FUNDAMENTAL OF NURSING

Prepared by

DR. REFAI YASSEN AL-HUSSEIN

ASSISTANT PROFESSOR / DOCTORATE PHILOSOPHY IN NURSING

TECHNICAL INSTITUTE OF MOSUL

NURSING DEPARTMENT

المادة: أسس التمريض

إعداد

د. رفاعي ياسين الحسين

أستاذ مساعد / دكتوراه فلسفة في تمريض

المعهد التقني / الموصل

قسم التمريض
<table>
<thead>
<tr>
<th>الأسبوع</th>
<th>المفردات النظرية</th>
</tr>
</thead>
<tbody>
<tr>
<td>الثاني</td>
<td>إدخال وإخراج المريض المستشفى - عم طبقة المريض - استلام التقارير الشفوية - كتابة التقارير التحريرية - خطوات العملية التمريضية (التقييم - التخطيط - التنفيذ - التقويم).</td>
</tr>
<tr>
<td>الثالث والثالث</td>
<td>المفردات التفصيلية</td>
</tr>
<tr>
<td>السادس</td>
<td>الجهة الجسم - أوقاع المريض - فوائد التمارين العلاجية والحركة - تحريك المريض ونفقه - مضاعفات ومخاطر عدم الحركة وكيفية تجنب المضاعفات.</td>
</tr>
<tr>
<td>السابع والثامن</td>
<td>الحاجيات الأساسية للمريض - العناية بوحدة المريض - عمل الفراش - أسباب عدم الراحة البدنية - الصحة النفسية والدعم النفسي والعاطفي للمريض.</td>
</tr>
<tr>
<td>الحادي عشر</td>
<td>التغذية والسوائل – الغذاء – العوامل المؤثرة على تغذية المريض - الإطلاع والتخلص من فضلات الجسم - الأطراف عن طريق الجهاز البولي - الأطراف عن طريق الجهاز الهضمي - الأطراف عن طريق الأندوب الألفي المعدى.</td>
</tr>
<tr>
<td>الثاني عشر</td>
<td>طرق التعقيم - التطهير الجراحي - التطهير الطبي - أنواع المطرات - توضيح الجروح ومقايضتها - أنواع الضمادات - تعقيم الأدوات الجراحية والقواعد المتاحة في تضميم الجروح ورفع الخيوط.</td>
</tr>
</tbody>
</table>
| الثالث عشر والرابع عشر | العلامات الحيوية - حرارة الجسم - تعريف درجة الحرارة للجسم - قياس الحرارة - طرق قياسها - الحرارة (المCOMMON- الوسيلة - الشريحة) - الحكم - تعريفها - أسبابها - علاماتها بالتمثيلية - طرق قياس النبض - تعريف النبض - العوامل المؤثرة على معدل النبض - مناطق قياس النبض - الملاحظات التمريضية أثناء قياس النبض - التنفس - تعريفه - العوامل المؤثرة على معدل التنفس - ضغط الدم - 
تـعـرـيـف الـضـغـط الـانـقـبـاضي — تـعـرـيـف الـضـغـط الـانـبـسـاطي — العوامـل
المؤشرة على معدل الضغط.


الأبامس
والسادس
والسابع
عشر

إعطاء السوائل والدم عن طريق التسريب الوريدي — دور الممرضة أثناء إعطاء السوائل الوريدية — دور الممرضة في رفع جهاز المغذي — إعطاء الدم — أهداف نقل الدم — الملاحظات المهمة أثناء عملية نقل الدم.

الثامن عشر

وفرة إنعاش القلب — محتويات وحدة إنعاش القلب — جهاز تخطيط القلب — أنواعه — مكونات جهاز تخطيط القلب — كيفية إجراء تخطيط القلب.

التاسع

Target Population: Students of Nursing Department; First Class Students.

The Goal: To enable the student to acquisition of body of knowledge regarding nursing profession.

Objectives:

1. To provide the student with basic concepts related to individual's health.
2. To assist the student how to evaluate body health condition in respect to vital signs.
3. To direct the student how to deal with medications and their administration.
4. To help the student to carry out special life-sustaining procedures, or life-promoting procedures.
5. To acquire the student by solid awareness of some of laboratory and diagnostic investigations.
6. To assist the student how to care the patient perioperatively.
Lecture One

Pre-Tests:

Answer by (True) against the true sentences and by (False) against the false sentences:

1. Is nursing directed to individuals only?
2. Is nursing directed to the sick only?
3. Health is many dimensions: physical, social and psychological.
4. The general hospitals affiliated with universities or governmental.

*******************************

Nursing: is autonomic and collaborative care of individuals of all ages, families, groups and communities, sick or well in all settings. The unique function of nursing is to assist the individual, sick or well, in the performance of these activities contributing to health, its recovery, or to peaceful death that the client would perform unaided if he/she has the necessary strength, will or knowledge, and to do this in such a way as to help the client gain independence as rapidly as possible.

Nurse: is a person who is educated and licensed in the practice of nursing, concerned with the diagnosis and treatment of human responses to actual or potential health problems.

Health: is a "State of complete physical, mental, and social well being, and not merely the absence of disease or infirmity." Health is a dynamic condition resulting from a body's constant adjustment and adaptation in response to stresses and changes in the environment for maintaining an inner equilibrium called homeostasis.

Hospital: is an institution for health care providing patient treatment by specialized staff and equipment, and often, but not always providing for longer-term patient stays. Some patients go to a hospital just for diagnosis, treatment, or therapy and then leave 'outpatients' without staying overnight; while others are 'admitted' and stay overnight or for several weeks or months 'inpatients'. Hospitals usually are distinguished from other types of medical facilities by their ability to admit and care for inpatients and the others often are described as a clinic. A hospital may be a single building or a number of buildings on a campus. Some hospitals are affiliated with universities for medical research and the training of medical personnel such as physicians and nurses, often called teaching
hospitals. Worldwide, most hospitals are run on a nonprofit basis by governments.

**Types:**

1. **General**- The best-known type of hospital is the general hospital, which is set up to deal with many kinds of disease and injury, and typically has an emergency department to deal with immediate and urgent threats to health. A general hospital typically is the major health care facility in its region, with large numbers of beds for intensive care and long-term care; and specialized facilities for surgery, plastic surgery, childbirth, laboratories, and so forth. Larger cities may have several hospitals of varying sizes and facilities.

2. **Specialized**- Types of specialized hospitals include trauma centers, rehabilitation hospitals, children's hospitals, geriatric hospitals, and hospitals for dealing with specific medical needs such as psychiatric problems, certain disease categories, and so forth.

3. **Teaching**- A teaching hospital combines assistance to patients with teaching to medical students and nurses and often is linked to a medical school, nursing school or university.

4. **Clinics**- A medical facility smaller than a hospital is generally called a clinic, and often is run by a government agency for health services or a private partnership of physicians. Clinics generally provide only outpatient services.
References:

- Taylor C, and Others; Fundamentals of Nursing; The art and Science of Nursing Care, Lippincott, 2001.
- Barbera K; Fundamentals Skills and concepts in Patient Care, Lippincott, 2000.

*******************************

Post-Tests:

Answer by (True) against the true sentences and by (False) against the false sentences:

1. Is nursing directed to individuals only?
2. Is nursing directed to the sick only?
3. Health is many dimensions: physical, social and psychological.
4. The general hospitals affiliated with universities or governmental.

Answer Keys:

1. False. 2. False 3. True 4. True

RETURN TO THE HOME PAGE
Lecture Two - Three

Patient's Admission to the Hospital

Pre-Test:

Answer by (True) against the true sentences and by (False) against the false sentences:

1. The patient's medical record contains only demographic data of the patient.
2. The patient's medical record contains the present health problem only.
3. The patient's medical record considers legal document.
4. Family health history isn't important to include in the patient's medical record.
5. Other medical or health encounters can't use the patient's medical record.
6. The components of nursing process is logical and sequential.

************************

Patient's Admission to the Hospital

Hospital admission means staying at a hospital for at least one night or more. Staying in the hospital overnight is done because the individual is too sick to stay at home, requires 24-hour nursing care, and/or is receiving medications and undergoing tests and/or surgery that can only be performed in the hospital setting.

Medical record or medical chart: is a systematic documentation of a patient's individual medical history and care. The information contained in the medical record allows health care providers to provide continuity of care to individual patients. The medical record also serves as a basis for planning patient care, documenting communication between the health care provider and any other health professional contributing to the patient's care, assisting in protecting the legal interest of the patient and the health care providers responsible for the patient's care, and documenting the care and services provided to the patient. Traditionally, medical records have been written on paper and kept in folders. These folders are typically divided into useful sections, with new information added to each section.
**Basic contents of the record:**

The information recorded with a personal health record could start with:

* Name, birth date, residence and emergency contact.
* Sex, Blood type.
* Date of last physical examination.
* Dates and results of tests and screenings.
* Major illnesses and surgeries, with dates.
* List of medication, dosages and duration of prescription.
* Any allergies.
* Any chronic diseases.
* Any history of illnesses in the family.

**Medical history:** The medical history is a longitudinal record of what has happened to the patient since birth. It records diseases, major and minor illnesses, as well as growth signs. It gives the clinician a feel for what has happened before to the patient. As a result, it may often give clues to current disease states.

**Surgical history:** The surgical history is a report of surgery performed for the patient. It may have dates of operations, operative reports, and/or the detailed narrative of what the surgeon did.

**Obstetric history:** The obstetric history lists prior pregnancies and their outcomes. It also includes any complications of these pregnancies.

**Medications and medical allergies:** The medical record may contain a summary of the patient’s current and previous medications as well as any medical allergies.

**Family history:** The family history lists the health status of immediate family members as well as their causes of death (if known). It may also list diseases common in the family or found only in one sex or the other. It may also include a history chart. It is a valuable asset in predicting some outcomes for the patient.

**Social history:** The social history is a record of human interactions. It tells of the relationships of the patient, his/her careers and trainings, schooling and religious training. It is helpful for the physician to know what sorts of community support the patient might expect during a major illness. It may explain the behavior of the patient in relation to illness or loss. It may also give clues as to the cause of an illness (e.g. occupational exposure to asbestos).
**Habits:** Various habits which impact health, such as tobacco use, alcohol intake, exercise, and diet are reported, often as part of the social history. This section may also include more essential details such as sexual habits and sexual orientation.

**Immunization history:** The history of vaccination is included. Any blood tests proving immunity will also be included in this section.

**Growth chart and developmental history:** For children and teenagers, charts documenting growth as it compares to other children of the same age is included, so that health-care providers can follow the child's growth over time. Many diseases and social stresses can affect growth and longitudinal charting and can thus provide a clue to underlying illness. Additionally, a child's behavior (such as timing of talking, walking, etc.) as it compares to other children of the same age is documented within the medical record for much the same reasons as growth.

**Medical encounters:** Within the medical record, individual medical encounters are marked by separate summations of a patient's medical history by a physician, nurse practitioner, or physician assistant and can take several forms. Hospital admission documentation (i.e., when a patient requires hospitalization) or consultation by a specialist often take an comprehensive form, detailing the entirety of prior health and health care. Routine visits by a provider familiar to the patient, however, may take a shorter form such as the problem-oriented medical record (POMR), which includes a problem list of diagnoses or a method of documentation for each visit. Each encounter will generally contain the aspects below:

- **Chief complaint:** This is the problem that has brought the patient to see the doctor. Information on the nature and duration of the problem will be explored.
- **History of the present illness:** A detailed exploration of the symptoms the patient is experiencing that have caused the patient to seek medical attention.
- **Physical examination:** The physical examination is the recording of observations of the patient. This includes the vital signs, muscle power and examination of the different organ systems, especially ones that might directly be responsible for the symptoms the patient is experiencing.
- **Assessment and plan:** The assessment is a written summation of what are the most likely causes of the patient's current set of
symptoms. The plan documents the expected course of action to address the symptoms (diagnosis, treatment, etc.).

**Orders and Prescriptions:** Written orders by medical providers are included in the medical record. These detail the instructions given to other members of the health care team by the primary providers.

**Progress notes:** When a patient is hospitalized, daily updates are entered into the medical record documenting clinical changes, new information, etc. These often take the form of notes and are entered by all members of the health-care team (doctors, nurses, physical therapists, dietitians, clinical pharmacists, respiratory therapists, etc.). They are kept in reported order and document the sequence of events leading to the current state of health.

**Test results:** The results of testing, such as blood tests (e.g., complete blood count) radiology examinations (e.g., X-rays), pathology (e.g., biopsy results), or specialized testing (e.g., pulmonary function testing) are included. Often, as in the case of X-rays, a written report of the findings is included in place of the actual film.

**Other information:** Many other items are variably kept within the medical record. Digital images of the patient, flow sheets from operations/intensive care units, informed consent forms, ECG tracings, outputs from medical devices (such as pacemakers), chemotherapy protocols, and numerous other important pieces of information form part of the record depending on the patient and his or her set of illnesses/treatments.

There are several information needed to be recorded while tracing state of patient's daily health:

1. Vital Signs: Body Temperature, Pulse Rate(Heart Rate), Blood pressure and Respiratory Rate.
2. Intake: Medication, Fluid, Nutrition, Water and Blood, etc.
3. Output: Blood, Urine, Excrement, Vomitus and Sweat, etc.
4. Observation on Pupil size.
5. Capability of four limbs of body

**Administrative issues:** Medical records are legal documents and are subject to the laws of the country/state in which they are produced.

**Demographics:** Demographics include patient's information that is not medical in nature. It is often information of address, and contact numbers.
It may contain information about race and religion as well as workplace and type of occupation.

**Nursing Process**

*Nursing Process* is a systematic, rational method of planning and providing nursing care. Its goal is to identify a client's health care status, and actual or potential problems, to establish plans to meet the identified needs, and to deliver specific nursing interventions to address those needs. The nursing process is cyclical; that is its components follow a logical sequence, but more than one component may be involved at one time. At the end of the first cycle, care may be terminated if goals are achieved, or the cycle may be continue with reassessment, or the plan of care may be modified.
References:

- Taylor C, and Others; Fundamentals of Nursing; The art and Science of Nursing Care, Lippincott, 2001.
- Barbera K; Fundamentals Skills and concepts in Patient Care, Lippincott, 2000.
- Medical record; From Wikipedia, the free encyclopedia, 2007.
Post test:

Answer by (True) against the true sentences and by (False) against the false sentences:

1. The patient's medical record contains only demographic data of the patient.
2. The patient's medical record contains the present health problem only.
3. The patient’s medical record considers legal document.
4. Family health history isn't important to include in the patient's medical record.
5. Other medical or health encounters can't use the patient's medical record.
6. The components of nursing process is logical and sequential.

Answer Keys:

1. False. 2. False. 3. True. 4. False
5. False. 6. True.

RETURN TO THE HOME PAGE
Lecture Four – Five

Physical Examination

Pre-test;

A). Answer by (True) against the true sentences and by (False) against the false sentences:

1. Observation of the patient is purposeless in diagnosing his/her health problem.
2. Enema may be done before patient exam.
3. Laboratory tests can confirm diagnosis.
4. Before lab test, the nurse may explain to the patient what to do.
5. Urea and Creatinine don't used to evaluate renal functions.
6. If pH is more than neutral (7) it calls acidity.

B). Complete the followings with suitable wards:

1. The levels of hemoglobin are; in Male …… g/dL, in Female ……d/mL.
2. RBCs count in Men is ……/ml, in Female ……/mL³.

Methods:

1. Inspection.
2. Palpation.
3. Percussion.
4. Auscultation by using Stethoscope.

Management before Examination:

1. Explain to the patient what to do.
2. Bath the patient.
3. Measure the weight and height of the patient.
4. Enema may be done.
5. Cover the patient unless the needed parts of the body.
6. Maintain the privacy of the patient.
7. Don't leave the female patient alone during the exam.
Management during Examination:

1. Psychological support by explaining to the patient what to do.
2. Check vital signs.
3. Assist physician.
4. Put the patient in comfortable position.
5. Collect laboratory specimens.
6. Maintain the privacy of the patient.
7. Don't leave the female patient alone during the exam.

Diagnostic Testing:

Diagnostic and laboratory tests (commonly called lab tests) are tools that provide information about the client. Frequently tests are used to help confirm a diagnosis, monitor an illness, and provide valuable information about the client's responses to treatment. Nurses need knowledge of the most common lab and diagnostic tests because one primary role of the nurse is to teach the client and family or significant other how to prepare for the test and the care that may required following the test. Nurses must also know the implications of the test results in order to provide the most appropriate nursing care for the client. Diagnostic testing involves three phases; pretest, intra-test and post-test.

Pretest: The focus of this phase is on client preparation through communication and teaching strategies (Explaining what to do).

1. Prior to radiological studies it is important to ask female clients if pregnancy is possible, the special precautions may be necessary or the test may need to be postponed.
2. The nurse also needs to know what equipments and supplies are needed for the specific test.
3. Know what type of sample will be needed and how to be collected.
4. know if the client need to stop oral intake for a certain number of hours prior the test.
5. Know if the test include administration of dye, and if so, is it injected or swallowed.
6. Know if fluid restricted or forced.
7. Know if medications given or withheld.
8. Know how long is the test.
9. Know if a consent form required.
**Intra-test:** The focus of this phase is on specimen collection and performing or assisting with certain diagnostic testing.

1. Using standard precautions and sterile technique as appropriate.
2. Emotional support while monitoring the client as needed (Check vital signs, Pulse oximetry, ECG).
3. Ensure correct labeling, storage, and transportation of the specimen to avoid invalid test results.

**Post-test:** The focus of this phase is on nursing care of the client and follow-up activities and observations.

1. Compare the previous and current test results and modify nursing interventions as needed.
2. Report the results to appropriate health team members.

**Laboratory Specimens:**

1. **Blood test;**
   A. Complete blood count (CBC)- specimens of venous blood are taken for this test that include; **hemoglobin** (is a measure of total amount of hemoglobin in the blood), **hematocrit** (measures the percentage of red blood cells in the total blood volume). *They are at higher levels with males than females.* [Hemoglobin; Males (14-18 g/dL or 8.7-11.2 mmol/L); Female (12-16 g/dL or 7.4-9.9 mmol/L); RBC; Male (4.7-6.1 ×10^6/mL); Female (4.2-5.4×10^6/mL)]. *They are increased with dehydration as the total blood becomes more concentrated, and decrease with hypervolemia and resulting hemodilution. They are varied by gender and age. Low RBC count is indicative anemia. Clients with chronic hypoxia may develop higher than normal counts.* **Leukocyte or white blood cell (WBC)** to determine the number of circulatory WBCs- it increases in the presence of bacterial infection and be low in viral infection.
B. Serum Electrolytes;

<table>
<thead>
<tr>
<th>Venous blood</th>
<th>Sodium</th>
<th>135–145 mEq/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium</td>
<td>3.5–5.0 mEq/L</td>
<td></td>
</tr>
<tr>
<td>Chloride</td>
<td>95–105 mEq/L</td>
<td></td>
</tr>
<tr>
<td>Calcium (total)</td>
<td>4.35–5.5 mEq/L or 8.3–10.5 mg/dL</td>
<td></td>
</tr>
<tr>
<td>Calcium (ionized)</td>
<td>50% of total calcium (2.5 mEq/L or 4.0–5.0 mg/dL)</td>
<td></td>
</tr>
<tr>
<td>Magnesium</td>
<td>1.5–2.5 mEq/L or 1.6–2.5 mg/dL</td>
<td></td>
</tr>
<tr>
<td>Phosphate</td>
<td>1.8–2.6 mEq/L</td>
<td></td>
</tr>
<tr>
<td>Serum osmolality</td>
<td>280–300 mOsm/kg water</td>
<td></td>
</tr>
</tbody>
</table>

Urea and Creatinine are routinely used to evaluate renal function. The kidneys, through filtration and tubular secretion, normally eliminate both. Urea, the end product of protein metabolism, is measured as blood urea nitrogen (BUN). Creatinine is produced in relatively constant quantities by the muscles and excreted by the kidneys. Thus, the amount of creatinine in the blood relates to renal excretory function.

C. Serum Osmolality; is a measure of the solute concentration of the blood. The particles included are sodium ions, chloride, glucose, and urea (BUN). Serum osmolality values are used primarily to evaluate fluid balance. Normal values are 280-300mOsm/kg. An increase in serum osmolality indicates a fluid volume deficit, a decrease reflects a fluid volume excess.

D. Drug Monitoring; Therapeutic drug monitoring is often conducted when a client is taking a medication with a narrow therapeutic range (e.g. digoxin, theophylline..). The Peak level indicates the highest concentration of the drug in the blood serum and the Trough level represents the lowest concentration. Ideally, a client's peak and tough levels fall within the therapeutic range.

E. Arterial Blood Gases; Blood specimens should be taken from the radial, brachial, or femoral arteries for there is the great pressure of the blood within these arteries. After taking the specimen, pressure must be applied to the puncture site for 5-10 minutes after removing the needle to prevent hemorrhage.

F. Blood Chemistry; in addition to serum electrolytes, certain enzymes as lactate dehydrogenase (LDH), creatine kinase (CK), aspartate aminotransferase (AST), and alanine
aminotransferase (ALT), serum glucose, hormones as thyroid hormone, and other substances as cholesterol and triglycerides.

G. Capillary Blood Glucose: is often taken to measure blood glucose when frequent tests are required or when a veinpuncture cannot be performed. Hence, the client can perform this technique on themselves.

H. 2. Specimen Collection: All hospitalized clients have at least one laboratory specimen collected during their stay at the health care facility. Laboratory examinations of specimens such as; urine, blood, sputum and wound drainage.

3. Stool Specimens; it carries for many reasons:
   A. To determine the presence of occult (hidden) blood, due to ulcers, inflammatory diseases or tumors.
   B. To analyze for dietary products and digestive secretions, as, an excessive amount of fat (steatorrhea) which indicate faulty absorption of fat from small intestine. A decreased amount of bile can indicate obstruction of bile flow from the liver and gallbladder into the intestine.
   C. To detect the presence of ova and parasites.
   D. To detect the presence of bacteria or viruses.

4. Urine Specimens; for;
   A. specific gravity (which is an indicator of urine concentration, or the amount of solutes – metabolic wastes and electrolytes; the normal range is 1.010-1.025).
   B. pH- to determine the client's acidity or alkalinity of urine and assess the client's acid-base status. Urine normally is slightly acidic with an average pH of (6), (7 is neutral, less than 7 is acidic, greater than 7 is alkaline).
   C. Glucose- to screen clients for diabetes mellitus and to assess clients during pregnancy for abnormal glucose tolerance.
   D. Ketones- which is product of the breakdown of fatty acids, normally they are not present in the urine.
   E. Protein- protein molecules normally are too large to escape from glomerular capillaries. If the glomerular membranes has been damaged due to an inflammatory process such as glomerulonephritis, it can become leaky, allowing proteins to escape.
   F. Occult blood- Normal urine is free from blood.
G. Osmolality- is a measure of the solute concentration of urine that is a more exact measurement of urine concentration than specific gravity. It also used to monitor fluid and electrolyte balance. The particles included are nitrogenous wastes as creatinine, urea, and uric acid. Normal values are 500 – 800 mOsm/kg.

H.  
5. **Sputum Specimens**; Sputum is the mucous secretion from the lungs, bronchi and trachea. It is important to differentiate it from Saliva, the clear liquid secreted by the salivary glands in the mouth. Healthy individual do not produce sputum.

6. **Throat Culture**; The throat culture sample is collected from the mucosa of the oropharynx and tonsillar regions using a culture swab, which is then cultured and examined for the presence of disease-producing microorganisms.

**Thoracenthesis:** Normally, only sufficient fluid to lubricate the pleura is present in the pleural cavity. However, excessive fluid can accumulate as a result of injury, infection, or other pathology. In such cases or in the case of pneumothorax, physician may perform thoracenthesis to remove he excess fluid or air to ease breathing. Also, thoracenthesis is performed to introduce chemotherapeutic drugs intrapleurally. The nurse assists the client to assume a position that allows easy access to the intracostal spaces (by sitting position with the arms above the head, which spread he ribs and enlarges the intracostal space. Two positions commonly used; one is the arm elevated and stretched forward and the other is which the client leans forward over a pillow). A site on the lower posterior chest is often used to remove fluid, and a site on the upper anterior chest is used to remove air. A chest X-ray prior to the procedure will help pinpoint the best insertion site.

![Thoracenthesis Images]

**Abdominal Paracenthesis:** Normally, the body creates just enough peritoneal fluid for lubrication. The fluid is continuously formed and absorbed into the lymphatic system. However, in some disease processes,
a large amount of fluid accumulates in the abdominal cavity; this condition is called **Ascitis**. Normal ascetic fluid is serous, clear and light yellow in color. An **abdominal paracenthesis** is carried out to obtain a fluid specimen for laboratory study and relieve pressure on the abdominal organs due to the presence of excess fluid. A common site for abdominal paracenthesis is the midway between the umbilicus and the symphysis pubis on the midline. A physician makes a small incision with a scalpel, inserts **trocar** (a sharp, pointed instrument) and **cannula** (tube) and withdraws the trocar, which is inside the cannula. Tubing is attached to the cannula and the fluid flow through the tubing into a receptacle. Normally, about 1.500 mL is the maximum amount of fluid drained at one time to avoid hypovolemic shock.

**Lumbar Puncture:** In a **lumbar puncture** cerebrospinal fluid (CSF) is withdrawn through a needle inserted into the subarachnoid space in the spinal canal between the third and fourth lumber vertebrae or between the fourth and fifth lumber vertebrae. At this level the needle avoids damaging the spinal cord and major nerve roots. The client is positioned laterally with the head bent toward the chest, the knees flexed onto the abdomen, and the back at the edge of the bed or examining table. The physician frequently takes CSF pressure readings using a **manometer**, a glass or plastic calibrated in millimeters.
References:

- Taylor C, and Others; Fundamentals of Nursing; The art and Science of Nursing Care, Lippincott, 2001.
Post-test:

A). Answer by (True) against the true sentences and by (False) against the false sentences:

1. Observation of the patient is purposeless in diagnosing his/her health problem.
2. Enema may be done before patient exam.
3. Laboratory tests can confirm diagnosis.
4. Before lab test, the nurse may explain to the patient what to do.
5. Urea and Creatinine don’t used to evaluate renal functions.
6. If pH is more than neutral (7) it calls acidity.

B). Complete the followings with suitable wards:

1. The levels of hemoglobin are; in Male …… g/dL, in Female ……d/mL.
2. RBCs count in Men is …… /ml, in Female ……/mL3.

Answer Keys:

5. False. 6. False.

B). 1. Male; (14 – 18 g/dL), Female; (12 – 16 g/dL)
2. Male; (4.7 – 6.1 × 106/mL3), Female; (4.2 – 5.4 × 106/mL3)
Lecture- Six

Body Mechanics

Pre-test:

Answer by (True) against the true sentences and by (False) against the false sentences:

1. Any body is stable if it has narrow base of support.
2. Any body is stable if its center of gravity is high.
3. Therapeutic exercises stimulate circulation.
4. Standing position uses to check knee reflex.
5. Prone position uses in case of IM injection (Gluteal muscle).
6. Fowler position in cardiopulmonary problems.
7. Immobility leads to joint stiffness.
8. If the immobile individual stands suddenly, he/she can faint.
9. Immobility reduces vital lung capacity.
10. Renal calculi (stone) can't accompanied with immobility.
11. Immobility can cause constipation.
12. Immobility doesn't interfere with skin circulation.

************************************************

Body Mechanics

Body Mechanics- is the efficient use of the body as a machine and as a means of locomotion and is directly related to the effective functioning of the body.
**Fundamentals of Body Mechanics:**

1. Base of support.

2. Center of gravity (*In human, the center of gravity when standing is located in the center of pelvis about midway between the umbilicus and symphysis pubis*).

3. Using muscles for designated activities.

**Principles of Body Mechanics:**

1. Develop a habit of erect position.

2. Hold chest up and slightly forward with waist extended.

3. Hold head erect with chin held in.

4. Stand with feet parallel at right angles to the lower leg, and keep body weight equally distributed on both feet.

5. Spread the feet apart to provide a wider base of support.

6. Keep the work area at a comfortable height.


8. Keep buttocks in, abdomen up and in.

9. Work as closely as possible to an object lifted or moved.

10. Use the weight of the body as a force for pulling or pushing.

11. Use arm bones as leavers and the elbows as fulcrums to facilitate lifting weight against resistance (force or gravity).

12. Use the largest and the strongest muscles of the arms and legs to help provide the power needed in strenuous activities.

13. Using a pull sheet – smooth, dry, firm to decrease the effects of friction which decreases the amount of effort required to move an object.

**purposes of Therapeutic Exercises:**

1. Maintain and build muscle strength.


3. Prevent deformity.
5. Enhance endurance.

*Types of Exercise:*

1. *Isotonic exercises:* involve muscle shortening and active movement, as, carrying out activities of daily lie.

2. *Isometric exercises:* involves muscle contraction without shortening, as, contraction of gluteal muscles.

3. *Isokinetic exercises:* involves muscle contraction with resistance, as, rehabilitative exercises for knee injury.

*Patient Positions:* It is important to consider patient age, health status, mobility, physical condition and energy level and privacy. Many positions need assisting from others.

1. *Standing position-* to assess posture, gait and balance.

2. *Sitting position-* to visualize the upper part of the body, and to assess vital signs, to assess the head, neck, posterior & anterior thorax, breasts, heart and upper extremities, and to check extremities reflexes.

3. *Supine position-* to assess head, neck, anterior thorax, lungs, breasts, heart, abdomen, extremities and peripheral pulses.

4. *Dorsal-Recumbent position-* similar to that of supine position in addition to assessment to perineal area.

5. *Prone position-* to assess the hip joint, supine, posterior thorax, and for intamuscular injection.

6. *Sim's position-* to assess the rectum and vagina.

7. *Fowler position-* for any condition require maximal chest expansion as cardiac or respiratory distress, also for oral hygiene and gastric feeding.

7. *Lithotomy position-* to assess the female rectum and vagina, and for delivery.


Effects of Immobility:

1. Musculoskeletal system:

   A. Osteoporosis- the bones become spongy and may gradually deform and fracture easily, due to de-mineralize (calcium depletion; calcium gives the bones strength and density).

   B. Atrophy- unused muscles losing most of their strength and normal function.

   C. Contracture- permanent shortening of the muscle which limit joint mobility.
D. **Stiffness and pain in the joints**- without movement, the collagen (connective) tissues at the joint become **ankylosed** (permanently immobile).

2. Cardiovascular system:

   A. **Diminished cardiac reserve**- due to preponderance of sympathetic activity over cholinergic activity heart rate increases. Rapid heart rate reduces diastolic pressure, coronary blood flow, and the capacity of the heart to respond to any metabolic demands above the basal levels. So, the patient experienced tachycardia with even minima exertion.

   B. **Orthostatic (postural) hypotension**- under normal conditions, sympathetic nervous system activity causes autonomic vasoconstriction in the blood vessels in the lower half of the body when a mobile person changes from a horizontal to a vertical posture. Vasoconstriction prevents pooling of blood in the legs and effectively maintains central blood pressure to ensure adequate perfusion of the heart and brain. During the immobility, this reflex becomes dormant. When the immobile person attempts to sit or stand, this reconstructing mechanism fails to function properly, and cerebral perfusion is seriously compromised and the patient feels dizzy and may even faint, also sudden and marked increase in heart rate.

   C. **Venous Vasodilation and statis**- the skeletal muscles can no longer assist in pumping blood back to the heart against gravity. Blood pools in the leg veins, causing vasodilation and engorgement. The tiny valves in the leg veins that prevent backward flow of blood and pooling can no longer work effectively, this phenomenon is known as **incompetent valves**. Then the venous pressure will increases.
D. *Dependent edema*- When the venous pressure is sufficiently great, some of the serous part of the blood is forced out of the blood vessels into the interstitial spaces surrounding the blood vessels, causing edema, which is most common in parts of the body positioned below the heart.

E. *Thrombus formation*- Three factors collectively predispose a client to the formation of a *thrombophlebitis* (a clot that is loosely attached to an inflamed vein wall): (1) impaired venous return to the heart, (2) hypercoagulability of the blood, (3) and injury to a vessel wall. A *thrombus* (clot) is particularly dangerous if it breaks loose from the vein wall to enter the general circulation as an *embolus* (an object that has moved from its place of origin, causing obstruction to circulation elsewhere).

3. **Respiratory System:**

A. *Decreased respiratory movement*- In recumbent immobile client; rigid bed, curtails chest movement, abdominal organs pushing against the diaphragm, restricting lung movement, the cartilaginous intercostals joints becoming fixed in an expiratory phase of respiration, all these factors produce shallow respiration and reduce *vital capacity* (the maximum amount of air that can be exhaled after a maximum inhalation).

B. *Pooling of respiratory secretions*- Secretions of the respiratory tract are normally expelled by changing positions or posture and by coughing. Inactivity allows secretions to pool by gravity, interfering with the normal diffusion of oxygen and carbon dioxide in the alveoli.

C. *Atelectasis*- When ventilation is decreased, pooled secretions may accumulate in a dependent area of bronchiole and effectively block it which can cause atelectasis (collapse of a lobe or an entire lung).
Immobile elderly, postoperative clients are at greatest risk of atelectasis.

D. *Hypostatic pneumonia*- Pooled secretions provide excellent media for bacterial growth. Pneumonia caused by static respiratory secretions can severely impair oxygen-carbon dioxide exchange in the alveoli and is fairly common cause of death among weakened, immobile persons, especially heavy smokers.

4. **Metabolic System:**

   A. *Decreased metabolic rate*- In immobile clients, the basal metabolic rate and gastrointestinal motility and secretions of various digestive glands as the energy requirements of the body decreased,

   B. *Anorexia* or *Loss of appetite*- It occurs because of the decreased metabolic rate and the increased catabolism (protein breakdown) that accompany immobility. If protein intake is reduced, the nitrogen imbalance may become more pronounced, sometimes so severely that malnutrition ensues.

   E. *Negative calcium balance*- Greater amount of calcium are extracted from bone that can be replaced. The absence of weight-bearing and of stress on the musculoskeletal structures is the direct cause of the calcium loss from bones. Weigh-bearing and stress are also required for calcium to be replaced in bone.

5. **Urinary System:**

   A. *Urinary stasis*- In a mobile person, gravity plays an important role in the emptying of the kidneys and the bladder. When the person remains in horizontal position, gravity impeded the emptying of urine from the kidneys and urinary bladder. To urinate, the person who is supine (in a back-lying position) must push upward, against gravity, while bladder muscles tone decreases. Then emptying is not as complete, and urinary stasis (stoppage or slowdown of flow) occurs after a few days of bed rest.
B. **Renal calculi** - In a mobile person, calcium in urine remains dissolved because of calcium and citric acid are balanced in an acid urine. With immobility and the resulting excessive amounts of calcium in the urine, this balance is no longer maintained. The urine becomes more alkaline, and the calcium salts precipitate out as crystals to form renal calculi (stones).

C. **Urinary retention (accumulation of urine in the bladder), Urinary incontinence (Involuntary urination)** - The decreases muscle tone of the urinary bladder inhibits its ability to empty completely, and the immobilized person is unable to relax the perineal muscles sufficiently to urinate. When urination is not possible, the bladder gradually becomes distended with urine.

D. **Urinary infection** - Static urine provides an excellent medium for bacterial growth. Frequent urination is absent, and urinary distention often causes minute tears in the bladder mucosa, allowing infectious organisms to enter. The increases alkalinity of the urine supports bacterial growth.

6. **Gastrointestinal System; Constipation** – due to decreased peristalsis and colon motility, weakness of overall skeletal muscles that affects the abdominal and perineal muscles used in defecation.

7. **Integumentary System**:

   A. Reduced skin turgor - The skin can atrophy due to prolonged immobility and shift in body fluids.

   B. **Skin breakdown** - Duo to diminished circulation and altered supply of nutrients to specific areas of skin.
8. **Psychoneurologic System:** People who are unable to carry out the usual activities related to their roles (as, breadwinner, husband, mother, athlete…) became aware of an increased dependence on others. These factors lower the person’s self-esteem, frustration, withdrawal, angry anxious, and aggressive.

**References:**

- Taylor C, and Others; Fundamentals of Nursing; The art and Science of Nursing Care, Lippincott, 2001.
- Barbera K; Fundamentals Skills and concepts in Patient Care, Lippincott, 2000.

Post test:

Answer by (True) against the true sentences and by (False) against the false sentences:

1. Any body is stable if it has narrow base of support.
2. Any body is stable if it's center of gravity is high.
3. Therapeutic exercises stimulate circulation.
4. Standing position uses to check knee reflex.
5. Prone position uses in case of IM injection (Gluteal muscle).
6. Fowler position in cardiopulmonary problems.

7. Immobility leads to joint stiffness.

8. If the immobile individual stands suddenly, he/she can faint.

9. Immobility reduces vital lung capacity.

10. Renal calculi (stone) can’t accompanied with immobility.

11. Immobility can cause constipation.

12. Immobility doesn’t interfere with skin circulation.

**Answer Keys:**

1. False.  
2. False.  
3. True.  
4. False.  
5. True.  
6. True.  
7. True.  
8. True.  
10. False.  
11. True.  
12. False.

**RETURN TO THE HOME PAGE**
Patient's Basic Needs

Pre-test:

Answer by (True) against the true sentences and by (False) against the false sentences:

1. Aesthetic needs don't consider one of the individual basic needs.
2. Rest and sleep do not consider essential factors in treatment of illness.
3. Bed making provide psychological comfort for the patient.

***********************

Patient's Basic Needs

Types:

1. Physiological needs: as food, shelter, water, sleep, oxygen, nutrition, excretory functions, adjustment of body temperature, rest and avoidance of pain.

2. Safety and security; diagnostic tests, unfamiliar functions, different procedure; all these mentioned increase the fear of the patient.

3. Love and belonging; affection, identification and companionship; all these mentioned and others assist the patient to feel acceptable.

4. Esteem and recognition; self-esteem, self-respect, prestige, success, esteem of others, all that are necessary for the patient.

5. Self-actualization; self-fulfillment, achieving one's own capabilities.

6. Aesthetic; beauty, harmony, spiritual needs.

Relationship between levels of needs:

A. The basic physiological needs related to survival (food, water etc) must be met first of all.
B. The basic physiological needs have a greater priority over those higher in the pyramid. They must be met before the person can move on to higher level needs. In other words, a person who is starving will not be concentrating on building his/her self-esteem.
A patient in severe pain will not be concerned with improving his/her interpersonal relationships.

C. Generally speaking, each lower level must be achieved before the next higher level(s) can be focused upon.

**Patient's Unit:** is a special area for the patient when he/she is in the hospital for treatment.

**Methods of care of patient's unit:**

1. **Concurrent disinfection:** is the daily cleaning of the unit.
2. **Terminal disinfection:** is the care of the unit after the patient has been discharged from the hospital.

**Bed-Making:** is the process of applying or changing the bed linen or other components (as; mattress, pillow, blanket) to provide rest and sleep which are two essential factors in treatment of illness.

**Types of patient's bed:**

1. Closed bed.
2. Opened bed.
3. Occupied bed.
4. Surgical bed.

**Objectives of bed-making:**

A. Provide clean environment.
B. Promote physical & psychological comfort.
C. Prevent contamination.

**References:**

- Taylor C, and Others; Fundamentals of Nursing; The art and Science of Nursing Care, Lippincott, 2001.
Post-test:

Answer by (True) against the true sentences and by (False) against the false sentences:

1. Aesthetic needs don't consider one of the individual basic needs.
2. Rest and sleep do not consider essential factors in treatment of illness.
3. Bed making provide psychological comfort for the patient.

Answer Keys:

1. False. 2. False. 3. True.
Lecture: Nine-Ten

Personal care and Hygiene

Pre-test;

Answer by (True) against the true sentences and by (False) against the false sentences:

1. Care of mouth and teeth can't prevent sores and infection.
2. Skin prevents micro-organism from invading the body.
3. The nurse can bath the patient partially in the bed.
4. Patient's bath can't establish a communication pattern between the patient and nurse.
5. Immobility and diminished blood supply are the major causes of pressure ulcer.
6. Vitamin "C" deficiency interfere with occurrence of pressure ulcer.
7. Regular position changing doesn't prevent occurrence of pressure ulcer.

************************

Personal care and Hygiene

Care of Mouth & Teeth: is the process of cleaning & freshening of the teeth, gum and mouth.

Purposes:

1. Keep the teeth, gum and mouth in a good condition.
2. Fresh the mouth and relieve unpleasant odor.
3. Prevent sores and infection.
4. Provide a sense of well-being and comfort.
5. Prevent bacteria from entering to the digestive system.
Care of Skin:

Functions of skin:

1. Protect underlying body organs and tissues from injury.
2. Prevent micro-organisms from invading the body.
3. Excretion of water including nitrogenous wastes.
4. Sense organ of touch, pain, heat and pressure.
5. Plays an important role in the regulation of body temperature.

Purposes:

A. Remove dirty oils.
B. Refresh & comfort patient.
C. Promote circulation.
D. Prevent pressure ulcers.
E. Prepare patient to sleep.

Bathing:

Types:

A. Bed bath-
   1. Complete bath; it means cleaning all the body.
   2. Partial bath; it means cleaning the face, axilla, hands, genital area and alcohol back rub only with changing position in bed.

B. Bathing in the bathroom.

Purposes:

1. Clean the skin.
2. Relaxation.
4. Assess body prominences for pressure ulcers.
5. Assess range of motion.
6. Promote elimination from the skin.
7. Establish a communication pattern between the patient and the nurse.

Pressure Ulcer

Is a decay of the skin tissues and sometimes the tissues under it.

Causes:
1. Immobility; causes prolonged pressure on body areas, as unconscious, paralysis and aged persons.
2. Diminished blood supply.
3. Friction.

**Predisposing factors:**

1. Patient-related factors:
   - Poor nutritional status as malnutrition especially protein & vitamin 'C' deficiency.
   - Moisture of the skin by urine, feces incontinence.
   - Diseases as; Diabetes Mellitus, Anemia, Obesity, Malignancy tumors.
   - Mental status; due to diminished self-care abilities.

2. Environmental-related factors:
   - * Wrinkled sheets or linen.
   - * Wet sheets or linen.
   - * Excessive skin massage.
   - * Excessive use of detergents substances.

**Sites:** At any bony prominence in the body which exposed to body articulation, as: Occipital bones, Ears, Elbows, Scapula, Sacrum (Buttock), Iliac crest, Knees, Heels, Ankles, Big toes…… etc.
**Prevention:**

1. Regular changing of body position (2-4 hours).
2. Release pressure by using sheep skin pieces under the buttock.
3. Inspection of pressure areas when changing position.
4. Keep skin clean and dry.
5. Avoid friction.
6. Improve patient's nutritional status.
7. Provide local protection for bony prominences.
8. Cleaning the bed.

**References:**

- Taylor C, and Others; Fundamentals of Nursing; The art and Science of Nursing Care, Lippincott, 2001.
- Barbera K; Fundamentals Skills and concepts in Patient Care, Lippincott, 2000.

***************

**Post-test:**

*Answer by (True) against the true sentences and by (False) against the false sentences:*

1. Care of mouth and teeth can't prevent sores and infection.
2. Skin prevents micro-organism from invading the body.

3. The nurse can bath the patient partially in the bed.

4. Patient's bath can't establish a communication pattern between the patient and nurse.

5. Immobility and diminished blood supply are the major causes of pressure ulcer.

6. Vitamin "C" deficiency interfere with occurrence of pressure ulcer.

7. Regular position changing doesn't prevent occurrence of pressure ulcer.

**Answer Keys:**

1. False.  
2. True.  
3. True.  
4. False.  
5. True.  
6. True.  
7. False.
Lecture- Eleven
Nutrition

Pre-test:

Answer by (True) against the true sentences and by (False) against the false sentences:

1. Diet measures by calories provided.
2. Basal metabolism is the amount of energy required to carry on the voluntary activities of the body at rest.
3. Medications administered to the individual don't affect his/her nutrition.
4. Water helps in maintaining body temperature.
5. Low-fiber diet can cause constipation.
6. In case of diarrhea, increase oral fluids.
7. Polyurea means increased urine excreted.
8. Naso-gastric tube can placed below the patient's stomach level.
9. Naso-gastric tube can used to drain stomach contents.
10. The length of naso-gastric tube measures as the distance between the patient's nose and stomach directly.
11. After insertion of the naso-gastric tube, if the air bubbles is heard in the stomach with a stethoscope, that means, it is in the false direction.
12. Gastric lavage means introduction of semi-fluid nutrients into the stomach via naso-gastric tube.
13. Gastric gavage means introduction of semi-fluid nutrients into the stomach via naso-gastric tube.

****************************
**Nutrition**

Nutrients (Diet) are specific biochemical substances used by the body for growth, development, activity, reproduction, lactation, health maintenance and recovery from illness or injury. There are six classes of nutrients, Supply-energy group (carbohydrates, protein and lipids), and regulation of body processes group (vitamins, minerals and water). Energy in the diet is measured in the form of kilocalories commonly abbreviated as calories or cal.

**Basal Metabolism Requirements:**

Basal metabolism- is the amount of energy required to carry on the involuntary activities of the body at rest, as maintaining body temperature and muscle tone, producing and releasing secretions, gastro-intestinal movements, inflating the lungs and beating heart. Basal metabolic rate (BMR) is about 1 cal/kgm of body weight per hour for men and 0.9 cal/kgm per hour for women. Males have a higher basal metabolic rate than females, because of their larger muscle mass and hormones.

**Factors affecting Basal Metabolic Rate are:**

1. Growth.
2. Infections.
3. Fever.
4. Emotional tensions.
5. Elevated some hormones (e.g. Adrenaline and thyroid hormones).

**Methods of calculating Caloric Requirements:**

1. Calculate the Basal Metabolic Rate (BMR) or the amount of calories necessary to maintain body at rest, as;

   Male- \[ \text{BMR} = \text{Wt (kgm)} \times 1 \text{ cal} \times 24 \text{ hours}. \]

   Female- \[ \text{BMR} = \text{Wt (kgm)} \times 0.9 \text{ cal} \times 24 \text{ hours}. \]

2. Determine calories needed for specific activity levels, as;

   Moderate activity = (BMR \times 0.7).

   Heavy activity = (BMR \times 1).
**Example:** Calculate the caloric requirements for a man with moderate activity if you know that his weight is 65 kgm.

\[
\text{BMR} = \text{wt (kgm)} \times 1 \text{ cal} \times 24 \text{ hours} \\
= 65 \text{ kgm} \times 1 \text{ cal} \times 24 \text{ hours} \\
= 1560 \text{ cal} / \text{day}. \\
\]

For moderate activity = \( \text{BMR} \times 0.7 = 1560 \times 0.7 = 1092 \text{ cal} \)

Caloric requirement = BMR + calories needed for activity level

\[
= 1560 + 1092 = 2652 \text{ cal} / \text{day needed.} \\
\]

**Factors affecting Nutrition;**

1. Developmental considerations.
2. Sex (Gender).
3. Health status.
4. Medications administered.
5. Socio-cultural and Psychological factors.

**Fluids and Electrolytes:** Water is the primary body fluid; it is the most important nutrient of life, although life can be sustained for many days without food, humans can survive for only a few days without water.

**Primary Functions of Water:**

1. Provide medium for transporting nutrients to cells and wastes from cells and for transporting substances as hormones, enzymes and blood cells.
2. Facilitate cellular metabolism and chemical functioning.
3. Consider solvent for electrolytes and non-electrolytes.
4. Help maintain normal body temperature.
5. Facilitate digestion and promote elimination.
6. Act as a tissue lubricants.
**Preventing and Treating Constipation:**

*Constipation* - is the passage of dry, hard feces.

*Individuals at risk of constipation are:*

1. Patients on bed rest.
2. Patients with reduced fluids, fibers in their diet.
3. Patients with central nervous system disease.

**Teaching about Nutrition:**

A. Teach patient and his family about specific nutrients high in fibers (as fruits, vegetables and bread).

B. Increase fluid intake (e.g. water, juices).

**Preventing and Treating Diarrhea:**

*Diarrhea* - is the passage of excessively liquid, unformed stool. So large amount of fluids and electrolytes may be lost quickly through diarrhea.

**Nursing Interventions of diarrhea:**

1. Assess the frequency and amount of diarrhea, stool characteristics, precipitating factors and accompanying manifestations.
2. Increase rest periods and discourage strenuous activity.
3. Administer Iv. Fluids, oral fluids as tolerated if prescribed.
4. Continue to assess hydration status and be alert to signs of electrolyte imbalance.
5. Monitor intake and output, note concentration of urine.
6. Discontinue solid foods and milk products until diarrhea is stopped.
7. Assess the patient's anal area after each passage of stool and note any irritation.
8. Wash and dry the anal area carefully after each episode of diarrhea and apply protective ointment as ordered.

9. Ventilate the room and use deodorants.

**Urinary Elimination:** Elimination from the urinary tract helps to rid the body from waste products. Nurse assist the patient with urination problems to resolve his/her problem related to urination. The urinary system composes of two kidneys, two ureters, bladder and urethra.

**Micturition**- is the process of emptying the bladder.

**Anuria**- The 24 hours urine voided is less than 100 ml (The normal daily urine amount is 1500-2000 ml).

**Oliguria**- decreased urine voided to (100-400 ml) daily.

**Dysuria**- Difficult urination.

**Polyuria**- increased urine excreted.

**Urgency**- Strong desire to urinate.

**Glycosuria**- Presence of sugar in urine.

**Proteinuria**- Presence of protein in urine.

**Melena**- Blood in feces or stool.

**Nasogastric intubation** is a medical process involving the insertion of a plastic tube (nasogastric tube, NG tube) through the nose, past the throat, and down into the stomach.

Polyurethane NG tube (Viasys Corflo), 8 Fr × 36 in (91 cm). This fine bore tube is appropriate for longer use (up to 4 weeks)
Stomach tube (Levin type), 18 Fr × 48 in (121 cm)

**Uses:**

1. Feeding and administering of drugs. For drugs and for minimal quantities of liquid, a syringe is used for injection into the tube. For continuous feeding, a gravity based system is employed, with the solution placed higher than the patient's stomach. Sometimes the tube is often connected to an electronic pump which can control and measure the patient's intake and signal any interruption in the feeding.

2. Treatment for severe anorexia nervosa can include nasogastric feeding to stabilize body weight. On the other hand, NG tube can be use for palliation of oesophageal cancer to maintain fluid and solid intake.

3. Draining the stomach's contents via the tube.

4. Remove gastric secretions and swallowed air in patients with gastrointestinal obstructions. Nasogastric aspiration can also be used in poisoning situations when a potentially toxic liquid has been ingested, for preparation before surgery under anesthesia, and to extract samples of gastric liquid for analysis.

**Technique:**

Before an NG tube is inserted the health care provider must measure with the tube from the tip of the patient's nose to their ear and down to the xyphoid process. Then the tube is marked at this level to ensure that the tube has been inserted far enough into the patient's stomach. Many commercially available stomach and duodenal tubes have several standard depth markings, for example (46cm), (56cm), (66cm) and (76cm) from distal end. The end of a plastic tube is lubricated (local anesthetic, such as 2% xylocaine gel, may be used, in addition, nasal vasoconstrictor spray may be applied before the insertion) and inserted into one of the patient's anterior nares. The tube should be directed aiming down and back as it is moved through the nasal cavity and down
into the throat. When the tube enters the oropharynx and glides down the posterior pharyngeal wall, the patient may gag, in this situation the patient, if awake and alert, is asked to mimic swallowing or is given some water to sip through a straw, and the tube continues to be inserted as the patient swallows. Once the tube is past the pharynx and enters the esophagus, it is easily inserted down into the stomach.

Great care must be taken to ensure that the tube has not passed through the larynx into the trachea and down into the bronchi. To ensure proper placement it is recommended (though not unequivocally confirmed) that injection of air into the tube be performed, if the air is heard in the stomach with a stethoscope, then the tube is in the correct position. Another more reliable method is to aspirate some fluid from the tube with a syringe. This fluid is then tested with pH paper (note not litmus paper) to determine the acidity of the fluid. If the pH is 5.5 or below then the tube is in the correct position. If this is not possible then correct verification of tube position is obtained with an X-ray of the chest/abdomen. This is the most reliable means of ensuring proper placement of an NG tube If the tube is to remain in place then a tube position check is recommended before each feed and at least once per day.

If the tube is to be used for continuous drainage, it is usually appended to a collector bag placed below the level of the patient's stomach; gravity empties the stomach's contents. It can also be appended to a suction system, however this method is often restricted to emergency situations, as the constant suction can easily damage the stomach's lining.

Figure: Equipment for NG tube placement. From left to right: laryngoscope, Magill forceps, lidocaine jelly/lubricant, nasogastric (NG) tube, longitudinally cut 8.0 endotracheal tube.

**Gastric Lavage:** Is the washing out of the stomach. The solutions used for gastric lavage are physiological saline, 1% sodium bicarbonate, plain water or a specific antidote for the poison. The procedure is performed before and after surgery to remove irritants or toxic substances and possibly before such examinations as endoscopy or gastroscopy. It also called a stomach pump. For this procedure, a flexible tube is inserted through the nose, down the throat, and into the stomach and the contents of the stomach are suctioned out. The inside of the stomach is rinsed with a saline (salt water) solution. It is allowed to flow into the stomach by gravity. The solution is removed by siphonage; when the funnel is lowered, the fluid flows out, bringing with it the contents of the stomach. **Gastric Gavage:** means introduction of fluid or semi-fluid nutrient into the stomach directly via naso-gastric tube.

**References:**

- Taylor C, and Others; Fundamentals of Nursing; The art and Science of Nursing Care, Lippincott, 2001.
- Barbera K; Fundamentals Skills and concepts in Patient Care, Lippincott, 2000.

The Free Medical Dictionary, 2010 Farlex, Inc.


***************************

**Post-test:**

Answer by (True) against the true sentences and by (False) against the false sentences:

1. Diet measures by calories provided.

2. Basal metabolism is the amount of energy required to carry on the voluntary activities of the body at rest.

3. Medications administered to the individual don't affect his/her nutrition.

4. Water helps in maintaining body temperature.

5. Low-fiber diet can cause constipation.

6. In case of diarrhea, increase oral fluids.

7. Polyurea means increased urine excreted.

8. Naso-gastric tube can placed below the patient's stomach level.

9. Naso-gastric tube can used to drain stomach contents.

10. The length of naso-gastric tube measures as the distance between the patient's nose and stomach directly.

11. After insertion of the naso-gastric tube, if the air bubbles is heard in the stomach with a stethoscope, that means, it is in the false direction.

12. Gastric lavage means introduction of semi-fluid nutrients into the stomach via naso-gastric tube.
13. Gastric gavage means introduction of semi-fluid nutrients into the stomach via naso-gastric tube.

**Answer Keys:**

1. True.  
2. False.  
3. False.  
4. True.  
5. True.  
6. True.  
7. True.  
8. False.  
10. False.  
11. False.  
12. False.  
13. True.

[RETURN TO HOME PAGE](#)
**Lecture-Twelve**

**Sterilization and Disinfection**

**Pre-test:**

Answer by (True) against the true sentences and by (False) against the false sentences:

1. Disinfection means destruction of contagious agents with spores.
2. Surgical asepsis means practices that keep objects and areas free from all micro-organisms.
3. Antiseptics are chemical agents which stop or slow the growth of germs.
4. Antibiotics destroy micro-organisms inside the body.
5. Wounds heal slowly when moist dressings are applied over the wound.
6. Cleaning the bottle os of the disinfectant solution is of no benefit.
7. When removing wound sutures, the nurse should cut the suture in the midpoint of it outside the wound, then pulling it.

***************

**Sterilization and Disinfection**

**Sterilization**- is the process by which all micro-organisms including spores are destroyed.

**Disinfection**- is the process by which the contagious agents are destroyed without any effect on the spores.

**Medical Asepsis**- are practices which help to reduce the number of diseases producing micro-organisms as possible as can from one person or place to another.

**Surgical Asepsis**- are practices which render and keep objects and areas free from all micro-organisms.
Antiseptics- Antiseptics are chemical agents that slow or stop the growth of micro-organisms (germs) on external surfaces of the body and help prevent infections. Antiseptics should be distinguished from antibiotics that destroy micro-organisms inside the body, and from disinfectants, which destroy micro-organisms found on inanimate (non-living) objects. However, antiseptics are often referred to as skin disinfectants. Most chemical agents can be used as both an antiseptic and a disinfectant. The purpose for which it is used is determined by its concentration. For example hydrogen peroxide 6% solution is used for cleansing wounds, while stronger solutions (>30%) are used in industry as a bleach.

<table>
<thead>
<tr>
<th>Group</th>
<th>Agent</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Alcohols</strong></td>
<td>Ethyl alcohol 70%</td>
<td>Skin disinfectant</td>
</tr>
<tr>
<td></td>
<td>Isopropyl alcohol 70%</td>
<td></td>
</tr>
<tr>
<td><strong>Quaternary ammonium</strong></td>
<td>Benzalkonium chloride</td>
<td>Skin disinfectant Irrigations</td>
</tr>
<tr>
<td></td>
<td>Cetrimide</td>
<td></td>
</tr>
<tr>
<td>compounds</td>
<td>Methylbenzethonium chloride</td>
<td>Eye drop preservative</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>------------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td></td>
<td>Benzethonium chloride</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cetalkonium chloride</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cetylpyridinium chloride</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dofanium chloride</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Domiphen bromide</td>
<td></td>
</tr>
<tr>
<td>Chlorhexidine and other diguanides</td>
<td>Chlorhexidine gluconate</td>
<td>Pre-operation skin</td>
</tr>
<tr>
<td></td>
<td>Chlorhexidine acetate</td>
<td>disinfectant</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Treat wounds</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bladder irrigations</td>
</tr>
<tr>
<td>Antibacterial dyes</td>
<td>Proflavine hemisulphate</td>
<td>Skin disinfectant</td>
</tr>
<tr>
<td></td>
<td>Triphenylmethane</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brilliant green</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Crystal violet</td>
<td></td>
</tr>
<tr>
<td>Peroxides and permanganates</td>
<td>Hydrogen peroxide solution</td>
<td>Wound cleanser</td>
</tr>
<tr>
<td></td>
<td>Potassium permanganate</td>
<td>Gargles and</td>
</tr>
<tr>
<td></td>
<td>solution</td>
<td>mouthwashes</td>
</tr>
<tr>
<td></td>
<td>Benzoil peroxide</td>
<td>Irrigations</td>
</tr>
<tr>
<td>Halogenated phenol derivatives</td>
<td>Chlorocresol</td>
<td>Skin disinfectant</td>
</tr>
<tr>
<td></td>
<td>Chloroxylenol</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chlorophene</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hexachlorophane/ exachlorophene</td>
<td></td>
</tr>
<tr>
<td>Quinolone derivatives</td>
<td>Hydroxyquinoline sulphate</td>
<td>Treat wounds</td>
</tr>
<tr>
<td></td>
<td>Potassium hydroxyquinoline</td>
<td></td>
</tr>
<tr>
<td></td>
<td>sulphate</td>
<td>Throat lozenges</td>
</tr>
<tr>
<td></td>
<td>Chlorquinaldol</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dequalinium chloride</td>
<td>Skin disinfectant</td>
</tr>
<tr>
<td></td>
<td>Di-iodohydroxyquinoline</td>
<td></td>
</tr>
</tbody>
</table>

**Uses of Antiseptics:** Antiseptics are mainly used to reduce levels of microorganisms on the skin and mucous membranes. The skin and mucous membranes of the mouth, nose, and vagina are home to a large number of what are usually harmless micro-organisms. However, when the skin or mucous membranes are damaged or breached in surgery,
Antiseptics can be used to disinfect the area and reduce the chances of infection. It is also important that people whom are treating patients with wounds or burns adequately wash their hands with antiseptic solutions to minimize the risk of cross infection.

Antiseptics are used for:

- Handwashing – chlorhexidine gluconate and povidone iodine solutions are often used in hand scrubs and hand rubs.
- Pre-operative skin disinfection – antiseptics applied to the operation site to reduce the resident skin flora.
- Mucous membrane disinfection – antiseptic irrigations may be instilled into the bladder, urethra or vagina to treat infections or cleanse the cavity prior to catheterization.
- Preventing and treating infected wounds and burns – antiseptic preparations are available over-the-counter from your pharmacist to treat minor cuts, abrasions and burns.
- Treating mouth and throat infections – dequalinium chloride has both antibacterial and antifungal properties and is the active ingredient in antiseptic throat lozenges.

**Wound Dressing:** Is covering the wound to protect it from harmful agents.

**Purposes of Wound Dressing:**

- Maintain a moist environment at wound interface
- Remove excess exudates without allowing 'strike through’ to surface of dressing
- Provide thermal insulation and mechanical protection
- Act as a barrier to micro-organisms
- Allow gaseous exchange
- Be no adherent and easily removed without trauma
- Leave no foreign particles in wound
- Be non-toxic, non-allergenic and non-sensitizing
- No single dressing is appropriate for all wound types and all stages of healing
Types of Wound Dressings;

Wound dressings are different from dry bandages because wound dressings keep the wound moist. Wounds heal more rapidly when moist wound dressings are applied. The moisture in the different types of wound dressings mimic healthy skin and cause the wound to heal faster and more completely.

1. Alginates- Alginates get their name because they are derived from kelp and other brown seaweeds. Alginates turn into a non-sticky gel when placed over a draining wound. Gauze or larger bandages hold the alginates into place above a wound and prevent the alginate from drying out as rapidly. Placing the alginates in layers provides more absorbency and ensures the alginates stay wet longer. Some brand names of alginates include Kaltostat, Ropes, and Sorbsan.

2. Adhesive Wafer Dressings- Also known as, hydrocolloid dressings, adhesive wafer dressings stick directly over wounds and form a gel-like substance when the gelling agents in the dressing interact with drainage from the wound. The gel substance makes an ideal environment for a healing wound. Name brands of adhesive wafer dressings include Tegasorb and DuoDerma.

3. Foam- Used often on new wounds, foam dressings absorb large amounts of fluid and wound drainage. Some foam dressings come with adhesive backings while others require gauze wrapping to stay in place. Foam wound dressing brand names include Lyofoam, Allevyn Adhesive Dressings, and Polymem Non-Adhesive Dressings.

4. Silicone Foam- Similar to regular foam dressings, silicone foam dressings prevent the wound from sticking to the dressing. This prevents scabs and skin from being disrupted during removal and changing of the dressings. Silicone foam dressings treat wounds with light to heavy drainage. Brand names of silicone foam wound dressings include Tendra Mepilex, Tendra Mepilex Lite, and Tendra Mepitel.

5. Hydrogels- Available in gels, gel covered gauze, or sheets, hydrogel wound dressings require a second dressing to maintain moisture and promote wound healing. Hydrogels offer cooling effects to relieve pain and discomfort. This type of wound dressing is best for wounds with light drainage. Brand names of hydrogel wound
dressings include Tegagel, DuoDerm Hydroactive Wound Gel, and Curasol Hydrogel Saturated Dressing.

6. Hydrofibers- Absorbent materials in hydrofiber wound dressings interact with wound drainage to create a moist, gel wound covering. Found as pads or ribbon, hydrofiber wound dressings provide care for deep wounds with heavy drainage. Hydrofiber wound dressing controls minor bleeding and stays in place up to a week, depending upon the amount of bleeding and drainage. Hydrofiber wound dressings are offered by the brand name Aquacel Hydrofiber Wound Dressing.

*Principles of Dressing:*

1. Hand washing.
2. The nurse may be far from any respiratory infection.
3. Put the mask on the nose & mouth.
4. Be sure that the door & windows of the patient's room are closed.
5. Wear sterile gloves.
6. Using aseptic techniques during dressing with the wound & instruments.
7. Be away far from touching the sterile space.
8. Clean the bottle os before using the solution.
9. When removing the wound sutures the nurse may;
   A. Cut the stitches near the skin and pull them from the another side of it.
   B. Don't cut the stitches from many sites.


**References:**

- Taylor C, and Others; Fundamentals of Nursing; The art and Science of Nursing Care, Lippincott, 2001.
- Barbera K; Fundamentals Skills and concepts in Patient Care, Lippincott, 2000.

***************
Post-test:

Answer by (True) against the true sentences and by (False) against the false sentences:

1. Disinfection means destruction of contagious agents with spores.
2. Surgical asepsis means practices that keep objects and areas free from all micro-organisms.
3. Antiseptics are chemical agents which stop or slow the growth of germs.
4. Antibiotics destroy micro-organisms inside the body.
5. Wounds heal slowly when moist dressings are applied over the wound.
6. Cleaning the bottle os of the disinfectant solution is of no benefit.
7. When removing wound sutures, the nurse should cut the suture in the midpoint of it outside the wound, then pulling it.

Answer Keys:

1. False. 2. True. 3. True. 4. False.

RETURN TO HOME PAGE
Lecture: Thirteen-Fourteen

Vital Signs

Pre-test:

A). Answer by (True) against the true sentences and by (False) against the false sentences:

1. Vital signs are indicators of individual health status.
2. Some of the vital signs value can be zero.
3. Abnormalities of the heart should be diagnosed by temperature.
4. The pulse can be measured sometimes from the venous wall.
5. All vital signs elevated as age advanced.
6. Oral method for checking temperature is used in children.
7. In Axilla method for checking temperature, the nurse may subtract 0.5 °c from the thermometer reading.
8. In rectal method of checking temperature, the colored tip of the thermometer must lubricated with water-based lubricant.
9. Fever (Pyrexia) means elevated body temperature more than normal.
10. Tachycardia means low pulse rate.
11. While checking respiration, the nurse must explain to the patient what to do.
12. While dyspnea, there are no muscles to use that assist in respiration.
13. While blood pressure, the cuff of sphygmomanometer must wrapped around the upper arm, one inch above the elbow.
14. If diastolic blood pressure is above 90 mm/Hg, it calls hypertension.
The normal ranges of vital signs are; Temperature (\(\pm\)) °F or (\(\pm\)) °C, Pulse (\(\pm\)) Beats/Minute, Respiration (\(\pm\)) Breaths/Minute, Blood Pressure (\(\pm\)) mm/Hg.

************

**Vital Signs**

Vital signs are measures of various physiological status, often taken by health professionals, in order to assess the most basic body functions. When these values are not zero, they indicate that a person is alive. All of these vital signs can be observed, measured, and monitored. This will enable the assessment of the level at which an individual is functioning. Normal ranges of measurements of vital signs change with age and medical condition.

**Purpose;**

The purpose of recording vital signs is to establish a baseline on admission to a hospital, clinic, professional office, or other encounter with a health care provider. Vital signs may be recorded by a nurse, physician, physician's assistant, or other health care professional. The health care professional has the responsibility of interpreting data and identifying any abnormalities from a person's normal state, and of establishing if current treatment or medications are having the desired effect. Abnormalities of the heart are diagnosed by analyzing the heartbeat (or pulse) and blood pressure. The rate, rhythm and regularity of the beat are assessed, as well as the strength and tension of the beat, against the arterial wall. Vital signs are usually recorded from once hourly to four times hourly, as required by a person's condition. The vital signs are recorded and compared with normal ranges for a person's age and medical condition. Based on these results, a decision is made regarding further actions to be taken. All persons should be made comfortable and reassured that recording vital signs is normal part of health checks, and that it is necessary to ensure that the state of their health is being monitored correctly. Any abnormalities in vital signs should be reported to the health care professional in charge of care.

Vital signs include the heart beat, breathing rate, temperature, and blood pressure. These signs may be watched, measured, and monitored to check an individual's level of physical functioning. Normal vital signs change with age, sex, weight, exercise tolerance, and condition. Normal ranges for the average healthy adult vital signs are:
**Blood Pressure:** 120/80 mm/Hg  
**Breathing or Respiration:** 12 – 18 breaths per minute  
**Pulse:** 60 – 80 beats per minute (at rest)  
**Temperature:** 97.8 – 99.1 degrees Fahrenheit / average 98.6 degrees Fahrenheit. $37 \pm 0.5^\circ$ Celsius.

**Temperature:** Temperature is recorded to check for fever (pyrexia or a febrile condition), or to monitor the degree of hypothermia. Manufacturer guidelines should be followed when recording a temperature with an electric thermometer. An alcohol or mercury thermometer can be used to monitor a temperature by three methods:

1. **Axillary**- To record an axillary temperature, the silver tip of the thermometer should be placed under the right armpit. The arm clamps the thermometer into place, against the chest. The thermometer should stay in place for three to four minutes. After the appropriate time has elapsed, the thermometer should be removed and held at eye level. During this waiting period, the body temperature will be measured. The alcohol or mercury will have risen to a mark that indicates the temperature of a person. Also, the degree of thermometer is added $[0.5]^\circ$.

2. **Orally**, To record an oral temperature, the axillary procedure should be followed, except that the silver tip of the thermometer should be placed beneath the tongue for three to four minutes, then read as described previously. In both cases, the thermometer should be wiped clean with an antiseptic and stored in an appropriate container to prevent breakage. The thermometer is putting under the tongue. Oral temperature cab be affected by number variables the nurse has to wait 20-30 minutes after a client ingested hot or cold liquids or food or has been smoking, or has been involved in strenuous exercise, before temperature can be checked. This method is never used with infants or very young children because they may accidentally bite or break the thermometer. They also have difficulty holding oral thermometers under their tongues long enough for their temperatures to be accurately measured. Also for mental disorders, cough, vomiting, oral and nose disturbances and comatose patients. The degree of thermometer is dependent as it is.
3. **Rectally**, inserted into the rectum. This method provides the most accurate recording of the temperature. It is most often used for infants. A recent study reported that rectal thermometers were more accurate than ear thermometers in detecting high fevers. With the ability to detect low-grade fevers, rectal thermometers can be useful in discovering serious illnesses, such as meningitis or pneumonia. To record a rectal temperature, a rectal thermometer should be shaken down, as described previously. A small amount of water-based lubricant should be placed on the colored tip of the thermometer. The tip of the thermometer is inserted into the rectum no more than (1-3 cm) and held there for two to three minutes. The thermometer is removed, read as before, and wiped with an antibacterial wipe. It is then stored in an appropriate container to prevent breakage, because ingestion of mercury can be fatal. Thermometer stays for [2-3] minutes, and subtract [0.5°C] from its reading.
Figure 27-5  ■ An electronic thermometer. Note the probe and probe cover.

Figure 27-6  ■ A temperature-sensitive skin tape.

Figure 27-9  ■ An infrared tympanic thermometer used to measure the tympanic membrane temperature.

Figure 27-10  ■ Oral thermometer placement.

Figure 27-12  ■ Inserting a rectal thermometer.

Figure 27-13  ■ Placing the bulb of the thermometer in the center of the axilla.

Figure 27-14  ■ Pull the pinna of the ear up and back while inserting the tympanic thermometer.
**Fever (Pyrexia):** is an elevation of body temperature more than normal.

**Causes:**

1. Direct action on temperature regulating center in the hypothalamus.
2. Acute infections.
3. Emotions.
4. Trauma.
5. Dehydration.

**Signs & symptoms:**

- Sweating
- Anorexia
- Headache
- Constipation
- Flushed face
- Chilling
- Vomiting sometimes
- Whitish layer on the tongue
- Muscle & back pain
- Delerium (in severe cases)
- Dry & hot skin
- Rapid & shallow pulse
- Unusual thirst.

**Nursing Management:**

1. Check body temperature continuously.
2. Good nutrition especially protein.
3. Increase fluid intake.
4. Change the patient's clothes & bed linen.
5. Cold compress.
6. Antipyretics as Paracetamol.

*Conversion from Celsius to Fahrenheit:* Celsius degree = (Fahrenheit - 32) × 5/9

*Conversion from Fahrenheit to Celsius:* Fahrenheit degree = (Celsius × 9/5) + 32
**Heart Beat (Pulse);** Is the palpable bounding of blood flow noted at various points in the body. It is indicator of circulatory status. Circulation is the means by which cells receive nutrients and remove waste products of metabolism. A person's heart rate varies throughout the day. Approximately, 60-70 ml of blood enters aorta with each ventricular contraction (stroke volume). The pulse can be recorded anywhere that a surface artery runs over a bone. The radial artery in the wrist is the point most commonly used to measure a pulse. To measure a pulse, one should place the index, middle, and ring fingers over the radial artery. It is located above the wrist, on the anterior or front surface of the thumb side of the arm. Gentle pressure should be applied, taking care to avoid obstructing blood flow. The rate, rhythm, strength, and tension of the pulse should be noted. If there are no abnormalities detected, the pulsations can be counted for half a minute, and the result doubled. However, any irregularities discerned indicate that the pulse should be recorded for one minute. This will eliminate the possibility of error. Pulse results should be noted in the health chart. *Elevation of every (1) ºc of body temperature, increase the pulse about (7-10) beats/minute. Tachycardia* is an abnormally elevated heart rate above (100) beat/minute. *Bradycardia* is a rate below (60) beat/minute.

**Factors affecting the pulse;**

1. Position- in standing rapid than in sitting.
2. Sleep- decreased.
3. Emotions- increased.
4. Hypotension- increased.
5. Exercises- increased.
Respiration – Respiration involves two distinctly different processes. **External respiration** which is the movement of air between environment and lungs, **Internal respiration** that is the movement of oxygen between the hemoglobin and single cells. An examiner's fingers should be placed on the person's wrist, while the number of breaths or respirations in one minute is recorded. Every effort should be made to prevent people from becoming aware that their breathing is being checked. Respiration results should be noted in the medical chart. Assessment of respiration includes; Rate [the nurse observes a full inspiration & expiration when counting; respiration rate greater than 20 times/minute calls Tachypnea; respiration rate less than 10 times/minute calls Bradypnea which can be seen while sleeping; Apnea is the absence of breathing that can be for few seconds or life threatening if prolonged], Depth [by assessing the degree of excursion or movement in the chest wall; shallow, deep or normal], and Rhythm. Dyspnea means difficulty in breathing, as breathing becomes labored, a person uses accessory muscles in the chest & neck to breathe. A client with dyspnea usually feels short of breath. Secretions in the large airways of the trachea and the bronchus can often be heard without a stethoscope. These sounds can occur during inspiration or expiration. They have a gurgling sound and are called Rhonchi or Gurgles. Many factors affecting respiration, as; age, sex, exercises, emotions, rest and sleep.

Blood Pressure- is the force exerted by the blood against a vessel's wall. To record blood pressure, a person should be seated with one arm bent slightly, and the arm bare or with the sleeve loosely rolled up. With an aneroid or automatic unit, the cuff is placed level with the heart and wrapped around the upper arm, one inch above the elbow. Following the manufacturer's guidelines, the cuff is inflated and then
deflated while an attendant records the reading. If the blood pressure is monitored manually, a cuff is placed level with the heart and wrapped firmly but not tightly around the arm one inch above the elbow over the brachial artery. Wrinkles in the cuff should be smoothed out. Positioning a stethoscope over the brachial artery in front of the elbow with one hand and listening through the earpieces, the cuff is inflated well above normal levels (to about 200 mmHg), or until no sound is heard. Alternatively, the cuff should be inflated 10 mm Hg above the last sound heard. The valve in the pump is slowly opened. Air is allowed to escape no faster than 5 mmHg per second to deflate the pressure in the cuff to the point where a clicking sound is heard over the brachial artery. The reading of the gauge at this point is recorded as the systolic pressure. The sounds continue as the pressure in the cuff is released and the flow of blood through the artery is no longer blocked. At this point, the noises are no longer heard. The reading of the gauge at this point is noted as the diastolic pressure. "Lub-dub" is the sound produced by the normal heart as it beats. Every time this sound is detected, it means that the heart is contracting once. The noises are created when the heart valves click to close. When one hears "lub," the atrioventricular valves are closing. The "dub" sound is produced by the pulmonic and aortic valves. With children, the clicking noise does not disappear. Because sounds continue to be heard as the cuff deflates to zero, the reading of the gauge at the point where the sounds change is recorded as the diastolic pressure. Blood pressure readings are recorded with the systolic pressure first, then the diastolic pressure (e.g., 120/70). Blood pressure should be measured using a cuff that is correctly sized for the person being evaluated. Cuffs that are too small are likely to yield readings that can be 10 to 50 millimeters (mm) Hg too high. Hypertension (high blood pressure) may be incorrectly diagnosed. As there may be no recorded knowledge of a person's previous vital signs for comparison, it is important that a health care professional be aware that there is a wide range of normal values that can apply to persons of different ages. The health care professional should obtain as detailed a medical history from the person as soon as possible. Any known medical or surgical history, prior measurements of vital signs, and details of current medications should be recorded, as well. Physical exertion prior to measurement of vital signs, such as climbing stairs, may affect the measurements. This should be avoided immediately before the measurement of one's blood pressure. Tobacco, caffeinated drinks, and alcohol should be avoided for 30 minutes prior to recording. A person should be sitting down or lying comfortably to
ensure that the readings are taken in a similar position each time. There should be little excitement, which can affect the results. The equipment required include a watch with a second hand, an electronic or manual sphygmomanometer with an appropriate sized cuff, and a stethoscope.

Blood pressure reflects the balance between various factors, including; [cardiac output, blood volume, peripheral vascular resistance, blood viscosity], from another side, there are many factors influencing blood pressure, as; [age- increased with age, stress, Medications, diurnal variation].

The difference between systolic and diastolic blood pressure call pulse pressure which may be between (30-40) mm/Hg, while any increase or decrease around this rage indicate heart problem.

**Hypertension**- means systolic blood pressure is above normal [over 140 mm/Hg], or the diastolic blood pressure is above [90 mm/Hg] as an average of two or more readings on at least subsequent visits.

**Hypotension**- means systolic blood pressure is [90 mm/Hg] or below that.
References:

- Taylor C, and Others; Fundamentals of Nursing; The art and Science of Nursing Care, Lippincott, 2001.
- Barbera K; Fundamentals Skills and concepts in Patient Care, Lippincott, 2000.


• American Academy of Family Physicians, 11400 Tomahawk Creek Parkway, Leawood, KS 66211-2672. (913) 906-6000. E-mail: fp@aafp.org. [http://www.aafp.org](http://www.aafp.org).

• American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, IL 60007-1098. 847) 434-4000. Fax: (847) 434-8000. E-mail: kidsdoc@aap.org. [http://www.aap.org/default.htm](http://www.aap.org/default.htm).

• American College of Physicians. 190 N. Independence Mall West, Philadelphia, PA 19106-1572. (800) 523-1546, x2600 or (215) 351-2600. [http://www.acponline.org](http://www.acponline.org).

• Karolinska Institute. [cited March 1, 2003] [http://isp.his.ki.se/text/physical.htm](http://isp.his.ki.se/text/physical.htm).

• Loyola University Chicago Stritch School of Medicine. [cited March 1, 2003] [http://www.meddean.luc.edu/lumen/MedEd/MEDICINE/PULMONARY/PD/Pdmenu.htm](http://www.meddean.luc.edu/lumen/MedEd/MEDICINE/PULMONARY/PD/Pdmenu.htm).


• Review of Systems School of Medical Transcription. [cited March 1, 2003] [http://www.mtmonthly.com/studentcorner/cpe.htm](http://www.mtmonthly.com/studentcorner/cpe.htm).

• American Accreditation HealthCare Commission (www.urac.org

******************************************
**Post-test:**

A). Answer by (True) against the true sentences and by (False) against the false sentences:

1. Vital signs are indicators of individual health status.

2. Some of the vital signs value an be zero.

3. Abnormalities of the heart should be diagnosed by temperature.

4. The pulse can be measured sometimes from the venous wall.

5. All vital signs elevated as age advanced.

6. Oral method for checking temperature is used in children.

7. In Axilla method for checking temperature, the nurse may subtract 0.5 °c from the thermometer reading.

8. In rectal method of checking temperature, the colored tip of the thermometer must lubricated with water-based lubricant.

9. Fever (Pyrexia) means elevated body temperature more then normal.

10. Tachycardia means low pulse rate.

11. While checking respiration, the nurse must explain to the patient what to do.

12. While dyspnea, there are no muscles to use that assist in respiration.

13. While blood pressure, the cuff of sphygmomanometer must wrapped around the upper arm, one inch above the elbow.

14. If diastolic blood pressure is above 90 mm/Hg, it calls hypertension.

B). The normal ranges of vital signs are; Temperature ( - ) °F or ( ± ) °c, Pulse ( - ) Beat/Minute, Respiration ( - ) Breaths/Minute, Blood Pressure ( / ) mm/Hg.
Answer Keys:

1. True. 2. False. 3. False. 4. False.

B). The normal ranges of vital signs are; Temperature (97.8 - 99.1 °F), or (37 ±0.5) °C, Pulse (60-80) Beat/Minute, Respiration (12 - 18) Breaths/Minute, Blood Pressure (120 / 80) mm/Hg.
Lecture; Fifteen- Sixteen- Seventeen

Drug Administration

Pre-test;

A). Answer by (True) against the true sentences and by (False) against the false sentences:

1. Drug can be taken for prevention.

2. If there are two drugs mixed in one syringe, it can be delayed for a time before administered.

3. While administering such drug intradermally, it can be given in many (cc)s.

4. For infants, intramuscular method of injection can be used.

5. Cream is best than ointment for skin areas exposed to sunlight.

6. Hot compress relax muscles.

7. Cold compress assist in controlling hemorrhage.

B). The appropriate angles of injection are; Intradermally (……….), Subcutaneously (……….), Intramuscularly (………..) and Intravenously (…….).

Drug Administration

Drug or Medication- is any substance that modifies body functions when it taken into the body. It has several names; {Chemical name- the precise description of the drug’s composition, Generic name- the manufacturer that first develops the drug assigns the name, Trade name- the company which sells the drug select this name}. The drug takes many forms; {Capsule, Tablet, Syrup, Liquid, Suspension, Lotion, Cream, Ointment, Suppository, Powder, Vial, Ampoule}. It prescribes for many reasons; (Prevention- as vaccines, Diagnosis- as tuberculin test, X-ray substances, Treatment- antibiotics, tonics, sedative…).
Computing Drug Dosage: To compute the drug, this formula must be used:

\[
\text{Dose Desired} \times \frac{\text{Quantity on hand}}{\text{Dose on hand}} = \text{Desired quantity}
\]

**Example:** Amoxicillin 625 mg is ordered, if the available is liquid preparation containing 250 mg in 5 ml, How much does the nurse administer?

\[
\begin{align*}
625 \text{ mg} & \quad \times \quad 5 \text{ ml} = 12.5 \text{ ml} \\
250 \text{ mg} & \quad \times \quad \frac{\text{5 ml}}{250 \text{ mg}} = 12.5 \text{ ml}
\end{align*}
\]

**The Five rights while drug administration:** are: Right patient; Right drug; Right time; Right method or route; Right dose.

**Parts of Medication Order:** The medication order must composed of seven parts; Patient's name; Date and time; Name of drug; Dose of drug; Route of administration; Frequency of administration; Signature of person who prescribe the drug.

**Routes of Drug Administration:** Oral; Sublingual; Parenteral (Intradermal; subcutaneous; Intramuscular; Intravenous); Topical or skin; Ophthalmic installation; Otic or ear installation; Nasal installation; Vaginal; Rectal; Inhalation; Irrigation; and Intraperitoneal.

**Mixing Medications in One Syringe**- When there are two drugs to be mixed, one from a vial and another from ampoule, the medication in the vial is prepared first and the medication in the ampoule is drawn up after the medication of the vial. The nurse must be aware of drug incompatibilities when preparing medication in one syringe. Certain medications are incompatible with other drugs in the same syringe. Other drugs have limited compatibility and should be administered within 15 minutes of preparation. Incompatible drugs may become cloudy or form a precipitate in the syringe. Such medications is not recommended unless opinion of the pharmacist should be known to determine the compatibility of the drugs as well as the compatibility of their pH values.

**Administering Medication Intradermally (ID.)**- The intradermal route has the longest absorption time of all parenteral routes. So, intradermal injections are used for diagnostic procedures, such as tuberculin test and allergies. The main sites used are inner surface of the forearm, the dorsal aspect of the upper arm and the upper back, while the dosage
administered is small, usually less than 0.5 ml, and the injection angle is 15 degree.

**Administering Medication Subcutaneously (Sc.)** - Subcutaneous tissue lies between the epidermis and the muscles. Because there is subcutaneous tissue all over the body, various sites are used for injection, as, outer aspect of the upper arm, abdomen, anterior aspect of the thigh and upper back, there are two injection angles; if the needle is 1/2 inch it is 90 degree while if it is 5/8 inch it is 45 degree.

**Administering Medication intramuscularly (Im.)** - this route is used for irritating drugs because there are few nerve ends in deep muscle tissue. Absorption occurs in this route more rapidly because the greater vascularity of muscle tissue. The amount of 4 ml is considered the maximum to be administered in one site for an adult with well developed muscles. The injection angle is 90 degree. An important point in this route is the selection of a safe site away from large nerves, bones, and blood vessels, as; [Gluteal muscle]- which is developed by walking, therefore it must not be used for children younger than three years of age; **Deltoid muscle**- injection in this site should be restricted to "1" ml of solution and used for adults; **Vatus Lateralis muscle**- this site is the outer middle third of the thigh, which is desirable for infants and children whose gluteal muscles are poorly developed]. Injection of the solution should be slowly so that it may disperse more easily into the surrounding tissues (10 seconds per one ml).
Administering Medication intravenously- This route is the most dangerous route of administration because the drug is administered directly into the bloodstream. This route is used in most emergency cases when immediate absorption is required. If the patient has infusion, drug can be added to it and receives it slowly and over a period of time. The injection angle is 45 degree to puncture the vein then it should be 15 degree.

Ointment provides prolonged contact of a medication with the skin, so it can be used for skin areas exposed to sunlight, while cream can be used for other skin areas.

Recording each dose of medication as soon as possible after it is given provides a documented record that can be consulted if there are any questions about whether the patient received the medication. The nurse should not record any medication before administering it.

Factors affecting the Selection of Length and Gauge of the Needle;

* Viscosity of drug.
* Route of administration.
* Skin state or elasticity.
* Speed of administration.

Cold compress: the advantages;

1. Inhibit the activity of bacteria & prevent their multiplication and reduce inflammation.
2. Reduce the temperature of the body.
3. Assist in controlling hemorrhage.
4. Numbs the nerve ends & relieve pain.
5. Lessen blood supply to the swelling area.

**Hot compress:** the advantages;
1. Increase blood supply to the affected area.
2. Remove waste products.
3. Relax muscles.
4. Relieve pain & congestion.

**References:**

- Taylor C, and Others; Fundamentals of Nursing; The art and Science of Nursing Care, Lippincott, 2001.
- Barbera K; Fundamentals Skills and concepts in Patient Care, Lippincott, 2000.
**Post-test:**

A). Answer by (True) against the true sentences and by (False) against the false sentences:

1. Drug can be taken for prevention.
2. If there are two drugs mixed in one syringe, it can be delayed for a time before administered.
3. While administering such drug intrademally, it can be given in many (cc)s.
4. For infants, intramuscular method of injection can be used.
5. Cream is best than ointment for skin areas exposed to sunlight.
6. Hot compress relax muscles.
7. Cold compress assist in controlling hemorrhage.

B). The appropriate angles of injection are; Intrademally (………), Subcutaneously (…………), Intramuscularly (………..) and Intravenously (…….).

**Key Answers:**

1. True. 2. False. 3. False. 4. False.

B). The appropriate angles of injection are; Intrademally (15 °c), Subcutaneously (90 if the needle is 1/2 inch, or 45 °c if the needle is 5/8 inch), Intramuscularly (90 °c) and Intravenously (45°C).

RETURN TO HOME PAGE
**Lecture- Eighteen**

**Fluid & Blood Infusion**

---

**Pre-test:**

A). Answer by (True) against the true sentences and by (False) against the false sentences:

1. Dextrose solution can be used for wound healing. **(True)**
2. Ringer solution is used mainly for dehydrated patient. **(True)**
3. Plasma solution can be used for severe burn. **(False)**
4. Blood can be given to fight infection. **(True)**
5. Antigen A and B are found in people with blood group O. **(False)**
6. People with blood group O have antibodies to both A and B antigens. **(True)**
7. People with blood group AB have antibodies to A and B antigens. **(False)**
8. If the donor blood differ from recipient blood, hemolysis of RBCs will occur. **(True)**
9. A donor of blood group A of Rh+ can give blood to a recipient of blood group A of Rh-. **(True)**
10. If febrile reaction occurs while blood transfusion, the nurse can complete the transfusion. **(False)**

---

**Fluid & Blood Infusion**

*Infusion*- is giving a large quantity of solution directly into the vein.

*Intravenous Solutions:*

1. **Isotonic solutions**- are solutions having the same concentration of solutes as blood plasma. They are often used to restore vascular volume.
2. **Hypertonic solutions**- are solutions that have a greater concentration of solutes than plasma.

3. **Hypotonic solutions**- are solutions that have a lesser concentration of solutes.

**IV solutions can be categorized according to their purpose:**

A. **Nutrient solutions**- contain some form of carbohydrate (dextrose, glucose, levulose) and water. They are used in preventing dehydration and ketosis but do not provide sufficient calories to promote wound healing, weight gain, or normal growth of children. The most common solutions are 5% dextrose in water (D5W) and 5% dextrose in 0.45% sodium chloride.

B. **Electrolyte solutions**- solutions contain varying amounts of cations and anions. Commonly used solutions are; Normal Saline (0.9% sodium chloride solution), Ringer's solution (contains sodium, chloride, potassium and calcium), Lactated Ringer's solution (contains sodium, chloride, potassium, calcium and lactate). Lactate is metabolized in the liver to form bicarbonate. Saline and balanced electrolyte solutions commonly are used to restore vascular volume, particularly after trauma or surgery. They also may be used to replace fluid and electrolytes for clients with continuing losses, as, due to gastric suction or wound drainage. Lactated Ringer's solution is an alkalinizing solution that may be given to treat metabolic acidosis. Acidifying solutions, in contrast, are administered to counteract metabolic alkalosis, as for acidifying solutions, 5% dextrose in 0.45% sodium chloride and 0.9% sodium chloride solution.

**Volume expanders**- are used to increase blood volume following severe loss of blood (e.g. hemorrhage), or loss of plasma (e.g. severe burn). Examples of expanders solutions are Dextran, Plasma and Albumin.
Nursing Role during IV. Infusion;

1. Determine the type and amount of solution to be infused.

2. Determine the amount (dose) of any medication to be added to a compatible solution.

3. Determine the flow or the time over which the infusion to be completed by using the formula:

   Solution amount in ml × 15

   ……………………………. = Drops / Minute

   Time in minutes

   Each one ml or cc = 15 drop.

   Example- Administer One pint (500 ml) of dextrose solution during five hours.

   500 × 15

   …………… = 25 drop / minute.

   5 × 60

4. Maintain asepsis by using sterile techniques.

5. Comfort the patient.


7. Observe any sign of reaction to the infusion solution.

8. Restrict the movement of the patient.
9. At the end, record the amount of the solution, time and any observations on the patient in the patient's record.

**Blood Transfusion**- is the introduction of whole blood or blood components (RBCs, Platelets, Albumin) into the venous circulation.

**Purpose**- To replace blood components or blood's ability to transport oxygen and carbon dioxide, to clot, to fight infection, and to keep extracellular fluid within the intravascular compartments.

**Blood Group**- Human blood is commonly classified into four main groups (A, B, AB, and O). The surface of an individual 's red blood cells contains a number of proteins known as **antigens**. Antigens A, B, and Rh are the most important in determining blood group or type.
Because antigens promote *agglutination* of blood cells, they are known as *agglutinogens*. The A antigen or agglutinogen is present on the RBCs of people with blood group A, The B antigen or agglutinogen is present on the RBCs of people with blood group B, and both A and B antigens are found on the RBCs surface in people with group AB blood. Neither antigen is present in people with group O blood. Performed *antibodies* to RBC antigens are present in the plasma; these antibodies are called *agglutinins*. People with blood group A have B antibodies (agglutinins); A antibodies are present in people with blood group B; and people with blood group O have antibodies to both A and B antigens. People with group AB blood do not have antibodies to either A or B antigens. When blood is transfused, the blood group of the donor and recipient must match to avoid an antigen-antibody reaction and destruction (hemolysis) of RBCs.

**Rhesus (Rh) Factor**- The Rh factor is present approximately in 85% of people. Blood that contains the Rh factor is known as Rh-positive (Rh\(^+\)); when it is not present the blood is said to be Rh-negative (Rh\(^-\)). However, on exposure to blood containing Rh factor (e.g., an Rh- mother carrying a fetus with Rh\(^+\) blood, or transfusion of Rh\(^+\) blood into a client with Rh\(^-\)), Rh antibodies develop. Subsequent exposure to Rh\(^+\) blood place the client at risk for an antigen-antibody reaction or hemolysis or RBCs.

**The Procedure and Care;**

1. Ascertain the blood of the patient (Group and Rh) before administration through blood compatibility and cross-matching procedures.

2. Maintain the blood in the refrigerator till using.

3. Small rise in body temperature is common during transfusion.

4. Headache is common during transfusion.

5. Adjust blood flow and observe it carefully.

6. Notice any reaction observed while transfusion (e.g., hemolytic reaction, febrile reaction- sensitivity to blood, allergic reaction, circulatory overload, and sepsis).

7. At the end of transfusion, clamp the infusion tube and withdraw the needle slowly, and apply pressure with alcohol sponge over puncture site for 2-3 minutes.
8. Record amount of blood given, time of infusion and any observations noticed on the patient during infusion in the chart of the patient.

![Table 50-11: The Blood Groups with Their Constituent Agglutinogens and Agglutinins](image)

**References:**

- Taylor C, and Others; Fundamentals of Nursing; The art and Science of Nursing Care, Lippincott, 2001.
Post-test:

Answer by (True) against the true sentences and by (False) against the false sentences:

1. Dextrose solution can be used for wound healing.
2. Ringer solution is used mainly for dehydrated patient.
3. Plasma solution can be used for severe burn.
4. Blood can be given to fight infection.
5. Antigen A and B are found in people with blood group O.
6. People with blood group O have antibodies to both A and B antigens.
7. People with blood group AB have antibodies to A and B antigens.
8. If the donor blood differ from recipient blood, hemolysis of RBCs will occur.
9. A donor of blood group A of Rh+ can give blood to a recipient of blood group A of Rh-.
10. If febrile reaction occurs while blood transfusion, the nurse can complete the transfusion.
**Key Answers:**

1. False.  
2. False.  
3. True.  
4. True.  
5. False.  
6. True.  
7. False.  
8. True.  
10. False.
Lecture- Nineteen; Twenty; Twenty-Five

Intensive Care Unit (ICU)

Pre-test:

Answer by (True) against the true sentences and by (False) against the false sentences:

1. After heart attack, the patient admits to medical wards.

2. The main equipment in Intensive Care Unit is the physiologic monitoring system.

3. Pulse oximeter uses for checking intracranial pressure.

4. Ventilator is important device in ICU.

5. Electrocardiogram is a visual representation of the electrical activity of the heart.

6. Electrocardiogram is a visual representation of the picture of the heart.

*****************************************************************************

Intensive Care Unit (ICU)
After a heart attack or major cardiac surgery, patients typically are treated in a hospital's cardiac care unit, or CCU, which offers highly specialized care until their condition stabilizes. The equivalent of an intensive care unit, or ICU, which is for critically ill patients with other types of conditions, a CCU contains extensive heart monitoring and testing equipment as well as a staff trained and certified in heart conditions and procedures and their aftermath.

**Equipment;** Intensive care unit (ICU) equipment includes patient monitoring, respiratory and cardiac support, pain management, emergency resuscitation devices, and other life support equipment designed to care for patients who are seriously injured, have a critical or life-threatening illness, or have undergone a major surgical procedure, thereby requiring 24-hour care and monitoring;
**Patient monitoring equipment**

* Acute care physiologic monitoring systems are comprehensive patient monitoring systems that can be configured to measure and display various parameters, such as an electrocardiogram (ECG), respiratory rate, blood pressure, body temperature, cardiac output, arterial hemoglobin oxygen saturation, mixed venous oxygenation, and end-tidal carbon dioxide, via electrodes and sensors connected to the patient. Each patient bed in an ICU has a physiologic monitor, and all monitors are networked to a central nurses’ station.

* Pulse oximeters measure the arterial hemoglobin oxygen saturation of the patient's blood with a sensor clipped over the finger or toe. Pulse oximetry is usually a capability included in a physiologic monitoring system, but the ICU also uses dedicated pulse oximeters for some patients.

* Intracranial pressure monitors are connected to sensors inserted into the brain through a cannula or bur hole. These devices warn of elevated pressure and record or display pressure trends. Intracranial pressure monitoring may be a capability included in a physiologic monitor.

* Apnea monitors use electrodes or sensors placed on the patient to detect cessation of breathing, display respiration parameters, and trigger an alarm if a certain amount of time passes without a patient’s breath being detected. Apnea monitoring may be a capability included in a physiologic monitor.

**Life support and emergency resuscitative equipment**

* Ventilators consist of a flexible breathing circuit, gas supply, heating/humidification mechanism, monitors, and alarms. They are microprocessor-controlled and programmable, and regulate the volume, pressure, and flow of patient respiration. Ventilator monitors and alarms may be interfaced to a central monitoring system or information system.

* Infusion pumps employ automatic, programmable pumping mechanisms to supply the patient with fluids intravenously or epidurally through a catheter. The pump is hung on an intravenous pole, which is located next to the patient’s bed.
* Crash carts, also called resuscitation carts or code carts, are strategically located in the ICU for immediate availability when a patient experiences cardiorespiratory failure. The cart holds a defibrillator, which is used to apply an electric shock to a patient in ventricular fibrillation. Two paddles are placed on the patient's chest and buttons are pressed to discharge an electrical shock of approximately 2,000 to 4,000 volts. The cart also holds a resuscitator, which is inserted into the patient's airway, and a bag is pressed to push air into the lungs.

* Intra-aortic balloon pumps use a balloon placed in the patient's aorta to help the heart pump. The balloon is on the end of a catheter that is connected to the pump's console, which displays heart rate, pressure, and ECG readings. The patient's ECG is used to time the inflation and deflation of the balloon.

* Common equipment in an ICU includes mechanical ventilator to assist breathing through an endotracheal tube or a tracheotomy opening; cardiac monitors including telemetry, external pacemakers, and defibrillators; dialysis equipment for renal problems; equipment for the constant monitoring of bodily functions; intravenous lines, feeding tubes, nasogastric tubes, suction pumps, drains and catheters; and a wide array of drugs to treat the main condition(s). Medically induced comas, analgesics, and induced sedation reduce pain and prevent secondary infections.

* Diagnostic devices most commonly used in the ICU are mobile x-ray units, which can be pushed to the patient's bedside to take x rays using a battery-operated generator that powers an x-ray tube, and point-of-care blood analyzers, which are handheld devices that require a small amount of whole blood and display blood chemistry parameters.

**Electrocardiogram**- is a visual representation of the electrical activity of the heart as reflected by changes in electrical potential at the skin surface. In order to facilitate the interpretation of the ECG, data about the patient's age, sex, blood pressure, height, weight, symptoms, and medications (especially digitalis and antiarrhythmic drugs) should be noted on the ECG requisition. Electrocardiography is particularly useful in the evaluation of conditions that interfere with normal heart functions, such as disturbances of rate of rhythm, disorders of conduction, enlargement of
heart chambers, presence of a myocardial infarction, and electrolyte imbalances.

_Electrical Conduction through the Heart-_ The normal electrical impulse of the heart, which inscribes the ECG and causes the heart to contract, begins in the Sinoatrial (SA) node, which is located in the superior portion of the right atrium. After beginning in the SA node the impulse travels across the atria so that an atrial contraction occurs. The impulse then arrives at the atrioventricular (AV) node, which lies between the atria and ventricles. The impulse is somewhat delayed in the AV node and then travels down the right and left bundle branches and Purkingi fibers to the ventricular muscle, then the ventricles contract. Both the SA and AV nodes are connected to two main nerve systems that the rate at which the heart beats.

![Diagram of the heart](image)

_The Twelve Leads of ECG-_ Normal, ECG consists of 12 leads; three bipolar standard leads (I, II, III); three unipolar leads (aVR, aVL, aVF); and six unipolar chest leads.

_The three bipolar leads represent a difference of electrical potential between two selected sites;_

**Lead I:** is the difference of potential between the left arm (LA) and the right arm (RA).
**Lead II:** is the difference of potential between the left leg (LL) and the right leg (RL).

**Lead III:** is the difference of potential between the left leg (LL) and the left arm (LA).

The three augmented unipolar extremity leads are:

- **aVR:** augmented vector of the right arm.
- **aVL:** augmented vector of the left arm.
- **aVF:** augmented vector of the left leg.

The unipolar leads represent a difference in the potential between one site and the average of the potential of two sites.

The last six leads of the 12-leads of ECG are the unipolar precordial (chest) leads that are called "V" leads, their placement are as in (Fig. 28-3):

- **V1:** at the fourth intercostal space, at the right side of sternum.
- **V2:** at the fourth intercostal space, at the left side of sternum.
- **V3:** midway between positions of **V1** and **V2**.
- **V4:** at the fifth intercostal space at the mid-clavicular line.
- **V5:** at the same level of **V4** in the anterior axillary line.
- **V6:** at the same level of **V4** and **V5** in the midaxillary line.
**Waves, Complexes, and Intervals:** The ECG is composed of several components or waves, including **P** wave, **QRS** complex, **T** wave, **ST** segment, **R** interval and possibly **U** wave (usually indicates an abnormality) as in "Fig. 28-4".

**P-Wave;** represents atrial muscle depolarization. It is normally 2.5 mm or less in height and is 0.11 second or less in duration. It is positive deflection.
ORS- Complex; represents ventricular muscle depolarization, is measured from the beginning of the Q wave or the R wave if no Q wave is present to the end of the S wave. The QRS complex is normally 0.04 to 0.10 second in duration. It is composed of:

Q- wave; is negative deflection, it is less than 0.03 seconds in duration and less than 25% of the R wave amplitude.

R- wave; is positive deflection after Q wave.

S- wave; is negative deflection after R wave.

When the QRS complex waves is less than 5 mm vertical, small letters (q, r, s) are used, and when a wave is greater than 5 mm vertically, capital letters (Q, R, S) are used. Not QRS complexes have all three wave forms.

T- wave; represents ventricular muscle repolarization. It follows the QRS complex and is usually of the positive deflection.

U- wave; is sometimes is seen, and follows T wave. If presents it indicate an electrolyte abnormality.

St- segment; it represents early ventricular repolarization of the ventricles, it is from the end of S wave to the beginning of the T wave.

P-R interval; is measured from the beginning of the P wave to the beginning of the Q wave, or to the beginning of R wave if no Q wave is present, and represents the time required for the impulse to travel through the atria and conduction system to the Purkingi fibers. In adults, the P-R interval normally ranges from 0.12 second to 0.20 second in duration.

Q-T interval; it presents electrical systole, is measured from the beginning of the Q wave, r the R wave if no Q wave is present to the end of the T wave. The Q-T interval varies with heart rate, is usually less than the R-R interval (measured from the beginning of one R wave to the beginning of the next R wave), and usually is 0.32 to 0.40 second in duration if the heart rate is 65 to 95 beat/ minute.
Determination of Heart Rate from ECG; Heart rate can be obtained from the ECG strip by two methods:

- P wave (0.08 - 0.10 s)
- QRS (0.06 - 0.10 s)
- P-R interval (0.12 - 0.20 s)
- Q-Tc interval (≤ 0.44 s)*

\[ Q_Tc = \frac{Q_T}{\sqrt{RR}} \]
1. **If the rhythm is regular:** count the number of 0.04 second intervals (0.04 second equals one small box) between two R waves, then divide 1500 by that number.

2. **If the rhythm is irregular:** count the number of R-R intervals in 6 seconds and multiply that number by 10. The R-R intervals are counted, not QRS complexes.

**Note:** Because the electrical resistance of the dry skin surface, it is desirable to wet skin surface in order to reduce the resistance between the body and the metal electrodes.

**Cardiac monitor**- The cardiac monitor is a device that shows the electrical and pressure waveforms of the cardiovascular system for measurement and treatment. Parameters specific to respiratory function can also be measured. Because electrical connections are made between the cardiac monitor and the patient, it is kept at the patient's bedside.

**Purpose**- The cardiac monitor continuously displays the cardiac electrocardiogram (ECG) tracing. Additional monitoring components allow cardiovascular pressures and cardiac output to be monitored and displayed as required for patient diagnosis and treatment. Oxygen saturation of the arterial blood can also be monitored continuously. Most commonly used in emergency rooms and critical care areas, bedside monitors can be interconnected to allow for continual observation of several patients from a central display. Continuous cardiovascular and pulmonary monitoring allows for prompt identification and initiation of
treatment. Cardiac monitors display such vital signs as heart rate, pulse, and blood pressure for patients in the intensive care unit.

References;


• Taylor C, and Others; Fundamentals of Nursing, The art and Science of Nursing Care, Lippincott, 2005.


• Taylor C, and Others; Fundamentals of Nursing; The art and Science of Nursing Care, Lippincott, 2001.


• Barbera K; Fundamentals Skills and concepts in Patient Care, Lippincott, 2000.


****************************

**Post-test:**

Answer by (True) against the true sentences and by (False) against the false sentences:

1. After heart attack, the patient admits to medical wards.
2. The main equipment in Intensive Care Unit is the physiologic monitoring system.
3. Pulse oximeter uses for checking intracranial pressure.
4. Ventilator is important device in ICU.
5. Electrocardiogram is a visual representation of the electrical activity of the heart.
6. Electrocardiogram is a visual representation of the picture of the heart.

**Answer Keys:**

1. False. 2. True. 3. False. 4. True.
5. True. 6. False.

**RETURN TO HOME PAGE**
Lecture; Twenty-One
Resuscitation Equipments

Pre-test;

Answer by (True) against the true sentences and by (False) against the false sentences:

1. Resuscitation equipments can be used by all patients.

2. Resuscitation drugs should not be replaced till expire.

Resuscitation Equipments

Recommended Minimum Equipment for In-Hospital Adult Resuscitation; Provision should be made in all clinical areas to have immediate access to resuscitation drugs and equipment to facilitate rapid resuscitation of the patient in cardiopulmonary arrest. Ideally, the equipment used for cardiopulmonary resuscitation (including defibrillators) and the layout of equipment and drugs should be standardized throughout an institution.

The choice of resuscitation equipment should be defined by the resuscitation committee and will depend on anticipated workload and specialized local requirements. Whilst it is difficult to plan for every eventuality, institutions should undertake a risk assessment to determine what additional resources may be required depending on local circumstances and specific locations (e.g., in some areas there may need to be provision for failed intubation, patients with tracheostomies etc). Where possible, resuscitation equipment should be single use. In addition to the resuscitation equipment listed below, clinical areas should have immediate access to stethoscopes, a device for measuring blood pressure, a pulse oximeter, a 12-lead ECG recorder and facilities for blood gas analysis. A method for verifying correct placement of the tracheal tube is recommended e.g., end-tidal carbon dioxide monitoring, or an oesophageal detector device.
The Resuscitation Council (UK) recommends that the manufacturer’s instructions for use and servicing are followed and that equipment and drugs are replaced before they expire.

The following items are the recommended minimum requirement:

* AIRWAY EQUIPMENT;

- Pocket mask with oxygen port (should be widely available in all clinical areas)
- Self inflating resuscitation bag with oxygen reservoir and tubing (ideally, the resuscitation bag should be single use – if not, it should be equipped with a suitable filter)
- Clear face masks, sizes 3,4 & 5
- Oropharyngeal airways, sizes 2, 3 & 4
- Nasopharyngeal airways, sizes 6 & 7
- Portable suction equipment
- Tracheal suction catheters, sizes 12 & 14
- Laryngeal mask airways (sizes 4 & 5), or ProSeal LMAs (sizes 4 & 5), or Combitube (small)
- Magill forceps
- Tracheal tubes – oral, cuffed, sizes 6, 7 & 8
- Lubricating jelly
- Laryngoscope handles (x 2) and blades (standard and long blade)
- Spare batteries for laryngoscope and spare bulbs (if applicable)
- Fixation for tracheal tube (e.g., ribbon gauze/tape)
- Scissors
- Selection of syringes
- Oxygen mask with reservoir (non-rebreathing) bag
- Oxygen cylinders
- Cylinder key

* CIRCULATION EQUIPMENT;

- Defibrillator
- ECG electrodes
- Defibrillation gel pads or self-adhesive defibrillator pads (preferred)
- Selection of intravenous cannula
- Selection of syringes and needles
- Cannula fixing dressings and tapes
- Central venous catheter kit
• Intravenous infusion sets
• 0.9% sodium chloride - 1000 mL x 2
• Arterial blood gas syringes
• Tourniquet

*DRUGS;

a) Immediately available prefilled syringes
   • Adrenaline (epinephrine) 1 mg (1:10,000) x 4
   • Atropine 3 mg x 1

b) Other readily available drugs.

*Intravenous medications:*

* Adrenaline 1 mg (1:10,000) x 4
* Adrenaline 1 mg (1:1,000) x 2
* Calcium Chloride 10 mL of 100mg per mL x 1
* Furosemide 50 mg x 2
* Glucose 10% 500 mL x 1
* Hydrocortisone 100 mg x 2
* Lidocaine 100 mg x 1
* Magnesium Sulphate 50% solution 2 g (4 mL) x 1
* Normal Saline 10 mL ampoules
* Potassium Chloride for injection
* Sodium Bicarbonate 8.4% - 50 mL x 1

*Other medications / equipment:*

* Salbutamol (5 mg x 2).
* Nebuliser device and mask
* Aspirin 300 mg
* ADDITIONAL ITEMS;

* Clock

* Gloves/Goggles/Aprons

* Audit forms

* Sharps container and clinical waste bag

* Large scissors

* Alcohol wipes

* Blood sample bottles

References:


- Taylor C, and Others; Fundamentals of Nursing; The art and Science of Nursing Care, Lippincott, 2001.


- Barbera K; Fundamentals Skills and concepts in Patient Care, Lippincott, 2000.


*********************

Post-test:

Answer by (True) against the true sentences and by (False) against the false sentences:

1. Resuscitation equipments can be used by all patients.

2. Resuscitation drugs should not be replaced till expire.

Answer Keys:

1. False. 2. False.

RETURN TO HOME PAGE
**Lecture; Twenty-two**  
**Veinpuncture**

**Pre-test:**

*Answer by (True) against the true sentences and by (False) against the false sentences:*

1. The veins of anterior forearm and dorsal hand are the best veins for veinpuncture.

2. Central Venous Catheter that is used for long term infusion can also be inserted in the veins of forearm.

3. Defibrillator terminates the arrhythmia.

4. A gel must not be applied on the electrodes while using the defibrillator.

5. One electrode of the defibrillator can be placed over the left pericardium while the other can be placed on the back behind the heart between scapula.

************************************************

**Veinpuncture**

**Veinpuncture**- is a puncture of a vein for collection of a blood or for infusion of therapeutic solutions. The site chosen for veinpuncture varies with the client's age, the length of time the infusion is to run, the type of solution used, and the condition of veins. For adults, veins in the hand and arm are commonly used; for infants, veins in the scalp and dorsal foot veins are often used. Large veins are preferred for infusions that need to be given rapidly and for solutions that could be irritating.

The metacarpal, basilic, and cephalic veins are commonly used for intermittent or continuous infusion.
The ulna and radius act as natural splints at these sites, and the client has greater freedom of arm movements for activities such as eating. Although the basilic and median cubital veins in the antecubital space are convenient sites for vein puncture, they are usually used for blood draws, bolus injections of medication, and insertion sites for a peripherally inserted central catheter line.

When long-term IV therapy or parenteral nutrition is anticipated or the client is receiving IV medications that are damaging to vessels (e.g., chemotherapy), a central venous catheter may be inserted. Central Venous Catheters usually are inserted into the subclavian or jugular
vein, with the distal tip of the catheter resting in the superior vena cava just above the right atrium.

Subclavian venous catheters permit freedom of movements for ambulation; however, there is a risk of pneumothorax on catheter insertion. Assess the client closely for manifestations such as shortness of breath, chest pain, cough, hypotension, tachycardia, and anxiety after the insertion procedure.

With a **peripherally inserted central venous catheter (PICC)**, the catheter is inserted in the basislic or cephalic vein just above or below the antecubital space of one arm especially the right arm. The tip of the catheter rests in the superior vena cava. The risk of pneumothorax is eliminated with PICC. These catheters frequently are used for long-term intravenous access when the client will be managing IV therapy at home.

Implantable venous access device or port is used for clients with chronic illness who require long-term IV therapy (e.g., intermittent medications as chemotherapy, total parenteral nutrition, and frequent blood samples). The device is designed to provide repeated access to the central venous system, avoiding the trauma and complications of multiple veinpunctures.
Defibrillation:

Is the definitive treatment for the life-threatening cardiac arrhythmias, ventricular fibrillation and pulseless ventricular tachycardia. Defibrillation consists of delivering a therapeutic dose of electrical energy to the affected heart with a device called a defibrillator. This depolarizes a critical mass of the heart muscle, terminates the arrhythmia, and allows normal sinus rhythm to be reestablished by the body's natural pacemaker, in the sinoatrial node of the heart. Defibrillators can be external, transvenous, or implanted, depending on the type of device used or needed. Some external units, known as automated external defibrillators (AEDs), automate the diagnosis of treatable rhythms, meaning that lay responders or bystanders are able to use them successfully with little, or in some cases no training at all.
Manual external defibrillator

External defibrillator / monitor- The units are used in conjunction with (or more often have inbuilt) electrocardiogram readers, which the healthcare provider uses to diagnose a cardiac condition (most often fibrillation or tachycardia although there are some other rhythms which can be treated by different shocks). The healthcare provider will then decide what charge (in joules) to use, based on proven guidelines and experience, and will deliver the shock through paddles or pads on the patient's chest. As they require detailed medical knowledge, these units are generally only found in hospitals and on some ambulances.

Interface with the patient- The most well-known type of electrode is the traditional metal paddle with an insulated (usually plastic) handle. This type must be held in place on the patient's skin while a shock or a series of shocks is delivered. Before the paddle is used, a gel must be applied to the patient's skin, in order to ensure a good connection and to minimize electrical resistance, also called chest impedance (despite the DC
discharge). These are generally only found on the manual external units. Newer types of resuscitation electrodes are designed as an adhesive pad. These are peeled off their backing and applied to the patient's chest when deemed necessary, much the same as any other sticker. These electrodes are then connected to a defibrillator. If defibrillation is required, the machine is charged, and the shock is delivered, without any need to apply any gel or to retrieve and place any paddles. These adhesive pads are found on most automated and semi-automated units, and are gradually replacing paddles entirely in non-hospital settings. Both solid- and wet-gel adhesive electrodes are available. Solid-gel electrodes are more convenient, because there is no need to clean the patient's skin after removing the electrodes. However, the use of solid-gel electrodes presents a higher risk of burns during defibrillation, since wet-gel electrodes more evenly conduct electricity into the body. Some adhesive electrodes are designed to be used not only for defibrillation, but also for transcutaneous pacing and synchronized electrical cardioversion. In a hospital setting, paddles are generally preferred to pads, due to the inherent speed with which they can be placed and used. This is critical during cardiac arrest, as each second of nonperfusion means tissue loss. However, in cases in which cardiac arrest is suspected, patches placed prophylactically are superior, as they provide appropriate ECG tracing without the artifact visible from human interference with the paddles. Adhesive electrodes are also inherently safer than the paddles for the operator of the defibrillator to use, as they minimize the risk of the operator coming into physical (and thus electrical) contact with the patient as the shock is delivered, by allowing the operator to stand several feet away. Adhesive patches also require no force to remain in place and deliver the shock appropriately, whereas paddles require approximately 25 lbs of force to be applied while the shock is delivered.

**Placement:** Antero-apical placement of external defibrillator electrodes (When defibrillation is unsuccessful, anterior-posterior placement is also sometimes attempted). Resuscitation electrodes are placed according to one of two schemes. The anterior-posterior scheme (conf. image) is the preferred scheme for long-term electrode placement. One electrode is placed over the left pericardium (the lower part of the chest, in front of the heart). The other electrode is placed on the back, behind the heart in the region between the scapula. This placement is preferred because it is best for non-invasive pacing. The anterior-apex scheme can be used when the anterior-posterior scheme is inconvenient or unnecessary. In this
scheme, the anterior electrode is placed on the right, below the clavicle. The apex electrode is applied to the left side of the patient, just below and to the left of the pectoral muscle. This scheme works well for defibrillation and cardioversion, as well as for monitoring an ECG.

**Cardioversion- (Direct-Current" or DC cardioversion);**

Cardioversion is a brief procedure where an electrical shock is delivered to the heart to convert an abnormal heart rhythm back to a normal rhythm. Most elective or "non-emergency" cardioversions are performed to treat atrial fibrillation or atrial flutter, benign heart rhythm disturbances originating in the upper chambers (atria) of the heart. Cardioversion is used in emergency situations to correct a rapid abnormal rhythm associated with faintness, low blood pressure, chest pain, difficulty breathing, or loss of consciousness.

Each normal heartbeat starts in an area of the heart known as the sinus node which is located in the upper right chamber of the heart (right atria) [Figure 1 - Normal Conduction]. The sinus node contains specialized cells that send an organized electrical signal through the heart resulting in a perfectly timed, rhythmic heartbeat. In patients with atrial fibrillation, however, the atria fibrillate (or "quiver") due to chaotic electrical signals that circulate throughout both atria. This typically results in a fast and irregular heartbeat. While some patients have no symptoms, others may experience shortness of breath, lightheadedness and fatigue. Depending on your specific medical history and symptoms, your physician may recommend a cardioversion to return your heart to a normal rhythm.
Cardioversion can be "chemical" or "electrical". Chemical cardioversion refers to the use of antiarrhythmia medications to restore the heart's normal rhythm. Antiarrhythmia medications work by modifying the heart's electrical properties to reduce the frequency of abnormal heart rhythms and to help restore a normal rhythm. Electrical cardioversion (also known as "direct-current" or DC cardioversion) is a procedure whereby a synchronized (perfectly timed) electrical shock is delivered through the chest wall to the heart through special electrodes or paddles that are applied to the skin of the chest and back [Figure 2]. The goal of the cardioversion is to disrupt the abnormal electrical circuit(s) in the heart and to restore a normal heart beat. The shock causes all the heart cells to contract simultaneously, thereby interrupting and terminating the abnormal electrical rhythm (typically fibrillation of the atria) without damaging the heart. This split second interruption of the abnormal beat allows the heart's electrical system to regain control and restore a normal heartbeat.
An electrical cardioversion is performed in a hospital setting such as an emergency room, intensive care unit, recovery room, special procedure room or Electrophysiology Laboratory. A cardiologist, a nurse and/or an anesthesiologist are present to monitor your breathing, blood pressure and heart rhythm. Special cardioversion pads are placed on your chest and back (or alternatively, both pads can be placed on the front of the chest). The pads are connected to an external defibrillator by a cable. The defibrillator allows the medical team to continuously monitor your heart rhythm and to deliver the electrical shock to restore your heart's rhythm back to normal [Figure - 3].

Since the shock can be painful, an anesthesiologist or specially trained nurse administers intravenous sedation. Once you are asleep (but still breathing on your own), the physician charges the defibrillator to a specified energy level and then delivers the shock by pressing a button on the defibrillator. The shock is transmitted along the cable to the pads on the chest where the energy is delivered across the chest wall to the heart muscle. Additional shocks at higher energy levels can be delivered if the first shock does not restore the rhythm back to normal. Rarely, minor skin redness can occur at the site of the cardioversion pads where the electrical energy was delivered. Patients typically awake quickly without any recollection of the shocks, due to the amnesic effects of the sedatives. Because of residual effects of the anesthetic medications used, patients are advised not to drive or make any important decisions for the rest of
the day. A responsible adult should be available to provide transportation home. The anesthetic agents typically used for the procedure are short acting; therefore most patients are able to go home an hour or so after the procedure. A normal heart rhythm can be restored more than 90% of the time, although abnormal rhythms may recur in about half the patients within one year. The success of electrical cardioversion often depends on the duration of atrial fibrillation and the underlying cause (heart disease). Cardioversion is not appropriate for every patient with atrial fibrillation.

Because the upper chambers of the heart are fibrillating (quivering) and do not squeeze uniformly in patients with atrial fibrillation, there is a potential risk that blood clots may form. The process of restoring a normal rhythm could potentially dislodge a blood clot from the heart resulting in a heart attack or a stroke. Fortunately, thinning the blood prior to cardioversion can prevent most blood clots. This is a process called "anticoagulation". Anticoagulant medications include aspirin, heparin or warfarin (Coumadin). Warfarin is a pill taken daily and dosed according to blood test results. This test, referred to as the INR or International Normalized Ratio, monitors the "thinness" or "thickness" of the blood and typically should be in the [2.0-3.0] range (a normal INR in someone who is not on warfarin is typically around 1.0). If the INR is too low, there may be at an increased risk of forming a blood clot. If the INR is too high, there may be at an increased risk for bleeding. Heparin is a blood thinner that can be given as an intravenous solution or shots in the skin. It acts more quickly and its effects are reversed more rapidly than warfarin (Coumadin). Frequently, patients are placed on heparin until warfarin (Coumadin) becomes effective, as this may take several days.

Prior to performing a cardioversion, your physician will determine your risk of blood clot formation (and thus, your risk of stroke or heart attack) and choose an anticoagulant medicine. In patients with atrial fibrillation or flutter that has been present for a while, the blood must be adequately thinned for at least [3-4] weeks prior to the cardioversion to reduce the risk of stroke. Because it takes many hours for blood clots to form, cardioversion can be safely performed without blood thinning medication in patients who have had their heart rhythm problem for less than (48) hours. Occasionally, your physician may recommend a special ultrasound of the heart (called a transesophageal echocardiogram or
TEE). During a transesophageal echocardiogram, a special probe is placed in the esophagus. It allows your physician to directly visualize the atria to scan for potential blood clots. Typically, anticoagulation is continued after the cardioversion for an additional (4) weeks to (6) months, even if the cardioversion is successful.

References;

1. "Claude Beck, defibrillation and CPR". Case Western Reserve University.
2. Sov Zdravookhr Kirg.. "Some results with the use of the DPA-3 defibrillator (developed by V. Ia. Eskin and A. M. Klimov) in the treatment of terminal states" (in Russian).
9. "What is the LifeVest?". Zoll Lifecor.

***********************

**Post-test:**

Answer by (True) against the true sentences and by (False) against the false sentences:

1. The veins of anterior forearm and dorsal hand are the best veins for venipuncture.
2. Central Venous Catheter that is used for long term infusion can also be inserted in the veins of forearm.
3. Defibrillator terminates the arrhythmia.
4. A gel must not be applied on the electrodes while using the defibrillator.
5. One electrode of the defibrillator can be placed over the left pericardium while the other can be placed on the back behind the heart between scapula.

**Answer Keys:**

1. True. 2. False. 3. True. 4. False. 5. True.

**RETURN TO HOME PAGE**
Lecture; Twenty- Three ; Twenty-Four
Oxygen Administration

Pre-test;

Answer by (True) against the true sentences and by (False) against the false sentences:

1. Oxygen administers in case of heart failure.
2. Dry oxygen dehydrates the respiratory mucous membranes.
3. Humidification may be done including very low liter flows.
4. Nasal cannula (prongs) is easy than other devices.
5. Convulsion can be occurred in case of high oxygen administration.

Oxygen Administration

Is introduction of oxygen to patients whose respiratory capacity diminished to maintain health and life, as in;

1. Difficulty ventilation all areas of their lungs.
2. Impairment of gas exchange.
3. Heart failure.

Three factors should be depended while oxygen administration, they are;

A. Concentration of oxygen administered.
B. Method of delivery.
C. Liter flow per minute.

Safety precautions are essential during oxygen therapy as in box below;
Because oxygen is colorless, odorless, and tasteless, people are often unaware of its presence. While oxygen itself will not burn or explode, it does facilitate combustion. Oxygen is supplied in several different ways. In hospitals and long-term care facilities, it is usually piped into wall outlets at the client's bedside. Tanks or cylinders of oxygen under pressure are also frequently available for use when wall oxygen either is unavailable or impractical. Clients who require oxygen therapy in the home may use small cylinders of oxygen, oxygen in liquid form, or an oxygen concentrator. Portable oxygen delivery systems are available to increase the client's independence.

Oxygen administered from a cylinder or wall-outlet system is dry. Dry gases dehydrate the respiratory mucous membranes. Humidifying devices that add water vapor to inspired air are thus an essential adjunct of oxygen therapy, particularly for liters flow over 2 liter/minute. These devices provide 20% - 40% humidity. The oxygen passes through distilled water or tap water and then along a line to the device through which the moistened oxygen is inhaled (e.g., cannula, nasal catheter, or oxygen mask).
Humidifiers prevent mucous membranes from drying and becoming irritated and loosen secretions for easier expectoration. The more bubbles created during this process, the more water vapor is produced. Very low liter flows (e.g., 1 – 2 liter/minute by nasal cannula) do not require humidification.

**Oxygen Delivery Systems:**

1. *Nasal cannula (nasal prongs)*; It is most common device, easy to apply and does not interfere with the client's ability to eat or talk, and permits some freedom of movement, and well tolerated by the client, it delivers low concentration of oxygen (24% - 45%) at flow rates of (2–6 L/minute).
2. *Face Mask*: It covers the client's nose and mouth to be used for oxygen inhalation, while exhalation ports on the sides of the mask allow exhaled CO₂ to escape. There are many types of masks that deliver oxygen at various concentrations (40% - 60% with liter flow of 5 – 8 L/m.; 60% - 90% with flow rate of 6 -10 L/m.; 955 – 100% with liter flow of 10 – 15 L/m.; 24% - 50% with flow rate of 4 – 10 L/m.).
3. *Face Tent*; instead of oxygen mask when it can not tolerate. It provides varying concentrations of oxygen; 30% - 50% with 4-8 L/m.

4. *Child Oxygen Tent*; it provides oxygen concentration of 30% with flow rate of 10 – 15 L/m.

**Complications of Oxygen Administration;**

1. Convulsion.
2. Irritation of the respiratory mucous membranes.
3. Blindness among infants if excessive oxygen administered.

**References:**

• Taylor C, and Others; Fundamentals of Nursing; The art and Science of Nursing Care, Lippincott, 2001.
• Barbera K; Fundamentals Skills and concepts in Patient Care, Lippincott, 2000.
• Sammaour S, Al-Momani F, Haddad M, Al-Majali M and Yousef F; Fundamental of Nursing, 1st edition, 2008، مكتبة المجتمع العربي للنشر والتوزيع

*******************************

Post-test:

Answer by (True) against the true sentences and by (False) against the false sentences:

1. Oxygen administers in case of heart failure.
2. Dry oxygen dehydrates the respiratory mucous membranes.
3. Humidification may be done including very low liter flows.
4. Nasal cannula (prongs) is easy than other devices.
5. Convulsion can be occurred in case of high oxygen administration.

Answer Keys:

1. True.  2. True.  3. False.  4. True.
5. True.

RETURN TO HOME PAGE
Lecture; Twenty-Six
Urinary Catheterization

Pre-test;

Answer by (True) against the true sentences and by (False) against the false sentences:

1. Urinary catheterization uses to empty distended bladder.
2. Stop insertion of the catheter with the first urine flow from it.
3. Complete inflation of the catheter balloon even if the client discomforts.
4. Hang the urine bag below the level of the bladder.
5. Enema is done to stimulate peristalsis.
6. Enema can't be used for diagnostic purposes.
7. Ask the patient to take deep breathing while administering the enema.
8. If enema is exact, defecation will occur not more than 30 minutes.

****************************************************

Urinary Catheterization

*Urinary catheterization* is the introduction of a catheter through the urethra into the urinary bladder.
Purposes:

1. To relieve discomfort due to bladder distension or to provide gradual decompression of a distended pressure.
2. To assess the amount of residual urine if the bladder empties incompletely.
3. To obtain a urine specimen.
4. To empty the bladder completely prior to surgery.
5. To facilitate accurate measurement of urinary output for critically ill clients whose output needs to be monitored hourly.
6. To provide for intermittent or continuous bladder drainage and irrigation.
7. To prevent urine from contacting as incision after perineal surgery.
8. To manage incontinence when other measures have failed.

**Hazards of Catheterization;**
1. Infection.
2. Trauma, particularly among males.

**Selection of an Appropriate Catheter:**

![Selecting an Appropriate Catheter]

- Select the type of material in accordance with the estimated length of the catheterization period. Antimicrobial-impregnated or hydrogel/silver-coated catheters may also be used to reduce the risk of infection.
  a. Use plastic catheters for short periods only (e.g., 1 week or less), because they are inflexible.
  b. Use a rubber or silastic catheter for periods of 2 or 3 weeks. Latex may be used for clients with no known latex allergy. However, because of these allergies, latex is being phased out of health care products.
  c. Use silicone catheters for long-term use (e.g., 2 to 3 months) because they create less encrustation at the urethral meatus. However, they are expensive.
  d. Use PVC catheters for 4- to 6-week periods. They soften at body temperature and conform to the urethra.
- Determine appropriate catheter length by the client's gender. For adult female clients, use a 22-cm catheter; for adult male clients, a 40-cm catheter.
- Determine appropriate catheter size by the size of the urethral canal. Use sizes such as #8 or #10 for children, #14 or #16 for adults. Men frequently require a larger size than women, for example, #18.
- Select the appropriate balloon size. For adults, use a 5-mL balloon to facilitate optimal urine drainage. The smaller balloons allow more complete bladder emptying because the catheter tip is closer to the urethral opening in the bladder. However, a 30-mL balloon is commonly used to achieve hemostasis of the prostatic area following a prostatectomy. Use 3-mL balloons for children.

**Nursing Performance and Care:**
1. Explain to the client what to do.
2. Wash hands and depend sterile technique.
3. Provide for client privacy.
4. Place the client in the appropriate position and drape all areas except the perineum; Male- supine position with legs slightly abducted, while Female- supine with knees flexed and externally rotated.
5. Apply clean gloves and inject 10-15 ml Xylocaine gel into the urethra, and wait for 5 minutes for the gel to take effect before inserting the catheter.
6. Open the catheterization kit. Place a waterproof drape under the buttocks (Female) or penis (Male) without contaminating the center of the drape with your hands.
7. Apply sterile gloves.
8. Saturate the cleansing balls with antiseptic solution.
9. Attach the prefilled syringe to the indwelling catheter inflation hub and test the balloon to ensure suitability.
10. Lubricate the catheter (1 - 2 inches for females, 6 – 7 inches for males) and place it with the drainage end inside the collection container.
11. Cleanse the meatus;
   for Women-
   * use the nondominant hand to spread the labia.
   * pick up a cleansing ball with the forceps in your dominant hand and wipe one side of the labia majora in an anteroposterior direction, and use new ball for the labia minora and use the last ball to cleanse directly over the meatus.
For Men-
* Use nondominant hand to grasp the penis just below the glans,
* Hold it firmly upright with slight tension,
* Pick up a cleansing ball with the forceps in your dominant hand and wipe from the center of the meatus in a circular motion around the glans,
* Use a new balls and repeat three more times.

12. Insert the catheter;
* Grasp the catheter firmly 2-3 inches from the tip, and ask the client to take a slow deep breath and insert the catheter as the client exhales.
* Advance the catheter 2 inches further after the urine begins to follow through it to be sure that it is in the bladder.

13. Hold the catheter with the nondominant hand.

14. For an indwelling catheter;
* Inflate the retention balloon with the designated volume, if the client complains of discomfort, immediately withdraw the instilled fluid and advance the catheter further and attempt to inflate the balloon again.
* Pull gently on the catheter until resistance is felt to ensure that the balloon has inflated and placed inside the bladder.

15. For an indwelling catheter, secure the catheter tubing to the inner thigh of the female clients.

16. Hang the urine bag below the level of the bladder.

17. Wipe the perineal area of any remaining antiseptic solution.

18. Discard all used supplies in appropriate receptacles and wash hands.

19. Document the catheterization process including catheter size and results in the client record.

Enema- is a solution introduced into a rectum and large intestine. The action of the enema is to distend the intestine and sometimes to irritate the intestinal mucosa, thereby increasing peristalsis and excretion of feces and flatus.

Types of Enema;
1. Cleansing Enema- is to:
* Prevent the escape of feces during surgery.
* Prepare intestine for certain diagnostic tests as X-ray or visualization tests (e.g., colonoscopy).
* Remove feces in intestines or constipation or impaction.

Various solutions can be used; **Hypertonic solution** (tap water); **Isotonic solution** (normal saline, soapsuds). Some enemas are large volume (e.g., 500 – 1000 ml). The client changes from the left lateral position to the dorsal recumbent position and then to the right lateral position during administration so that the solution can flow the large intestine.

2. **Carminative Enema**- is given primarily to expel flatus, and in turn distends the rectum and colon, thus stimulating peristalsis. For an adult, 60-80 ml of fluid is administered.

3. **Retention Enema**- introduce oil or medication into the rectum and sigmoid colon, the liquid is retained for a relatively long period (e.g., 1-3 hours);
   * An oil retention enema- acts to soften the feces and lubricate rectum and anal canal, thus facilitating passage of feces.
   * **Antibiotic enema**- are used to treat infections locally.
   * **Anthelmintic enema**- to kill helminths such as worms and intestine parasites.
   * **Nutritive enema**- to administer fluids and nutrients to the rectum.

4. **Return-Flow Enema**- is used occasionally to expel flatus. Alternating flow of (100-200 ml) of fluid into and out of rectum and sigmoid colon stimulates peristalsis. This process is repeated five or six times until the flatus is expelled and abdominal distension is relieved.

**Nursing Performance and Care:**

1. Explain to the client what to do.
2. Wash hands, apply clean gloves, and observe appropriate infection control procedures.
3. Provide for client privacy.
4. Assist the adult client to a left lateral position, with the right leg as acutely flexed as possible, and the linen-saver pad under the buttocks.
5. Insert the rectal tube;
   * For client in the left lateral position, lift the upper buttock.
   * Insert the tube smoothly and slowly into the rectum, directing toward the umbilicus after lubricating it about (5 cm.).
   * Insert the tube (7-10 cm.) into the rectum.
   * If resistance is encountered at the internal sphincter, ask the client to take deep breath, then run a small amount of solution through the tube to relax the anal sphincter.
   * Never force tube or solution entry. If instilling a small amount of solution does not permit the tube to be advanced or the solution to freely flow, withdraw the tube. Check for any stool that may have blocked the tube during insertion. If present flush it and retry the procedure. You may also perform a digital rectal examination to determine if there is an impaction or other mechanical blockage. If resistance persists, end the procedure and report the resistance to the physician.

6. Slowly administer the enema solution;
   * Raise the solution container and open the clamp to allow fluid flow, or compress a pliable container by hand.
* During most low enemas, hold or hang the solution container no higher than 30 cm. above the rectum. During a high enema, hang the solution container about 45 cm.

* Administer the fluid slowly, if the client complain of fullness or pain, use the clamp to stop the flow for 30 seconds, and then restart the flow at a slower rate.

* After all the solution has been instilled or when the client cannot hold any more and feels the desire to defecate (the urge to defecate usually indicates that sufficient fluid has been administered), close the clamp, and remove the rectal tube from the anus.

7. Encourage the client to retain the enema;
   * Ask the client to remain lying down because gravity promoted drainage and peristalsis.
   * Request that the client retain the solution for the appropriate amount of time, for example, 5-10 minutes for a enema or at least 30 minutes for retention enema.

8. Assist the client to defecate;
   * Assist the client to a sitting position on the bedpan, or toilet, for a sitting position facilitates the act of defecation.
   * Ask the client who is using the toilet not to flush it, for the nurse needs to observe the feces.
   * If a specimen of feces is required, ask the client to use a bedpan not toilet.

References:

- Taylor C, and Others; Fundamentals of Nursing; The art and Science of Nursing Care, Lippincott, 2001.
- Barbera K; Fundamentals Skills and concepts in Patient Care, Lippincott, 2000.
Post-test:

Answer by (True) against the true sentences and by (False) against the false sentences:

1. Urinary catheterization uses to empty distended bladder.
2. Stop insertion of the catheter with the first urine flow from it.
3. Complete inflation of the catheter balloon even if the client discomforts.
4. Hang the urine bag below the level of the bladder.
5. Enema is done to stimulate peristalsis.
6. Enema can't be used for diagnostic purposes.
7. Ask the patient to take deep breathing while administering the enema.
8. If enema is exact, defecation will occur not more than 30 minutes.

Answer Keys:

1. True. 2. False. 3. False. 4. True.
Lecture; Twenty-Seven
Perioperative Care; Preoperative Care

Pre-test;

Answer by (True) against the true sentences and by (False) against the false sentences:

1. Preoperative care objects to reduce postoperative complications.
2. Reduce high vitamin C diet preoperatively.
3. Overweight considers a risk of pulmonary complications.
4. Oral food intake may be continued till the morning of the operation day.
5. Atropine must administered preoperatively to reduce respiratory tract secretions.
6. Intra-operative care aims to control operation environment.
7. Tracheostomy is an opening on the neck directly to the esophagus to introduce feeding.

Perioperative Care; Preoperative Care

Preoperative Nursing Care- is the term used to describe the wide variety of nursing activities, which begins with decision for surgical intervention and ends with the transfer of the patient to the operating room.

Purposes;

1. To promote the patient for the best possible physical and psychological condition for the operation.
2. To reduce post-operative discomfort and complications.
Procedure:

1. Taking health history from the patient, perform physical examination, measure vital signs and perform diagnostic tests as blood analysis, endoscopies and urine and stool studies as requested.

2. Explain the diagnosis; the goal, duration of operation.

3. Allow the family to participate in providing support to the patient.

4. Use spiritual therapy, as, praying, reading parts of Quran or other Holy books.

5. Encourage high; protein, carbohydrate and vitamins (A, C and K) diet several days prior operation (Protein is essential for tissue repair, Vitamin C is required for wound healing and synthesis of collagen, and vitamin K is necessary for blood clotting).

6. If the patient is overweight, weight reduction may be undertaken due to the risk for pulmonary complications (Fatty tissue is not highly resistant to infection, and poor ventilation increases).

7. Stop smoking 4-6 weeks prior operation and report any signs or symptoms of respiratory infection (To have optimum respiratory function).

8. If there is liver or renal problem, hyper or hypoglycemia, or allergy history to drug or blood, report to the physician. Prior drug therapy must be reported to the physician, e.g., steroids, thiazide, phenothiazine, anti-depressants, insulin and antibiotics especially mycin (Liver and kidney are involved in the excretion of anesthetic drugs. Hyper or hypoglycemia, are potential in uncontrolled D.M. Antidepressant and phenothiazine "Largactil" increases the potential effect of anesthesia, while thiazide and mycin antibiotics may cause respiratory depression. If steroids therapy stopped suddenly before the surgery, it may cause cardiovascular collapse).

9. Withhold food and water at midnight the day of operation (To prevent aspiration during operation).

10. Give enema if requested the evening before an operation (To prepare the intestine and prevent defecation during the operation).

11. Prepare the skin bathing, and then shaving the site of operation (To reduce the risk of skin contamination of the surgical wound).
12. Teach the patient about; Deep breathing and coughing, and getting out of bed *To promote lung ventilation and blood oxygenation following general anesthesia*.

13. Clothe the patient with short gown, cover hair with a cap, and remove denture and jewelry *Gown simplifies the exposure of operation site, hair cap prevents hair spreading, dentures may cause throat obstruction*.

14. Encourage the patient to void immediately before sent to the operation room *To empty the bladder*.

15. Give pre-anesthetic medication which may include Morphine or Pethidine and Atropine 45 minutes to 1.5 hour before anesthesia has begun *Morphine or Pethidine is used to decrease the amount of general anesthesia required while Atropine reduces respiratory tract secretion and prevents severe reflex slowing of the heart during anesthesia*.

16. Check the pro-operative list and report any unusual last minute observation.

17. Transfer the patient on a prepared stretcher and cover him/her with a blanket.

**The most general tests performed pre-operatively are; Complete blood count "RBCs- Hb-hematocrit- WBCs", Blood group and Rh, Serum electrolytes "Na, K, Ca, Mg, Cl, HCO₃", Fasting blood sugar "FBS", Blood urea "BU", Creatinine, SPOT, SGPT, LDH, Bilirubin, Serum albumin, Total protein analysis, Chest X-ray and Electrocardiogram "ECG".**

**Intra-operative Care**- is the wide variety of nursing activities begins when the patient is transferred to the surgery department.

**Purposes;**

1. Control operation environment.
2. Prepare equipment for operation.
3. Position the patient during operation.
4. Assist surgeon during operation.
5. Maintain aseptic technique.
Procedure:

1. Wear operation room attire with mask, head gear and comfortable covered shoes to reduce microorganism transmission.
2. Control operation environment; temperature, humidity, cleansing frequently with soap and water or detergent germicides.
3. Position the patient in the required position for the operation.
4. Surgical hand washing.
5. Wear operation gown, sterile gloves.
6. Apply sterile drapes.
7. Prepare the surgical equipments kits, and open them for using.
8. Assist the surgeon during operation.

Tracheotomy:

Tracheotomy and tracheostomy are surgical procedures on the neck to open a direct airway through an incision in the trachea (the windpipe). They are performed by emergency physicians, and surgeons. Surgical technique is widely used.

Uses of tracheostomy; The conditions in which a tracheostomy may be used are:

• Acute setting - maxillofacial injuries, large tumors of the head and neck, congenital tumors, e.g. branchial cyst, acute inflammation of head and neck.
• Chronic / elective setting - when there is need for long term mechanical ventilation and tracheal toilet, e.g. comatose patients, surgery to the head and neck.

**Types of Tracheostomy Tubes;**

A tracheostomy (trach) tube is a curved tube that is inserted into a tracheostomy stoma (the hole made in the neck and windpipe). There are several different brands of tracheostomy tubes, but all have similar parts. In double-cannula tubes, the inner cannula is inserted and locked in place after the obturator is removed; it acts as a removable liner for the more permanent, outer tube. The inner cannula can be withdrawn for brief periods to be cleaned. The main parts of a double cannula tracheostomy tube are the outer tube (or cannula), the inner tube and the obturator. The obturator is used only to guide the outer tube during insertion and is removed immediately after the outer tube is in place. The outer tube has ties to secure it in place around the client's neck.

**Parts of a Tracheostomy Tube- Single Cannula Silicone Tube;**

![Diagram of a tracheostomy tube with labels: Inflation Line, Connector, Flanges, Tube Ties, Side-Port Connector, Fome-Cuff, Obturator.]

**Bivona Fome-Cuff Tracheostomy Tube-** (Photograph Courtesy of Smiths Medical, Hythe, Kent CT21 6JL. UK)
Parts of a Tracheostomy Tube- Tube with inner cannula;

(Photographs from Growing and Thriving with a Tracheostomy by Ann Marie Ramsey and Colin Macpherson, photography by Joe Welch, Copyright UMMC 1994-95.)

Many of the smaller plastic tracheostomy tubes do not have an inner tube. They are called single-cannula tubes. For infants and small children, the trach tube is usually a single-cannula plastic tube and is generally not cuffed (even if mechanical ventilation is required). The tube size and type is determined by the doctor depending on the reason for the trach tube as well as the size, age and medical needs of the child. Tracheostomy tubes can be made of metal, plastic or silicone. Plastic and silicone tubes are increasingly popular because they are lightweight and there is less crusting of secretions.
Metal tube with inner cannula and obturator

Single Cannular Shiley Pediatric Tracheostomy Tube;

Tracheostomy tubes come in many varieties, including cuffed, uncuffed and fenestrated. A cuff is a soft balloon around the distal (far) end of the tube that can be inflated to allow for mechanical ventilation in patients with respiratory failure. The cuffs are inflated with air, foam or sterile water. There are several types of cuffs. The low volume cuff is similar to a balloon, a high volume cuff is barrel-shaped. The high volume cuff may be better to avoid complications such as stenosis, because it spreads the pressure out, rather than pushing on one spot in the airway. Tight to shaft (TTS) balloons by Bivona are instilled with sterile water. These work well for children who can be off the ventilator at times. When the balloon is deflated, the tube allows air around tube for vocalization. In small children, cuffed tubes may not be needed, however,
in older children a low-pressure cuff may be needed to achieve an adequate seal. For children who are not ventilator dependant, the tracheostomy tube should allow some airflow around the tube to avoid damage to the tracheal wall and to permit speech. Fenestrated tubes have an opening in the tube that permits speech through the upper airway when the external opening is blocked, even if the tube is too big to allow airflow around the outer cannula. Fenestrated tubes are not recommended for small children, because they can obstruct the opening with granulation tissue. The opening of the hole must be at a correct angle to prevent problems. Also, in an emergency, a solid inner cannula must be inserted in order to ventilate the child through the trach.

A Tracheal Button is a rigid cannula that can be placed into the tracheostomy stoma after removal of a tracheostomy tube. The button
does not extend into the tracheal lumen. The tracheal button requires a mature stomal tract, and is generally used as a long-term solution for people with obstructive sleep apnea, which cannot be treated by other means. It is generally kept closed during the day to be unobtrusive, and opened at night to eliminate sleep apnea. Since the tube does not extend far into the airway itself (like a standard tracheotomy tube), it is easy to breath and talk normally with the device in place. It does not need to be opened during the day, since there is no fixed airway obstruction, as in laryngotracheal stenosis. In sleep apnea, the blockage is due to dynamic collapse of the soft tissue of the throat during the muscle relaxation that accompanies sleep.
NEW! Bivona Uncuffed Neonatal and Pediatric FlexTend Silicone Tracheostomy Tubes. (More Info)

Montgomery T-tubes are often used in adult patients; however, they are less commonly used in the pediatrics.

Sara with a Montgomery t-tube

Tracheostomy tubes can also be custom made according to a child’s unique needs.

Note: Some trach tubes such as Bivona tubes contain metal fibers and must be changed for a plastic tube for MRI tests.

References:


Post-test:

Answer by (True) against the true sentences and by (False) against the false sentences:

1. Preoperative care objects to reduce postoperative complications.
2. Reduce high vitamin C diet preoperatively.
3. Overweight considers a risk of pulmonary complications.
4. Oral food intake may be continued till the morning of the operation day.

5. Atropine must administered preoperatively to reduce respiratory tract secretions.

6. Intra-operative care aims to control operation environment.

7. Tracheostomy is an opening on the neck directly to the esophagus to introduce feeding.

**Answer Keys:**

1. True.  
2. False.  
3. True.  
4. False.  
5. True.  
6. True.  
7. False.
Lectures: Twenty-Eight; Twenty-Nine; Thirty
Post-operative Nursing Care

Pre-test:

Answer by (True) against the true sentences and by (False) against the false sentences:

1. Assess the cardiovascular status of the patient is from the postoperative care.
2. An anti-inflammatory agents are of no benefit postoperatively.
3. Elevation of the affected extremities higher than heart promotes venous drainage and reduces swelling.
4. Spirometer encourages deep breathing.
5. Pillows must be placed under the knees postoperatively.
6. Ambulation must be done the evening of the operation or the first day postoperatively unless it is contraindicated.
7. Large amount of water orally postoperatively can induce vomiting.
8. The client can be able to resume oral intake when nausea is no longer present.
9. Oral fluids and food are usually started before the return of peristalsis.
10. It can be a problem if the client doesn't void till 8 hours postoperatively.
11. It is not important to check intake and output fluids.
12. Fluid and electrolytes must be replaced IV in case of gastric suction.
13. Excessive drainage may not indicate hemorrhage, infection or open wound.
14. Inflammation of the wound can be occurred in the first hours after operation.
15. Clean wound bridged and closed within 7-10 days postoperatively.
16. If drain is present, it must be cleaned later.
17. The wound or incision must be dried at last.

18. Generally, the suction is discontinued from 3-5 days postoperatively.

19. Wound sutures can be removed 3-4 days postoperatively.

******************************

Post-operative Nursing Care

Post-operative care- is a term used to describe the side variety of nursing activities which begin with receiving the patient from the operation room and ends with evaluating the patient for discharge.

**purposes:**

1. Assist the patient to maintain optimum respiratory function.

2. Assess the cardiovascular status of the patient.

3. Promote comfort and safety.

4. Maintain fluid and electrolytes balance, proper nutrition and adequate elimination.

5. Enhance wound healing.


**Post-operative care:**

1. **Pain management**- pain is usually greatest 12-36 hours after surgery, and decreasing after that period, so, patient controlled analgesia or continuous analgesic administration through IV line is often prescribed, therefore;

   * Monitor IV infusion and amount of analgesic administration.

   * Assess the client's pain relief.

   * Notify the physician if the client is experiencing unacceptable side effects or inadequate pain relief.
* Parenteral or oral analgesics should be administered on a routine basis (every 2-6 hours depending on the drug, route, and dose) for the first 24 hours.

* An anti-inflammatory agent, such as ibuprofen, is often administered in conjunction with a narcotic analgesic to enhance pain relief.

* Because muscle tension increases pain perception and responses, so, using non-pharmacologic measures are necessary as, warm, back rub, position changes, diversional activities and so on.

2. Positioning-

* Clients who have had spinal anesthetics usually lie flat for 8-12 hours.

* An unconscious or semiconscious client is placed on one side with the head slightly elevated, or in a position that allows fluids to drain from the mouth.

* Unless contraindicated, elevation of the affected extremities (e.g., following foot surgery) with the distal extremity higher than heart promotes venous drainage and reduces swelling.

3. Deep-Breathing and Coughing Exercises- Deep breathing exercises help remove mucus which can form and remain in the lungs due to the effects of general anesthetic and analgesics and prevent the accumulation of secretions, also deep breathing helps prevent pneumonia and atelectasis (collapse of the alveoli), which may result from stagnation of fluid in the lungs. Deep breathing frequently initiates the coughing reflex. Voluntary coughing in conjunction with deep breathing facilitates the movement and expectoration of respiratory tract secretions. Encourage the client to do deep-breathing exercises hourly, or at least every 2 hours.

   Assist the client to sitting position in bed or on the side of the bed. The client can splint the incision with a pillow when coughing, or the nurse can splint the incision for the client to reduce discomfort.

   An incentive spirometer is often ordered for postoperative client to encourage deep breathing.
4. **Leg Exercises**- The client should do leg exercises taught preoperatively every 1-2 hours, because muscle contraction compress the veins, preventing the stasis of blood in the veins which is the cause of **thrombus** (stationary clot adhered to the wall of vessels) formation and subsequent **thrombophlebitis** (inflammation of a vein followed by formation of a blood clot) and **emboli** (a blood clot that has moved). Contraction also promote arterial blood flow.

5. **Moving and Ambulation**-

* Encourage the client to turn from side to side at least every 2 hours.

* Avoid placing pillows or rolls under the client's knees because pressure on the popliteal blood vessels can interfere with blood circulation to and from the lower extremities.

* The client should ambulate as soon as possible after surgery in accordance with the surgeon's orders. Generally, client begin ambulation the evening of the day of surgery or the first day after surgery, unless contraindicated. Early ambulation prevents respiratory, circulatory, urinary and gastrointestinal complications. It also prevents general muscle weakness. Ambulation should be gradual, starting with the client sitting on the bed and dangling the feet over the bed.

* A client who cannot ambulate periodically assisted to a sitting position in bed, if allowed, and turned frequently. The sitting position permits the greatest lung expansion.
6. Hydration-

* When oral intake is permitted, initially offer only small sips of water. Large amount of water can induce vomiting because anesthetics and narcotic analgesics temporarily inhibit the mobility of the stomach.

* The client who cannot take fluids by mouth may be allowed by the surgeon's orders to suck ice chips.

* Provide mouth care and place mouthwash at the client's bedside.

* Measure the client's fluid intake and output for at least 2 days or until fluid balance is stable without an intravenous infusion.

* Ensuring adequate fluid intake is important to keep the respiratory mucous membranes and secretions moist and facilitate expectoration of mucus during cough, also to maintain renal and cardiovascular function.

* Maintain IV infusion as ordered to replace body fluids lost either before or during surgery.

7. Diet-

* Depending on the extent of surgery and the organs involved, the client may be allowed nothing by mouth for several days or may be able to resume oral intake when nausea is no longer present.

* When "diet as tolerated" is ordered, offer clear liquids initially. If the client tolerates these, with no nausea, the diet can often progress to full liquids, and then to a regular diet, provided that gastrointestinal functioning is normal.

* Assess the return of peristalsis every 4-6 hours by auscultating the abdomen, gurgling and rumbling sounds indicate peristalsis. Anesthetic agents, narcotics, handling of the intestines during abdominal surgery, fasting, and inactivity inhibit peristalsis.

* Oral fluids and food are usually started after the return of peristalsis.

* Assist very weak client to eat.
* Observe the client’s tolerance of the food and fluids ingested and note and report the passage of flatus or abdominal distension.

8. Urinary Elimination-

* Provide measures that promote urinary elimination, as, help male clients stand at the bedside, or female clients to a bedside commode if allowed, and ensure that fluid intake is adequate.

* Determine whether the client has any difficulties voiding and assess the client for bladder distension.

* Report to the surgeon if a client does not void within 8 hours following surgery, unless another time frame is specified.

* Anesthetic agents temporarily depress urinary bladder tone, which usually returns within 6-8 hours after surgery. Surgery in the pubic area, vagina, or rectum, during which the surgeon may manipulate the bladder, often causes urinary retention. If all measures to promote voiding fail, a urinary catheterization is often ordered.

* Measure the fluid intake and output (I & O) of all new postoperative clients.

* Generally, I & O records are kept for at least 2 days or until the client reestablishes fluid balance without an IV or catheter in place.

9. Suction-

* Some clients return from surgery with a gastric or intestinal tube in place and orders to connect the tube to suction. The suction ordered can be continuous or intermittent. Intermittent suction is applied when a single-lumen gastric tube is used to reduce the risk of damaging the mucous membrane near the distal port of the tube.
* Fluids and electrolytes must be replaced IV when gastric suction or continuous drainage is ordered.

* Nasogastric tube may be irrigated before and after tube feedings or the instillation of medications.

* Suction may also be applied to other drainage tubes as chest tubes or wound drain. The type and amount of suction is ordered by the physician.
* Check the drainage receptacle frequently to prevent excess drainage from interfering with the suction apparatus, empty or change the receptacle according to the agency policy.

10. **Wound Dressing**- Most clients return from surgery with a sutured wound covered by a dressing, although in some cases the wound may be left unsutured. Dressing are inspected regularly to ensure that they are clean, dry, and intact. Excessive drainage may indicate hemorrhage, infection or an open wound. When dressing are changed. The nurse assesses the wound for appearance, size, drainage, swelling, pain and the status of a drain or tubes. Because surgical incisions heal by primary intention, the nurse can expect the following sequential signs of healing:

   **A). Absence of bleeding and appearance of a clot binding the wound edges**- The wound edges are well approximated and bound by fibrin in the clot within the first few hours after surgical closure.

   **B). Inflammation (redness, and swelling)** at the wound edges for (1-3) days.

   **C). Reduction in inflammation when the clot diminishes**- as granulation tissue starts to bridge the area. The wound is bridged and closed within (7-10) days. Increased inflammation associated with fever and drainage is indicative of wound infection; the wound edges then appear brightly inflamed and swollen.

   **D). Scar formation**- collagen synthesis starts 4 days after injury and continues for 6 months or longer.

   **E). Diminished scar size over a period of months or years.**

11. **Surgical Dressing**- Not all surgical dressings require changing. Sometimes surgeon in the operating room apply a dressing that remains in place until the sutures are removed, and no further dressings are required. In many situations, however, dressings are changed regularly to prevent the growth of microorganisms.
**Performance and Care of Surgical Dressing:**

- Explain to the patient what to do.
- Wash hands and observe other appropriate infection control procedures.
- Provide for client privacy.
- Remove binders and tape
  
  + Remove binders, if used, and place them aside. Unite tie tapes, if used. Tie tapes are commonly used for wounds requiring frequent dressing changes.

  + If adhesive tape was used, remove it by holding down the skin and pulling the tape gently but firmly toward the wound. Pulling the tape toward the incision is to prevent strain on the suture or wound.

  + Use a solvent or acetone to loose tape, if required. Moistering the tape lessens the discomfort of removal, particularly from hairy surfaces.

  + Remove and dispose of solid dressings appropriately.

  + Assess the location, type (color, consistency), and odor of wound drainage, and the number of gauzes saturated or the diameter of drainage collected on the dressings.

- Set up the sterile supplies-

  + Open the sterile dressing set, using surgical aseptic technique.

  + Place the sterile drape beside the wound.

  + Open the sterile cleaning solution and pour it over a gauze sponges in the plastic container.

  + Put on sterile gloves.

* Clean the wound, if indicated-

  + Use the cleaning methods as in the figure below;
+ Use a separate swab for each stroke and discard each swab after use.

+ If drain is present, clean it next, taking care of it avoid reaching across the cleaned incision. Clean the skin around the drain site by swabbing if half or full circles from around the drain site outward, using separate swabs for each wipe.

+ Support and hold the drain erect while cleaning around it. Clean as many times as necessary to remove the drainage.

+ Dry the surrounding skin with dry gauze swabs as required. Do not dry the incision or wound itself. Moisture facilitates wound healing.

- Apply dressing to the drain site and the incision-

+ Place a precut gauze snugly around the drain.
+ Apply the sterile dressings one at a time over the drain and the incision. Place the bulk of the dressing over the drain area and below the drain, depending on the client’s usual position.

+ Apply the final surgipad, remove gloves, and dispose of them, secure the dressing with tape or ties.

- Document the procedure and all nursing assessments.

12. *Wound Drains and Suction*- 

*Penrose Drain*- are inserted to permit the drainage of excessive seroanguineous fluid and purulent material and to promote healing of underlying tissues. These drains may be inserted and sutured through the incision line, but that are most commonly inserted through stab wounds a few centimeters away from the incision line so that the incision itself may be kept dry. Without a drain some wounds will heal on the surface and trap the discharge inside, and an abscess might form. Drainage vary in length and width. The length can be 25-35 cm., and the width 1.2-4 cm. To facilitate drainage and healing of tissues from the inside to the outside, the drain pulled out or shortened 2-5 cm. each day. When a drain is completely removed, the remaining stab wound usually heals within a day or two. Shortening the drain is usually done when the dressing is changed.

*Close-Wound Drainage System*- consists of a drain connected to either electric suction or a portable drainage suction, such as a Hemovac or Jackson-Pratt (the figures below), The closed system reduces the possible entry of microorganisms into the wound through the drain. The drainage tubes are sutured in place and connected to a reservoir. These portable wound suckers also provide for accurate measurement of the drainage.
The surgeon inserts the wound drainage tube during surgery. Generally the suction is discontinued from 3-5 days postoperatively or when the drainage is minimal. Nurses are responsible for maintaining the wound suction, which hastens the healing process by draining excess exudates that might otherwise interfere with the formation of granulation tissue.

When emptying the container, the nurse should wear gloves and avoid touching the drainage port;

To reestablish suction, the nurse places the container on a solid, flat surface with the port open. The palm of one hand presses the top and bottom together while the other hand cleanses the opening and plug with an alcohol swab;
Replace the drainage plug before releasing hand pressure to reestablish the vacuum necessary for the closed drainage system to work.

16. **Sutures**- It is a thread used to sew body tissues together. Sutures used to attach tissues beneath the skin are often made of an absorbable material that disappears in several days. Skin sutures, by contrast, are made of a variety of non-absorbable materials, as silk, cotton, linen, wire, nylon, and polyester fiber. Silver wire clips or staples are also available. Usually skin sutures are removed 7-10 days after surgery. There are various types of suturing.

Retention sutures are very large sutures used in addition to skin sutures for some incisions. They attach underlying tissues of fat and muscle as well as skin and are used to support incisions in obese individuals or when healing may be prolonged. They are frequently left in place longer than skin sutures (14-21 days) but in some instances are removed at the same time as the skin sutures.
Sterile technique and special suture scissors are used in suture removal. The scissors have a short, curved cutting tip that readily slides under the suture;

Wire clips or staples are removed with a special instrument that squeezes the center of the clip to remove it from the skin;
Guidelines for removing sutures and staples;

- Before removing skin sutures, verify the orders for suture removal,
- Whether a dressing is to be applied following the suture removal.
- Inform the client that suture removal may produce slight discomfort, such as a pulling or stinging sensation, but should not be painful.
- Cleaning the suture line with an antimicrobial solution before and after suture removal to prevent infection.
- Put on sterile gloves.
- Remove plain interrupted sutures as follow;
  + Grasp the suture at the knot with a pair of forceps.
  + Place the curved tip of the suture scissors under the suture as close as to the skin as possible, either to the side opposite the knot, or directly under the knot.
Cut the suture, sutures are cut as close to the skin as possible on one side of the visible part because the suture material that is visible to the eye is in contact with the resident bacteria of the skin and must not be pulled beneath the skin during removal. Suture materials that is beneath the skin is considered free from bacteria.

Wipe the forceps, pull the suture out in one piece. Inspect the suture carefully to make sure that all suture material is removed. Suture material left beneath the skin acts as a foreign body and cause inflammation.

References:

- Taylor C, and Others; Fundamentals of Nursing; The art and Science of Nursing Care, Lippincott, 2001.
- Barbera K; Fundamentals Skills and concepts in Patient Care, Lippincott, 2000.
Post-test:

Answer by (True) against the true sentences and by (False) against the false sentences:

1. Assess the cardiovascular status of the patient is from the postoperative care.
2. Anti-inflammatory agents are of no benefit postoperatively.
3. Elevation of the affected extremities higher than heart promotes venous drainage and reduces swelling.
4. Spirometer encourages deep breathing.
5. Pillows must be placed under the knees postoperatively.
6. Ambulation must be done the evening of the operation or the first day postoperatively unless it is contraindicated.
7. Large amount of water orally postoperatively can induce vomiting.
8. The client can be able to resume oral intake when nausea is no longer present.
9. Oral fluids and food are usually started before the return of peristalsis.
10. It can be a problem if the client doesn't void till 8 hours postoperatively.
11. It is not important to check intake and output fluids.
12. Fluid and electrolytes must be replaced IV in case of gastric suction.
13. Excessive drainage may not indicate hemorrhage, infection or open wound.
14. Inflammation of the wound can be occurred in the first hours after operation.
15. Clean wound bridged and closed within 7-10 days postoperatively.
16. If drain is present, it must be cleaned later.

17. The wound or incision must be dried at last.

18. Generally, the suction is discontinued from 3-5 days postoperatively.

19. Wound sutures can be removed 3-4 days postoperatively.

**Answer Keys:**

1. True.  
2. False.  
3. True.  
4. TRUE.

5. False.  
6. True.  
7. True.  
8. True.

10. True.  
11. False.  
12. True.

13. False.  
14. False.  
15. True.  
16. False.

17. False.  
18. True.  
19. False.