for blood. If blood appears withdraw the needle and start again. Slowly inject the medication. Withdraw the needle and cover the site with an alcohol swab. Gently massage the site, except if you are injecting heparin. Discard the needle and syringe in the proper container.

Intramuscular Route Administration

The sites for intramuscular medications are the gluteus maximus, the deltoid muscle, the vastus lateralis, the rectus femoris muscle, and the ventrogluteal muscle. The gluteus maximus muscle and the deltoid muscle are NOT used for infants or young children who are less than 3 years of age. Select the appropriate intramuscular injection site using bony landmarks. Position the client as indicated.

Don gloves.

Clean the injection site with an alcohol swab in an outward circular pattern of about 2 inches around the selected site. Position the needle with the bevel up and insert at a 90 degree angle. Pull the plunger back to check for blood. If blood appears withdraw the needle and start again. Slowly inject the medication. Withdraw the needle and cover the site with an alcohol swab. Gently massage the site. Discard the needle and syringe in the proper container.

Z Track Intramuscular Injections

Z tract injections are a special type of an intramuscular injection that is used for iron administration, for example, to avoid any staining of the skin as the result of the medication. This route is also advantageous to insure that the injected medication is completely injected into the muscle and not into the subcutaneous tissue. Select the appropriate intramuscular injection site using bony landmarks. Position the client as indicated.

Don gloves.

Pull the skin over the selected site to the side. Inject the medication into the selected muscle. Release the skin. Do not massage the site if a dark solution like iron was administered.

Intravenous Route Bolus Administration (IV Push)

The procedure for IV push without an existing IV line is as follows: Select the largest vein suitable for the medication.

Don gloves.

Apply a tourniquet, locate the vein, prep the skin and insert the needle at a 30 degree angle with the bevel up. Lower the angle when you are in the vein. Check for blood backflow. Remove the tourniquet and slowly inject the medication at the ordered or recommended rate. Withdraw the needle, cover the site with a gauze pad and pressure for 3 minutes. Place a bandage over the site.

The procedure for an IV push bolus with an existing IV line is as follows Make sure that the medication is compatible with the IV solution and any additives.

Don gloves.

Close the flow clamp on the IV tubing or pinch the tubing just above the injection port. Prep the injection port with alcohol. Inject the medication slowly over several minutes. Open the flow clamp and readjust the flow rate to the ordered rate.

Intravenous Piggy Back or Secondary Line Administration

This procedure is as follows: Make sure that the medication is compatible with the IV solution and any additives. Hang the secondary IV set (piggy back). Clean the injection port on the primary intravenous line with alcohol. Insert the secondary set needle or needless system into the injection port of the primary IV tubing.

Lower the primary IV using an extension hook to run only the piggy back medication. This allows the higher piggy back to run until it is finished, after which the primary intravenous will automatically run at the established rate. If you want to run the primary intravenous solution at the same time as the piggy back, keep the primary and the secondary containers at the same height. Remove the secondary set when the medication is completely administered. More information about intravenous fluid and medication administration and how to start an intravenous line was discussed in the section entitled "Educating the Client on the Reason For and Care of a Venous Access Device.

4.2. Documenting Medications Given Using All Routes

Nurses are legally and ethically responsible and accountable for accurate and complete medication administration, observation, and documentation.

Some health care facilities use double locked cabinets to secure controlled substances and others use more sophisticated bar coded entry systems to access controlled substances. When the older model double locked narcotics cabinet is used, the contents are counted and checked by the nurse at the beginning of the shift; this count is then compared to the documented count that was done by the nurse from the prior shift. If there are any discrepancies, these are immediately addressed, explored and corrected if it was a simple oversight or mathematical error. When the narcotics count cannot be corrected, a report must be filed according to the facility's policies and procedures. At times illegal drug diversion may be the reason for inconsistent narcotics counts.

When a bar coded entry system for narcotics and controlled substances are used, each nurse can access these medications because the nurse's identification is automatically processed and the controlled substances are also automatically processed and recorded. When this automated system is not used, the "narcotic keys" are retained by one nurse and, if another nurse has to administer a controlled substances, this nurse will enter the narcotics cabinet with the nurse who is holding the keys. All controlled substances are documented on the narcotics record as soon as they are removed, and all controlled substances, like all other medications, are documented on the client's medication record as soon as they are administered. If a controlled substance is wasted for any reason, either in its entirety or only partially, this waste must be witnessed or documented by the wasting nurse and another nurse.

Both nurses document this wasting. Pull the skin over the selected site to the side. Inject the medication into the selected muscle. Release the skin. Do not massage the site if a dark solution like iron was administered. Intravenous Route Bolus Administration (IV Push)

The procedure for IV push without an existing IV line is as follows: Select the largest vein suitable for the medication.

Don gloves.

Apply a tourniquet, locate the vein, prep the skin and insert the needle at a 30 degree angle with the bevel up. Lower the angle when you are in the vein. Check for blood backflow. Remove the tourniquet and slowly inject the medication at the ordered or recommended rate. Withdraw the needle, cover the site with a gauze pad and pressure for 3 minutes. Place a bandage over the site.

The procedure for an IV push bolus with an existing IV line is as follows: Make sure that the medication is compatible with the IV solution and any additives.

Don gloves. Close the flow clamp on the IV tubing or pinch the tubing just above the injection port. Prep the injection port with alcohol. Inject the medication slowly over several minutes. Open the flow clamp and readjust the flow rate to the ordered rate.

Intravenous Piggy Back or Secondary Line Administration

This procedure is as follows:

Make sure that the medication is compatible with the IV solution and any additives.

When a bar coded entry system for narcotics and controlled substances are used, each nurse can access these medications because the nurse's identification is automatically processed and the controlled substances are also automatically processed and recorded. When this automated system is not used, the "narcotic keys" are retained by one nurse and, if another nurse has to administer a controlled substances, this nurse will enter the narcotics cabinet with the nurse who is holding the keys.

All controlled substances are documented on the narcotics record as soon as they are removed, and all controlled substances, like all other medications, are documented on the client's medication record as soon as they are administered.

If a controlled substance is wasted for any reason, either in its entirety or only partially, this waste must be witnessed or documented by the wasting nurse and another nurse. Both nurses document this wasting. All medications that are given, omitted, held or refused by the patient must be documented in the patient's medication record in addition to other data like vital signs, apical rate, PT and/or PTT as indicated by the actions of the medication and/or the doctor's order. Additional professional responsibilities, in terms of medication administration, include the observation and assessment of the patient prior to the administration of a medication and the observation and evaluation of the patient's responses to the medication including the therapeutic effects, any side effects and adverse drug reactions to the medication.

Participating in the Medication Reconciliation Process

According to the Institute of Medicine's Preventing Medication Errors report, more 40% of medication errors are the result of a lack of communication related to the client's medications; these errors can be prevented by performing the medication reconciliation process for all clients, particularly those clients who are newly admitted, transferred or discharged to another facility or health care setting.

All medications including all prescription medications, vitamins, over the counter medications, herbal remedies, nutritional and dietary supplements, vaccinations, blood derivatives, diagnostic and contrast agents, and radioactive medications are included in the compilation of the list which contains all current medications and treatments.

The procedure for this medication reconciliation process are Compile a list of current medications Compile a list of newly prescribed medications. Compare the two lists and make note of any discrepancies and inconsistencies. Employ critical thinking and professional judgments during the comparisons of the two lists Communicate and document the new list of medications to the appropriate healthcare providers

Titrating the Dosage of a Medication Based on the Assessment and Ordered Parameters

Titration is defined as adjusting the dosage of a medication according to some ordered and specified parameters or criteria. The most commonly occurring example of a titrated medication is insulin coverage with regular insulin that is based on the client's blood glucose levels.

For example, the client's order for regular insulin before a meal may specify that the client take 2 units of regular insulin for blood glucose levels from 200 to 260. Some intravenous medications are also titrated. For example, an intravenous antihypertensive drug like hyper stat will be titrated and adjusted according to the client's blood pressure. Disposing of Unused Medications According to the Facility/Agency Policy. Agencies vary in terms of how they dispose of unused medications after the client has been discharged and/or no longer in need of a specific medication. Refer to your facility's policies and procedures relating to the disposal of unused medications.

Clients in the home environment must also be instructed about the proper and safe disposal of unused and expired medications in order to prevent use by others and to protect the environment. The U.S. Drug Enforcement Administration (DEA) periodically hosts National Prescription Drug Take-

Back days for the disposal of prescription drugs, some local law enforcement departments may have a local take back program, and some local health care agencies and pharmacies may also take back unwanted medication. When these resources are not available in the community, the home care client should be instructed to contract their local solid waste department to find out how these medications should be discarded. If a controlled substance is wasted, this waste must be witnessed by and documented by the wasting nurse and another nurse.

Self-Check -6	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Prior to the administration of medications, the nurse must check and validate the_____ and _____

II. Say True or False

2 The four general types of medication orders are stat orders, single orders, standing orders and prn orders

3. Nurses are legally and ethically responsible and accountable for accurate and complete medication administration, observation, and documentation.

Note: Satisfactory rating - 2 points **Unsatisfactory - below 2 points**

Name: _____

Date: _____

Score = _____

Rating: _____

Answer sheet

1_____

_____

2_____

_____

3_____

_____

Information sheet-7	Storage and disposal of medication

7.1. Storage and disposal of medication

Monitoring drug before, during and after administration. A critical element of drug administration is documentation. The standard is “if it was not documented it was not done.” Many drug errors can be avoided with appropriate documentation. The nurse responsible for administering the medication must initial the medication on the MAR near the time the drug is scheduled. Usually there is a space available for a full signature on the record. The nurse should document that a drug has been given after the client has taken the drug.

2.6. Guidelines for Safe Administration of Medications

Never administer medications that are prepared by another nurse. You are responsible for a medication error if you administer a medication that was inaccurately prepared by another nurse. Nurses should listen carefully to the client who questions the addition or deletion of a medication. Most clients are aware of their prescribed medications. If a client questions the drug or dose you are preparing to administer, recheck the order. If a medication is withheld, indicate the exact reason why in the client’s record.

Legally you are accountable for giving ordered medications to the client; however, circumstances may prevent you from giving a medication as ordered.

Medications may be held for some diagnostic tests, or the client receiving antihypertensive medications may have a blood pressure that is lower than normal. If you gave the antihypertensive, the blood pressure would decrease, causing further hypotension.

Do not leave medications at the client’s bedside for any reason. The client may forget to take the medication, medications can accumulate, and the client could take two or more of the same medication, causing an overdose, or another client who is confused could take the medicine. Initial the MAR only for those medications you actually have administered. This practice ensures accurate charting by clearly indicating which actions you have performed. Advise clients not to take medications belonging to others and not to offer their medications to others. Medications are ordered for each client on the basis of the history, physical examination, and effectiveness of the medication.

If the client refuses to take a medication once it has been prepared, the nurse must indicate that a dose was missed.

In some hospitals, a circle is placed around the time the medication was scheduled to be given. The nurse should write in the record why the dose was missed and notify the health care practitioner. The client may have refused because the tablet was too large. The medication may be supplied as a liquid so an alternate form of the medication can be given; the nurse must request that the health care practitioner change the order to a liquid. Clients do have the right to refuse medications. However, if clients understand the actions of the medication, they may be willing to take the medication. Clients who are scheduled for various diagnostic tests or treatments at the time the medication is to be administered will need to have the medication times rescheduled.

2.7. Preparing medication according to legislative.

The Code of Health and Disability Services Consumers 'Rights (Health and Disability Commissioner, 2004) applies to all health and disability services . This includes:

- public and private services;
- paid and unpaid services;
- all regulated health practitioners;
- health care assistants;
- any other person providing health or disability services to a person; and
- People who care for family members.

The code was developed as a result of the Health and Disability Commissioner (HDC) Act 1994. The purpose of the Act is to promote and protect the rights of health consumers and disability services consumers, and, to that end, to facilitate the fair, simple, speedy, and efficient resolution of complaints relating to infringements of those rights (Health and Disability Commissioner Act, 1994).

This aim is completed through the implementation of the Code of Rights, a complaints process to enable enforcement of the rights, and education for consumers and providers.

The Rights are:

Right 1 Right to be treated with respect;

Right 2 Right to freedom from discrimination, coercion, harassment, and exploitation;

Right 3 Right to dignity and independence;

Right 4 Right to services of an appropriate standard;

Right 5 Right to effective communication;

Right 6 Right to be fully informed;

Right 7 Right to make an informed choice and give informed consent;

Right 8 Right to support;

Right 9 Rights in respect of teaching or research; and

Right 10 Right to complain.

2.8. Nursing implications related to medicine administration:-very client expects the rights outlined above, and every health and disability provider is subject to the duties in the code. It is vital to be familiar with the details of each right and apply these to the nursing role related to medicine administration e.g. a client who refuses prescribed medicines.

> Employers are responsible under section 72(2) of the HDC Act 1994 for ensuring that employees comply with the code.

> Under section 72(5) of the same Act it is a defense for an employing authority to prove that it —took such steps as were reasonably practical to prevent the employee from breaching the codell (HDC Act, 1994). This emphasizes the importance for nurses to inform their employer of problems related to enacting the code, and documenting these discussions.

2.9. Further information

Case reviews are available from the HDC website that outline cases related to medicine administration. These are available for education purposes, and are recommended reading. These can be accessed via www.hdc.org.nz and are found under the heading commissioner's decisionsll. An example is case 02HDC08949 which is related to an overdose of paracetamol to a three year old child. The case describes how the actions of the nurses involved breached Rights Four and Ten of the Code and also breached accepted standards of professional nursing practice.

Further information on the Code can be found in the NZNO pamphlet The Code of Health and Disability Services Consumer Rights available for free download on the NZNO website (www.nzno.org.nz).

2.10. Consent

It is part of a Health Practitioner's work to touch a client and to carry out procedures on that person, be it washing, or giving medication...According to the law no such action may be taken without the client's consent to itll (Keenan, 2010, p.86). A client or their guardian has the right to refuse consent to medicine administration. In such situations, the following general principles apply for the health professional involved:

Discuss the situation with the client and significant others as appropriate to establish reasons for refusal;

Consider whether the refusal of that medicine compromises the client‘s condition or subsequently effects other medicines the client may be taking.

Conform the prescriber or appropriate medical staff/senior nursing staff member on duty or on call; and

Document an accurate record of the refusal and discussion. It is emphasized that consent is potentially a complex issue; this guideline does not attempt to address issues related to clients with a mental health problem, cognitive impairment, intellectual disability, or children. Information can be found on these specific themes in Keenan (2010).

6. Statutory Law Regarding Control of Medicines in New Zealand

There are two main statutes providing for the lawful and unlawful handling, possession, advertising, sale and administration of drugs:

The Medicines Act 1981 and associated regulations which outline the law related —to the manufacture, sale, and supply of medicines medical devices, and related productsǁ (Medicines Act, 1981, p.3). The Medicines Act and Regulations are reviewed at regular intervals and it is important that nurses keep up-to-date with changes that may affect their practice.

The Misuse of Drugs Act 1975 and associated Regulations. This contains provisions regarding the legal and illegal use of controlled drugs. These acts, statutes and regulations can be found on www.legislation.govt.nz and at some public libraries.

2.11. The Medicines Act and Associated Regulations

There are four classifications/schedules of medicines:

a. Prescription medicines: a medicine which can only be sold, supplied or administered pursuant to a prescription by a person authorized to prescribe medicines e.g. medical practitioner, dentist, registered midwife, veterinarian, a designated prescriber,2 or in accordance with a standing order.

b. Restricted medicines (known as pharmacist-only medicines): a medicine which can only be sold or supplied by a pharmacist from a pharmacy or hospital or in accordance with a standing order.

c. Pharmacy only medicines: a medicine, which can be sold or supplied from a pharmacy or hospital or an isolated shop which has a license to sell specific medicines, or in accordance with a standing order.

d. General Sale Medicines: are not scheduled or classified and can be supplied from any retail outlet.

A designated prescriber is registered health professional authorized under the Medicines Act to prescribe any specified class or description of prescription medicines and who satisfies applicable requirements relating to competency, qualifications or training specified in or imposed under regulations made under the Act – this may include a nurse practitioner or registered nurse.

2.12. Regulations Regarding Prescription Form

Regulations for the form of prescriptions (how they must be written) and those who can prescribe medicines is established by the Medicines Regulations 1984 and subsequent amendments and regulations. Section 41 of the Medicines Regulations 1984 (SR 1984/143) (as at 01 August 2011) state under ‗Form of Prescription 'that every prescription given under the regulations shall:

a) Be legibly and indelibly printed;

b) Be signed personally by the prescriber with his usual signature (not being a facsimile or other stamp), and dated;

c) Set out the following information in relation to the prescriber:

i. the prescriber's full name;

ii. the full street address of the prescriber's place of work or, in the absence of the prescriber having a place of work, the postal address of the prescriber;

iii. the prescriber's telephone number;

d) Set out:

i. the surname, each given name, and the address of the person for whose use the prescription is given;

ii. in the case of a child under the age of 13 years, the date of birth of the child;

e) Indicate by name the medicine and, where appropriate, the strength that is required to be dispensed;

f) Indicate the total amount of medicine that may be sold or dispensed, or the total period of supply;

g) If the medicine is to be administered by injection, or by insertion into any cavity of the body, or by swallowing, indicate the dose and frequency of dose; and

h) If the medicine is for application externally, indicate the method and frequency of use. Prior to administration, the nurse must ensure that all prescriptions include all these elements. If these elements are not present then the nurse must not administer the medicine.

2.12. Nursing implications

Where a nurse encounters poor prescribing practice, it is essential that this is addressed. If the nurse feels unprepared to discuss this directly with the prescriber, NZNO recommends the nurse documents the poor practice and reports this to their manager. Completion of an incident report may be required.

The prescriber is also the manager, the nurse may wish to seek further advice from their NZNO organizer. A new national medication chart for District Health Boards (DHBs) has been developed and as at October 2011 was being rolled out across NZ. See 8.4.5 for further information.

2.14. Nursing implications

Nurses need to aware of legislation regarding the storage, recording and administration of medicines and controlled drugs, and the local workplace policies surrounding such requirements. Ask the liaison pharmacist for your service if clarification is required. See section 11.2 for further information.

Self-Check -7	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Say true or false

1 Every client expects the rights outlined above, and every health and disability provider is subject to the duties in the code

2 There are two main statutes providing for the lawful and unlawful handling, possession, advertising, sale and administration of drugs:

3 *Prescription medicines:* a medicine which can only be sold, supplied or administered pursuant to a prescription by a person authorized to prescribe medicines e.g. medical practitioner, dentist, registered midwife, veterinarian, a designated prescriber,2 or in accordance with a standing order.

4 *Restricted medicines (known as pharmacist-only medicines):* a medicine which can only be sold or supplied by a pharmacist from a pharmacy or hospital or in accordance with a standing order

Note: Satisfactory rating - 2 points Unsatisfactory - below 2 points

Answer Sheet

Name: _____

Date: _____

Answer sheet

1_____

2_____

3_____

Score = _____

Rating: _____

L G #19	LO #- 3 Administer medications within legal parameters

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Laws relating to administering medication
- Legislation
- Standards
- Health care unit policies and procedures
- Accountability
- Responsibility
- Authorized prescriber
- Consent
- Dispensing & Prescribing
- Quality management and risk assessment
- The role of the nurse in the administration of medications
- Safe storage and disposal of medication
- Medications of dependence
- Admission or/pass medications

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Implement laws relating to administering medication
- Implement legislation of drugs
- Use the standards medications
- Health care unit policies and procedures
- Practice accountability, responsibility of medication administration.
- Ask clients consent for medication administration
- Quality management and risk assessment
- implement role of the nurse in the administration of medications
- store and dispose medication Safely
- Identify Medications of dependence

Learning Instructions

Read the specific objectives of this Learning Guide.

1, Follow the instructions.

2, Read the information written in the “Information Sheets pages. Try to understand what are being discussed.

3, Ask you teacher for assistance if you have hard time understanding them.

4, Accomplish the “Self-check at the end of information sheet page,

5, Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering each Self-checks).

6, If you earned a satisfactory evaluation proceed to other “Information Sheets”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activities.

Submit your accomplished Self-check.

Information Sheet-1	Recording of administered medications

3.1. Recording of administered medications

The law requires that medicines are given to the right person, at the right time, in the correct form, using the correct dose, via the correct route. To achieve this, the legal framework draws together four separate areas of accountability to protect patients from the harmful effects of medicines while allowing them to benefit from their therapeutic properties. Four key areas of law bind nurses when administering medicine. They regulate the right to administer medicine and the standard required when giving medicine. They can mutually or collectively demand that actions are justified and apply sanctions if those demands are not satisfied. It is vital, therefore, that administration practice is informed by reference to the law in each area of accountability.

Appropriate practitioners are defined as registered medical practitioners, registered dentists and nurses and midwives who comply with conditions specified by Order. Currently these are district nurse/health visitor prescribers and extended formulary nurse prescribers (Prescription Only Medicines (Human Use) Amendment Order 2002). Each class of appropriate practitioner has its own formulary of medicines from which it is authorized to prescribe

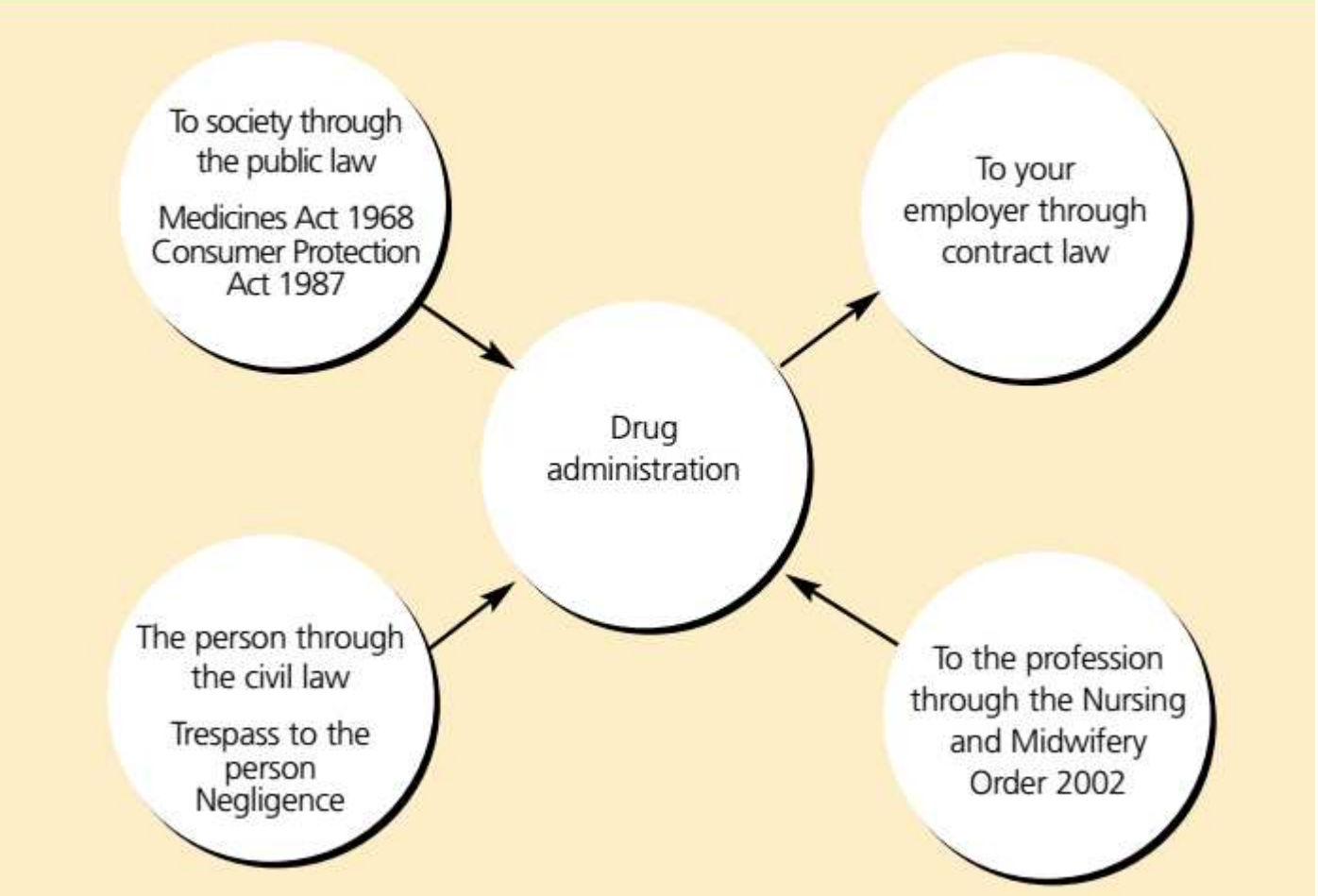
The standard of administration As well as regulating the right to administer medicines to others, the law also regulates the standard of giving or administration. These standards have been developed through the common law, or rules of law developed from the decisions of judges in decided cases. Two key principles of common law apply to the administration of medicines, namely the person's right to self-determination and the practitioner's duty to be careful when administering medicines to those in his or her care.

The right to self-determination*:-* the right to self-determination is long established in law and its role in health care is best summed up by the words of Cardozo J in Schloendorff v Society of New York Hospitals.

Every human being of adult years and sound mind has a right to determine what shall be done with his body.' The 'right to determine' means that a person has the legal right to accept or decline medical treatment.

Lord Goff in Airedale NHS Trust Bland [1993] held that the principle of self-determination requires respect be given to the wishes of patients, so that if adult patients of sound mind refuse, however unreasonably, to consent to treatment or care, those responsible for patients' care must give effect to patients' wishes, even though they do not consider it to be in the patients' best interests to do so the right to administer medication and the standards of administration are regulated by statute and common law, by implied contract terms and professional standards. Consequences for nurses of failing to abide by standards will be liability in four areas, namely trespass to the person, negligence, professional misconduct and breach of employment contract. In the most serious cases, the nurse may face criminal charges

Figure 1. Accountability and drug administration – the four areas



The nurse is responsible for interpreting the prescription accurately, recording that the drug has been given and observing the patient's response.

Prior to administration the nurse must know the reason for, action and usual dosage of the drug; this should enable him or her to recognize and question mistakes in prescribing. When in doubt about a prescription, advice should be sought and, if necessary, the doctor should be consulted. Observations should be made for therapeutic and adverse effects. The nurse should realize that the patient's condition may alter the effect of a drug and that there may be interactions with concurrent treatment. The nurse is greatly assisted in these circumstances by the pharmacist, with whom a good working relationship will enhance the safety of patient care.

In the community, most patients, or some member of the family, are responsible for drug administration, although the nurse may have a role to play.

Many people are now discharged within a few days or hours of surgery and the average length of stay for medical patients has also been reduced. People returning home are often still taking drugs which until recently would have been given only within the confines of a hospital, so monitoring for adverse effects is an increasingly important aspect of the community nurse's role. The nurse must also be aware that some drugs, even if stopped before discharge, may still exert an action or cause side-effects.

Medication Administration

The administration of medicines is one of the most common procedures nurses undertake and the process is often complex and time consuming. Organizations will have their own policies and procedures that govern the administration of medicines and nurses should be familiar with these; staff who administer medicines should receive appropriate training and have a competency assessment before carrying out the procedure.

Principles of Medication Administration

When you give medications, regardless of the type of medication, there are some basic principles that you will always follow. The basic principles that you will always follow are:

Talk with the individual and explain what you are doing before you give medications. Answer any questions that the individual has. Help the individual to be as involved as possible in the process. Provide privacy for the individual.

Give medication administration your complete attention.

Give medications in a quiet area, free from distractions.

Never leave medications unattended, even for a moment!

Wash your hands**!** You must wash your hands before giving medications and then again after you have given medication to each individual.

Six Rights of Medication Administration

When you are giving medication, regardless of the type of medication, you must always follow the six rights.

Each time you administer a medication, you need to be sure to have the: Right individual

Right medication

Right dose

Right time

Right route

Right documentation

Each time you give a medication, you must systematically and conscientiously check your procedure against these six rights. This is essential every time you administer any medication – including medications that an individual has been taking for a long time. You must check for all six rights every time you administer any drug to any individual.

Each time that you give a medication, you also need to remember to do the "Three Checks". This means that you are going to do a "triple-check" to make sure that the six rights are present each time that you give a medication. You must: 1. Remove the medication from the locked area and check the prescription label against the medication log to make sure that they match: this is the 1st check. 2. Before pouring the medication, check the prescription label against the medication order to make sure that they match: this is the 2nd check.

3. After you pour the medication, but before you give it, check the prescription label against the medication log entry again to make sure that they match: this is the 3rd check.

Right Individual In order to make sure that you are about to administer medications to the right individual, you have to know the individual. Even when you know the individual well, mistakes can happen. Sometimes, when medications are being administered to more than one individual in a setting, or if you prepare medications for more than one individual at a time, you can be distracted and give the medications to the wrong individual.

You can avoid a serious mistake if you:

1. Prepare medication for one individual at a time.

2. Give the medication to the individual as soon as you prepare it.
3. Do not talk to others and ask them not to talk to you when you are giving medication.
4. Do not stop to do something else in the middle of giving medications.

5. Pay close attention at all times when you are giving medications. You must also compare the individual's name on the prescription label, the medication order and the medication log. Make sure that they match.

If they do not match, or if there is any doubt about whether you are giving the medication to the right individual, ask questions! If you make a mistake, follow your agency's policy for reporting medication errors. You may need to call the individual's physician, the Poison Control Center, and/or take the individual to the emergency room for evaluation. This is why we do the triple check.

Routes and forms of medication administration

The most appropriate route of medication administration is determined by a physician with the knowledge of the desired response rate, body system being treated, available medication forms and the physical and chemical properties of the medication. Medications produce either a local or systemic (whole body) effect. An example of a local effect is the application of an antibiotic ointment on a cut. A systemic effect would be consumption of an aspirin or Tylenol.

ROUTES

Local effect:-drugs are designed to treat a specific site. Topical medications are for external use. They may be tinctures, lotions, ointments, liniments, and sprays or aerosols. Vaginal medications are inserted into the vagina and usually are suppositories, creams, liquids or foam. Systemic effects occur after a drug is absorbed into the bloodstream and distributed throughout body tissues. Oral medications are taken by mouth. They are the safest, most economical and convenient method of administering medications. They take the form of tablets, capsules, liquids, or troches.

Rectal medications are inserted into the rectum through the anus and used when digestive enzymes alter the medication and/or when a person is unable to take a medication by mouth. Rectal medications are suppositories or enemas. (These cannot be administered by authorized staff and may be local or systemic in effect.)Sublingual medications are tablets or sprays that go under the tongue and remain there to be absorbed through the mucous membranes. Inhaled medications are given by the person breathing the powder or spray into the lungs. They are then absorbed by the respiratory tract mucous membranes. Parenteral medications are injected with a needle and syringe. Drugs given intravenously cause the most rapid body response. This route is used when speed of action is needed and when digestive chemicals alter or destroy the medication.

FORMS

- **TABLETS** are a preparation of powdered drugs that are compressed or molded into shape. Scored have indented lines that divide them into halves or quarters. This allows the tablet to be broken or cut easily for administering a divided, more accurate dosage.

ENTERIC COATED – A thick coating completely encases the tablet (much like the candy coating of an M & M covers the chocolate). This coating prevents the aspirin from dissolving in the stomach, thus preventing the acidic character of aspirin from irritating the stomach wall or decreasing/destroying the medication's effectiveness. It will dissolve in the small intestine. These tablets must be swallowed whole. If chewed or crushed, the medication is released in the stomach.

CAPSULES are medication enclosed in a gelatinous container. Some can be pulled apart, and the contents given with food or liquid. If done, care must be taken to assure the capsule has been completely emptied to assure correct dosage. Capsules should not be crushed or chewed.

LOZENGES are held in the mouth until dissolved and come in a variety of shapes and sizes.

SUSPENSIONS occur when undissolved medications are mixed with a liquid. These drugs are fine particles suspended in the liquid. They must be shaken or stirred before administration.

SYRUPS are liquid preparations of medications contained in a sweetened, aqueous base.

EMULSIONS are mixtures of oil and water that have a milky appearance and tend to separate into layers after standing for long periods (like some salad dressings). Emulsions must always be thoroughly shaken before administration.

SOLUTIONS are one or more drugs dissolved in a solvent. When the solvent is water, the solution is an “aqueous” solution.

FLUID EXTRACTS are concentrated fluid preparations made by dissolving a crude plant drug in a solvent. They are always 100% in strength.

TINCTURES are diluted alcoholic extracts and vary in strength from 10% to 80%.

LOTIONS are aqueous preparations of suspended ingredients used externally to treat skin conditions such as dryness.

OINTMENTS are mixtures of drugs with a fatty base for external application. **LINIMENTS** are aqueous preparations applied topically, generally with a massage.

Often liniments are not recommended for older persons due to fragile skin. In that case, a liniment may produce burns if given with massage.

AEROSOLS are solid or liquid particles suspended in a gas. Wet or surface aerosols are sprayed on the skin without touching the skin. Foam aerosols must be shaken prior to administration so the substances are emulsified.

SPRAYS are prepared so they can be administered by atomizers and are primarily used to treat throat and nose conditions.

SUPPOSITORIES are mixtures in a base that melts at body temperature. This base may be soap, glycerin, or cocoa butter. They are molded for suitable for insertion into the rectum or vagina.

Categories

Medication can be divided into a number of different groups depending on the purpose of the grouping. One way is to divide drugs into prescription drugs and nonprescription drugs (also known as over-the-counter [OTC] drugs). For individuals you are caring for, ALL drugs, including OTC drugs must have a physician’s order.

Prescription Drugs are all medications that must be physician prescribed and pharmacist dispensed. These medications are further divided into controlled and non-controlled drugs. Examples of prescribed drugs are antibiotics (Keflex [cephalexin], Amoxil [Amoxicillin]), psychotropic (Ability [aripiprazole], Clozaril [clozapine], Eskalith [lithium carbonate]), anticonvulsants (Depakote [divalproex sodium], Tegretol [carbamazepine], Dilantin [phenytoin or diphenylhydantoin]).

Non-controlled drugs are any drug that must be prescribed but is not a controlled drug. o Controlled drugs are prescription medications legally designated as "controlled substances". These drugs have a high potential for abuse. Therefore, each dose must be accounted for on a medication count sheet as well as the MAR. Examples: Valium [diazepam], Ativan [lorazepam], Tylenol #3 with Codeine [acetaminophen with codeine phosphate], Somnote [Chloral Hydrate], Hydrocodone. Always ask you RN Nurse-Trainer or pharmacist if a medication is controlled or not.

Non-Prescription (OTC) Medications OTC medication include those that can be purchased without prescription. Examples: Tylenol [acetaminophen], Aspirin [acetylsalicylic acid, ASA], Advil [Ibuprofen], and medicated shampoo. For providers covered by Administrative rule. Non prescriptions (OTC) drugs and vitamins may be purchased and taken with the following conditions: it is prescribed by the physician. The medication is maintained in its original container. If it does not come from a "stock" supply, the individual's name is permanently attached to the container in such a manner as to not obscure the original label.

NAMES

A drug/medication may be known by its chemical name, generic name, or trade (often called brand) name.

Chemical name: A drug's chemical name can be quite long and confusing and is rarely used except by the chemists and other scientists developing the medication. **Generic Name**: The drug name assigned by the laboratory/company that first developed the drug. This is the only consistent medication name and should, at least initially, be used when talking and/or charting about the medication.

Trade/Brand Name: This is the name given the drug by the manufacturer that is typically the name advertised to the public. The manufacturer can be the exclusive drug supplier (and user of the Trade/Brand name) for anywhere from 7 to 15 years. Examples of Generic and Trade/Brand Names for the same drug:

Generic Name: Aspirin (acetylsalicylic acid); Trade/Brand Name(s): ASA, Aspergum, ecotrin, empirin. Generic Name: Divalproex sodium; Trade/Brand Name(s): Depakote, Depakote ER, Depakote Sprinkle o Generic Name: Gabapentin; Trade/Brand Name(s): Neurontin, Gabarone.

Generic Name: Omeprazole; Trade/Brand Name(s): Prilosec It is important to note that a physician may order a drug by its trade name and pharmacist may fill the prescription with the generic drug and label it with its generic name with the physician's permission.

DOSAGE:- Dosage is the drug amount prescribed for administration. Medications dosages are determined by the physician. Dosage is based on the:

Individual's weight, gender and age disease being treated route of administration. Individual's drug tolerance. Dose frequency is determined by the time it takes to get the medication to the treatment site. Time of absorption how long the drug effect lasts in the body (duration of action) how fast it leaves the body (rate of elimination) some drugs tend to act more quickly than others. Some are eliminated quickly and others have a tendency to accumulate. (Ex. pain relievers [analgesics] act and are eliminated quickly while sedatives have a tendency to accumulate.) Never change a medication dosage without the guidance and written documentation of a physician or nurse. When in doubt, withhold administration and immediately check with the nurse or physician before administration.

Good Dispensing Practice

Good dispensing practices ensure that the correct medicine is delivered to the right patient, in the required dosage and quantities, with clear information, and in package that maintains an acceptable potency and quality of the medicine. Dispensing includes all the activities that occur between the times the prescription or oral request of the patient or care provider is presented and the medicine is issued. This process may take place in health institutions and community drug retail outlets.

It is often carried out by pharmacy professionals. No matter where dispensing takes place or who does it, any error or failure in the dispensing process can seriously affect the care of the patient mainly with health and economic consequences. Therefore, the dispenser plays a crucial role in the therapeutic process. The quality of dispensing may be determined by the training and supervision the dispenser has received.

During medicines dispensing and counseling the information mentioned under prescribing above, the “Medicines Good Dispensing Practices” manual 2012 edition and also medicines dispensing and counseling guides are good resources to use. Finally, an application of the professional code of ethics by pharmacy professionals is an important issue that needs due consideration particularly with respect to confidentiality of patient data, withholding therapeutic interventions and varying cost of drug.

Prescription writing

A prescription is a written therapeutic transaction between the prescriber and dispenser. It is a written order by the prescriber to the dispenser on how the drug should be dispensed. It serves as a means of communication among the prescriber, dispenser and drug consumer pertaining to treatment or prophylaxis A prescription should be written on a standard prescription blank, in ink and in generics. It should be legible and not ambiguous. A prescription should contain Date

Full name, age and address of the drug consumer, Name, dose, formulation, strength of the drug (in standard unit, without decimals as much as possible; if decimal should be given a zero should be written in front of the decimal point), and quantity of the drug to be dispensed. Directions specifying the route, dose, frequency and course of treatment (avoid non standard abbreviations and phrases like “take as directed” or “take as before”), prescriber’s name, signature and address for easy access to the prescriber.

Self-Check 1	Written

True or False

1. A drug/medication may be known by its chemical name, generic name, or trade (often called brand) name.

2. Medications dosages are determined by the physician

3. The administration of medicines is one of the most common procedures nurses undertake and the process is often complex and time consuming.

4. The nurse is responsible for interpreting the prescription accurately, recording that the drug has been given and observing the patient's response.

Answer sheet for Self-Check

1……. **3……...**

2……. **4…….**

Information Sheet- 2	Quality management and risk assessment

3.2. Quality management and risk assessment

Quality Risk Management (QRM) has become a mandatory regulatory requirement towards healthcare organizations. QRM is an overall and continuing process of minimizing risks to product quality throughout its life-cycle in order to optimize its benefit and balance the risk. It is a systematic process for the evaluation, control, communication and review of risks to the quality of the medicinal product. It supports science based and practical decisions when integrated into quality systems, examples of quality systems include Validation, Quality Defects - Investigation, Auditing, Inspection, Documentation, Training etc. Quality Risk Management principles are effectively utilized in many areas including business, insurance, work related safety, public health, pharmacovigilance, and by agencies regulating these industries.

Even though there are some examples of the use of quality risk management in the pharmaceutical industry, today they are limited and do not represent the full contributions that risk management has to offer. In relation to pharmaceuticals, though there are a variety of stakeholders, including medical practitioners and patients as well as government and industry, the safety of the patient by managing the risk to quality should be considered prime importance.

The manufacturing and use of a drug product, including its components, necessarily involve some degree of risk. An effective QRM approach can further ensure the high quality of the drug product to the patient by identify and control potential quality issues during development and manufacturing. Use of QRM can improve the decision making if a quality problem arises. Effective QRM implementation can facilitate better and well-versed decisions which can provide regulators with greater assurance of a company's ability to deal with possible risk

3.1.1. Principles of Quality Risk Management

Four primary principles of QRM are**:**

The assessment of the risk to quality should be based on scientific knowledge and ultimately link to the protection of the patient.The assessment of the risk to quality should be based on scientific knowledge and ultimately link to the

The assessment of the risk to quality should be based on scientific knowledge and ultimately link to the assessment of the risk to quality should be based on scientific knowledge and ultimately link to the protection of the patient. QRM should be dynamic, iterative and responsive to change. The level of effort, formality and documentation of the QRM process should be commensurate with the level of risk the capability for continual development and enhancement should be embedded in the QRM p QRM should be dynamic, iterative and responsive to change.

The level of effort, formality and documentation of the QRM process should be commensurate with the level of risk. The capability for continual development and enhancement should be embedded in the QRM process. The assessment of the risk to quality should be based on scientific knowledge and ultimately link to the capability for continual development and enhancement should be embedded in the QRM process.

3.1.2. General Quality Risk Management Process

Quality Risk Management is a systematic process for evaluation, control, communication and review of risks to the quality of the drug product across the product lifecycle. Risk can be defined as the combination of the probability of occurrence of harm and the severity of that harm.

Initiating a Quality Risk Management Process

Quality Risk Management should include systematic processes designed to organize, facilitate and improve science-based decision making with respect to risk. Steps used to initiate and plan a quality risk management process might include the following

- Define the problem and/or risk question, including relevant assumptions identify the potential for risk.

- Assemble background information and/or data on the potential hazard, harm or human health impact applicable to the risk assessment.
- Specify a timeline, and appropriate level of decision making for the risk management process.

Risk Assessment

Risk assessment consists of the identification of hazards and the analysis and evaluation of risks associated with exposure to those hazards. It includes risk identification, risk analysis and risk evaluation.

Three fundamental questions are often helpful.

2. What might go wrong?
3. What is the possibility that it will go wrong?
4. What are the consequences?

Risk identification is a organized use of information to identify hazards referring to the risk. Information can include historical data, theoretical analysis, and the concerns of stakeholders. Risk identification addresses the “What might go wrong?” question, including identifying the possible consequences. This provides the basis for further steps in the quality risk management process. **Risk analysis** is the estimation of the risk associated with the identified hazards. It is the qualitative or quantitative process of linking the likelihood of occurrence and severity of harms. In some risk management tools, the ability to detect the harm (detectability) also factors in the estimation of risk.

Risk evaluation compares the identified and analyzed risk against given risk criteria. Risk evaluations consider the strength of evidence for all three of the fundamental questions.

Different Steps Involved In the Risk Assessment Are

1. Collect & organize the information. Gathering relevant information, reviewing appropriate references & identifying assumptions. Tools can be used to categorize the information. Define the limits of the QRM exercise

2. Formulate the Risk Question: It is the starting point of the QRM exercise, high level statement outlining the issue & purpose for conducting the QRM exercise including risk factors, the scope of the issue and any related limits or constraints

3. Choose Tool different tools include- Basic risk management facilitation methods (flowcharts, check sheets etc.). Failure Mode Effects Analysis and Failure Mode Effects and Criticality Analysis. Fault Tree Analysis. Hazard Analysis and Critical Control Points. Hazard & Operability Analysis. Preliminary Hazard Analysis. Risk Ranking & Filtering. Supporting statistical tools.

4. Identify Risks Factors and Related Hazards. A hazard is a failure that could cause potential harm to the patient. Once the hazards are recognized, they can then be categorized into one of five areas: Operator, Environment, System, Reagents, or Specimen. These categories will make it easier to later identify types of controls necessary to reduce unwanted risk.

5. Define the Risk Components &Scales

RISK = PRIORITY * DETECTABILITY * SEVERITY
Where,
Severity- Criticality of the product Priority- Complexity of the site (multi-product). Detection- Audit history.

6. Evaluate the risk for each hazard. This is the step where you decide how often that a failure will occur.

7. Determine acceptability of risks. Once the risks are assigned, the next step is to look at severity and probability of harm to determine whether the risks are acceptable.

8. Determine Action Threshold A level or value above which an action will take place and below which it will not.

9. Apply the tool analyze the detailed risks and quantify those risks using the scales for severity, probability and detection to provide a risk score. conclude what actions are required based on the threshold for action.

Risk Control Risk control includes decision making to reduce and/or accept risks. The intention of risk control is to reduce the risk to an acceptable level. The amount of effort used for risk control should be proportional to the significance of the risk Risk control might focus on the following questions: Is the risk above an acceptable level? What actions might take to reduce or eliminate risks? What is the appropriate balance among benefits, risks and resources? Are new risks introduced as a result of the identified risks being controlled?

Risk reduction focuses on processes for mitigation or avoidance of quality risk when it exceeds a specified level. Risk reduction might include actions taken to mitigate the severity and probability of harm. The implementation of risk reduction measures can introduce new risks into the system or increase the significance of other existing risks. Hence, it might be appropriate to revisit the risk assessment to identify and evaluate any possible change in risk after implementing a risk reduction process. Consider measures/actions that could:

1. Decrease the severity Stop failure before significant consequences, reject, and recall.
2. Decrease the probability Inspect defect out of batch

3. Increase the detection Move from manual to machine inspection
4. Reapply the tool taking the mitigating measures into consideration

5. Determine if the mitigations/actions have introduced new risks **Risk acceptance** is a decision to accept risk. For some types of harms, even the best quality risk management practices might not entirely eliminate risk. In these circumstances, it might be agreed that an appropriate quality risk management strategy has been applied and that quality risk is reduced to a specified (acceptable) level. This (specified) acceptable level will depend on many parameters and should be decided on a case-by-case basis. **Risk Review** is the output/results of the risk management process should be reviewed to take into account new knowledge and experience. Once a quality risk management process has been initiated, that process should continue to be utilized for events that might impact the original quality risk management decision. Risk review might include reconsideration of risk acceptance decisions **Risk Communication** is the sharing of information about risk and risk management between the decision makers and others. The output/result of the quality risk management process should be appropriately communicated and documented. The included information might relate to the existence, nature, form, probability, severity, acceptability, control, treatment, detectability or other aspects of risks to quality. The approach described can be used to thoroughly analyze products and processes to ensure the best scientific rationale is in place to improve the probability of success. Identify important knowledge gaps coupled with processes that need to be understood to properly identify risks. Provide a communication process that will best interface with all relevant parties involved in the Risk Management Plan. Make possible to transfer process knowledge and product development history to ease product progression and to supplement generic corporate knowledge. Enable the pharmaceutical industry to adopt a risk-based approach to development as described in external regulatory guidance.

The Risk Management outputs will potentially very as reference documents to support product development and control strategy discussions in regulatory filings.

Self-check 2	

True / False

1. Risk Review is the output/results of the risk management process should be reviewed to take into account new knowledge and experience

2. Risk evaluation compares the identified and analyzed risk against given risk criteria.

3. QRM should be dynamic, iterative and responsive to change.

Answer sheet Self-check 2

1……

2……

3……

Information Sheet 3	The role of the nurse in drug administration

3.1. The role of the nurse in drug administration

Patient's Rights

Because of the risks involved in drug administration patients have the right to:

- be informed of the name, purpose, action & potential side effects of drugs
- refuse a medication regardless of the consequences receive labelled medications safely in accordance with the six (6) rights
- be adequately informed of the experimental nature of any drug and sign a written consent.
- not receive unnecessary medications

The nurse is also responsible for ensuring that they have the knowledge to ensure the correct administration of drugs. This includes

- pharmacology
- anatomy and physiology,
- legal issues.

Monitoring Allergic reaction

- Allergic reaction is exaggerated immune response to any substance including drugs….
- Histamines and leukotrienes are Chemicals released by the immune system.
- Extreme allergic reaction involves multiple organs.
- Which can rapidly result in death.

Nursing responsibility:-Check if your patient has any known drug allergies has had any previous adverse drug reaction. Another responsibility of the nurse is

- ✓ Monitoring the effect of the drugs that are administered to a client
- ✓ Whether the drug had the required effect or no effect or if any adverse reactions occurred.

Self-check 3	

True / False

1. Allergic reaction is exaggerated immune response to any substance including drugs

2. Monitoring the effect of the drugs that are administered to a client nursing responsibility

Answer sheet

1……

2……

Information sheet -4	Medications of dependence

4.1. **Medications of dependence**

Drugs of dependence are **prescription** medicines with a recognized therapeutic use but also a higher potential for misuse, abuse and dependence. Many of these are Schedule 8 medicines. These medicines have important therapeutic uses such as: treatment of severe pain. Stimulant medicines, such as methylphenidate and dexamphetamine, are used to treat attention deficit hyperactivity disorder (ADHD) and narcolepsy (repeatedly falling asleep during waking hours). These medicines are unlikely to cause dependence or addiction when used as prescribed.

What is drug dependence?

Drug dependence occurs when you need one or more drugs to function. The American Psychiatric Association (APA) used to distinguish between dependence and abuse. Abuse was considered the mild or early phase of inappropriate drug use that led to dependence. People viewed dependence as a more severe problem than abuse. The APA replaced “dependence” and “abuse” with “substance use disorder” in the 2013 edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5). This diagnosis focuses on the disorder involving the use of the substance.

Drug dependence vs. drug addiction: - People sometimes use the terms “addiction” and “dependence” interchangeably. Dependence is not the same as addiction.

Addiction: - Addiction can occur without being dependent on drugs.

Addiction may involve:

- using drugs despite the consequences
- being unable to stop using drugs
- neglecting social and work obligations because of drug use

Dependence

It's possible to be dependent on drugs without being addicted. Dependence can be a bodily response to a substance. This often occurs if you rely on medications to control a chronic medical condition. These conditions may include:

- high blood pressure
- diabetes
- glaucoma

Dependence may involve:

- some or all the symptoms of addiction
- development of a high tolerance for the substance as your body adapts to the drug, leading to a desire for larger or more frequent doses
- physical symptoms of withdrawal when you attempt to stop using the drug

How drug abuse can lead to dependence

The National Institute on Drug Abuse estimates 22.7 million Americans need help treating a drug or alcohol problem. In some cases, people may take a prescription medication for pain or another medical condition. This kind of use can sometimes develop into a substance use disorder. The following are known triggers for substance use disorders:

- having a family history of addiction
- living in an environment where illegal drugs are often used and easy to access
- having a history of anxiety
- having a history of depression
- having a history of other mental health conditions

Drug users typically pass through certain stages on the way to drug dependence. One way that healthcare providers describe these stages is with the Jellinek Curve. The curve tracks typical stages experienced through occasional use, dependence, disorder, and rehabilitation.

These stages include:

1. You use drugs for recreation. You take them infrequently and in social settings.
2. You start using drugs on a regular basis, often abandoning family and friends in favor of drug use. You become concerned about losing access to drugs.
3. You become addicted to drugs as you become more tolerant to their effects and preoccupied with getting them. You may abandon most or all your previous interests and relationships.
4. You become dependent on drugs and unable to live without them. Your physical and mental health deteriorates.

Recognizing the symptoms of drug dependence

You can often determine if an addiction has turned into dependence by looking at behavior. When a person addicted to drugs hasn't had them for a period of time, this can cause a physical reaction. Physical symptoms of withdrawal occur when the body becomes stressed without the drug.

These symptoms include:

- anxiety
- depression
- muscle weakness
- nightmares
- body aches
- sweating
- nausea
- vomiting

What drugs are most likely to cause dependency?

Treating drug dependence

When drug abuse escalates to dependence, treatment becomes complicated. You must stop using the drug, but doing so abruptly can cause physical symptoms. You may need the help of a healthcare provider to rid your body of the substance. This can be done on an inpatient or outpatient basis. Substances that mimic the effects of illegal drugs may help reduce the symptoms of withdrawal during treatment. Detox programs use a combination of therapy and medical treatment to ease dependence and treat the disorder. Ongoing therapy sessions may be needed after you're released from a treatment program. Extreme cases of intoxication, withdrawal, or overdose may need emergency care before addiction and dependence can be treated.

L G #20	LO #-4 Monitor and evaluate client response to administered medication

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the Following content coverage and topics:

- Recording of administered medications
- Providing information to clients and care giver
- Evaluating client understanding of information
- Recognize and acting upon acute and delayed adverse reactions
- Emergency actions to address acute and delayed adverse reactions
- Recording and reporting response to emergency strategies
- Recording and reporting effectiveness of pain relieving medication

This guide will also assist you to attain the learning outcomes stated in the cover page.

Specifically, upon completion of this learning guide, you will be able to:

Learning Instructions. Read the specific objectives of this Learning Guide.

1, Follow the instructions.

2, Read the information written in the “Information Sheets pages. Try to understand what are beir

3, Ask you teacher for assistance if you have hard time understanding them.

4, Accomplish the “Self-check at the end of information sheet page,

5, Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering each Self-checks).

6, If you earned a satisfactory evaluation proceed to other “Information Sheets”.

However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activities. Submit your accomplished Self-check.

Information Sheet-1	Recording of administered medications

4.1. **Recording of administered medications**

Whenever medications are administered, the person administering the medications must accurately document or chart that they were given.

The Medication Administration Record (MAR) and progress notes are the forms most frequently used for documentation. Let us look at the agency's MAR. We have talked how the "Seven Rights" are used with the MAR. There are other parts to the MAR and methods of completing it. It is the initial record of medication administration and, therefore, of major importance to safe administration. Who puts the MAR together? Most often a pharmacy is contracted by a provider to furnish medications. As part of that responsibility the pharmacy will print the MAR for the agency. There are other methods to author the MAR, but they are relatively unusual and not specifically important. Whenever a physician, dentist, physician's assistant, advanced practice professional nurse, etc. writes a prescription for a medication or treatment or verbally instructs a nurse to write it, it must be written on the MAR or for a treatment, on a Treatment Administration Record or TAR. This is called "transcribing". Only a nurse can transcribe orders. It cannot be delegated to unlicensed persons.

The timing of medication administration is very important. For instance, a medication, such as insulin, must be given before breakfast so it has a chance to work on the food consumed at breakfast so it has a chance to work on the food consumed at breakfast and during the day. Antibiotics must be concentrated in the blood above a certain level to be effective. Too low a blood level concentration may even help the disease resist the antibiotic. Therefore, antibiotics are given at regular intervals such as 6:00 am, noon, 6:00 pm and midnight. Unless times are specified on the physician's orders, the agency can develop its own medication schedules within limits of medication pharmacology. It is the professional nurse's responsibility to properly set these times.

It describes the writing of information in the individual's personal record. This can be in progress notes, MARs, TARs, or any other Health/Nursing/Medical document. It is called "charting" because the Medical Record is often called the "Chart".

The following are rules for charting on the MAR/TAR:

- The medication column should be completed by a Clinical nurse, midwifery or other health care provider if not already done by the pharmacy. (Make sure you are familiar with the medications listed, doses ordered, and abbreviations used.)

- For each medication you administer, your initials must appear in the small box in the column indicating the date you administered the medication and in the row that indicates the medication given at the scheduled time.

- Your initials followed by your full signature must be on each MAR sheet. This is typically at the bottom of the MAR where medications are listed or on the back of the sheet.

Your title must be written or abbreviated and follow your signature. Make your signature legible!

- Ditto marks cannot be used.

Immediately record after administering the medication on the MAR. This means a few seconds to a few minutes. This is the most effective and only acceptable means of assuring the right medication, right person, right time, and right route. Medications cannot be removed from the original pharmacy packaging into medication cups or envelopes for later administration. The chance of medication error increases if a MAR is not used. Mistakes can more easily be detected, tracked and addressed if an MAR is used. Remember that the person suffering from a medication error is the individual receiving **or** not receiving it.

- If a medication cannot be administered as ordered due to a contradiction, write your initials in the appropriate box, circle the initials, and note the reason for withholding the medication in the progress notes on the back of the MAR if that is the policy of your agency. Notify the Nurse-Trainer immediately for instruction.

Notify the health care provider or designee immediately regarding your actions and reasons for withholding the medication. (If these instructions contradict those written in the agency policy, consult with the Nurse-Trainer to resolve the conflict.)

• If the individual refuses the medication, after three attempts within the designated time frame according to provider policy, write your initial in the appropriate box, circle the initials, and note the reason for this refusal in the progress notes on the back of the MAR. Notify the Nurse-Trainer immediately for instruction. Notify the health care provider or designee immediately regarding your actions. (If these instructions contradict those written in the agency policy, consult with the Nurse-Trainer to resolve the conflict.) Charting is considered incomplete and incorrect unless it contains your initials, verified with full signature and title on the MAR, or full signature and title in the progress notes.

Self-cheek-1	

True or False

1. The timing of medication administration is very important

2. The Medication Administration Record (MAR) and progress notes are the forms most frequently used for documentation.

3. Charting is considered complete and correct unless it contains your initials, verified with full signature and title on the MAR

Answer Sheet for Self-cheek

1…….. 3……

2……..

Information Sheet-2	providing information to clients and care giver

4.2. **Providing information to clients and care giver**

It's easy for patients to make significant mistakes with their medications. Furthermore, data shows that the rate of serious mistakes is on the rise, with many errors leading to a hospital stay. While mistakes are inevitable, clinicians can help reduce their likelihood. That's where the importance of medication education for patients comes in. To help patients avoid making medication errors and understand what to do if they have questions or concerns about their medications, clinicians should focus on the following eight areas of medication education.

1. Purpose: - When prescribing a new medication, make sure the patient understands what the drug is intended to treat. Reviewing this will help patients take their medication appropriately. This is particularly important for medications intended to treat the onset of symptoms, such as headache, nausea, or diarrhoea.

2. Effects and Side Effects: - Discuss with patients the intended effects and possible or expected side effects of the medication. This will help patients determine whether a medication is working appropriately. It will also help patients identify undesired side effects that may require intervention.

3. Name and Qualities:- Rather than just write a prescription, say the name of the medication you are prescribing to the patient and ask the patient to repeat it. Also, discuss the qualities of the medication: type (e.g., tablet, liquid), colour, size, texture, and shape. If possible, show the patient a visual of the medication. Going through these few extra steps can help patients identify if their pharmacy makes a mistake in filling the prescription. Patients should also be encouraged to check refills for errors. If anything about a filled prescription appears different than what you reviewed, patients should be encouraged to speak with their pharmacist.

4. Instructions: - When patients fail to properly follow a prescription's instructions, they risk experiencing the effects of under- or over-dosing. Review new prescription instructions with patients before they complete their visit, then encourage patients to always review instructions before taking medications. Remind patients of the importance of taking the exact dose prescribed and using any measuring device that comes with liquid medications. Tell patients that if they lose this device that they should get a replacement rather than attempt to measure the amount prescribed any other way that could lead to an incorrect dosage.

5. Warnings:-Make sure patients understand what they should not do when taking a medication. This may include drinking alcohol and driving. When reviewing a medication's warnings, explain why they are necessary. Rather than just say, "Do not drink and drive when taking this medication," you might say, "Do not drink and drive when taking this medication as the medication can blur your vision and make your drowsy." Some people are naturally inclined to ignore general warnings; by providing more details about why a warning is appropriate, the seriousness may hit home more effectively6. Responding to

6. Side Effects: - Any medication can cause side effects. As noted earlier, patients should understand what side effects are commonly associated with their medication. They should also know what to do and not do if they experience any side effects, including stopping a medication or taking other medications. Let patients know what to do if they experience a side effect and are unsure about how to respond, including how to reach you or another clinician who can provide guidance, or going to the emergency room.

7. Importance of Asking Questions: - Healthcare can be an overwhelming topic for patients. It can feel even more overwhelming when a clinician is prescribing medications with names patients have never heard of and possibly for significant health reasons. On top of this, some patients may be intimidated by clinicians. These and other factors can cause patients to clam up and choose not to ask questions about their condition and medications. Emphasize the importance of patients speaking up, asking questions, and expressing concerns. Work to create an environment that makes patients more willing to open up. Be sensitive to the possibility that a patient may feel more comfortable speaking with a clinician who shares certain qualities with them, such as gender, religion, race, and age.

8. Value of Transparency:-It's important for clinicians to know all they can about a patient's health history, which includes medications and dietary supplements the patient is on and, in some cases, has previously taken. Patients may not fully appreciate or understand how this information can influence the treatment decisions made by clinicians, including new prescriptions or changes to a medication regimen. Explain the role patients play in and the importance of a complete, accurate medication record. If you have any doubts about a patient's willingness to share all details, outline the potential risks of an incomplete record. Tell patients to reach out immediately if they realize following a visit that they omitted a medication.

Self-cheek	

Multiple choice

1. When prescribing a new medication, make sure the patient understands what the drug is intended to treat.

A. Purpose C. Responding to Side Effects

B. Effects and Side Effects D. Warnings

2. Review new prescription instructions with patients before they complete their visit, then encourage patients to always review instructions before taking medications.

A. Purpose C. Responding to Side Effects

B. Effects and Side Effects D. Instructions

Answer Sheet for Self-cheek

1……..

2……..

Information Sheet-3	**Recognize and acting upon acute and delayed adverse reactions**

4.3.1. **Recognize and acting upon acute and delayed adverse reactions**

Adverse drug reactions include all unintended pharmacologic effects of a drug except therapeutic failures, intentional over dosage, abuse of the drug, or errors in administration. They can be classified as predictable or unpredictable.

Unpredictable reactions are further subdivided into drug intolerance, drug idiosyncrasy, drug allergy, and pseudo allergic reactions. Adverse drug reactions (ADRs) result in major health problems in the United States in both the inpatient and outpatient settings. ADRs are broadly categorized into predictable (type A) and unpredictable (type B) reactions.

Predictable reactions are usually dose dependent, are related to the known pharmacologic actions of the drug, and occur in otherwise healthy individuals. They are estimated to comprise approximately 80% of all ADRs. Unpredictable reactions are generally dose independent, are unrelated to the pharmacologic actions of the drug, and occur only in susceptible individuals. Unpredictable reactions are subdivided into drug intolerance, drug idiosyncrasy, drug allergy, and pseudo allergic reactions. Both type A and type B reactions may be influenced by genetic predisposition of the patient.

In this parameter, drug allergy is defined as an immuno-logically mediated response to a pharmaceutical and/or formulation (excipient) agent in a sensitized person. The classification of drug allergies is impeded by our limited understanding of the underlying mechanisms. Although the Gel-Coombs classification served a useful purpose in its time, it does not account for many common clinical problems. Nevertheless, when applicable we will still refer to recent modifications of that system. Our knowledge of IgE- mediated drug allergy is derived chiefly from the vast amount of research involving penicillin allergy. Beyond this, our knowledge of drug allergy mechanisms is limited but emerging.

Adverse drug reactions encompass a wide range of clinical symptoms and signs that may be confused with a preexistent disease, a proximate unexpected clinical event (eg, drug-induced liver disease vs viral hepatitis), or a disorder that would not have occurred if the drug had not been used (e.g. aseptic necrosis after Glucocorticosteroids). As defined by the World Health Organization, such reactions do not include therapeutic failures, intentional overdose, abuse of the drug, or errors in administration. Adverse drug reactions occur more frequently in seriously ill patients requiring multiple drugs, human immunodeficiency virus–positive patients, or patients with underlying hepatic or renal impairment.

Occasionally, the occurrence of an unexpected event during drug administration may be mistakenly attributed to extension of the underlying disease rather than to the drug itself. In certain instances, there may be an excessive reaction to the primary effect of the drug (e.g., diarrhea after a laxative). In making a determination about whether the patient is experiencing an adverse drug reaction, the physician must appreciate the wide scope of such reactions with special emphasis on early recognition, pathophysiologic mechanisms, and severity. Predictable adverse drug reactions (type A) are usually dose dependent and related to the known pharmacologic effects of the drug; examples include pharmacologic adverse effects and drug-drug interactions. Unpredictable reactions (type B) are elicited by relatively small doses and are usually unrelated to the pharmacologic actions of the drug. In assessing the possibility of an adverse drug reaction, knowledge about the dose, duration of use, temporal relation-ship of drug administration, and predilection of individual drugs to cause tissue or organ-specific adverse effects is important. In addition, the pharmacologic properties of drugs may provide useful clues about the type of adverse effects that is most likely to occur. Attention to these factors usually can distinguish pseudo allergic reactions, which occur as a result of mediator release from mast cells or basophils, from specific drug allergic reactions

Most adverse drug reactions are predictable type A reaction. Examples of this type of reaction include acetaminophen-induced hepatic toxicity, sedation from antihistamines, and interference of theophylline metabolism by erythromycin. Clinical presentations of idiosyncratic and intolerance reactions are often characteristic for certain drugs. Aspirin-induced tinnitus at therapeutic or sub therapeutic doses is an example of drug intolerance.

Hemolytic anemia induced by dispone in patients with glucose-6-phosphate dehydrogenase deficiency is an example of drug idiosyncrasy. By contrast, pseudo allergic reactions are of-ten symptomatically identical to Ig E-mediated drug allergy, may occur without a prior history of exposure, and do not require prior sensitization. Pruritus after administration of opiates is an example of a pseudo allergic reaction. Some but not all non-immunologic reactions can be confirmed by a graded challenge, including aspirin challenge in patients with possible aspirin-exacerbated respiratory disease

ANNOTATION 6: Future management and prevention of nonimmune adverse drug reactions. Dose modification may be possible in specific instances of toxicity, adverse effects, or drug interactions. In many cases, use of the drug should be discontinued, and if available, a suitable alternative drug should be used. If the suspect drug is essential, gradually increasing doses of the drug may be administered by various graded challenge regimens in an attempt to minimize adverse effects and to demonstrate tolerance. Cautious use of some agents inducing severe pseudo allergic reactions (e.g., radiocontrast media) may be possible if patients are treated with premedication regimens consisting of corticosteroids and Anti histamines.

Types of Adverse Reactions

Anaphylactic reactions are serious, potentially life-threatening reactions associated with the administration of contrast material. Acute bronchospasm, profound hypotension, and severe urticarial may occur within minutes of administration of as little as 1 mL of contrast material. These reactions are not “true” allergic reactions, because they can occur in patients who have not been exposed to contrast material previously. IgE antibodies, which are associated with allergic reactions, have not been demonstrated in most patients with anaphylactic reactions. The aetiology of these anaphylactic reactions is unclear.

Dose dependent

Dose-dependent, systemic adverse reactions to contrast material include nausea and vomiting, a metallic taste in the mouth, and generalized warmth or flushing. These reactions are usually nonlife-threatening, self-limited problems.

Renal failure is another form of adverse reaction that is dependent on the dose of contrast material used. Intravenous administration of contrast material is responsible for 12 percent of cases of hospital-acquired renal failure.[3] Renal failure following administration of contrast material occurs in 0.1 to 13 percent of patients who receive contrast material. This range results from the lack of a set definition for contrast-induced nephrotoxicity. A generally accepted definition is the elevation of serum creatinine to greater than 25 percent of baseline within three days of receiving contrast material. Proteinuria is often found on routine urinalysis but is not required for the diagnosis of contrast-induced nephropathy.

Patients with pre-existing renal insufficiency and diabetes are at greatest risk of developing permanent renal failure following administration of contrast material. Patients with multiple myeloma are also at increased risk of developing renal failure, especially if they are dehydrated. The risk of renal failure in patients with myeloma is caused by an interaction of light chains and contrast material. How contrast materials cause renal failure is unclear, but direct cellular toxicity and intra renal vasoconstriction are believed to be the primary causes of renal function changes.

Delayed reactions

Adverse reactions that occur 30 minutes or more after the administration of contrast material are considered delayed reactions. Delayed reactions are more common with the use of ionic agents. Up to 30 percent of patients receiving ionic contrast materials develop delayed reactions. Administration of non-ionic agents is associated with delayed reactions in only 10 percent of patients. The symptoms of delayed reactions resemble a flu-like syndrome and include fever, chills, nausea, vomiting, abdominal pain, fatigue, and congestion.

Extravasation of contrast material

Tissue damage from extravasation of contrast material is caused by the direct toxic effect of the agent. Compartment syndrome may occur if enough contrast material leaks into surrounding tissue.

Patients at Risk

A patient who has renal insufficiency before the administration of contrast material is five to 10 times more likely to develop contrast-induced renal failure than patients in the general population. Patients with a history of anaphylactic reaction to contrast material are more likely to have a similar reaction if they are again exposed to contrast material, but even these patients may not experience repeat reactions on re exposure. Patients with a history of asthma have double the risk of developing adverse reactions compared to the general population, even if the patient's asthma is under control. Patients with multiple food or medication allergies and those with multiple medical problems (e.g., cardiac disease, pre-existing azotaemia) are more likely to develop complications when exposed to contrast agents.

No substantive data support the myth that patients with seafood allergy are at higher risk of developing allergic reactions to contrast media. Patients treated with nephrotoxic medications (e.g., aminoglycosides and non-steroidal anti-inflammatory agents) are at greater risk of developing renal failure. Advanced age is also considered a risk factor for developing renal insufficiency.

Metformin (Glucophage), an oral agent used in the treatment of diabetes, has been associated with the development of severe lactic acidosis following administration of intravenous contrast media. Many experts recommend stopping metformin therapy at the time of the procedure, or before, and for at least 48 hours following the administration of contrast material. The medication should be resumed only after the patient's renal function has returned to baseline (as determined by the serum creatinine level). Contrast material should not be administered to pregnant women. Alternative forms of visualization are recommended for these patients.

Self-cheek	

True or False

1. The symptoms of delayed reactions resemble a flu-like syndrome and include fever, chills, nausea, vomiting, abdominal pain, fatigue, and congestion.

2. Anaphylactic reactions are serious, potentially life-threatening reactions associated with the administration of contrast material.

3. Most adverse drug reactions are predictable type A reaction.

4. Adverse drug reactions include all unintended pharmacologic effects of a drug except therapeutic failures, intentional over dosage, abuse of the drug, or errors in administration.

Answer Sheet for Self-cheek

1……..

2……..

3……

4……..

Information Sheet-4	Recording and reporting effectiveness of pain relieving medication

4.4.1. Recording and reporting effectiveness of pain relieving medication

The experience of pain has been recognized as a national public health problem with profound physical, emotional, and societal costs.

Pain management stakeholders have been working to improve care for those suffering from acute and chronic pain in an era challenged by the opioid crisis. An unprecedented rise in

In pain management, a critical part of providing comprehensive care is a thorough initial evaluation, including assessment of both the medical and the probable biopsychosocial factors causing or contributing to a pain condition.

A second critical step is to develop a treatment plan to address the causes of pain and to manage pain that persists despite treatment. Quality pain diagnosis and management can alter opioid prescribing both by offering alternatives to opioids and by clearly stating when they may be appropriate. Several recent clinical practice guidelines (CPGs) for best practices for chronic pain management agree on specific recommendations for mitigating opioid-related risk through risk assessment, including screening for risks (e.g., depression, active or prior history of SUDs, family history of SUD, childhood trauma) prior to initiating opioids; medication dosing thresholds; consideration of drug-drug interactions, with specific medications and drug-disease interactions; risk assessment and mitigation (e.g., patient-provider treatment agreements); drug screening/testing; prescription drug monitoring programs; and access to non-pharmacologic treatments.

Clinical practice guidelines for best practices that only promote and prioritize minimizing opioid administration run the risk of undertreating pain, especially when the cause of the pain is uncertain or cannot be reduced through non-opioid approaches

To continue improving quality of pain care in the current environment of opioid-related risks, experts have noted several key challenges associated with clinical best practices (CBPs).

First, there is the need to increase the use of CPGs, as indicated in specific patient groups delineated by their underlying diagnosis or cause of pain (e.g., arthritis, postoperative, neuropathic), comorbidities, psychosocial characteristics (e.g., social support, stress), demographics, and settings (e.g., hospital, perioperative, primary care, emergency department [ED]).

Second, access to effective pain management treatments must be improved through adoption of clinical best practices in medical and dental practice and clinical health systems.

Third, clinical best practices for pain management should be better incorporated into the routine training of clinicians, with special attention to residency training to meet the needs of patients treated in each specialty.

Finally, quality care must be adequately reimbursed the number of deaths from overdose in the past two decades is associated with prescription opioids, heroin, and synthetic opioids.

The practice of pain management and the opioid crisis have influenced one another as each has evolved in response to different influences and pressures. It is imperative to ensure that patients with painful conditions can work with their health care providers to develop integrative pain treatment plans that balance a focus on optimizing function, quality of life (QOL), and productivity while minimizing risks for opioid misuse and harm. Effective pain management, particularly for chronic pain, is best achieved through a patient-centered, multidisciplinary approach that may include pharmacotherapy

In general, two broad categories of medications are used for pain management:

Non-opioids and opioid classes of medications. In response to the public health crisis resulting from the current opioid epidemic, there is a surge of interest in non-opioid pharmacotherapies for chronic pain. Non-opioid medications that are commonly used include acetaminophen, nonsteroidal anti-inflammatory drugs (NSAIDs), antidepressants (e.g., serotonin-norepinephrine reuptake inhibitors [SNRIs], tricyclic antidepressants [TCAs]), anticonvulsants, musculoskeletal agents, biologics, topical analgesics and anxiolytics.

Non-opioid medications can mitigate and minimize opioid exposure. Each medication has its own risks and benefits as well as mechanism of action. Different medications can complement one another, and their effects can be synergistic when used in combination. A risk-benefit analysis is always recommended based on the individual patient's medical, clinical, and biopsychosocial circumstances

As a general rule, caution should be taken, particularly for over-the-counter medicine, to ensure that patients are aware of the individual side effects and risks of these medications. Over-the-counter analgesic medications can be present in or components of common cold and cough medicine; clinicians must ensure that patients are aware of and discuss all their medications with their doctor or pharmacist.

Acetaminophen can be effective for mild to moderate pain. Risks of acetaminophen include dose-dependent liver toxicity, especially when the drug is taken at high doses, with alcohol, or by those with liver disease. This risk further illustrates why patients should be aware of the presence of acetaminophen in both over-the-counter and prescribed combination medications.

NSAIDs such as aspirin, ibuprofen, and naproxen can provide significant pain relief for inflammation, such as from arthritis, bone fractures or tumors, muscle pains, headache, and acute pain caused by injury or surgery.

Nonselective NSAIDs (those that inhibit the activity of both the cyclooxygenase [COX]-1 and COX-2 enzymes) can be associated with gastritis, gastric ulcers, and gastrointestinal (GI) bleeding. Conversely, COX-2 inhibitors have fewer GI adverse effects. The use of NSAIDs may be associated with renal insufficiency, hypertension, and cardiac-related events. Anticonvulsants are medications originally developed to treat seizures, but they are also commonly used to treat different pain syndromes, including post therapeutic neuralgia, peripheral neuropathy, and migraine. They are often used as part of a multimodal approach to the treatment of perioperative pain.

Some of these agents can effectively treat the neuropathic components of pain syndromes. Anticonvulsants, which include gabapentinoids such as gabapentin and pregabalin, may cause significant sedation and have recently been associated with a possible risk of misuse. Antidepressants are commonly used in various chronic pain conditions. TCAs are effective in a variety of chronic pain conditions, including neuropathic pain. As with other medications, they have risks and adverse effects, including dry mouth, dizziness, sedation, memory impairment, orthostatic hypotension, urinary retention, and cardiac conduction abnormalities. Trials with different TCAs (e.g., desipramine, nortriptyline, and amitriptyline) should be initiated at a low dose and gradually titrated to optimal effect.

SNRIs, such as venlafaxine and duloxetine, are effective for a variety of chronic pain conditions, including musculoskeletal pain, fibromyalgia, and neuropathic pain conditions, but have markedly fewer adverse effects (e.g., lower risk of drowsiness, memory impairment, and cardiac conduction abnormalities) than TCAs. There have been some reports of withdrawal reactions when these medications are suddenly stopped. Although selective serotonin reuptake inhibitors (SSRIs), such as fluoxetine, sertraline, citalopram, and paroxetine, are effective antidepressants; they have less analgesic effect compared with other antidepressant classes. Overall, the analgesic actions of antidepressants occur even in patients who are not clinically depressed, and their analgesic effect typically occurs sooner and at lower doses than those required for the treatment of depression.

Musculoskeletal agents commonly used for pain treatment include baclofen, tizanidine, and cyclobenzaprine. Carisoprodol is metabolized to meprobamate, which is both sedating and possibly addictive, so the use of carisoprodol is not recommended, particularly because alternatives are available. Antianxiety medications are often prescribed to treat the anxiety that accompanies acute pain as well as anxiety resulting from fluctuations in chronic pain. They may also be prescribed for co-morbid anxiety disorders such as generalized anxiety disorder, panic disorder, post-traumatic stress disorder (PTSD), and agoraphobia, which as a group have a prevalence estimated in the range of 30% in patients with chronic pain. SSRIs and SNRIs may also help manage the anxiety associated with co-morbid depression. It is important to recognize and treat anxiety effectively because it can worsen the severity of pain as well as interfere with a patient's coping skills for managing his or her pain. Several classes of medications can be used to treat anxiety. Benzodiazepines do not have independent analgesic effects but may have indirect pain-relieving effects. Thus, they can be helpful when used briefly for the anxiety associated with pain in an acute medical setting (e.g., injury, hospitalization), but benzodiazepines should generally be avoided for regular or long-term use for three reasons.

First, benzodiazepines increase the risk of substance use disorder.

Second, co-prescription of benzodiazepines and opioids is associated with enhanced risks of overdose, respiratory depression, and death.

Third, the cognitive effects of benzodiazepines, when used chronically, may interfere with a patient's development of new coping skills needed to manage a chronic pain condition.

For chronic anxiety disorders, usually a combination of medications indicated for that specific condition plus evidence-based psychotherapy, such as cognitive-behavioral therapy (CBT).

SSRIs and SNRIs are the medications most frequently used for the generalized anxiety that often accompanies chronic pain conditions.

Buspirone is another choice. SSRIs, because of their lower side effect profile, are generally the first choice for panic disorder, but TCAs can also be used. Venlafaxine ER and prazosin are used for PTSD. For more severe cases of co-morbid anxiety disorders, psychiatric consultation for medication regimens is advised.

Administration of opioid medication can include short- or long-acting formulations and different delivery modalities, such as oral, buccal, sublingual, spray, intravenous, intramuscular, intrathecal, suppository, transdermal patches, and lozenge formulation.

Opioids bind to opioid receptors in the brain, spinal cord, and other sites, activating analgesic and reward pathways. It is important to point out that opioid medications vary in the ratio of their analgesic potency and their potential for respiratory depression, the major cause of opioid overdose death. For example, synthetic fentanyl and fentanyl analogues (e.g., carfentanil) are particularly potent for respiratory depression.

Common prescription opioid medications that can be considered for management of acute and chronic pain include hydromorphone, hydrocodone, codeine, oxycodone, methadone, and morphine. Although effective for moderate to severe acute pain, the effectiveness of opioids beyond three months requires more evidence). A recent study demonstrated that treatment with opioids alone was not superior to treatment with trials of various combinations of non-opioid medications for improving pain-related function over 12 months; the authors concluded that the results do not support initiation of opioid therapy alone for moderate to severe chronic back pain or hip or knee osteoarthritis pain.

There are challenges to completing long-term studies of any therapy for moderate to severe pain, particularly patient drop-out from intolerable pain. Opioid medications can be associated with significant side effects, including constipation, sedation, nausea, vomiting, irritability, prurituses, and respiratory depression.

Opioids: Additional Considerations The following paragraphs briefly describe additional considerations relevant to medications used for pain management.

Medicines play an important role in treating certain conditions and diseases, but they must be taken with care and stored securely where they cannot be misused by a third party or accidentally ingested by children or pets. Unused portions of these medicines must be disposed of properly to avoid harm. Patients and caregivers can remove expired, unwanted, or unused medicine from their home as soon as they are no longer needed to help reduce the chance that others accidentally or intentionally misuse the unneeded medicine and to help reduce drugs from entering the environment.

Synthetic opioids other than methadone (a category that includes prescribed and illicit fentanyl and fentanyl analogues) are now the leading opioids involved in overdose deaths in the United States. The illicit fentanyl analogues used are not necessarily the same product that is legally prescribed and used during surgeries or in the transdermal and mucosal fentanyl preparations provided for moderate to severe pain.

Self-cheek	

True or False

1. TCAs are effective in a variety of chronic pain conditions, including neuropathic pain.

2. Pain management stakeholders have been working to improve care for those suffering from acute and chronic pain in an era challenged by the opioid crisis

3. Effective pain management, particularly for chronic pain, is best achieved through a patient-centered, multidisciplinary approach that may include pharmacotherapy

4. Musculoskeletal agents commonly used for pain treatment include baclofen, tizanidine, and cyclobenzaprine.

Answer Sheet for Self-cheek

1……..

2……..

3……

4……..

L G #21	LO#5- Monitor peripheral intravenous therapy

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Describing Purpose and function of intravenous therapy
- Identifying IV solutions /Fluids administered to a client
- Checking common fluid and electrolyte imbalances
- Calculating intravenous drip rate
- Recognizing and reporting risks and complications associated with IV therapy.
- Monitoring and documenting IV therapy
- Nursing care for client with fluid & electrolyte imbalance
- Monitoring action of drug in fluid and electrolyte imbalance
- Securing Intravenous cannula according to organization policy and procedure.

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Describe purpose and function of intravenous therapy
- IV solutions /Fluids administered to a client is identified
- Assess fluid and electrolyte imbalance
- calculate Intravenous drip rate
- Identify risk and complications of IV therapy
- Monitor and documenting IV therapy
- Provide care for client with fluid electrolyte imbalance
- Monitor action of drug in fluid and electrolyte imbalance
- Secure IV Cannula according to organization policy and procedure.
- Provided care for client with fluid and/or electrolyte imbalance.

Learning Instructions

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 6.
3. Read the information written in the information “Sheet found in this LO
4. Accomplish the “ all the Self-check
5. If you earned a satisfactory evaluation from the “Self-check” proceed to “

Information Sheet-1	purpose and function of intravenous therapy

5.1. Purpose and function of intravenous therapy

5.1.1. Intravenous therapy :- (abbreviated as **IV therapy**) is a medical technique that delivers a liquid directly into a person's vein. The intravenous route of administration is commonly used for rehydration solutions or to provide nutrition in those who cannot consume food or water by mouth. It may also be used to administer medications or other medical therapy such as blood products or electrolytes to correct electrolyte imbalances. Attempts at providing intravenous therapy have been recorded as early as the 1400s, but the practice did not become widespread until the 1900s after the development of techniques for safe, effective use. The intravenous route is the fastest way to deliver medications and fluid replacement throughout the body as they are introduced directly into the circulatory system and thus quickly distributed throughout the body. For this reason, the intravenous route of administration is also used for the consumption of some recreational drugs. Many therapies are administered as a "bolus" or one-time dose, but they may also be administered as an extended *infusion* or *drip*. The act of administering a therapy intravenously, or placing an intravenous line ("IV line") for later use, is a procedure which should only be performed by a skilled professional. The most basic intravenous access consists of a needle piercing the skin and entering a vein which is connected to a syringe or to external tubing. This is used to administer the desired therapy. Intravenous fluid therapy is essential when clients are unable to take sufficient food, medications and fluids orally. (Berman & Snyder, 2012).

IV lines are classified as "**central lines**" if they end in a large vein close to the heart, or as "**peripheral lines**" if their output is to a small vein in the periphery, such as the arm. An IV line can be threaded through a peripheral vein to end near the heart, which is termed a "peripherally inserted central catheter" or PICC line. If a person is likely to need long-term intravenous therapy, a medical port may be implanted to enable easier repeated access to the vein without having to pierce the vein itself each time.

A catheter can also be inserted into a central vein through the chest, which is known as a tunneled line. The specific type of catheter used and site of insertion are affected by the desired substance to be administered and the health of the veins in the desired site of insertion. Knowledge of different parenteral fluids and their method of action is essential to the safe delivery of infusion therapy. Nurses have a professional and legal responsibility to understand the rationale for the use of specific prescribed fluids and the desired and untoward effects of administration. Safe administration demands an understanding of the role of electrolytes and water and of the mechanisms of movement between different body compartments, as well as knowledge of the actions of the various solutions available.

Self-Check -1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I. Choose the best answer

1. The route of drug administration that gives the most rapid onset of the pharmacological effect is? **(4points)**

A. Intramuscular injection
B. Intravenous injection
C. Intradermal injection
D. Per oral administration
E. Subcutaneous injection

2. Intravenous fluid therapy is essential when clients are unable to take sufficient food, medications and fluids orally. **(2points)**

A. True B. False

Note: **Satisfactory rating – 5-6and points Unsatisfactory - below 4points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

1. _____
2. _____

Score = _____
Rating: _____

Name: _____

Information Sheet-2	IV therapy administered to a client

5.2. IV therapy administered to a client

Patients are prescribed an IV solution (fluids) based on their electrolyte and fluid volume status. IV fluids are commonly categorized as colloids and crystalloids.

5.2.1. **Colloid solutions** contain large molecules that cannot pass through semi-permeable membranes and are used to expand intravascular volume by drawing fluid from extravascular space via high osmotic pressure. Examples of colloid solutions are albumin, dextran, and hydroxyethyl starches (Crawford & Harris, 2011).

5.2.2. **Crystalloid solutions** contain solutes such as electrolytes or dextrose, which are easily mixed and dissolvable in solution. Crystalloids contain small molecules that flow easily across semi-permeable membranes, which allows for transfer from the bloodstream into the cells and tissues (Crawford & Harris, 2011). They may increase fluid volume in interstitial and intravascular space. Examples of crystalloid solutions are isotonic, hypotonic, and hypertonic solutions.

5.2.3. Isotonic solutions have an osmolality of 250 to 375 mOsm/L. Isotonic solutions have the same osmotic pressure as plasma, creating constant pressure inside and outside the cells, which causes the cells to remain the same (they will not shrink or swell) and does not cause any fluid shifts within compartments. Isotonic solutions are useful to increase intravascular volume, and are utilized to treat vomiting, diarrhea, shock, and metabolic acidosis, and for resuscitation purposes and the administration of blood and blood products. Examples of isotonic solutions include normal saline (0.9% sodium chloride), lactated Ringer's solution, 5% dextrose in water (**D5W**), and Ringer's solution. It is important to monitor patients receiving isotonic solutions for fluid volume overload (hypervolemia) (Crawford & Harris, 2011).

5.2.4. Hypotonic solutions have a lower concentration, or tonicity, of solutes and have an osmolality equal to or less than 250 mOsm/L. The infusion of hypotonic solutions lowers the osmolality within the vascular space and causes fluid to shift to the intracellular and interstitial space. Cells will swell but may also delete fluid within the vascular space. Examples of hypotonic solutions include 0.45% sodium chloride, 0.33% sodium chloride, 2.5% dextrose in water, and 0.2% sodium chloride. Monitor for hypovolemia and hypotension related to fluid shifting out of the vascular space, and do not administer to patients with increased intracranial pressure (ICP), as it may exacerbate cerebral edema. Use cautiously in patients with burns, liver failure, and traumas (Crawford & Harris, 2011).

5.2.5. Hypertonic solutions have a higher concentration, or tonicity, of solutes and have an osmolality equal to or greater than 375 mOsm/L. The osmotic pressure gradient draws water out of the intracellular space into the extracellular space. Examples of hypertonic solutions include D5W and 0.45% sodium chloride, D10W, and 3% sodium chloride. Hypertonic solutions may cause intravascular fluid volume overload and pulmonary edema, and they should not be used for an extended period of time. Hypertonic solutions should not be used in patients with heart or renal disease who are dehydrated (Crawford & Harris, 2011). Although all IV fluids must be administered carefully, hypertonic solutions are additionally risky. An order for IV fluids may be continuous or as a bolus, depending on the needs of the patient. IV solutions are available in 25 ml to 1000 ml bags. The frequency, duration, amount, and additives to solution must be ordered by a physician or nurse practitioner; for example, an order may be “give NS at 125 ml/hr. The most common types of solutions include normal saline (NS) and D5W. Patients may also have medications, such as potassium chloride, thiamine, and multivitamins, added to IV solutions. To discontinue an IV infusion, an order must be obtained from the physician or nurse practitioner(1).

Table 1: Intravenous Solutions

Types of Solution	Nursing Implications
Isotonic Solutions 0.9% NaCl (normal saline - NS) Lactated Ringer's 5% dextrose in water (D5W)	Isotonic solutions such as NS and lactated Ringer's initially remain in the vascular compartment, expanding vascular volume. Assess clients carefully for signs of hypervolemia such as ascites, high blood pressure, bounding pulse, jugular vein distension, crackles and shortness of breath. D5W is isotonic on initial administration but provides free water when dextrose is metabolized, expanding intracellular and extracellular fluid volumes. D5W is avoided in clients at risk for increased intracranial pressure (IICP) because it can increase cerebral edema.
Hypotonic Solutions 0.45% NaCl (1/2 NS) 0.33%NaCl (1/3 NS)	Hypotonic solutions are used to provide Na+, Cl-, and free water and treat cellular dehydration. These solutions promote waste elimination by the kidneys. Do not administer to clients at risk for IICP or third space fluid shift.
Hypertonic Solutions 5% dextrose in NS (D5NS) 5% dextrose in 0.45% NaCl (D1/2NS) 5% dextrose in lactated Ringer's (D5LR) 10% dextrose in Water (D10W)	Hypertonic solutions draw fluid out of the intracellular and interstitial compartments into the vascular compartment, expanding vascular volume. Do not administer to clients with kidney or heart disease or clients who are dehydrated. Watch for signs of hypervolemia.

Information Sheet-3	Fluid and electrolyte imbalance
Self-Check -2	**Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I. Choose the best answer (each 1point)

1. A solution which contains small molecules that flow easily across semi-permeable membranes are? **(2points)**

A. Albumin B. Dextran C. Sodium chloride D) None

2. A crystalloid solution which are used to manage dehydration are? **(3Points)**

A. 5% dextrose with water (D5W) B) Sodium chloride (N/S 0.9%)

C. Sodium chloride (0.33%) D. DNS

Note: **Satisfactory rating - 8 and 15 points Unsatisfactory - below 8and 15points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

1. _____

2. _____

Name: _____

Score = _____

Rating: _____

5.3. Fluid and electrolyte imbalance

It is important when nursing patients with fluid and electrolyte imbalance and those receiving infusions, to understand the role of electrolytes in body fluids, the reason why and how their levels are maintained within homeostatic limits, and the problems that can arise as a result of the imbalance. Because the electrolyte content of ECF differs from that of ICF, it is customary to measure the electrolytes in ECF, chiefly plasma. Plasma electrolyte concentrations can be used to assess and manage patients with a diversity of electrolyte imbalances. Although some tests are performed on serum, the terms 'serum' and 'plasma' are used interchangeably.

5.3.1. Sodium: - Sodium plays a vital role in maintaining the concentration and volume of ECF. It is the main cation (positively charged ion) of ECF and, therefore, the major determinant of the osmotic pressure of ECF. The normal concentration of sodium is 135-145mEq/L. Sodium is also important in maintaining irritability and conduction of nerve and muscle tissue, and assists with the regulation of acid base balance. Average daily intake of sodium far exceeds the body's normal requirement. The kidneys excrete excess sodium and are capable of conserving sodium in times of extreme sodium restriction. Sodium concentration is maintained via regulation of water intake and excretion. If serum sodium falls below 135mEq/L (Hyponatraemia), the kidneys excrete water. Conversely, if serum sodium levels rise above 145mEq/L (hypernatremia), the osmotic pressure of serum increases stimulating the thirst center and causing the release of antidiuretic hormone (ADH) by the posterior pituitary gland. ADH acts on the kidney to conserve water, thus diluting the sodium.

5.3.1.1. Causes of hyponatraemia

Prolonged diuretic use ■ Excessive diaphoresis (sweating) ■ Prolonged vomiting/ diarrhoea ■ Extensive burns ■ Renal disease ■ Over infusion of dextrose 5% ■ Anorexia, fasting, alcoholism ■ Syndrome of inappropriate antidiuretic hormone (ADH) ■ Adrenal impairment ■ Cirrhosis ■ Congestive cardiac failure ■ Drugs, such as intravenous cyclophosphamide, carbamazepine, amitriptyline, ecstasy ■ Addison's disease

Aldosterone released from the adrenal cortex also regulates serum sodium by causing the kidney to conserve sodium and water, thereby increasing ECF volume.

Possible causes of hypernatremia include water deprivation/loss, excessive infusion of saline and diabetes mellitus. Because sodium is the major determinant of the osmotic pressure of ECF, hypernatremia always causes a shift of water out of the cells, which leads to cellular dehydration.

5.3.1.2. Causes of hypernatremia

■ Inadequate water intake ■ Watery diarrhoea ■ severe insensible loss ■ Burns ■ Osmotic diuretic therapy ■ Hyperglycaemia ■ Diabetes insipidus ■ near drowning in salt water ■ Hypertonic IV saline ■ Hyperaldosteronism (Conn's syndrome).

5.3.2. Potassium: - Potassium is the main cation of ICF, which contains more than 98 per cent of the body's total potassium. The 2 per cent found in ECF is kept in a narrow range of 3.5-5.0mEq/L. Because the ratio of ICF to ECF helps determine the resting membrane potential of nerve and muscle cells, an alteration in the plasma potassium level might adversely affect neuromuscular and cardiac function. Excess or deficit in ICF or ECF can, therefore, cause serious, (potentially fatal) impairment of body function.

The body gains potassium from food (primarily meat, fruit and vegetables) and medication. In addition, ECF gains potassium any time there is a breakdown of cells (tissue catabolism) or movement of potassium out of the cells.

However, elevated serum potassium does not occur unless there is a concomitant reduction in renal function (Horne and Swearingen 1991). Potassium is lost from the body through the kidneys, GI tract and skin, but the kidneys are the primary regulators. They do this by adjusting the amount of potassium excreted in the urine. The presence of aldosterone also increases the excretion of potassium. Conditions that increase aldosterone secretion might, therefore, increase urinary excretion of potassium. High serum potassium levels (hyperkaliemia) have an adverse effect on heart muscle and can cause cardiac arrhythmias.

Hyperkaliemia is, therefore, a life-threatening emergency requiring prompt recognition of ECG changes and treatment. If the potassium level rises above 5.5 mEq/L, an infusion of dextrose with insulin might be commenced to assist the movement of potassium back into the cells.

Other signs and symptoms of hyperkaliemia include tingling and numbness in the extremities, a potassium level below 3.5 mEq/L and a slow heart rate. Signs of hypokalemia include malaise, skeletal and smooth muscle atony, muscular cramps and postural hypotension.

5.3.3. Other electrolytes: - **Calcium** is one of the body's most abundant ions. It combines with phosphorus to form the mineral salts of the bones and teeth. Calcium exerts a sedative effect on nerve cells and has important intracellular functions, including development of the cardiac action potential and contraction of muscles. Less than 1 per cent of the body's calcium is found in ECF. **Magnesium** has an important role in enzyme activity, contributing to the metabolism of carbohydrates and proteins. Serum levels should be 1.3- 2.1mEq/L.

A magnesium imbalance is common in critically ill patients, although deficits can occur in less ill patients, such as those experiencing withdrawal from alcohol and those receiving parenteral or enteral nutrition after a period of starvation. Magnesium is excreted by the kidneys, therefore, diminished renal function results in abnormal renal magnesium retention.

Chloride is the chief anion (negatively charged ion) of ECF, with a plasma concentration of 97- 110mEq/L. Chloride deficiency leads to a deficiency of potassium and vice versa. There is also a loss of chloride with a loss of sodium.

Phosphate is the chief anion of ICF, with a normal plasma level of 1.7-2.3mEq/L(2).

Self-Check -3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I. Choose the best answer (each 1point)

Part II .fill the blank space

1. List down the most common butter packing containers and storage system! (5%)

_____,_____

_____,_____

_____,_____

Note: **Satisfactory rating - 8 and 15 points Unsatisfactory - below 8and 15points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

1. _____

2. _____

Name: _____

Score = _____
Rating: _____

Information Sheet-4	Calculating intravenous drip rate

5.4. Calculating intravenous drip rate

Although all IV fluids must be administered carefully, hypertonic solutions are additionally risky. An order for IV fluids may be continuous or as a bolus, depending on the needs of the patient. IV solutions are available in 25 ml to 1000 ml bags. The frequency, duration, amount, and additives to solution must be ordered by a physician or nurse practitioner; for example, an order may be “give NS at 125 ml/hr. ”The most common types of solutions include normal saline (NS) and D5W. Patients may also have medications, such as potassium chloride, thiamine, and multivitamins, added to IV solutions. To discontinue an IV infusion, an order must be obtained from the physician or nurse practitioner (Perry et al., 2014).

5.4.1. IV Administration Equipment

When a peripheral vein has a cannula inserted, an extension tubing is connected to the hub on the cannula and flushed with normal saline to maintain patency of the cannula. Most peripheral intravenous cannulas will have extension tubing, a short, 20 cm tube with a positive fluid displacement/positive pressure cap attached to the hub of the cannula for ease of access and to decrease manipulation of the catheter hub (Vancouver Coastal Health, 2008). The extension tubing must be changed each time the peripheral catheter is changed. When the peripheral cannula is not in use, the extension tubing attached to the cannula is called a *saline lock*. Intravenous fluids are administered through thin, flexible plastic tubing called an *infusion set* or primary infusion tubing/administration set (Perry et al., 2014). The infusion tubing/administration set connects to the bag of IV solution. Primary IV tubing is either a macro-drip solution administration set that delivers 10, 15, or 20 gtts/ml, or a micro-drip set that delivers 60 drops/ml. Macro-drip sets are used for routine primary infusions.

Micro-drip IV tubing is used mostly in pediatric or neonatal care, when small amounts of fluids are to be administered over a long period of time (Perry et al., 2014). The drop factor can be located on the packaging of the IV tubing. Primary IV tubing is used to infuse continuous or intermittent fluids or medication.

It consists of the following parts:-

- Back check valve: Prevents fluid or medication from travelling up the IV
- Access ports: Used to infuse secondary medications and give IV push medications
- Roller clamp: Used to regulate the speed of, or to stop or start, a gravity infusion
- Secondary IV tubing: Shorter in length than primary tubing, with no access ports or back check valve; when connected to a primary line via an access port, used to infuse intermittent medications or fluids.

A **secondary tubing administration set** is used for secondary IV medication. IV solution bags should have the date, time, and initials of the health care provider marked on them to be valid. Add-on devices (e.g., extension tubing or dead-enders) should be changed every 96 hours, if contaminated when administration set is replaced, or as per agency policy. Intravenous solution and IV tubing should be changed if:

- IV tubing is disconnected or becomes contaminated by touching a non-sterile surface
- Less than 100 ml is left in the IV solution bag
- Cloudiness or precipitate is found in the IV solution
- Equipment (date and time) is outdated
- IV solution is outdated (24 hours since opened)

Primary and secondary administration sets (see Figure 8.4) should be changed regularly to minimize risk and prevent infection (CDC, 2011; Fraser Health Authority, 2014). Change IV tubing according to agency policy. Table 8.5 lists the frequency of IV tubing change. Primary and secondary IV tubing and add-on devices (extension tubing) must be primed with IV solution to remove air from the tubing.

Priming refers to placing IV fluid in IV tubing to remove all air prior to attaching the IV tube to the patient. IV tubing is primed to prevent air from entering the circulatory system. An air embolism is a potential complication of IV therapy and can enter a patient's blood system through cut tubing, unprimed IV tubing, access ports, and drip chambers with too little fluid (Perry et al., 2014). It is unknown how much air will cause death, but deaths have been reported with as little as 10 ml of air.

The best way to avoid air bubbles in IV tubing is to prevent them in the first place (Perry et al., 2014). New IV tubing may also be required if leaking occurs around the tube connecting to the IV solution, if the tubing becomes damaged, or if it becomes contaminated. Calculate desired flow rate (hourly volume) and drop rate of prescribed infusion depending on macro drip or micro drip infusion set, and open rate-controlling clamp to calculated drop rate:

$$\text{Fow rate (mL/hr)} = \frac{\text{Total infusion (mL)}}{\text{Hours of infusion (hr)}}$$

$$\text{Drop rate (gtts/min)} = \frac{\text{gtts factor}}{60} \times \frac{\text{flow rate}}{1}$$

Or Two-Step Method:

a. Amount of fluid / hours to administer = ml/h

b. $\frac{\text{ml / h / gtt / ml (IV set)}}{\text{60 min}} = \text{gtt / min}$

To calculate the drops per minute for an infusion by gravity, follow the steps below

Table 8.6 Calculating the Drops per Minute (gtts/min) for an Infusion by Gravity	
Steps	**Additional Information**
1. Verify the physician order.	An order may read: Example 1. Give NS IV 125 ml/hr. Example 2. Give 1000 ml of NS IV over 8 hours.
2. Determine the drop factor on the IV administration set.	The drop factor is the amount of drops (gtts) per minute. IV tubing is either macro tubing (10, 15, or 20 gtts/min) or micro tubing (60 gtts/min). The drop factor (or calibration of the tubing) is always on the packaging of the IV tubing.

3. Complete the calculation using the formula.	Use the formula: $\frac{\text{volume of fluid (gtts/min)} \times \text{IV drop factor}}{\text{60 (Administration time is always in minutes)}}$ = drops per minute To calculate ml/hr, divide 1000 ÷ 8 = 125 ml/hr. Example: Infuse IV NS at 125 ml/hr. IV tubing drop factor is 20 gtts/min $\frac{125 \times 20}{60}$ = 41.6 gtts/min, round up to 42 gtts/min down or up to the nearest whole number)
4. Regulate IV infusion using the roller clamp.	Observe and count the drips in the drip chamber and regulate for 42 gtts/min (one full minute). Alternatively, divide 42 by 4 (rounded down from 10.4 to 10 gtts/min) to count for 15 seconds. The gtts/min should be assessed regularly to ensure the IV is infusing at the correct rate (e.g., every 1 to 2 hours, if the patient accidentally bumps the IV tubing, or if a patient returns from another department). Regulate IV tubing by using a roller clamp

Self-Check -4	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I. Choose the best answer (each 1point)

1. Order: 2000 ml of 5% dextrose in 0.45% NaCl (one-half normal saline solution) and 1000 ml of D5W to run over 24 hours. The drop factor on the manufacturer's box is 10 gtt/ml. Calculate the amount of fluid the patient should receive?

Part II .fill the blank space

1. List down the most common butter packing containers and storage system! (5%)

_____,_____

_____,_____

Note: **Satisfactory rating - 8 and 15 points Unsatisfactory - below 8and 15points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

Score = _____
Rating: _____

1. _____
2. _____
3. _____
4. _____
5. _____

Name: _____

Information Sheet-5	Recognize and report risks and complications associated with IV therapy

5.5. Complications

When a patient has an intravenous, the nurse caring for that patient needs to assess the patency of the IV and potential complications. Complications may present as being either local or systemic. Local complications may be more frequent and less severe than systemic complications. The following table defines potential complications, and signs, symptoms and nursing considerations for each local complication.

5.5.1. Local complication.

Table 3: Local complications associated with intravenous infusions **Complication/Cause**	**Signs and symptoms**	**Nursing Considerations**
Infiltration: the escape of fluid into the subcutaneous tissue.	Swelling, pallor, coldness, or pain around the infusion site; decrease in flow rate; unable to palpate tip.	Check the infusion site every hour for signs/symptoms. Discontinue the infusion if symptoms occur. Remove catheter
Dislodged catheter Penetrated vessel wall	Restart the infusion at a different site. Elevate affected limb. Use warm or cold compresses depending on the IV fluid (eg. hypertonic solution use cold compress, isotonic/hypotonic use warm or cold compress). Limit the movement of the extremity with the IV.	
Extravasation: the inadvertent administration of a vesicant substance into the tissue surrounding the vein. Dislodged catheter Penetrated vessel wall	Pain, burning, feeling of tightness, tingling, numbness.	***This is considered an emergency.*** Stop the infusion immediately. Remove the dressing and withdraw the peripheral catheter. Use dry gauze to control bleeding. Assess color, sensation, motion, temperature and capillary refill distal to the injury.

		Measure circumference of affected extremity and compare with other extremity. Apply a new dry dressing. Do not apply excessive pressure to the area. Elevate affected arm. Apply heat or cold depending on the drug. Notify primary care provider STAT.
Infection: when insertion site is invaded by bacteria and has the potential to spread.	Redness, pain, warmth, discharge, fever	Discontinue infusion and remove catheter. Swab site for culture and sensitivity. Cleanse infected site using medical asepsis. Apply dry dressing. Use warm compresses if necessary. Restart IV in alternate location away from infection site Change dressing as per agency protocol.
Phlebitis: an inflammation of a vein. Mechanical trauma from needle or catheter Chemical trauma from solution Septic (contamination)	Acute tenderness; redness and pain along vein pathway, warmth, palpable cord vein, and slight edema of the vein above the insertion site.	Discontinue infusion and remove catheter. Apply warm, moist compresses to the affected site Avoid further use of the vein Restart the infusion in another vein
Thrombus: a blood clot on the tip of the catheter inside the vessel that blocks blood flow. Tissue trauma from needle or catheter	Symptoms similar to phlebitis IV fluid may cease if clot obstructs needle	Stop infusion immediately Remove catheter Apply warm compresses Restart the IV at another site Do not rub or massage the affected area
Hematoma: blood leaking into the tissue causes bruising which may occur at any time during treatment. Poor IV insertion technique Injury to vessel	Discoloration, swelling, tenderness.	Remove intravenous catheter. Apply pressure over insertion site. Elevate arm while applying pressure. Apply dry gauze dressing.

When monitoring IV therapy, it is important to be aware of possible systemic complications and know how to assess and respond in the event of occurrence. Table 4 defines systemic complications, outlines specific signs and symptoms to assess for, and presents nursing considerations in the event of a complication.

5.5.2. Systemic complications

Systemic complications of intravenous therapy **Complication/Cause**	**Signs and symptoms**	**Nursing Considerations**
Speed shock: the body's reaction to a substance that is injected into the circulatory system to rapidly	Pounding headache, fainting, rapid pulse rate, apprehension, chills, back pains, dyspnea	If symptoms develop, discontinue the infusion immediately Report symptoms of speed shock to primary care provider immediately Monitor vital signs if symptoms develop Use the proper IV tubing Carefully monitor the rate of flow Check the rate frequently for accuracy. A time tape is useful.
Fluid Overload: the condition caused when too large a volume of fluid infuses into the circulatory system which may lead to excess fluid in the lungs (pulmonary edema).	Engorged neck veins, anxiety, restlessness, increased blood pressure and pulse, cyanosis, dyspnea, cough, crackles, bounding pulse.	If symptoms develop, slow the rate of infusion Place in semi-Fowler's position Administer oxygen Notify the physician immediately Monitor vital signs Carefully monitor the rate of fluid flow Monitor intake and output Check the rate frequently for accuracy
Air embolism: air in the circulatory system Break in the IV system allowing air in the circulatory system as a bolus	Respiratory distress Increased heart rate Chest pain Cyanosis Decreased blood pressure Change in level of consciousness	Pinch off catheter or secure system to prevent entry of air Place client on left side in Trendelenburg position to trap air in right atrium Inform physician Monitor vital signs and pulse oximetry

	Shock	Administer oxygen
Pulmonary Embolism: occurs when a thrombus blocks completely or partially blocks the pulmonary artery Thrombus becomes dislodged from IV catheter	Anxiety, chest pain, cyanosis, diaphoresis, hemoptysis, increased respiratory rate, shortness of breath, tachycardia	Place in semi-fowler's position Administer oxygen Notify physician
Sepsis: microorganisms invade the blood stream through the catheter insertion site Poor aseptic technique Multi-lumen catheters Long-term catheter insertion Frequent dressing changes	Red and tender insertion site Fever, chills, malaise, headache, disorientation, hypotension, tachycardia, shortness of breath, cyanosis, nausea and vomiting	Assess catheter site daily. Notify physician immediately if any signs of sepsis. Follow agency policy for taking a specimen for culture and sensitivity of IV site and catheter tip. Remove IV Obtain blood cultures as ordered Administer antibiotics as ordered. Use scrupulous aseptic technique

Table 7: Good practice to reduce infection in intravenous therapy

• Wash hands, wear a new pair of non-sterile disposable gloves and use an aseptic, non-touch technique for all aspects of IV therapy, including preparation, administration, and site care. • Prepare IV fluids and drugs in designated clean area. Use pre-mixed solutions and avoid additives to fluid bags if possible. Ensure all IV administration sets are labeled with the date and time and change them appropriately: solution sets – change every 72 hours; blood sets – change every 12 hours; lipid containing solutions – change every 24 hours. • Administration sets that are disconnected should be discarded. Add-on devices should be kept to a minimum and changed as recommended by the manufacturer. In general, 3 way taps should be changed every 72 hours, and needleless devices should be changed according to the manufacturer's instructions. All administration ports should be thoroughly decontaminated before and after use. IV dressings should be replaced when loose, wet or soiled. • Venous access devices should be removed when no longer in use.

Self-Check -5	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I. Choose the best answer (each 1point)

Part II .fill the blank space

1. List down the most common butter packing containers and storage system! (5%)

_____,_____

_____,_____

_____,_____

Note: **Satisfactory rating - 8 and 15 points Unsatisfactory - below 8and 15points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

1. _____

2. _____

3. _____

Name: _____

Score = _____
Rating: _____

Information Sheet-6	Monitoring and documenting IV therapy

5.6. Monitoring and documenting IV therapy

IV sites should be monitored at established intervals to insure these devices are working properly. This inspection includes both equipment and site inspection.

5.6.1. When inspecting equipment examine:

- The catheter itself for migration
- All connections are secure
- Fluids being infused
- Pump function and flow rate

5.6.2. When examining the site be sure to examine:

- The insertion site (must remove gauze dressing)
- Patient's report of pain or discomfort at access site
- Signs of IV-related infections or complications
  - ✓ Discoloration (i.e. blanching, erythema)
  - ✓ Disruption of Sensation (i.e. pain, tenderness, numbness)
  - ✓ Edema
  - ✓ Localized Swelling
  - ✓ Exudate
  - ✓ Increase in skin or basal body temperature
  - ✓ Induration (i.e. Sclerosis) with palpable cord

5.6.3. Site Changes: - Short-peripheral catheter sites should be rotated at established intervals (consult your institution's policies and procedures) and immediately upon suspected contamination. The Intravenous Nurses Society (2000) recommends that these catheters should be rotated every 48 hours or every 72 hours if the institution's phlebitis rate is less than 5% for three consecutive months.

It is not recommended to change access sites in pediatrics unless indicated by the assessment of the site. Additionally, if your patient has limited venous access due to the condition of their veins, changing the site may be extended for longer than the recommended dwell time. A physician's order is usually required to extend the dwell time of a short peripheral catheter if necessary.

A peripheral catheter should be removed with an order from the physician when therapy is completed, during routine site rotation, when contamination or IV-related complication is suspected, or when the tip location is no longer appropriate for the prescribed therapy.

5.6.4. Documentation of Venipuncture

- Date and time of venipuncture
- Type and gauge of needle and catheter
- The location of the insertion site – Use the anatomical names of the veins!
- Reason site was changed or initiated
- Number attempts at venipuncture (REMEMBER – Only stick a patient twice before getting another competent, trained professional to try or follow facility policy!)
- The type and flow rate of the IV solution (if any)
- The name and amount of medication in the solution (if any)
- Any adverse reactions and actions taken to correct them
- Patient teaching and evidence of patient understanding
- Your name or initials
- How the patient tolerated the procedure

5.6.5. Documentation of Removal

- Date and time and reason of removal
- Size, type and condition of catheter upon removal
- Location and condition of the site
- Type of dressing applied
- How the patient tolerated the procedure
- Any actions taken for infiltration or phlebitis or extravasation(3).

Self-Check -6	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I. Choose the best answer (each 1point)

Part II .fill the blank space

1. List down the most common butter packing containers and storage system! (5%)

_____,_____

_____,_____

_____,_____

Note: **Satisfactory rating - 8 and 15 points Unsatisfactory - below 8and 15points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

1. _____

2. _____

3. _____

Name: _____

Score = _____
Rating: _____

Information Sheet-7	Nursing care for client with fluid & electrolyte imbalance

7.1. Nursing care for client with fluid & electrolyte imbalance

7.2. Nursing Management

Nurses may use effective teaching and communication skills to help prevent and treat various fluid and electrolyte disturbances.

7.3. Nursing Assessment

Close monitoring should be done for patients with fluid and electrolyte imbalances.

- **I&O.** the nurse should monitor for fluid I&O at least every 8 hours, or even hourly.
- **Daily weight.** Assess the patient's weight daily to measure any gains or losses.
- **Vital signs.** Vital signs should be closely monitored.
- **Physical exam.** Physical exam is needed to reinforce other data about a fluid or electrolyte imbalance.

7.4. Diagnosis

The following diagnoses are found in patients with fluid and electrolyte imbalances.

- **Excess fluid volume** related to excess fluid intake and sodium intake.
- **Deficient fluid volume** related to active fluid loss or failure of regulatory mechanisms.
- **Imbalanced nutrition: less than body requirements** related to inability to ingest food or absorb nutrients.

- **Imbalanced nutrition: more than body requirements** related to excessive intake.
- **Diarrhea** related to adverse effects of medications or malabsorption.

7.5. Nursing Care Planning & Goals

Planning and goals for fluid and electrolyte imbalances include:

- Maintenance of fluid volume at a functional level.
- Display of normal laboratory values.
- Demonstration appropriate changes in lifestyle and behaviors including eating patterns and food quantity/quality.
- Reestablishment and maintenance of normal pattern and GI functioning.

7.6. Nursing Interventions

There are specific nursing interventions for fluid and electrolyte imbalances that can aid in alleviating the patient's condition.

- **Monitor turgor.** Skin and tongue turgor are indicators of the fluid status of the patient.
- **Urine concentration.** Obtain urine sample of the patient to check for urine concentration.
- **Oral and parenteral fluids.** Administer oral or parenteral fluids as indicated to correct the deficit.
- **Oral rehydration solutions.** These solutions provide fluid, glucose, and electrolytes in concentrations that are easily absorbed.
- **Central nervous system changes.** The nurse must be alert for central nervous system changes such as lethargy, seizures, confusion, and muscle twitching.

- **Diet.** The nurse must encourage intake of electrolytes that are deficient or restrict intake if the electrolyte levels are excessive.

7.7. Evaluation

Evaluation of the care plan can check the effectiveness of the treatments. The interventions are deemed effective if the client has:

- Maintained fluid volume at a functional level.
- Displayed normal laboratory results.
- Demonstrated appropriate changes in lifestyle and behaviors including eating patterns and food quantity/quality.
- Reestablished and maintained normal pattern and GI functioning.

7.8. Discharge and Home Care Guidelines

After hospitalization, treatment and maintenance of the condition must continue at home.

- **Diet.** A diet rich in all the nutrients and electrolytes that a person needs should be enforced.
- **Fluid intake.** Fluid intake must take shape according to the recommendations of the physician.
- **Follow-up.** A week after discharge, the patient must return for a follow-up checkup for evaluation of electrolyte and fluid status.
- **Medications.** Compliance to prescribed medications should be strict to avoid recurrence of the condition.

7.9. Documentation Guidelines

Data should be documented for future medical and legal references. The nurse must document:

- Individual findings, including factors affecting ability to manage body fluids and degree of deficit.
- I&O, fluid balance, changes in weight, urine specific gravity, and vital signs.
- Results of diagnostic testing and laboratory studies.
- Plan of care.
- Client's responses to treatment, teaching, and actions performed.
- Attainment or progress toward desired outcome.
- Modifications to plan of care.

Self-Check -7	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I. Choose the best answer (each 1point)

Part II .fill the blank space

1. List down the most common butter packing containers and storage system! (5%)

_____,_____

_____,_____

_____,_____

Note: **Satisfactory rating - 8 and 15 points Unsatisfactory - below 8and 15points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

1. _____

2. _____

3. _____

Name: _____

Score = _____
Rating: _____

Information Sheet-8	Monitoring action of drug in fluid and electrolyte imbalance

5.8. Monitoring action of drug in fluid and electrolyte imbalance

Electrolytes, or ions, are substances dissolved in body fluid that carry an electrical charge. Cations have positive charges; anions have negative charges. Body fluids are electrically neutral, which means that the number of positive ions is balanced by an equal number of negative ions. However, the distribution of ions differs in the extracellular fluid (ECF) and the intracellular fluid (ICF) (Fig. 11-12).

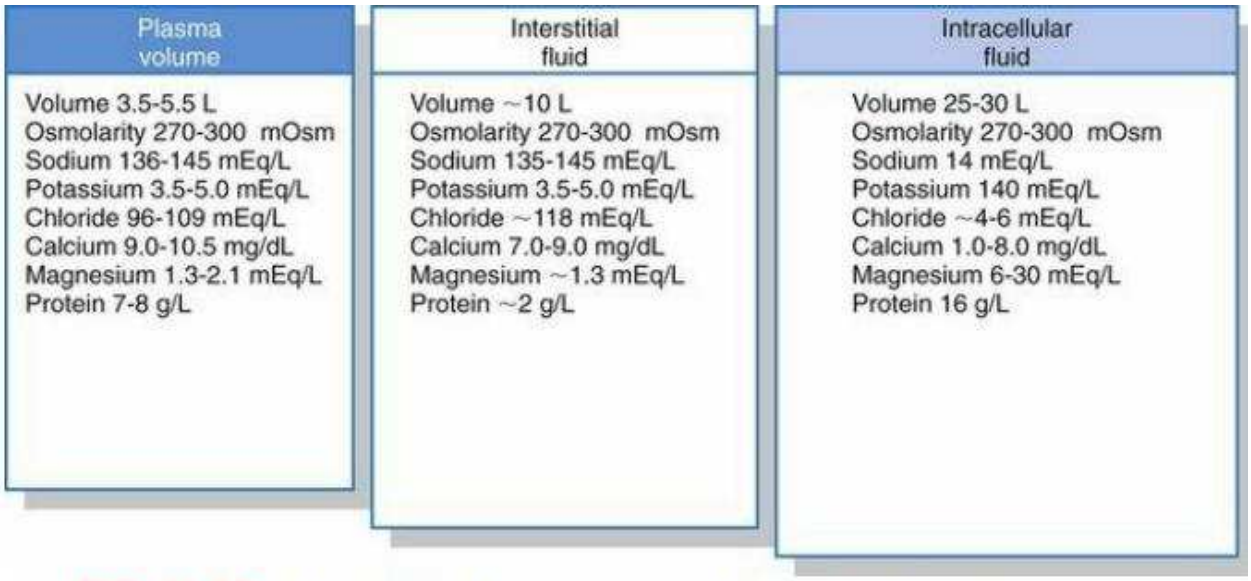


FIG. 11-12 The electrolyte composition of various body fluids.

Most electrolytes have different concentrations in the ICF and ECF. This concentration difference helps maintain membrane excitability and allows nerve impulse transmission. The normal ranges of electrolyte concentration are very narrow. So, even small changes in these levels can cause major problems. Electrolyte imbalances can occur in healthy people as a result of changes in fluid intake and output. These imbalances are usually mild and are easily corrected. Severe electrolyte imbalances with actual losses or retention of specific electrolytes are life threatening and can occur in any setting.

People at greatest risk for severe imbalances are older patients, patients with chronic kidney or endocrine disorders, and those who are taking drugs that alter fluid and electrolyte balance. All ill people are at some risk for electrolyte imbalances.. Most electrolytes enter the body in ingested food. Electrolyte balance occurs by matching the dietary intake of electrolytes with the kidney excretion or reabsorption of electrolytes. For example, the plasma level of potassium is maintained between 3.5 and 5.0 mEq/L (mmol/L

5.8.1. Sodium:- Sodium (Na +), a mineral, is the major cation (positively charged particle) in the extracellular fluid (ECF) and maintains ECF osmolarity. Sodium levels of the ECF are high (136 to 145 mEq/L [mmol/L]), and the intracellular fluid (ICF) sodium levels are low (about 14 mEq/L [mmol/L]). Keeping this difference in sodium levels is vital for skeletal muscle contraction, cardiac contraction, and nerve impulse transmission.

The ECF sodium level determines whether water is retained, excreted, or moved from one fluid space to another. To maintain electrical balance, the sodium (a cation) level within body fluids must be matched by an equal number of anions (negatively charged substances). When this balance is present, the fluid is electrically neutral.

5.8.1.1. Hyponatremia:- Hyponatremia is an electrolyte imbalance in which the serum sodium (Na +) level is below 136 mEq/L (mmol/L).

Cerebral changes are the most obvious problems of hyponatremia. Behavioral changes result from cerebral edema and increased intracranial pressure. Neuromuscular changes are seen as general muscle weakness. Intestinal changes include increased motility, causing nausea, diarrhea, and abdominal cramping. Assess the GI system by listening to bowel sounds and observing stools. Bowel sounds are hyperactive, with rushes and gurgles over the splenic flexure and in the lower left quadrant. Cardiovascular changes are seen as changes in cardiac output. The cardiac responses to hyponatremia with hypovolemia (decreased plasma volume) include a rapid, weak, thready pulse. Peripheral pulses are difficult to palpate and are easily blocked with light pressure. The priorities for nursing care of the patient with hyponatremia are monitoring the patient's response to therapy and preventing hypernatremia and fluid overload. Drug therapy involves reducing the doses of any drugs that increase sodium loss, such as most diuretics. Nutrition therapy can help restore sodium balance in mild hyponatremia.

Therapy involves increasing oral sodium intake and restricting oral fluid intake. Nursing actions for patient safety, skin protection, monitoring, and patient and family teaching are the same as those for fluid overload.

5.8.1.2. Hypernatremia:- Hypernatremia is an electrolyte imbalance in which the serum sodium level is over 145 mEq/L (mmol/L). More sodium is present to move rapidly across cell membranes during depolarization, making excitable tissues more easily excited. This condition is called irritability, and excitable tissues over-respond to stimuli. In addition, water moves from the cells into the ECF to dilute the hyperosmolar ECF. So, when serum sodium levels are high, severe cellular dehydration with cellular shrinkage occurs. Priorities for nursing care of the patient with hypernatremia include monitoring his or her response to therapy and ensuring patient safety by preventing hyponatremia and dehydration. Drug therapy is used to restore fluid balance when hypernatremia is caused by fluid loss. Isotonic saline (0.9%) and dextrose 5% in 0.45% sodium chloride are most often prescribed.

5.8.2. Potassium:- Potassium (K+) is the major cation of the intracellular fluid (ICF). The normal plasma potassium level ranges from 3.5 to 5.0 mEq/L (mmol/L) (see Table 11-1). The normal ICF potassium level is about 140 mEq/L (mmol/L). Almost all foods contain potassium. It is highest in meat, fish, and many (but not all) vegetables and fruits. It is lowest in eggs, bread, and cereal grains.

5.8.2.1. Hypokalemia: - is an electrolyte imbalance in which the serum potassium level is below 3.5 mEq/L (mmol/L). It can be life threatening because every body system is affected.

The Patient with Hypokalemia

• Question the continued use of drugs that increase excretion of potassium (e.g., thiazide and loop diuretics).

• Administer prescribed oral potassium supplement, well diluted and with a meal or just after a meal or snack to prevent nausea and vomiting.

• Prevent accidental overdose of IV potassium by checking and rechecking the concentration of potassium in the IV solution, ensuring that the maximum concentration is no greater than 1 mEq/10 mL of 563 solution.

• Establish an IV access in a large vein with a high volume of flow, avoiding the hand.

• Assess the IV access for placement and an adequate blood return before administering potassium-containing solutions.

• Use a controller for solution delivery, maintaining an infusion rate not faster than 5 to 10 mEq of potassium per hour.

• Assess the IV site hourly.

• Stop the infusion immediately if the patient reports pain or burning or if any manifestation of infiltration occurs.

• If possible, monitor electrocardiography (ECG) continuously.

• Monitor patient responses every 1 to 2 hours to determine therapy effectiveness and the potential for hyperkalemia.

Numbness or tingling is present in the hands and feet and around the mouth The patient is anxious Serum potassium level is above 5.0 mEq/L.

• Keep patient on bedrest until hypokalemia resolves, or provide assistance when out of bed to prevent fall. Potassium is a severe tissue irritant and is never given by IM or subcutaneous injection.

5.8.2.2. Hyperkalemia:- Hyperkalemia is an electrolyte imbalance in which the serum potassium level is higher than 5.0 mEq/L (mmol/L). Even small increases above normal values can affect excitable tissues, especially the heart. Hyperkalemia is rare in people with normal kidney function. Most cases of hyperkalemia occur in hospitalized patients and in those undergoing medical treatment. Cardiovascular changes are the most severe problems from hyperkalemia and are the most common cause of death in patients with hyperkalemia.

The priorities for nursing care of the patient with hyperkalemia are assessing for cardiac complications, patient safety for falls prevention, monitoring the patient's response to therapy, and health teaching. Drug therapy can restore normal potassium balance by enhancing potassium excretion and promoting the movement of potassium from the extracellular fluid (ECF) into the cells.

You Should Avoid

• Meats, especially organ meat and preserved meat

• Dairy products

• Dried fruit

• Fruits high in potassium: Bananas Cantaloupe Kiwi Oranges.

Vegetables high in potassium: Avocados Broccoli Dried beans or peas Lima beans Mushrooms Potatoes (white or sweet) Seaweed Soybeans Spinach

You May Eat

• Eggs, Breads, Butter, Cereals, Sugar

Fruits low in potassium (fresh, frozen, or canned): Apples Apricots Berries Cherries Cranberries Grapefruit Peaches Pineapple

Vegetables low in potassium: Alfalfa sprouts Cabbage Carrots Cauliflower Celery Eggplant Green beans Lettuce Onions Peas Peppers Squash

5.8.3. Calcium:- Calcium (Ca 2+) is a mineral with functions closely related to those of phosphorus and magnesium. It is an ion having two positive charges (divalent cation) that exists in the body in a bound form and an ionized (unbound or free) form. Free calcium is the active form and must be kept within a narrow range in the ECF. The body functions best when blood calcium levels are maintained between 9.0 and 10.5 mg/dL, or between 2.25 and 2.62 mmol/L.

Hypocalcemia is an electrolyte imbalance in which a total serum calcium (Ca 2+) level is below 9.0 mg/dL or 2.25 mmol/L. Calcium is stored in bone, 572 with only a small amount of total body calcium present in extracellular fluid (ECF).

Drug therapy for hypocalcemia includes direct calcium replacement (oral and IV) and drugs that enhance the absorption of calcium, such as vitamin D.

Hypercalcemia is an electrolyte imbalance in which the total serum calcium level is above 10.5 mg/dL or 2.62 mmol/L. Even small increases above normal have severe effects. Interventions for hypercalcemia focus on reducing serum calcium levels through drug therapy, rehydration, and, depending on the cause and severity, dialysis. Cardiac monitoring is also important.

5.8.4. Phosphorus:- Normal serum levels of phosphorus range from 3.0 to 4.5 mg/dL, or 0.97 to 1.45 mmol/L (see Table 11-1). Most phosphorus (80%) can be found in the bones. It is the major anion in the ICF, and its levels inside cells are much higher than in the ECF.

5.8.4.1. Hypophosphatemia is an electrolyte imbalance in which the serum phosphorus level is below 3.0 mg/dL. Drugs that promote phosphorous loss (e.g., antacids, osmotic diuretics, calcium supplements) are discontinued. Oral replacement of phosphorus along with a vitamin D supplement may correct moderate hypophosphatemia. IV phosphorus is given only when serum phosphorus levels fall below 1 mg/dL and the patient has serious manifestations.

5.8.4.2. Hyperphosphatemia is an electrolyte imbalance in which the serum phosphorus level is above 4.5 mg/dL. High levels are well tolerated by most body systems. Causes of increased serum phosphorus levels include kidney disease, certain cancer treatments, increased phosphorus intake, and hypoparathyroidism.

5.8.5. Magnesium:- Magnesium (Mg 2+) is a mineral that forms a cation when dissolved in water. Most magnesium is stored in bones and cartilage. Little magnesium is present in the extracellular fluid (ECF). Plasma levels of 581 free magnesium range from 1.3 to 2.1 mEq/L, or 0.65 to 1.05 mmol/L.

5.8.5.1. Hypomagnesemia is an electrolyte imbalance in which the serum magnesium (Mg 2+) level is below 1.3 mEq/L. It is most often caused by decreased absorption of dietary magnesium or increased kidney magnesium excretion.

Drugs that promote magnesium loss, such as high-ceiling (loop) diuretics, osmotic diuretics, aminoglycoside antibiotics, and drugs containing phosphorus, are discontinued.

Magnesium is replaced intravenously with magnesium sulfate (MgSO4) when hypomagnesemia is severe.

5.8.5.2. Hypermagnesemia is an electrolyte imbalance in which the serum magnesium level is above 2.1 mEq/L. Interventions for hypermagnesemia focus on reducing the serum level and correcting the underlying problem that caused the imbalance. All oral and parenteral magnesium is discontinued.

5.8.6. Chloride:- Chloride (Cl −) is the major anion of the extracellular fluid (ECF) and works with sodium to maintain ECF osmotic pressure. The normal plasma concentration of chloride ranges from 98 to 106 mEq/L or mmol/L. It enters the body through dietary intake and is important in the formation of hydrochloric acid in the stomach. Only a small amount of chloride is present inside the cells because negative charges on the cell membrane repel chloride and prevent it from crossing the membrane. An exception is chloride loss from excessive vomiting or prolonged gastric suction. Imbalances of chloride are usually corrected by interventions for correcting other electrolyte or acid-base problems.

5.8.7. Health Promotion and Maintenance:- Encourage all patients to maintain an adequate fluid intake (minimum of 2 L per day) unless another condition requires fluid restriction. Teach all people to increase fluid intake when exercising, when in hot or dry environments, or during conditions that increase metabolism (e.g., fever). Instruct patients at risk for fluid imbalance to weigh themselves on the same scale daily, close to the same time each day, and with about the same amount of clothing on each time and to monitor these daily weights for changes or trends. Patient-Centered Care Instruct patients who exercise heavily (athletes) to take scheduled fluid replacement breaks. Instruct caregivers of older adults who have cognitive impairments or mobility problems to schedule offerings of fluids at regular intervals throughout the day. Patient-Centered Care. Teach patients how to determine electrolyte content of processed foods by reading labels. Teach patients who are prescribed to take diuretics to take the drugs as prescribed. Teach patients who are taking digoxin to measure their pulse for rate, rhythm, and quality. Teach patients who are taking diuretics to measure their pulse for rate, rhythm, and quality.

Self-Check -8	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I. Choose the best answer (each 1point)

Part II .fill the blank space

1. List down the most common butter packing containers and storage system! (5%)

_____,_____

_____,_____

_____,_____

Note: **Satisfactory rating - 8 and 15 points Unsatisfactory - below 8and 15points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

1. _____

2. _____

3. _____

4. _____

Name: _____

Score = _____
Rating: _____

Information Sheet-9	Secure IV Cannula according to organization policy and procedure

5.9. Secure IV Cannula according to organization policy and procedure

Intravenous cannulation is becoming one of the most common procedures in healthcare as increasing numbers of patients are treated for acute and chronic illnesses. The use of an intravenous cannula is not without risk, so it is essential that the healthcare practitioner can justify why the patient requires cannulation, as well as being able to safely manage and provide ongoing care for patients with the device. Common reasons for inserting a cannula include:

- Administration of intravenous fluids to maintain hydration.
- To treat dehydration in patients who are unable to tolerate sufficient oral fluid.
- To administer intravenous medication.
- To transfuse blood or blood products.
- To assist close observation and monitoring of a deteriorating patient.

Pre-insertion:-There must be a clear indication of clinical need for PIVC insertion, to prevent inappropriate insertion and exposure to associated risks. The most appropriate peripheral device to be inserted must be chosen based on the treatment required i.e. peripheral IV cannula or midline. If a midline is required please contact Interventional Radiology. The patient`s verbal or implied consent to examination and treatment must be obtained. Where obtaining verbal/implied consent is not possible, a risk assessment by the healthcare professional must be undertaken regarding the need for examination and treatment. The procedure must be explained to the patient to ensure that they are informed of what the procedure entails and that the risk of allergic reaction to products used is minimized. Patients must also be aware of the importance of keeping the PIVC site clean, dry and intact.

Site selection (not midlines):-The insertion site should be determined by the risk of infection and mechanical complications.

It is generally preferable to use the non-dominant arm with the PIVC sited away from elbow and wrist joints, thereby reducing the likelihood of dislodgement through movement and to maintain cannula patency. Hand veins have a lower risk of phlebitis than veins on the wrist or upper arm. Veins in the lower limbs should not be used routinely in adults and children due to the increased risk of embolism and thrombophlebitis. Any PIVC inserted into lower limbs should be re-sited to an upper limb as soon as possible. If possible, select most distal site for initial cannulation. Pre-existing medical conditions or injury may prevent particular limbs from being used, e.g. the affected side of a patient who has had a stroke, renal patient with arterio-venous fistula, lymphoedema, a fractured limb, previous mastectomy, limb with bruised, painful, broken or infected skin.

Equipment

The following will be required to ensure the procedure is performed without disruption:

- Cannulation pack or: Universal sanitizing wipes (to clean tray if being used)
- Clean procedure tray
- Sterile gauze swabs
- A single use application of 2% Chlorhexidine Gluconate in 70% Isopropyl alcohol
- Sterile semi-permeable transparent dressing
- Non-ported safety PIVC of appropriate size for all in-patient areas (unless there has been a prior agreement to use ported cannula)
- Extension set connector (use single lumen where possible)
- Clean tape to secure extension set connector.

The following items are not contained within the cannulation pack if used but will also be required. 0.9% Sodium Chloride or POSI flush solution for flushing, which must be prescribed and checked by a second registered practitioner (NB posiflush is a medical device and does not require a second checker). Non sterile, well-fitting gloves (unless there is a clear indication for gloves not being worn e.g. very difficult cannulations)

Disposable or cleanable tourniquet (Reusable tourniquets may be used for low to medium risk patients and decontaminated between each Page 5 of 17 patient use with a universal sanitizing wipe.

Single patient use tourniquets must be used for all high risk patients i.e. all patients in isolation)

- A disposable apron
- Eye protection if there is a risk of splashing with blood or body fluids
- Sharps bin
- Topical local anesthetic if required e.g. when inserting a 18G or larger cannula
- Peripheral Intravenous Cannula Record sheet (see Appendix 2)

Peripheral IV cannula choice

- All PIVCs must be safety devices
- Non-ported cannula should be used for patients on in-patient areas, where possible
- Ported cannula can be used when the device is only required for short term use such as for surgery e.g. theatres/anesthetics, endoscopy, day treatment units, or in emergency situations
- The Peripheral Intravenous Cannula Record must be completed for ALL cannula regardless of duration in-situ.

Procedure

2. Operation sheet-1: - Securing Intravenous line

Purpose	**Purpose:-** • When the given drug is irritating to the body tissue if given through other routes. • When quick action is desired. • When blood drawing is needed.
Equipment ,tools and materials	Supplies and equipment needed for Securing Intravenous line include Tray containing • Sterile syringe and needle (16-18gauge) • IV cannula (16-24g) • Medication • Alcohol swab • File • Tourniquet • Patient chart • Towel and rubber sheet • Receiver
Conditions or situations for the operations	• All tools, equipment's and materials should be available on time when required. • Appropriate table, working area/ workshop to Simulator for Securing Intravenous line practice.

Procedures	1. Gather prepared equipment (medication labeled with the client's name, and time tape for fluids to infuse per hour) 2. Wash hands 3. Check the client's armband 4. Explain the procedure to the client 5. Assess the puncture site A. Observe for redness and puffiness. B. Palpate for tenderness 6. Check patency of infusion site. A. Observe fluid infusing. B. Remove IV container from the pole and lower the container below the level of infusion site C. Observe for backflow of blood into the hub of the venous access device. D. Replace container on IV pole 7. Secure medication bag prepared and labeled by pharmacy and check health care practitioner's prescription and the MAR. 8. Check the client's chart for allergies, and check the drug compatibility chart. 9. Hang the secondary bag on IV pole. 10. Add the administration set to the secondary bag and prime the tubing. 11. Affix a needle-less locking cannula to the end of tubing 12. Cleanse needle-less Y–site injection port of pri-mary IV tubing closest to infusion site with an alcohol swab; allow to dry. 13. Insert needle-less locking cannula of secondary bag set into Y–site injection port of primary set and secure in place with tape 14. Affix the extension hook to the primary bag on the IV pole so that the primary bag hangs below the level of the secondary bag. 15. Open clamp of secondary tubing and adjust drip rate to desired infusion rate

	• Slowly close the regular clamp while observing the drip chamber until the fluid is drip-ping at a slow, steady pace • Count the drops for a 15-second interval and multiply by 4 • Recount the drop rate in 5 minutes.
Precautions	• Care should be taken while selecting IV sites • Preparing materials, tools and equipment are before starting.
Quality criteria	• Did personal protective equipment worn while securing • Did trainees secure IV appropriately • Did the trainees keep aseptic techniques while securing the iv line.

Securing Intravenous line

LAP Test	Practical Demonstration

Name: _____ Date: _____

Time started: _____

Time finished: _____

Instructions:

1. You are required to perform any of the following:
   1.1. Prepare equipment and material for securing IV line
   1.2. Secure the IV line under aseptic techniques
   1.3. Documenting the procedures
2. Request your teacher for evaluation and feedback

Self-Check -9	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I. Choose the best answer (each 1point)

1. What is the first step in the insertion of a peripheral IV line or saline lock? **(3points)**

   A. Get permission from the patient/family member

   B. Obtain a physician's order

   C. Educate the patient about the need for IV access

   D. Preparing the necessary equipment's

2. What is the best choice of cannula size? **(3points)**

   A. The largest one you feel you can successfully insert in the patient.

   B. The smallest one you can find.

   C. The smallest guage to accommodate therapy

   D. The largest guage your facility has.

3. Common reasons for inserting a cannula include? **(4points)**

   A. Administration of intravenous fluids to maintain hydration.

   B. To treat dehydration in patients who are unable to tolerate sufficient oral fluid.

   C. To administer intravenous medication.

   D.To transfuse blood or blood products.

   E. All

Part II .fill the blank space

1. List down the most common sites of IV for child and adult (5%)

Note: **Satisfactory rating 8 -15 points** **Unsatisfactory - below 8points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

1. _____

2. _____

3. _____

Score = _____
Rating: _____

Name:

_____

L G #22	LO#-6 Develop strategies for pain management

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Identifying signs of pain and/or discomfort
- Clarifying the location and nature of pain
- Pain assessment scale.
- Pain management strategies
- Evaluation of client for drug effectiveness
- Nursing roles of pain management

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- identify signs of pain and/or discomfort
- Clarify location and nature of pain and factors which may influence a client's perception of pain.
- Use Pain assessment scale to ensure consistency of interpretation.
- Undertake pain management strategies.
- Evaluate client for drug effectiveness.
- Manage pain as a Nursing role.

Learning Instructions

6. Read the specific objectives of this Learning Guide.
7. Follow the instructions described below 3 to 6.
8. Read the information written in the information "Sheet 1, Sheet 2, Sheet 3, and sheet 4"
9. Accomplish the "Self-check 1, Self-check 2, Self-check 3, and Self-check 4" in page 4, 14,
10. If you earned a satisfactory evaluation from the "Self-check" proceed to "Operation Sheet 1, Operation Sheet 2, operation sheet 3, operation sheet 4 and" in page 52-54.
11. Do the "LAP test" in page – 55 (if you are ready).

Information Sheet-1	identifying signs of pain and/or discomfort

6.1. Identifying signs of pain and/or discomfort

6.1.1. Definition of Pain

The American Pain Society defines pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage”. This definition describes pain as a complex phenomenon that can impact a person’s psychosocial, emotional, and physical functioning. The clinical definition of pain reinforces that pain is a highly personal and subjective experience:

“Pain is whatever the experiencing person says it is, existing whenever he says it does”.

6.1.2. Effects of Pain

Pain affects individuals of every age, sex, race, and socioeconomic class (Herr et al., 2015; International Association for the Study of Pain [IASP], 2013). It is the primary reason people seek health care and one of the most common conditions that nurses treat. Unrelieved pain has the potential to affect every system in the body and cause numerous harmful effects, some of which may last a person’s lifetime.

6.1.3. Types and Categories of Pain

Pain can be categorized in many ways, and clear distinctions are not always possible. Pain often is described as being acute or chronic (persistent).

6.1.3.1. Acute pain: - differs from chronic pain primarily in its duration. For example, tissue damage as a result of surgery, trauma, or burns produces acute pain, which is expected to have a relatively short duration and resolve with normal healing.

6.1.3.2. Chronic pain: - is subcategorized as being of cancer or non-cancer origin and can be time limited (e.g., may resolve within months) or persist throughout the course of a person’s life. Examples of non-cancer pain include peripheral neuropathy from diabetes, back or neck pain after injury, and osteoarthritis pain from joint degeneration.

Some conditions can produce both acute and chronic pain. For example, some patients with cancer have continuous chronic pain and also experience acute exacerbations of pain periodically

—called breakthrough pain (BTP)—or endure acute pain from repetitive painful procedures during cancer treatment.

Pain is better classified by its inferred pathology as being either nociceptive pain or neuropathic pain. Nociceptive (physiologic) pain refers to the normal functioning of physiologic systems that leads to the perception of noxious stimuli (tissue injury) as being painful. This is why nociception is described as “normal” pain transmission. Neuropathic (pathophysiologic) pain is pathologic and results from abnormal processing of sensory input by the nervous system as a result of damage to the peripheral or central nervous system (CNS) or both. Patients may have a combination of nociceptive and neuropathic pain. For example, a patient may have nociceptive pain as a result of tumor growth and also report radiating sharp and shooting neuropathic pain if the tumor is pressing against a nerve plexus. Sickle cell disease pain is usually a combination of nociceptive pain from the clumping of sickled cells and resulting perfusion deficits, and neuropathic pain from nerve ischemia(1).

6.1.4. Physiological signs of pain may include:

- Dilatation of the pupils and/or wide opening of the eyelids.
- Changes in blood pressure and heart rate.
- Increased respiration rate and/or depth.
- Pilo-erection.
- Changes in skin and body temperature.
- Increased muscle tone, Sweating, increased defecation and urination

6.1.5. Non-Verbal Clinical Signs and Symptoms of Pain:- Screaming, swearing, crying, moaning, sighing, and making fewer sounds than is typical. Gaiting, limping, rubbing a body area, muscle rigidity, decreased movement, guarding, pacing, rocking, fidgeting, repetitive movements, reluctance to move, decreased range of movement.

Self-Check -1	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I. Choose the best answer

1. Which one of the following is different from the other? **(2points)**
   A. Pain as a result of surgery
   B. Pain as a result of trauma
   C. Osteoarthritis
   D. Pain due to burn
2. Pain is classified by its inferred pathology as **(3points)**
   A. nociceptive pain or neuropathic pain.
   B. Acute pain
   C. chronic pain
   D) Pain for 1 week

Part II .fill the blank space

1. List down the most common examples of acute and chronic pains (5%)

_____,_____

_____,_____

Note: **Satisfactory rating - 5 and 10 points Unsatisfactory - below 10points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet

1. _____

2. _____

3. _____

Name: _____

Score = _____
Rating: _____

Information Sheet-2	Clarifying location and nature of pain

6.2.1. Signs and Symptoms of Acute Pain

Location(s) of pain*:* Ask the patient to state or point to the area(s) of pain on the body. Sometimes allowing patients to make marks on a body diagram is helpful in gaining this information.

Intensity: Ask the patient to rate the severity of the pain using a reliable and valid pain assessment tool. Provides guidance for educating patients and their families how to use a pain rating scale. Various scales translated in several languages have been evaluated and made available for use in clinical practice and for educational practice

Acute pain tends to be of a relatively short duration (and we use this term loosely, since when someone is in pain, a couple of days can feel like a lifetime). The most common signs and symptoms of acute pain include:

- **Sharp pain**: - When you feel a sudden, intense spike of pain that qualifies as "sharp." Sharp pain may also fit the descriptors cutting and shooting
- **Throbbing:** - Throbbing pain consists of recurring achy pains. You may also experience pounding, beating, or pulsing pain.
- **Burning:** - A **burning sensation** is a type of **pain** that's distinct from dull, stabbing, or aching **pain**. A **burning pain** is often related to nerve problems. However, there are many other possible causes. Injuries, infections, and autoimmune disorders have the potential to trigger nerve **pain**, and in some cases cause nerve damage.
- **Stabbing pain: -** Like sharp pain, stabbing pain occurs suddenly and intensely. However, stabbing pain may fade and reoccur many times. Stabbing pain is similar to drilling and boring pain.

- **Tingling:** - **Tingling** (paresthesia) is an unusual sensation most commonly felt in your hands, feet, arms and legs. **Tingling** is often associated with numbness, or a decrease in the ability to feel or sense pressure or texture.
- **Weakness:** - **Weakness** is a decrease in the strength in one or more muscles. In the strictest sense, the medical definition of **weakness** refers to loss of muscle strength, and this article is focused upon conditions that can result in a measurable loss of muscle function.
- **Numbness:** - Numbness describes a loss of sensation or feeling in a part of your body. It's often accompanied by or combined with other changes in sensation, such as a pins-and-needles feeling or burning. **Numbness** can occur along a single nerve on one side of the body, or it may occur symmetrically, on both sides of the body(2, 3).

Self-Check -2	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I. Choose the best answer

1. A pain consists of recurring achy pains and also experience pounding, beating, or pulsing pain is? **(2points)**
   A. Throbbing
   B. Stabbing
   C. Tingling
   D. Numbness

Part II .fill the blank space

1. Writ the most common signs and symptoms of acute pain? (5%)

Note: **Satisfactory rating - 5 and 10points Unsatisfactory - below 10points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet Name: _____

1. _____
2. _____
3. _____

Score = _____
Rating: _____

Information Sheet-3	Pain Assessment Scale

6.3.1. Pain Assessment

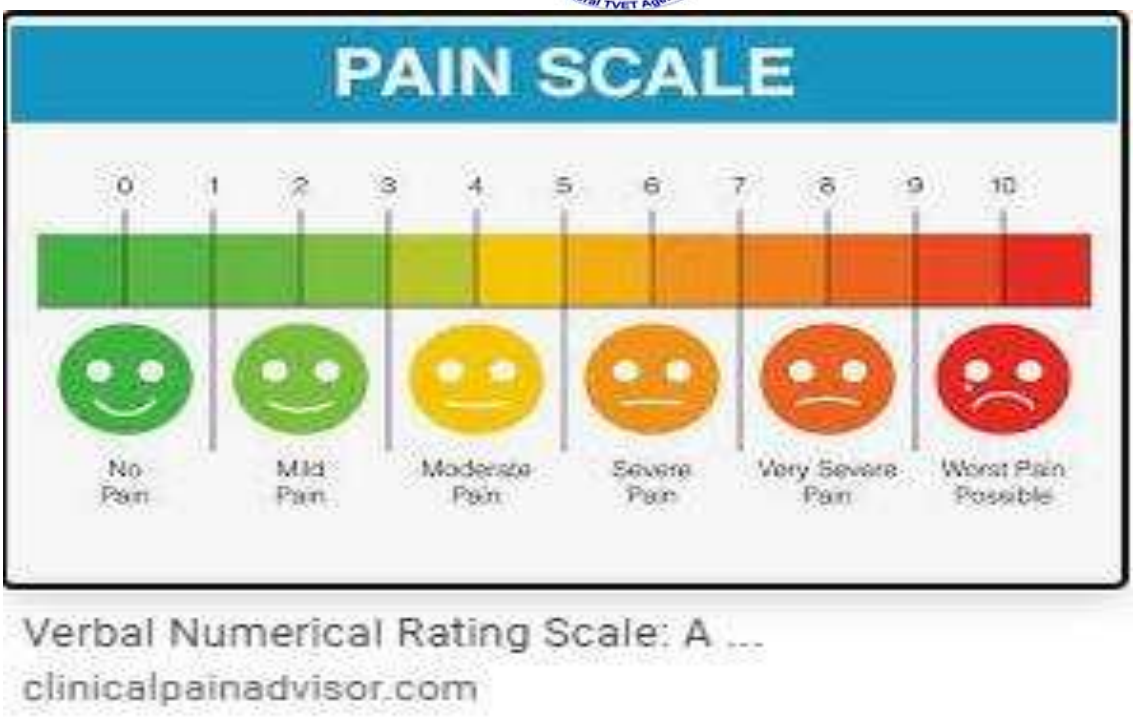
The highly subjective nature of pain causes challenges in assessment and management; however, the patient's self-report is the undisputed standard for assessing the existence and intensity of pain.

A comprehensive pain assessment should be conducted during the admission assessment or initial interview with the patient, with each new report of pain, and whenever indicated by changes in the patient's condition or treatment plan during the course of care. It serves as the foundation for developing and evaluating the effectiveness of the pain treatment plan. The following are components of a comprehensive pain assessment and tips on how to elicit the information from the patient:

Location(s) of pain*:* Ask the patient to state or point to the area(s) of pain on the body. Sometimes allowing patients to make marks on a body diagram is helpful in gaining this information.

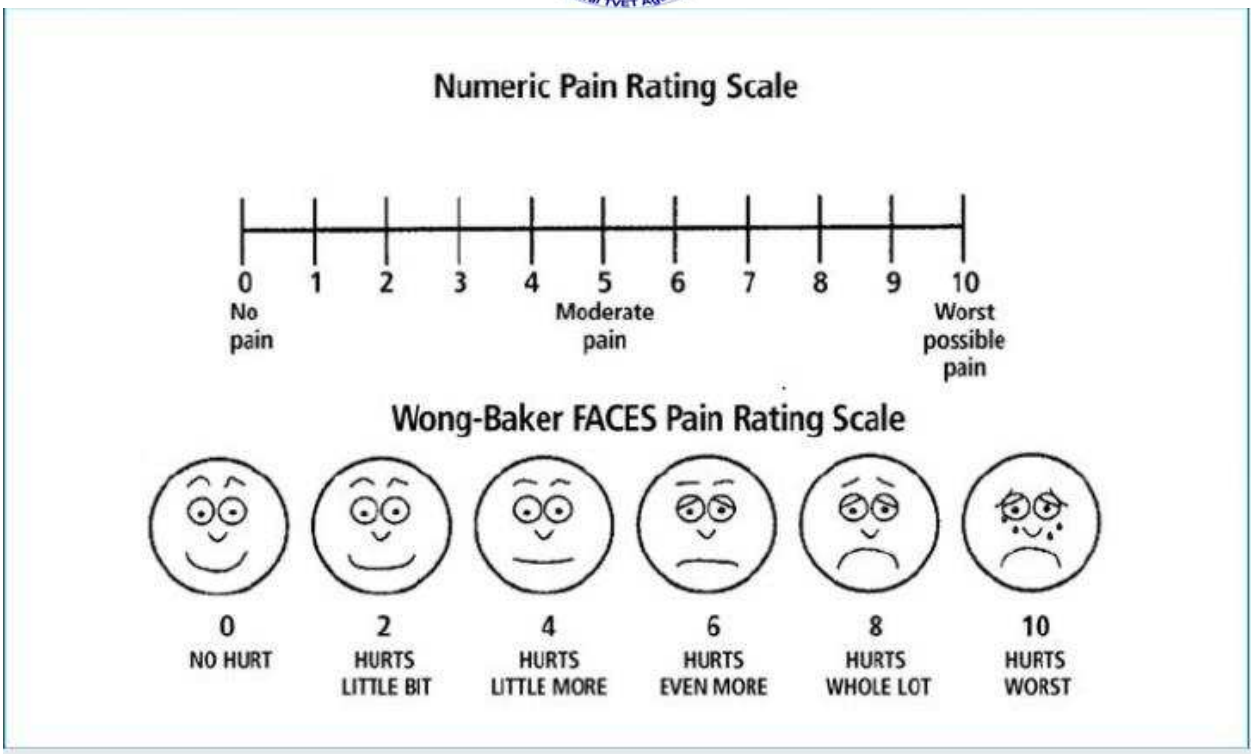
Intensity: Ask the patient to rate the severity of the pain using a reliable and valid pain assessment tool. Provides guidance for educating patients and their families how to use a pain rating scale. Various scales translated in several languages have been evaluated and made available for use in clinical practice and for educational practice. The most common include the following:

6.3.1.1. Numeric Rating Scale (NRS): The NRS is most often presented as a horizontal 0- to-10-point scale, with word anchors of "no pain" at one end of the scale, "moderate pain" in the middle of the scale, and "worst possible pain" at the end of the scale. It may also be put on a vertical axis, which may be helpful for patients who read from right to left.



6.3.1.2. Wong-Baker FACES Pain Rating Scale*:* The FACES scale consists of six cartoon faces with word descriptors, ranging from a smiling face on the left for “no pain (or hurt)” to a frowning, tearful face on the right for “worst pain (or hurt).”

Patients are asked to choose the face that best reflects their pain. The faces are most commonly numbered using a 0, 2, 4, 6, 8, 10 metric, although 0 to 5 can also be used. Patients are asked to choose the face that best describes their pain. The FACES scale is used in adults and children as young as 3 years. It is important to appreciate that faces scales are self-report tools; clinicians should not attempt to match a face shown on a scale to the patient’s facial expression to determine pain intensity. Patients may be able to understand the tool better if it is displayed vertically with no pain as the anchor at the bottom.



6.3.1.3. Faces Pain Scale–Revised (FPS-R): The FPS-R has six faces to make it consistent with other scales using the 0 to 10 metric. The faces range from a neutral facial expression to one of intense pain and are numbered 0, 2, 4, 6, 8, and 10. As with the Wong-Baker

FACES scale, patients are asked to choose the face that best reflects their pain. Faces scales have been shown to be reliable and valid measures in children as young as 3 years of age; however, the ability to optimally quantify pain (identify a number) is not acquired until approximately 8 years of age. Some research shows that the FPS-R is preferred by both cognitively intact and impaired older and minority populations.

6.3.1.4. Verbal descriptor scale (VDS): A VDS uses different words or phrases to describe the intensity of pain, such as “no pain, mild pain, moderate pain, severe pain, very severe pain, and worst possible pain.” The patient is asked to select the phrase that best describes pain intensity.

6.3.1.5. Visual Analog Scale (VAS): The VAS is a horizontal (sometimes vertical) 10-cm line with word anchors at the extremes, such as “no pain” on one end and “pain as bad as it could be” or “worst possible pain” on the other end. Patients are asked to make a mark on the line to indicate intensity of pain, and the length of the mark from “no pain” is measured and recorded in centimeters or millimeters. Although often used in research, the VAS is impractical for use in daily clinical practice and rarely used in that setting.

Quality: Ask the patient to describe how the pain feels. Descriptors such as “sharp,” “shooting,” or “burning” may help identify the presence of neuropathic pain.

Onset and duration*:* Ask the patient when the pain started and whether it is constant or intermittent.

Aggravating and relieving factors*:* Ask the patient what makes the pain worse and what makes it better.

Effect of pain on function and quality of life*:* The effect of pain on the ability to perform recovery activities should be regularly evaluated in the patient with acute pain. It is particularly important to ask patients with persistent pain about how pain has affected their lives, what they could do before the pain began that they can no longer do, or what they would like to do but cannot do because of the pain.

Comfort-function (pain intensity) goal*:* For patients with acute pain, identify short-term functional goals and reinforce to the patient that good pain control will more likely lead to successful achievement of the goals. For example, surgical patients are told that they will be expected to ambulate or participate in physical therapy postoperatively.

Patients with chronic pain can be asked to identify their unique functional or quality-of-life goals, such as being able to work or walk the dog.

Success is measured by progress toward meeting those functional goals.

***Other information**:* The patient's culture, past pain experiences, and pertinent medical history such as comorbidities, laboratory tests, and diagnostic studies are considered when establishing a treatment plan.

Patients who are unable to report their pain are at higher risk for under treated pain than those who can report

. In the adult population, this includes patients who are cognitively impaired, critically ill (intubated, unresponsive), comatose, or imminently dying. Patients who are receiving neuromuscular blocking agents or are sedated from anesthesia and other drugs given during surgery are also among this at-risk population.

The Hierarchy of Pain Measures is recommended as a framework for assessing pain in nonverbal patients. The key components of the hierarchy require the nurse to

(1) Attempt to obtain self-report

(2) Consider underlying pathology or conditions and procedures that might be painful (e.g., surgery),

(3) Observe behaviors

(4) Evaluate physiologic indicators, and

(5) Conduct an analgesic trial. Provides detailed information on each component of the Hierarchy of Pain Measures(1).

Self-Check -3	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I. Choose the best answer

1. The scale used to assess pain in adults and children as young as 3 years is? **(3points)**

   A. Visual analog scale
   B. Wong-Baker face pain rating scale
   C. Verbal descriptor scale
   D. Number pain scale

2. Which pain scale is the most sensitive to gender and ethnic differences?

   A. Visual
   B. Verbal
   C. Numerical
   D. Flacc

Part II .fill the blank space

1. List down the most common pain assessment methods (5%)

_____,_____

_____,_____

_____,_____

Note: **Satisfactory rating – 5 - 8points** **Unsatisfactory - below 5points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet Name: _____

1. _____

Score = _____
Rating: _____

Information Sheet- 4	Pain management strategies

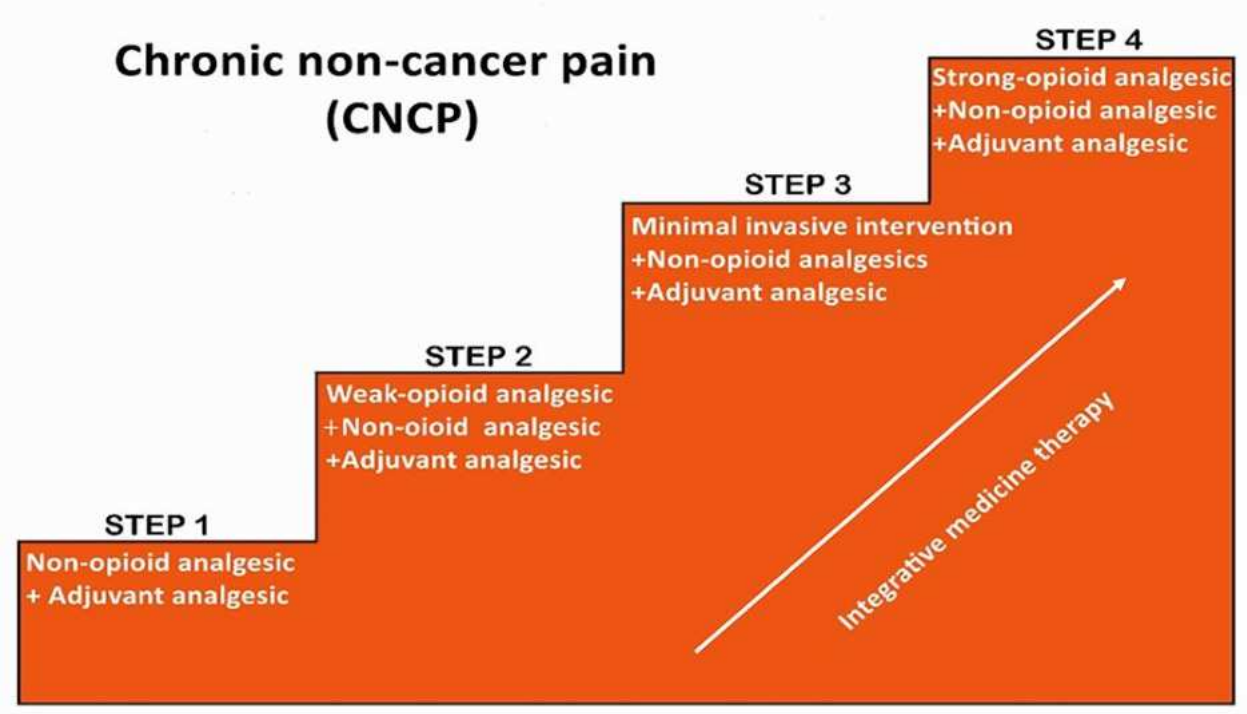
6.4. Pain management strategies

6.4.1. Pain Management

Achieving optimal pain relief is best viewed on a continuum, with the primary objective being to provide both effective and safe analgesia. The quality of pain control should be addressed whenever patient care is passed on from one clinician to another, such as at change of shift and transfer from one clinical area to another. Optimal pain relief is the responsibility of *every* member of the health care team and begins with titration of the analgesic agent, followed by continued prompt assessment and analgesic agent administration during the course of care to safely achieve pain intensities that allow patients to meet their functional goals with relative ease.

Although it may not always be possible to achieve a patient's pain intensity goal within the short time the patient is in an area like the PACU or emergency department, this goal provides direction for ongoing analgesic care. Important information to provide during transfer report is the patient's comfort–function goal, how close the patient is to achieving it, what has been done thus far to achieve it (analgesic agents and doses), and how well the patient has tolerated administration of the analgesic agent (adverse effects). There is growing interest among both clinicians and researchers in linking pain management to functional goals. Pain management interventions should improve and not inhibit progress toward healing and rehabilitation

Pain control is the responsibility of every member of the health care team and begins with systematic assessment and initial analgesic titration, followed by reassessment and analgesic administration throughout the course of care to safely achieve a level of pain that allows patients to meet their functional goals with relative ease.



The WHO analgesic ladder specifies treatment on pain intensity, from simple analgesics for mild pain to opioid analgesics for moderate and severe pain. Its three steps are: Step 1 Non-opioid plus optional adjuvant analgesics for mild pain; Step 2 Weak opioid plus non-opioid and adjuvant analgesics for mild to moderate pain; Step 3 Strong opioid plus non-opioid and adjuvant analgesics for moderate to severe pain. It is advised to move up one step when there is persistent pain.

In case of toxicity or severe adverse effects, providers are advised to either reduce medication doses or move down one step(4).

INITIATION OF PAIN RELIEF

Recommendation

In adults (including older persons) and adolescents with pain related to cancer, non-steroidal anti-inflammatory drugs (NSAIDs), paracetamol, and opioids should be used at the stage of initiation of pain management, either alone or in combination, depending on clinical assessment and pain severity in order to achieve rapid, effective and safe pain control. (Strong recommendation; low-quality evidence)

Remarks

Patients should be started on an analgesic with a strength appropriate to their assessed pain severity. Mild analgesics (paracetamol, NSAIDs) should not be given alone for initiation of management of moderate or severe pain. Patients may be started on a combination of paracetamol and/or NSAIDs with an opioid, such as oral morphine, if indicated by pain severity as measured on a validated numeric or visual analogue pain rating scale.

MAINTENANCE OF PAIN RELIEF WITH OPIOIDS

In adults (including older persons) and adolescents with pain related to cancer, any opioid may be considered for maintenance of pain relief (alone or in combination with NSAIDs and/or paracetamol), depending on clinical assessment and pain severity, in order to achieve sustained, effective and safe pain control. (Strong recommendation; low-quality evidence)

Remarks

The correct dose of opioid is the dose that relieves the patient's pain to an acceptable level. Patient responses to opioid medicines vary by patient and vary by medicine.

Recommendation

Regularly-dosed immediate-release oral morphine, or regularly-dosed slow-release morphine, should be used to maintain effective and safe pain relief whenever oral dosing is possible. With either formulation, immediate-release oral morphine should be used as rescue medicine. (Strong recommendation; moderate-quality evidence)

Remarks

Immediate-release oral morphine must be available and accessible to all patients who need it. Slow-release morphine should be made available whenever possible as an addition to, but not instead of, immediate-release oral morphine.

Best Practice statement

When oral or transdermal routes are not possible for administration of opioids, the subcutaneous route is preferred over intramuscular injection, as this route is less painful for the patient.

CESSATION OF OPIOIDS

Best Practice statement: - If a patient has developed physical dependence on opioids over the course of the management of their pain, opioid dosages should be decreased gradually to avoid withdrawal symptoms.

Non-Pharmacological Treatment

There are a variety of approaches for decreasing pain in adult and pediatric patients that are non-pharmacological. These types of strategies are often over-looked, but can be effective for alleviating pain when used either alone or in combination with other non-pharmacological or pharmacological measures.

Non-Pharmacological Treatment Non-pharmacological interventions may include: • Heat or cold (as appropriate)

- Massage
- Therapeutic touch
- Decreasing environmental stimuli (e.g. sound, lighting, temperature)
- Range of motion or physical therapy
- Repositioning
- Immobilization
- Relaxation techniques and imagery
- Distraction
- Psychotherapy or cognitive behavioral therapy

- Biofeedback
- Music therapy Material protected by copyright
- Aromatherapy
- Acupressure or acupuncture
- Transcutaneous electrical stimulus (TENS)

Self-Check -4	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I. Choose the best answer

1. According to the International Association for the Study of Pain, pain can be an unpleasant and emotional experience. Management can be simple or complex and may require a variety of skills and techniques. Which of the following is a technique used for pain management?
   A. Medication management
   B. Psychological counseling
   C. Interventional procedures
   D. All of the above
2. Pain Medication Orders must have"do not exceed in 24 hours" and "as evidenced by" orders? A. True B. False

Part II .fill the blank space

1. List down WHO analgesic ladder specifies treatment on pain intensity, from simple analgesics for mild pain to opioid analgesics for moderate and severe pain (5%)

_____,_____

Note: **Satisfactory rating - 5 and 10points Unsatisfactory - below 10points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet Name: _____

1. _____
2. _____
3. _____

Score = _____
Rating: _____

Information Sheet-5	Evaluation of client for drug effectiveness

6.5.1. Evaluation of client for drug effectiveness

Pain treatment is a relatively new discipline that has not yet significantly addressed the issue of treatment effectiveness or outcomes. Even the diagnosis of pain has been controversial since much debate continues to center around the issue as to whether pain is psychologic or anatomic. The severity of pain is believed by some to be purely whatever the patient says it is on a scale of 1 to 10. Treatment of pain is argued as to whether it should be medical, psychological, or interventional. While progress in pain treatment has certainly occurred, the journey has been an arduous process. Presented here is a paradigm in which a sub-class of pain patients is objectively diagnosed as having severe, chronic pain and treated with objective outcome measures of effectiveness. The objective diagnosis and evaluation techniques described here are recommended as a means to eliminate some of the subjectivity that has characterized ambulatory pain treatment.

6.5.1.1. Sympathetic Discharge Signs

Sympathetic or adrenergic discharge is caused by two concomitant mechanisms. Adrenergic receptors in the central nervous system are activated by uncontrolled pain, and these central receptors, in turn, activate the autonomic nervous system by sending electrical impulses downward into the periphery via the vagus nerve and the autonomic nerve network. The second mechanism is activation of the hypothalamic-pituitary-adrenal axis and the out-pouring of catecholamine (adrenalin, dopamine, and noradrenalin) and glucocorticoids (pregnenolone, cortisol) into the blood stream.

Findings of excess sympathetic discharge can be detected in acute and chronic uncontrolled pain. The author has frequently heard the comment that sympathetic discharge signs are only present with acute pain, but these signs are found to occur with any uncontrolled pain.

Signs of sympathetic discharge can be detected in non-verbal or comatose patients such as infants or bed-bound elderly. While not all the sympathetic discharge signs are present in every patient, signs such as elevated pulse rate, hypertension, dilated pupil, vasoconstriction, and diaphoresis are seen in every patient whose pain has elevated above a critical threshold that is biologically specific to that person. Sympathetic discharge signs can be quickly and easily assessed in clinical practice. Medical or nursing assistants—or even the patient—can be taught to take a blood pressure and pulse rate that can be verified by the practitioner. A simple feel of hands or feet can detect vasoconstriction, and a light touch of the skin under the eyes is a good place to feel the moisture of excess sweating. Pupil examination will require that fluorescent lights be turned off. The author recommends that patients with severe, chronic pain attempt to keep their pulse rate under about 88 per minute and their blood pressure below about 130/90mmHg. Normal pupil diameter is approximately 3.0 to 5.0mm.

6.5.1.2. Positional Relief Signs

Patients who “hurt” with some movement or physical function will attempt to avoid pain by finding a comfortable position. They may do this over a period of months to years and leave telltale physical signs that are easily observable (see Table 5). In its simplest form, positional relief is present in the patient who walks with a limp, drags a foot, or walks off-balance. Others can be observed in the patient who leans in one direction to relieve back pain or the headache patient who frowns on one side. In these cases, a permanent crease on one side of the back or forehead can be detected. If the patient seeks positional relief long enough, some muscle groups hypertrophy to compensate for the extra load while others may atrophy due to minimal use. Patients who walk abnormally to seek pain relief may have one shoe sole that wears down in one spot compared to the opposite shoe.

The basic physiologic problem with long-term attempts to utilize positional relief is that some body parts become asymmetrical. Rather than a balance of two equal sides, one side becomes overused with subsequent muscle hypertrophy and possibly degeneration of joints. For example, a patient with a painful right knee will over-load and over-use the left hip and knee and may develop degenerative arthritis and pain in the left hip and knee. The side of the body that is in pain, favored, and underused will undergo muscle atrophy and, possibly, contractures. For example, patients with a severe, painful neuropathy in one extremity may develop permanent atrophy and contractures to the point that the extremity is functionless. The atrophic side will often become cool to the touch as circulation also apparently decreases in the area. Fundamentally, the practitioner should look for physical, objective signs of asymmetry when evaluating a chronic pain patient. Unless severe pain is controlled, physical signs of asymmetry in the affected area of the body will invariably emerge.

6.5.1.3. Sensory Avoidance Signs

Closely related to positional relief is sensory avoidance. The obvious example of sensory avoidance is a painful area that gets more painful to touch. Uncontrolled pain hyper stimulates the autonomic nervous system, so practically any sensory input may cause additional pain (see Table 6). The classic case is the migraine patient who turns out the lights, lays alone in a room, and covers their head and eyes. This patient hurts worse with any sensory input including light, noise, smell, eating, or movement. Some extremely painful conditions such as reflex sympathetic dystrophy (Chronic Regional Pain Syndrome), adhesive arachnoiditis, and diabetic peripheral neuropathy produce such pain that even light touch is unbearable (allodynia). In these cases, patients may not wear clothes or allow a sheet to cover themselves. They may not wear shoes or socks. Patients with neuropathies of the face, head, and neck may not brush their teeth, shave, or comb their hair. Any attempt by the examiner to touch the affected area will be met with immediate withdrawal of the body part and a sudden “no” from the patient.

Patients with painful conditions of the upper torso, including fibromyalgia, abdominal adhesions, or cervical spine conditions may speak slowly, softly, and with hesitancy, lest a forceful voice and the effort of speaking produce more pain. Often, patients in severe pain will sit on the edge of their chair and stare straight ahead, because leaning back or turning their head is painful. Patients with spinal or abdominal diseases may breathe so slow and shallow that their carbon dioxide (CO2) levels increase.[2]

6.5.1.4. Pain Distraction Signs

When a patient is in severe pain, they may not only attempt to avoid sensory input and find positional relief, they may also attempt maneuvers or techniques to distract their attention away from their pain (see Table 7). An old joke describes this maneuver as the doctor who hammers the patient's hand so he's distracted from the pain of his slipped disc. With severe, pain, however, a similar phenomena may occur that can sometimes be physically detected by the practitioner. Grinding of the teeth can sometimes be detected by whittled-down teeth. Lip-biting and fist-clenching are common. Less commonly observed is overheating of a painful area with a hot water bottle or heating pad. Sometimes, permanently mottled skin or actual burns can be observed. Some rare patients become so tortured with pain that they will bang their head, fist, or foot against a wall, and the trauma of this activity may be evident. Cigarette burns may be intentionally self-inflicted.

6.5.1.5. At-Home Blood and Pulse Monitoring

Chronic pain has a baseline or persistent component, as well as breakthrough pain or pain flares. It is for this reason that patients should be taught to take their BP and pulse at home when breakthrough pain or flares occur. This can be done by use of contemporary BP/pulse monitoring devices that can be cheaply obtained at most pharmacies or large retail outlets.

Patients should keep an at-home record and bring this to their practitioner for review. In this manner, practitioners can determine if their medical regimen is effectively controlling pain while the patient is outside the clinical setting. In addition, patients and their families need to know that severe, chronic pain raises blood pressure and/or pulse rate, and that these elevations may lead to the cardiovascular complications of coronary artery disease and cerebral vascular accidents (strokes). Once patients and families see that the blood pressure and pulse rate go up with pain intensity, it is easy for the practitioner to educate the patient that a rise in adrenalin and cortisol is occurring and producing elevated blood lipids and glucose which may further hasten the development of arteriosclerosis and diabetes. Fundamentally, chronic pain of enough severity will cause sympathetic discharge and this physiologic phenomenon is a profound cardiovascular risk.

6.5.2. Critical Importance of Physical Signs in Regulating Opioid Dosages

Today there are many drug seekers as well as relief seekers. New patients who are initially evaluated should be physically examined for the objective, physical signs of severe pain that are presented as a checklist in Figure 1. If none are found, non-opioid treatments should be satisfactory for pain treatment. If a practitioner encounters a questionable patient, the patient's close family members can usually verify behavioral signs compatible with positional relief, sensory avoidance, or pain distraction attempts.

Patients who are in ongoing, ambulatory opioid treatment will periodically require an adjustment in opioid dosage. Upward increases in opioid dosages should be done if the patient's complaints of uncontrolled pain are confirmed by evidence of excess sympathetic discharge such as tachycardia, hypertension, cold hands, or dilated pupil.

For example, a patient who states their pain is an 8 out of 10 and demonstrates a pulse rate of 100 and a pupil dilated above 5.0mm in diameter warrants a higher opioid dosage or an additional opioid. On the contrary, if the same patient demonstrates a normal blood pressure, pulse rate, and pupil size, an adjustment in opioid dosage should be postponed for later evaluation. In this case, a daily at-home tracking of pulse and blood pressure and interview with the family would be in order.

6.5.3. Outcome Evaluation

In this paradigm, the outcomes of treatment are far more critical and important than any particular drug, therapy, or counseling. Outcomes are not just pain relief, but improvements in biochemical, physiologic, functional, and quality of life measures. On-going evaluation can easily be done at each clinic visit by written patient questionnaires (see Figures 2-4).

6.5.4. Short Term Evaluation

Within a short time after treatment is initiated an objective assessment should be done (see Table 9). In general, the author recommends a 60–90 day time-frame. This evaluation should consist of three components:

1. Pain Relief to Eliminate Emergency Room Visits
2. Biochemical Stabilization
3. Health and Function Stabilization

An unappreciated goal of treatment of severe pain is success in keeping the patient out of the emergency room and hospital, since most severe pain patients frequently seek help at these institutions prior to effective treatment. Figure 2 is a sample 60 – 90 day questionnaire given to our severe pain patients to help determine if treatment is beginning to work.

6.5.6. Pain Relief

Although it is standard practice to ask patients to evaluate their pain on a 1 to 10 scale, this scale is, by itself, inadequate to evaluate on-going pain control. Once pain control begins to occur, the pain scale may “shift” or “re-adjust” in the patient’s mind to the point that the patient always reports an 8, 10, or “worst ever” even though they have visibly improved. Other evaluative questions such as “do you believe your pain has improved or is it better controlled than before” are more revealing. Questionnaires (illustrated in Figures 2 and 3), given to pain patients at each clinic visit, provide a better on-going assessment.

6.5.7. Biochemical Evaluation

Some of the most serious medical complications of pain can be detected and evaluated by laboratory testing at the time of treatment initiation and at periodic follow-ups. It is highly recommended that severe pain cases have an initial, adrenal hormone screen of early morning pregnenolone and cortisol. Either high or low serum levels indicate severe pain[4,5,7]; low pregnenolone and/or cortisol represent adrenal exhaustion and hormone replacement may be necessary. In the author’s view, however, immune, lipid, and electrolyte monitoring is still early in research and are not yet recommended for routine evaluation.

6.5.8. On-Going Evaluation

Our severe pain patients are followed monthly for at least 6 to 12 months before a less frequent clinic attendance schedule is allowed. During this initial period, family members must be involved in the treatment process.

Goals are to not only provide pain relief but help the patient do the following:

- develop an at-home treatment program,
- determine if he/she is “getting better” (see Figure 3), and
- build a quality life (see Figure 4).

Also, at each visit, blood pressure and pulse rate are monitored to determine if sympathetic discharge is being adequately suppressed. If there is a question, the patient is requested to monitor BP and pulse rate at home.

Summary

Proper evaluation of pain treatment requires, like any other medical condition, that all patients have a treatment entry diagnosis that is defined, standard, and objectively determined. Outcomes need to be clear and easily assessed among all patients in treatment. Presented here is an paradigm to identify pain patients who have a diagnosis of severe, chronic pain, and whose treatment is assessed by various objective measures to monitor clinical progress. Severe chronic pain patients, as defined and identified here, may have to be in opioid treatment for many years—if not a lifetime. While the objective measures and definitions presented here are admittedly new and undoubtedly preliminary in sophistication relative to the future, they represent a structured paradigm with examples for future investigation.

Self-Check -5	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I. Choose the best answer

1. Nurses need to evaluate and reevaluate not only the patient's pain intensity level, but also which of the following factors:

A. **Pain** duration and quality.
B. Quality of **pain relief**.
C. Time to onset of analgesic effect.
D. Functional ability, sleep, mood, and/or behaviors.
E. All are correct

Pain interferes with many daily activities, and one of the goals of **acute pain management** is**.**

A. To reduce the effect of pain on patient function and quality of life.
B. To cure the rout cause of pain
C. To diagnosis the rout cause of pain
D. To show the client that the pain is curable.

Part II .fill the blank space

1. When should you assess pain? (5%)

_____,_____

_____,_____

Note: **Satisfactory rating - 5 and 10points Unsatisfactory - below 10points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet Name: _____

1. _____
2. _____
3. _____

Score = _____
Rating: _____

Information Sheet-6	Nursing role of pain management

6.6. Nursing role of pain management

Pain can be a common experience for patients in the hospital setting. It is integral to the role of a nurse to effectively assess and manage the perception of pain for patients. Nurses require both the knowledge and skills to appropriately plan and provide interventions for pain.

Pain is often referred to as the “fifth vital sign,” and should be assessed regularly and frequently. Pain is individualized and subjective; therefore, the patient’s self-report of pain is the most reliable gauge of the experience. If a patient is unable to communicate, the family or caregiver can provide input. Use of interpreter services may be necessary. Components of pain assessment include: a) history and physical assessment; b) functional assessment; c) psychosocial assessment; and d) multidimensional assessment.

Consistent with the licensee’s scope of practice, the nurse is accountable for implementing the pain management plan utilizing his/her knowledge base and documenting assessment of the individual’s needs. It is the responsibility of the nurse to utilize critical thinking and integrate multimodal approaches for effective pain management. The nurse has the authority to adjust medication levels within the dosage range stipulated by the prescriber and according to the institutions established procedures. When pain is not controlled under the currently prescribed treatment plan, the nurse is responsible for reporting such findings to the prescriber, advocating for an optimal pain management plan and documenting the continuum of care provided an individual with pain. Advanced Practice Nurses who are authorized by law to prescribe or dispense drugs, including controlled substances.

6.6.1. Principles of pain management include:

• Assessment - the process of pain management starts with an adequate assessment of the pain which can include but is not limited to

- ✓ Nature of the pain (including the use of an appropriate, evidence-based pain assessment scale.
- ✓ Cause of the pain
- ✓ Personal context of pain, including how pain impacts daily function and quality of life

• Development and implementation of an individualized pain management plan that is evidence-based and includes comprehensive and on-going pain assessment, including impact on daily functional ability, appropriate pharmacological and non-pharmacological modalities, and substantiation of adequate symptom control;

• Implement measures in the care plan that include non-pharmacological modalities, interventions, and comfort measures for pain management i.e. positioning, pillow placement, music, dimming lights, heat and cold etc.

• Document assessments, interventions, treatment and response;

• Utilization of controlled substances when appropriate including opioid analgesics in the management of all pain types;

• Collaboration and consultation with Interdisciplinary teams;

• Recognition that:

1. Tolerance and physical dependence are normal consequences of sustained use of opioids and are not synonymous with addiction;

2. pseudo addiction may develop as a direct consequence of inadequate pain management and that pseudo addiction can be distinguished from true addiction in that inappropriate drug seeking behaviors resolve when pain effectively treated;

3. Patients with chemical dependency may require special pain management involving controlled substances including opioids;

4. individuals who suffer from extreme pain or disease progression may require increased doses of pain medication and the appropriate dose is the dose required to effectively manage the patient's pain in that particular circumstance.

- Adherence to system safe-guards that are designed to minimize the potential for abuse and diversion when controlled substances are used;
- Acceptance of an individual's self-determination and autonomy;
- Culturally sensitive patient, family/significant other, and/or caregiver pain management education.

6.6.2. Pain Education and Training

The nurse is responsible and accountable for acquiring and maintaining current knowledge, skills and abilities necessary to practice in accordance with accepted standards of care for pain management. Such competencies may be acquired through basic, graduate or continuing education programs, as appropriate to the nurse's scope of practice. These competencies include, but are not limited to knowledge of the current federal and state laws and regulations for the prescription, dispensing, administration and destruction of controlled substances, current evidence-based guidelines developed by nationally recognized professional organizations in the assessment and management of pain and the use of pharmacological and non-pharmacological modalities (e.g. heat and cold therapies).

Evidence-based clinical practice guidelines support the need for individual titration of the dose of medications such as opioid analgesics. Range orders enable necessary and safe adjustments in doses based on individual responses to treatment. In order to promote Oregon State Board of Nursing: Interpretive Statement Updated December 2015 Page 5 of 6 patient safety and reduce medication errors it is critical that physicians, nurses, and pharmacists share a common understanding of how to properly write, interpret, and carry out PRN range orders. The nurse is often the health professional most involved in on-going pain assessment and implementing the pain management plan. The LPN may assist in the assessment however the RN has the overall responsibility.

In order to achieve adequate pain management, the RN and LPN must base decisions concerning the implementation of range dose orders based on a thorough pain assessment.

Both the RN and LPN must be knowledgeable of the:

- Medication to be administered,
- Anticipated time of onset of the medication,
- Time to peak effect, duration of action of the medication,
- And side effects of the medication to be administered.

Consistent with the licensee's scope of practice, both the RN and LPN is accountable for implementing the pain management plan including pharmacologic, non-pharmacologic and complimentary interventions utilizing their knowledge, skills and abilities and organization policy.

Self-Check -6	Written Test

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

Part I. Choose the best answer

1. The nurse's role in pain management include the following except? **(3points)**
   A. on-going **pain** assessment
   B. implementing the prescribed **pain management** plan
   C. Changing the prescribed drug if needed
   D. evaluating the response to interventions and adjusting **medication** levels, based on the individual's response
2. The nurse is responsible and accountable for acquiring and maintaining current knowledge, skills and abilities necessary to practice in accordance with accepted standards of care for pain management? **(2points)**
   A. True B. False

Note: **Satisfactory rating – 3-5points Unsatisfactory - below 3points**

You can ask you teacher for the copy of the correct answers.

Answer Sheet Name: _____

1. _____
2. _____
3. _____

Score = _____
Rating: _____

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