



Midwifery

Level III

Based on January, 2022, Curriculum Version I



Module Title: Provide Common Medical and Surgical Care in Maternal Health

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Page 2 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
---------------	---	--	--

Table of Contents

Contents

Acknowledgement.....	2
Table of Contents	3
Acronyms.....	6
Unit one: Provide Introduction on general human anatomy and physiology	11
1.1 Introduction to anatomy and physiology	12
1.2 Anatomy and Physiology of integumentary system	17
1.3 Anatomy and Physiology of Musculoskeletal System.....	18
1.4 Anatomy and Physiology of respiratory system	49
1.5 Anatomy and Physiology of Digestive System	58
1.6 Anatomy and Physiology of Cardiovascular System	65
1.7 Anatomy and Physiology of Genitourinary System.....	72
1.8 Anatomy and Physiology of Endocrine System	76
1.9 Anatomy and Physiology of Nervous System	86
1.10 Anatomy and Physiology of Head, Eye, Ear, Nose and Throat (HEENT)	90
1.11 Anatomy and Physiology of the Reproductive System	94
Self-check-1	105
Unit two: Patient/client assessment	106
2.1 Take client history	107
2.2 Principles of physical examination.....	110
2.3 Complete patient/client physical examination.....	111
Physical Assessment.....	111
2.4 Vital Signs	115
Measuring Vital signs	131
2.5 Complete patient/client data	137
Self-check-2	139
Unit three: Apply basic patient/client care	141

3.1 patient client care procedures	142
3.2 Oral hygiene/care	166
3.3 Correct and Faulty Posture in Different Activities.....	171
Self-check- 3	176
Operation sheet-I	177
Unit four: Identify and manage common medical disorder.....	180
4.1 Identify and Manage HEENT disorders.....	181
4.2 Common respiratory disorders	191
4.3 Cardiovascular System disorders	215
4.4 Digestive System disorder	240
4.5 Genitourinary System disorders.....	266
4.6 Endocrine system disorders.....	292
4.7 Integumentary System disorders	310
4.8 Nervous System disorders.....	331
4.9 Reproductive System disorders	347
4.10 Musculoskeletal System disorders.....	357
Self-check-4	370
Unit five: Identify and manage surgical problems.....	372
5.1 Operation room techniques	373
5.2 Pre, intra and post-operative care.....	381
5.3 A patient with hernias.....	400
5.4 Degree of burn cases and care	404
5.5 A patient with acute abdomen.....	406
5.6 Management for a patient with hemorrhoid.....	410
5.7 Acid-base, fluid and electrolyte imbalance	414
Self-check-5	418
Directions: Answer all the questions listed below	418
6.1 Common bacterial diseases	419

6.2 Common viral infections	430
6.3 Common fungal infections.....	434
6.4 common parasitic infections	437
Self-check-6	443
References	445
Developers Profile	446

Acronyms

ABC	Airway Breathing and Circulation
ADH	Antidiuretic Hormone
ALT	Alanine transaminase
ANS	Autonomic Nervous System
AST	Aspartate Aminotransferase
ATP	Adenosine triphosphate
BID	Bis in die
BP	Blood Pressure
BPH	Benign Prostate Hyperplasia
BUN	Blood Urea Nitrogen
CAD	Coronary Artery Disease
COPD	Chronic Obstructive Pulmonary Disease
CURB-65	Confusion Urea Respiratory rate Low systolic
CVA	Cerebro Vascular Accident
CXR	Chest X-Ray
DKA	Diabetic Ketoacidosis
DNA	Deoxyribonucleic Acid
ECF	Extra cellular fluid
ECG	Electrocardiography
ESR	Erythrocyte Sedimentation Rate
GA	General Anesthesia

GCS	Glasgow Coma Scale
GERD	Gastroesophageal reflux Disease
GI	Gastrointestinal Tract
HBeAg	Hepatitis B e Antigen
HBsAg	Hepatitis B serum Antigen
HBV	hepatitis B virus
HEENT	Head Eye Ear Nose and throat
HF	Heart Failure
HP	Helicobacter pylori
HPV	Human Papilloma Virus
IM	Intra Muscular
IV	Intra Venous
ICP	Intra Cranial pressure
IOP	Intra ocular Pressure
IV	Intra Venous
KOH	Potassium Hydroxide
MR	Mitral Regurgitation
MRI	Magnetic Resonance Imaging
NSAID	Non-Steroidal Anti-Inflammatory Disease
OR	Operating Room
ORS	Oral rehydrating Salt
PAR	Post Anesthetic Recovery

PARR	Post Anesthetic Recovery Room
PET Scan	Positron emission tomography scans
PID	Pelvic Inflammatory Disease
PO	Per Os
POP	Post-operative phase
PR	Pulse Rate
RA	Regional Anesthesia
ROM	Range of Motion
RUQ	Right upper quadrant
SC	Subcutaneous
SCD	Sudden Cardiac Death
STDs	Sexually transmitted Diseases
TB	Tuberculosis
TBSA	Total Body Surface Area
TBW	Total Body water
UTIs	Urinary tract Infections
WBC	White blood cell

Introduction to Common Medical and Surgical Care in Maternal Health

Medical surgical stands for medical-surgical nursing. This type of nursing focuses on providing care for adults who are either preparing for, or recovering from, a surgical procedure. Medical surgical nurses often work in a more fast-paced environment than other types of nurses, due to the high volume of patients and intense work that revolves around surgical operations.

A traditional medical surgical unit can be found in a hospital, with many rooms of patients who are preparing or recovering from surgery. This ward is similar to the general medical unit, due to the wide range of conditions found in the patients. The biggest difference between the medical surgical floor and the general medical ward is that many patients in medical surgical are often transferred there from more intense parts of the hospital like intensive care unit (ICU), emergency room (E.R), and acute care areas.

Module units

Introduction on general human anatomy and physiology

Patient/client assessment

Basic patient/client care

Common medical disorders

Common surgical problems

Common communicable & non communicable diseases

Page 9 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

Learning objectives of the Module

At the end of this session, the students will be able to:

- Provide introduction on general human anatomy and physiology
- Perform patient/client assessment
- Apply basic patient/client care
- Identify and manage common medical disorders
- Identify and manage surgical problems
- Identify and manage common communicable & non communicable diseases

Module Learning Instructions:

- Read the specific objectives of this Learning Guide.
- Follow the instructions described below.
- Read the information written in the information Sheets
- Accomplish the Self-checks
- Perform Operation Sheets
- Do the “LAP test”

Page 10 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

Unit one: Provide Introduction on general human anatomy and physiology

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

- Introduction to Anatomy and physiology
- Anatomy and physiology of integumentary system
- Anatomy and physiology of musculoskeletal system
- Anatomy and physiology of respiratory system
- Anatomy and physiology of digestive system
- Anatomy and physiology of cardiovascular system
- Anatomy and physiology of genitourinary system
- Anatomy and physiology of endocrine system
- Anatomy and physiology of nervous system
- Anatomy and Physiology of head, eye, ear, nose and throat (HEENT)
- Anatomy and physiology of the reproductive system

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

- Introduce about anatomy and physiology
- Describe anatomy and physiology of integumentary system
- Describe anatomy and physiology of musculoskeletal system
- Describe anatomy and physiology of respiratory system
- Describe anatomy and physiology of digestive system
- Describe anatomy and physiology of cardiovascular system
- Describe anatomy and physiology of genitourinary system
- Describe anatomy and physiology of endocrine system
- Describe anatomy and physiology of nervous system
- Describe anatomy and Physiology of head, eye, ear, nose and throat (HEENT)
- Describe anatomy and physiology of the reproductive system

Page 11 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

I.1 Introduction to anatomy and physiology

I.1.1 Definition of terms

Anatomy: - the word anatomy is derived from a Greek word “Anatome” meaning to cut up. It is the study of **structures** that make up the body and how those structures relate with each other.

The study of anatomy includes many sub specialties. The following are some with examples

Gross anatomy: a type of anatomy that can be undertaken without a microscope.

Microscopic anatomy: requires the use of a microscope (e.g. light or phase microscope)

Regional anatomy: studies specific regions of the body. E.g. head and neck

Systemic anatomy: study of specific system. E.g. Digestive and reproductive systems.

Radiographic anatomy: study of the structure of the Body using x -rays.

Cytology: microscopic study of the cells.

Histology: microscopic study of the tissues; also known as microscopic anatomy.

Embryological anatomy: study of prenatal development.

Non-invasive imaging techniques: MRI, CAT SCAN, PETSCAN, etc.

Pathological anatomy: study of structural change associated with disease.

Physiology: - the word physiology derived from a Greek word for study of nature. It is the study of how the body and its part **work** or **function**.

1. Systemic physiology: study of the function of the Systems. E.g. respiratory system, reproductive system, cardiovascular system.
2. Cell physiology: study function of the cell.
3. Neurophysiology: study the function of nerve cells.
4. Endocrinology: study of hormones and how they control Body functions.
5. Immunology: study of the body defense mechanisms.

Homeostasis: - When structure and function are coordinated the body achieves a relative stability of its internal environment called homeostasis / staying the same. Although the external

Page 12 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

environmental changes constantly, the internal environment of a healthy body remains the same with in normal limits.

Feedback system: is a response to the initiating Stimulus it can be positive or negative.

A. Negative feedback: when the response is opposite to the initiating stimulus. E.g. increased Production of heat by the body to oppose the Effect of cold weather.

B. Positive feedback: when the response reinforces the initial stimulus. E.g. when blood glucose

Level decreases, the response of positive feedback is to decrease it further.

* Positive feedback leads to death, exceptant in cases such as child delivery and a few other examples.

Level of structural organization of the body: -Subatomic Particles→ Atoms → Molecules → Macromolecules →Organelles → Cells →Tissues → Organs → Organ Systems → Organism

Medical: - It refers to the study of disease and its treatment, which doesn't need surgical intervention

Surgical /surgery: - Branch of medicine dealing with manual and operative procedures for correction of deformities and defects, repair of injuries, and diagnosis and cure certain diseases with surgical intervention.

Medical surgical: - a subject concerning both medical and surgical care to the patient. Previously (Traditionally) Medical surgical nursing was limited in managing only acute care at inpatient room in the hospital. But nowadays chronic illnesses are increasing with that of communicable disease in our country, So that Medical surgical nursing has become a community based concern for the society.

ANATOMICAL POSITION:

In the anatomical position, the body is standing erect and facing forward, the feet are together, and the arms are hanging at the sides with the palms facing forward.

Anatomical Planes: - is a structure used to transect the human body, in order to describe the location of structures or the direction of movements.

Page 13 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

Midsagittal or median plane: divides the body symmetrically into left and right halves.

Parasagittal or sagittal plane: divides the body asymmetrically into left and right parts. Can be any number of these.

Frontal or coronal plane: divides the body asymmetrically into anterior and posterior sections.

Transverse or horizontal plane: divides the body horizontally into superior and inferior sections.

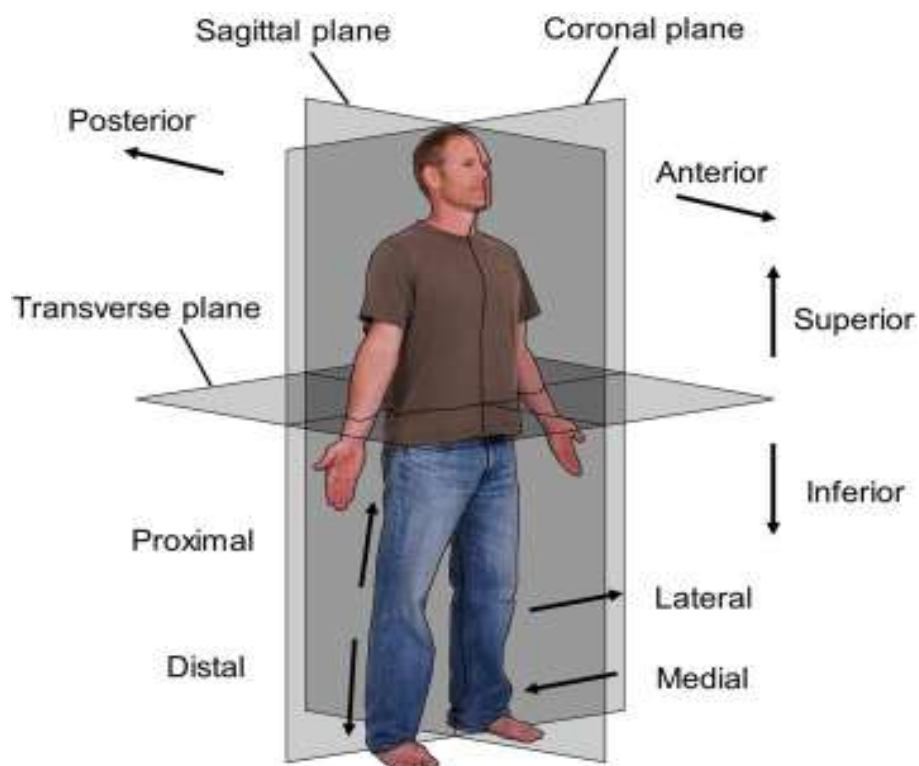


Figure 1.1 different anatomical planes

Page 14 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
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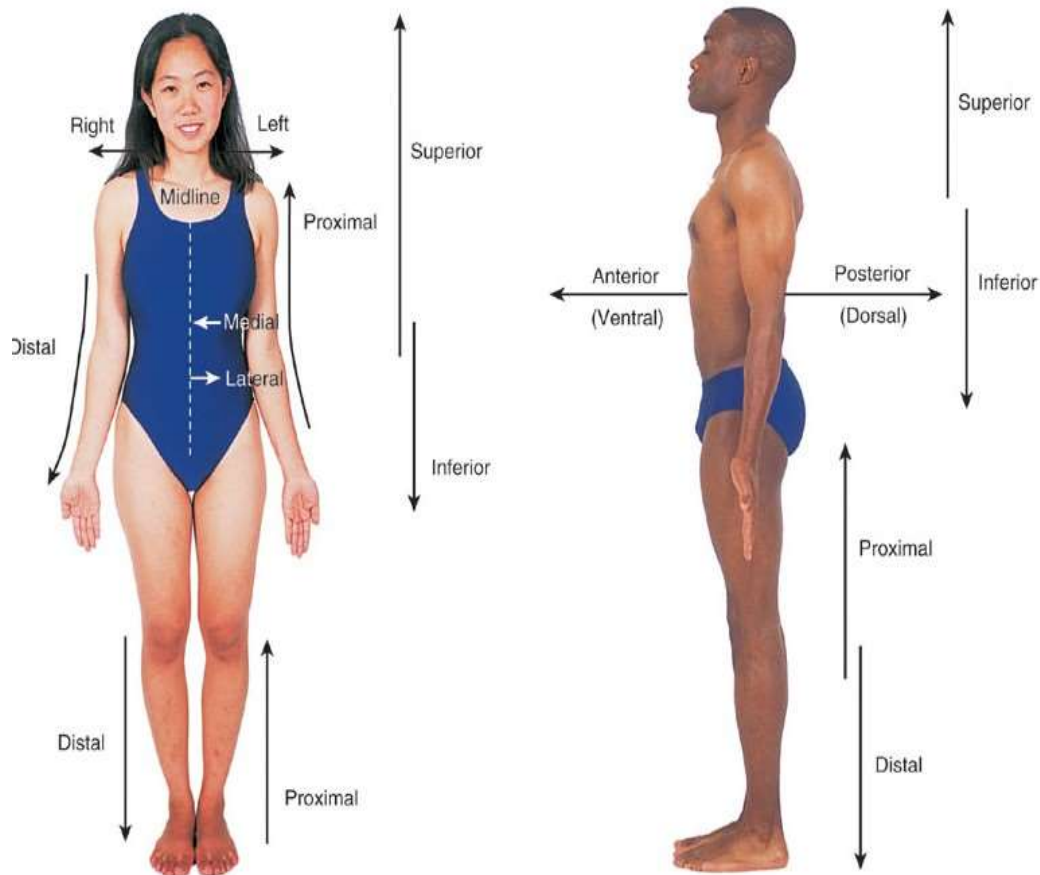


Figure 1.2 Anatomical Positions

Table 1.1 Directional terms

1.	CRANIAL OR CEPHALIC (toward the head)	CAUDAL (toward the tail)
2.	SUPERIOR (above; to move <u>up</u> on a human)	INFERIOR (below; to move <u>down</u> on a human)
3.	ANTERIOR = VENTRAL (toward the front)	POSTERIOR = DORSAL (toward the back)
4.	MEDIAL (toward the midline)	LATERAL (away from the midline)
5.	PROXIMAL (nearer to the trunk)	DISTAL (farther from the trunk)
6.	SUPERFICIAL = EXTERNAL (near the surface)	DEEP = INTERNAL (farther from surface)
7.	PLANTER (sole of foot)	DORSAL OF FOOT (upper surface of foot)
8.	PALMAR (palm of hand)	DORSAL OF HAND (back of the hand)
9.	PARIETAL (related to body walls)	VISCERAL (related to anterior organs)
10.	SUPINE (to recline on one's back)	PRONE (to recline on one's front; e.g. - to lie down on one's stomach)
11.	OBLIQUE (at an angle)	

Organs and systems

Systems of the body: a group of organs with their tissues that work together to perform a major function.

Integumentary system: made of skin, nails, hair, Sweat glands and oil glands. Function: protection, Regulate body temperature contains sensory receptors.

Skeletal system: made of bone and cartilage. Function: support body, protect organs, manufacture Red blood cells, provide level mechanism for Movement.

Muscular system (skeletal--smooth--cardiac). Function: body movement produce body heat.

Nervous system: made of brain--spinal cord peripheral nerves--sensory organs. Function: regulates body activities, initiates action of muscles.

Endocrine system: made of ductless glands. Function: secrete hormones.

Cardiovascular system: made of heart, blood, blood vessels. Function: pumps blood through vessels, transport of gases.

Respiratory system: made up airways and lungs. Function: breathing exchange of gases between air and blood.

Digestive system: made up of organs from mouth to anus and accessory structures (liver, pancreas, etc) function: break down food, remove solid waste.

Urinary system: made of kidneys, ureters, bladder, urethra. Function: eliminate metabolic wastes, regulate blood pressure, regulate water-salt balance.

Reproductive system: made of ovaries, testes, germ cells, accessory glands and ducts. Function: Reproduction.

Lymphatic system: made of lymph nodes, lymphatic blood vessels, tonsils. Function immune system defense, fat transport

Immune system: made of lymphocytes (T and B). Function: Defense

1.2 Anatomy and Physiology of integumentary system

The Integumentary system consist the skin and its derivatives. These include hair, nails, and several types of glands.

The system functions in protection, in the regulation of body temperature, in the excretion of waste materials, in the synthesis of vitamin D3 with the help of sunrays, and in the receptation of various stimuli perceived as pain, pressure and temperature.

The following are terms used in integumentary system Dermis, Epidermis, Eponychium, Hypodermis, Hyponychium, Lunula, Sebaceous glands and Sudoriferous glands.

Functions of Skin

Page 17 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

Protection: against harmful microorganisms, foreign material and it prevents excessive loss of body fluid.

Temperature regulation: with the sweat, heat leaves the body

Excretion: Small amount of waste products from the body such as urea

Synthesis: By the action of UV. Vitamin D is synthesized in the skin. Vitamin D is necessary for absorption calcium from intestine.

Sensory reception: it contains sensory receptors of heat, cold, touch, pressure, and pain.

Color of the skin

Skin's color is determined by 3 factors

1. The presence of melanin a dark pigment produced by specialized cell called melanocyte
2. The accumulation of yellow pigment carotene.
3. The color of blood reflected through the epidermis

* The main function of melanin is to screen out excessive ultraviolet rays.

* All races have some melanin in their skins although the darker races have slightly more melanocyte. The person who is genetically unable to produce any melanin is an albino.

I.3 Anatomy and Physiology of Musculoskeletal System

Function

The skeletal system consists of 206 bones that make up the internal framework of the body, called the skeleton. The skeleton supports the body, protects internal organs, serves as a point of attachment for skeletal muscles for body movement, produces blood cells, and stores minerals.

Organs

Here are the primary structures that comprise the skeletal system:

Bones and joints

Word Parts

Here are the most common word parts (with their meanings) used to build skeletal system terms.

Table I.3 common anatomical word with corresponding names

Page 18 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022



ankyl/o	stiff joint	metatars/o	Metatarsals
arthr/o	Joint	myell/o	bone marrow, spinal cord
articul/o	Joint	orth/o	Straight
burs/o	Sac	oste/o	Bone
carp/o	Wrist	pector/o	Chest
cervic/o	Neck	patell/o	Patella
chondr/o	Cartilage	ped/o	child; foot
clavicul/o	Clavicle	pelv/o	Pelvis
coccyg/o	Coccyx	phalang/o	Phalanges
cortic/o	outer layer	pod/o	Foot
cost/o	Rib	prosthet/o	Addition
crani/o	Skull	pub/o	Pubis
femor/o	Femur	radi/o	radius; ray (X-ray)
fibul/o	Fibula	sacr/o	Sacrum
humer/o	Humerus	scapul/o	Scapula
ili/o	Ilium	scoli/o	Crooked
ischi/o	Ischium	spin/o	Spine
kyph/o	Hump	spondyl/o	Vertebrae
lamin/o	lamina (part of vertebra)	stern/o	Sternum
lord/o	bent backward	synovi/o	synovial membrane
lumb/o	loin (low back between ribs and	synov/o	synovial membrane

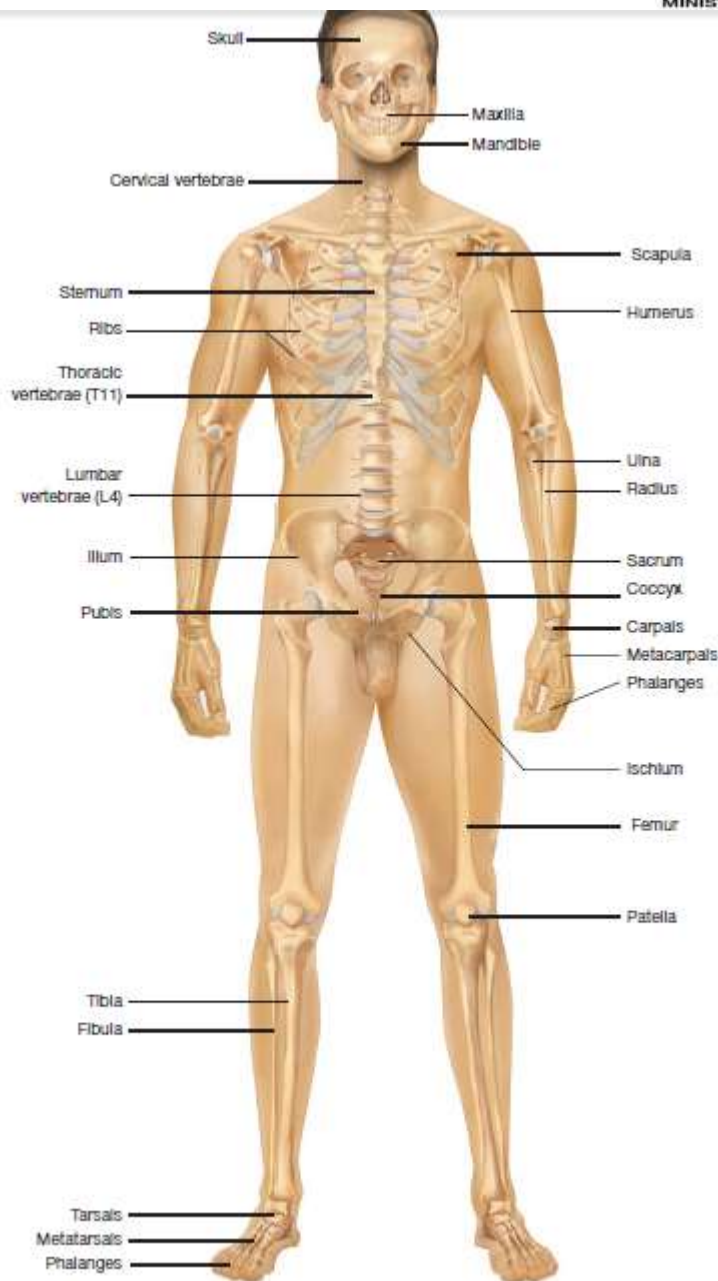


Figure 1.3 Skeletal system

Anatomy and Physiology of the Skeletal System

The word skeleton comes from the Greek word skeleton meaning “dried up”. It is strong yet light adapted for its function of body protection and motion. The skeletal system includes bones, joints, cartilages and ligaments. The joint give the body flexibility and allow movements

Page 20 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

to occur. But from structural point of view, the human skeletal system consists of two main types of supportive connective tissue, bone and cartilage.

Each bone in the human body is a unique organ that carries its own blood supply, nerves, and lymphatic vessels. When these bones are connected to each other it forms the framework of the body called a skeleton. The skeleton protects vital organs and stores minerals.

Bone marrow is the site of blood cell production. A joint is the place where two bones meet and are held together by ligaments. This gives flexibility to the skeleton. The skeleton, joints, and muscles work together to produce movement.

Bones, also called osseous tissue, are one of the **hardest** materials in the body. Bones are formed from a gradual process beginning before birth called ossification. The first model of the skeleton, made of cartilage, is formed in the fetus. Osteoblasts, immature bone cells, gradually replace the cartilage with bone. In a fully adult bone, the osteoblasts have matured into osteocytes that work to maintain the bone. The formation of strong bones is greatly dependent on an adequate supply of minerals such as calcium (Ca) and phosphorus (P).

Bone Structure

Articular cartilage, cancellous bone, compact bone, cortical bone, diaphysis, epiphysis, flat bones, irregular bones, long bones, medullary cavity, periosteum, red bone marrow, short bones, spongy bone and yellow bone marrow

Skeletal Classification

- There are 206 named bones in the human body.
- Each belongs to one of 2 large groups:

Axial skeleton

- Forms long axis of the body.
- Includes the bones of the skull, vertebral column, and rib cage.
- These bones are involved in protection, support, and carrying other body parts.

Appendicular skeleton

Page 21 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
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- Bones of upper & lower limbs and the girdles (shoulder bones and hip bones) that attach them to the axial skeleton.
- Involved in locomotion and manipulation of the environment.

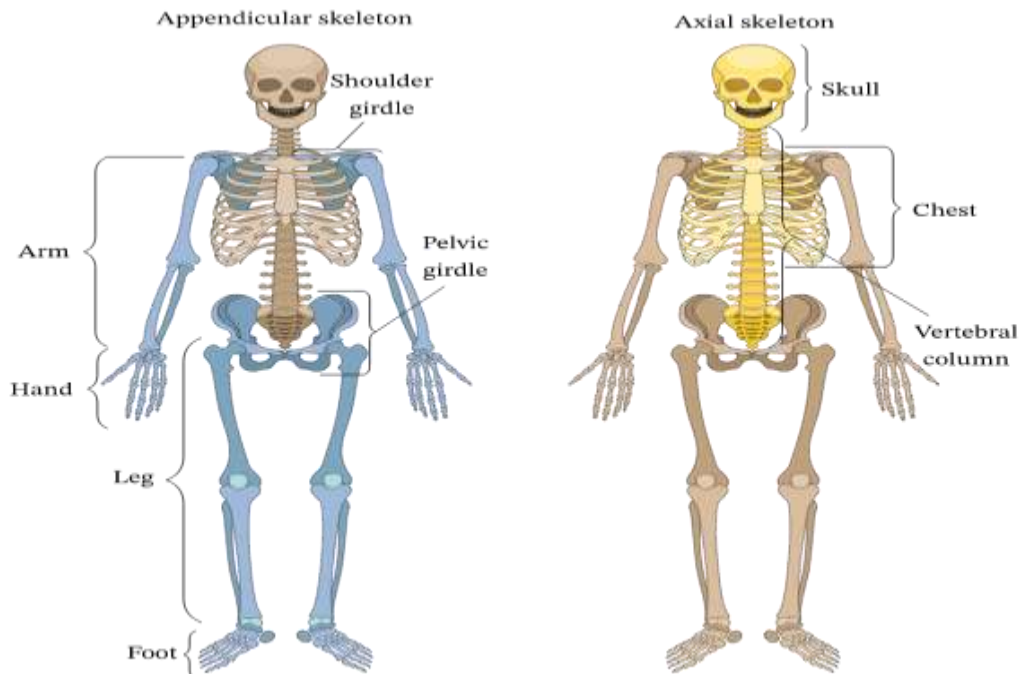


Figure 1.4 types of bones

Table 1.4 Axial and Appendicular skeleton

Page 22 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

AXIAL SKELETON		APPENDICULAR SKELETON	
Skull —22 bones	Auditory ossicles —6 bones	Pectoral girdle —4 bones	
14 <i>facial bones</i>	malleus (2)	scapula (2)	
maxilla (2)	incus (2)	clavicle (2)	
palatine bone (2)	stapes (2)	Upper extremities —60 bones	
zygomatic bone (2)		humerus (2)	carpal bone (16)
lacrimal bone (2)	Hyoid —1 bone	radius (2)	metacarpal bone (10)
nasal bone (2)		ulna (2)	phalanx (28)
vomer (1)	Vertebral column —26 bones	Pelvic girdle —2 bones	
inferior nasal	cervical vertebra (7)	os coxae (2) (each contains 3 fused bones)	
concha (2)	thoracic vertebra (12)	Lower extremities —60 bones	
mandible (1)	lumbar vertebra (5)	femur (2)	tarsal bone (14)
	sacrum (1) (5 fused bones)	tibia (2)	metatarsal bone (10)
8 <i>cranial bones</i>	coccyx (1) (3 to 5 fused bones)	fibula (2)	phalanx (28)
frontal bone (1)	Rib cage —25 bones	patella (2)	
parietal bone (2)	rib (24)		
occipital bone (1)	sternum (1)		
temporal bone (2)			
sphenoid bone (1)			
ethmoid bone (1)			

The Axial Skeleton

- Forms the longitudinal part of the body
- There are 80 bones in the axial skeleton
- Divided into three parts
 - Skull
 - Vertebral column
 - Bony thorax

The Skull

- Two sets of bones
 - Cranium(eight cranial bones)
 - Facial bones(fourteen facial bones)
- Bones are joined by sutures
- Only the **mandible** is attached by a freely movable joint

The Skull

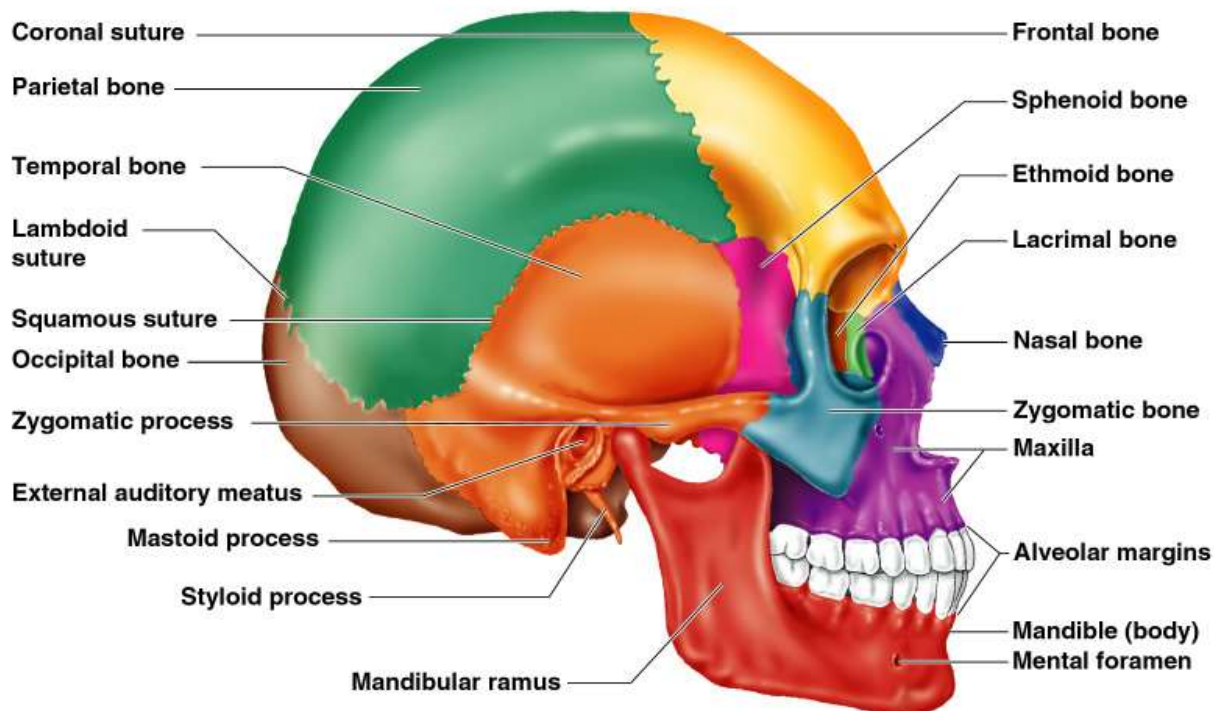


Figure 1.5 the skull bone

Cranium- 8 bones

- **Ethmoid (1)** Base of cranium, anterior to body of sphenoid.
- **Frontal (1)** Anterior and superior parts of cranium, forehead, brow areas.
- **Occipital (1)** Posterior part of cranium, including base.
- **Parietal (2)** Superior sides and roof of cranium, between frontal and occipital bones.
- **Sphenoid (1)** Base of cranium, anterior to occipital and temporal bones.
- **Temporal (2)** Sides and base of cranium at temples.
- **Bones of the Skull**

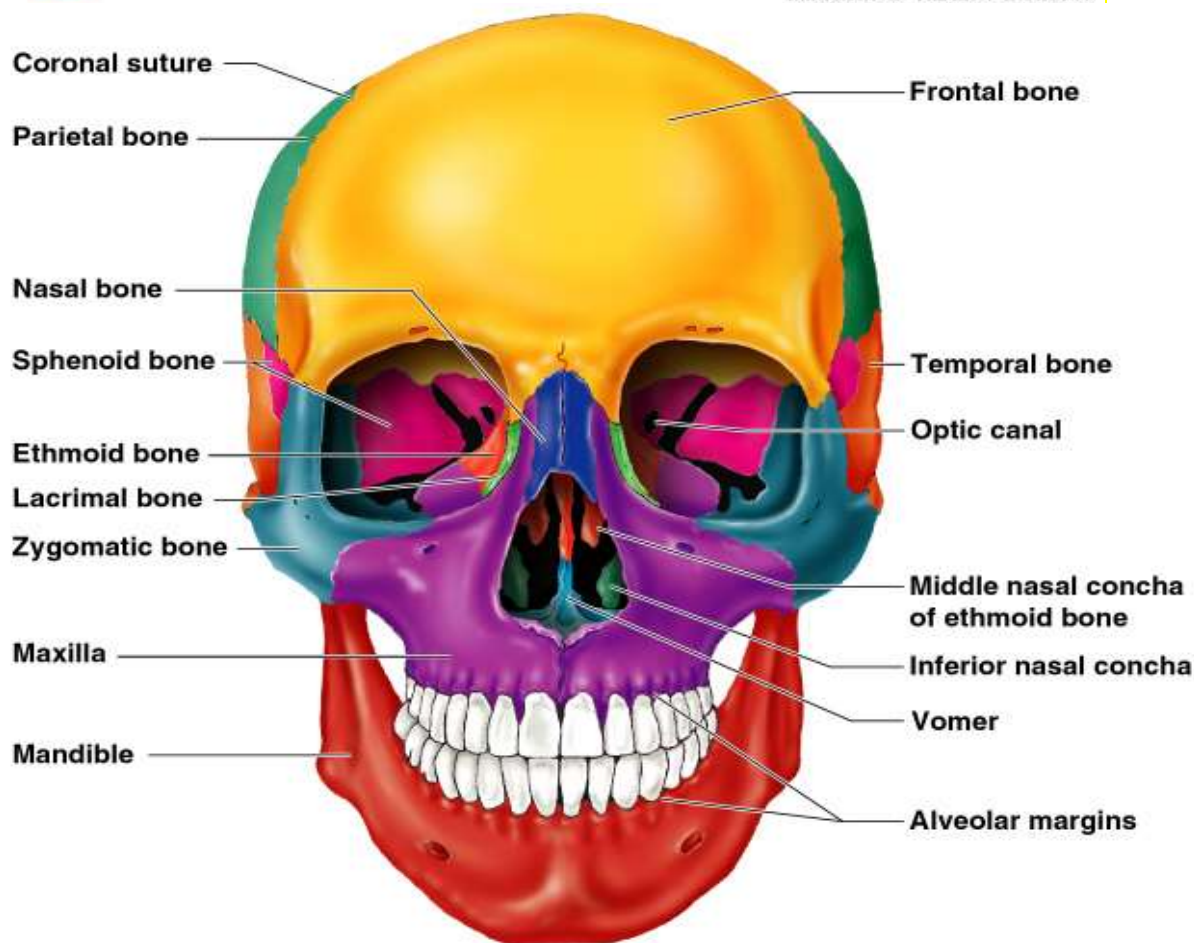


Figure 1.6 the Cranium

Facial bones (fourteen facial bones)

- **Inferior nasal** Lateral walls of nasal cavities, below superior and middle
- **Conchii (2)** conchae of Ethmoid bone. Thin, cancellous, shaped like curved leaves.
- **Lacrimal (2)** Medial wall of orbit, behind frontal process of maxilla.
- **Mandible (1)** Lower jaw, extending from chin to mandibular fossa of temporal bone.
- **Maxillae (2)** Upper jaw and anterior part of hard palate
- **Nasal (2)** Upper bridge of nose between frontal processes of maxillae.

- **Palatine (2)** Posterior part of hard palate, floor of nasal cavity and orbit.
- **Vomer (1)** Posterior and inferior part of nasal septum.
- **Zygomatic (2)** Cheekbones below and lateral to orbit.
- **Hyoid(1)** Below root of tongue, above larynx.
- **Ossicles of ear (6)** Inside cavity of petrous portion of temporal bone. These are Incus(2), malleus (2) and stapes (2)

Sutures

- Meaning to stitch, are immovable joint found between skull bones.
- There are four main sutures in the skull.

Coronal suture: between the frontal & the two-parietal bone.

Sagittal suture: between the two parietal bones.

Lambdoidal suture: between parietal & occipital bone.

Squamosal suture: between parietal bone and temporal bone.

Page 26 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
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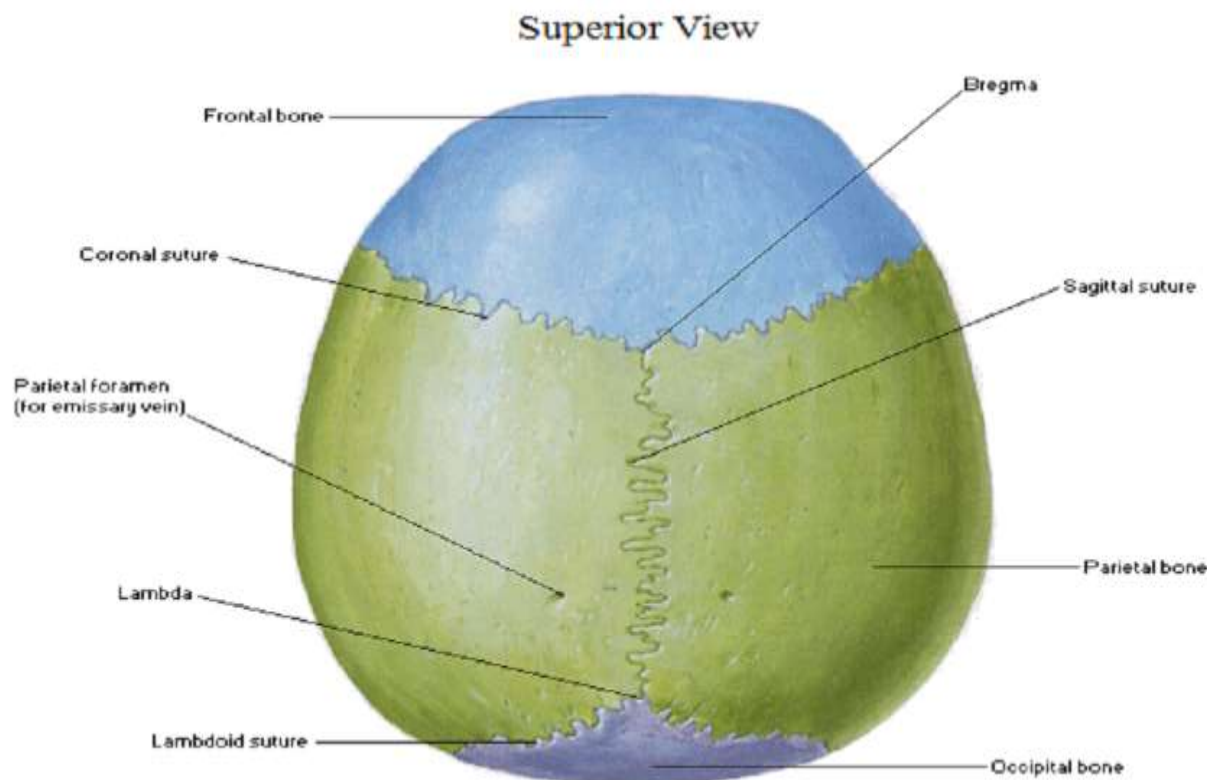


Figure 1.7 sutures of fetal skull

The Hyoid Bone

- The only bone that does not articulate with another bone
- Serves as a moveable base for the tongue



Figure 1.8 the hyoid bone

Function of Fontanels

- They enable skull of the fetus to compress as it pass through the birth canal
- Permit rapid growth of brain during infancy
- Serves as a landmark (anterior fontanel) for withdrawal of blood from the superior sagittal sinus
- Aid in determination of fetal position prior to birth.

The skull of the fetus there are 6 prominent fontanels:

The Anterior (frontal) fontanel, between angle of two parietal bones & segment of the frontal bone.

It is diamond shaped and is the largest fontanel.

It closes 18 to 24 months after birth.

The posterior (occipital) fontanel, between parietal & occipital bone.

It is also diamond shaped but smaller than the anterior fontanel.

It closes 2 months after birth

The Anterolateral (sphenoidal) fontanel, they are pair, one in each side.

Found at the junction of frontal, parietal, temporal & sphenoidal bone.

They are small & irregular in shape and closes at 3rd month after birth.

The posterolateral (mastoid) fontanel, Paired one in each side.

Found at the junction of parietal, occipital and temporal bones.

They are irregular in shape and begin to close at 1 or 2 months after birth and completed by 12 months.

The Vertebral Column

- Vertebrae separated by intervertebral discs
- The spine has a normal curvature

Page 28 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	--	--	--

- Each vertebrae is given a name according to its location

The vertebral column consists.

- **7 cervical** vertebrae
- **12 thoracic** vertebrae
- **5 lumbar** vertebrae

The **bony thorax** forms a cage to protect major organs

In a child there are 33 separate vertebrae, the 9 in the sacrum and coccyx not yet being fused.

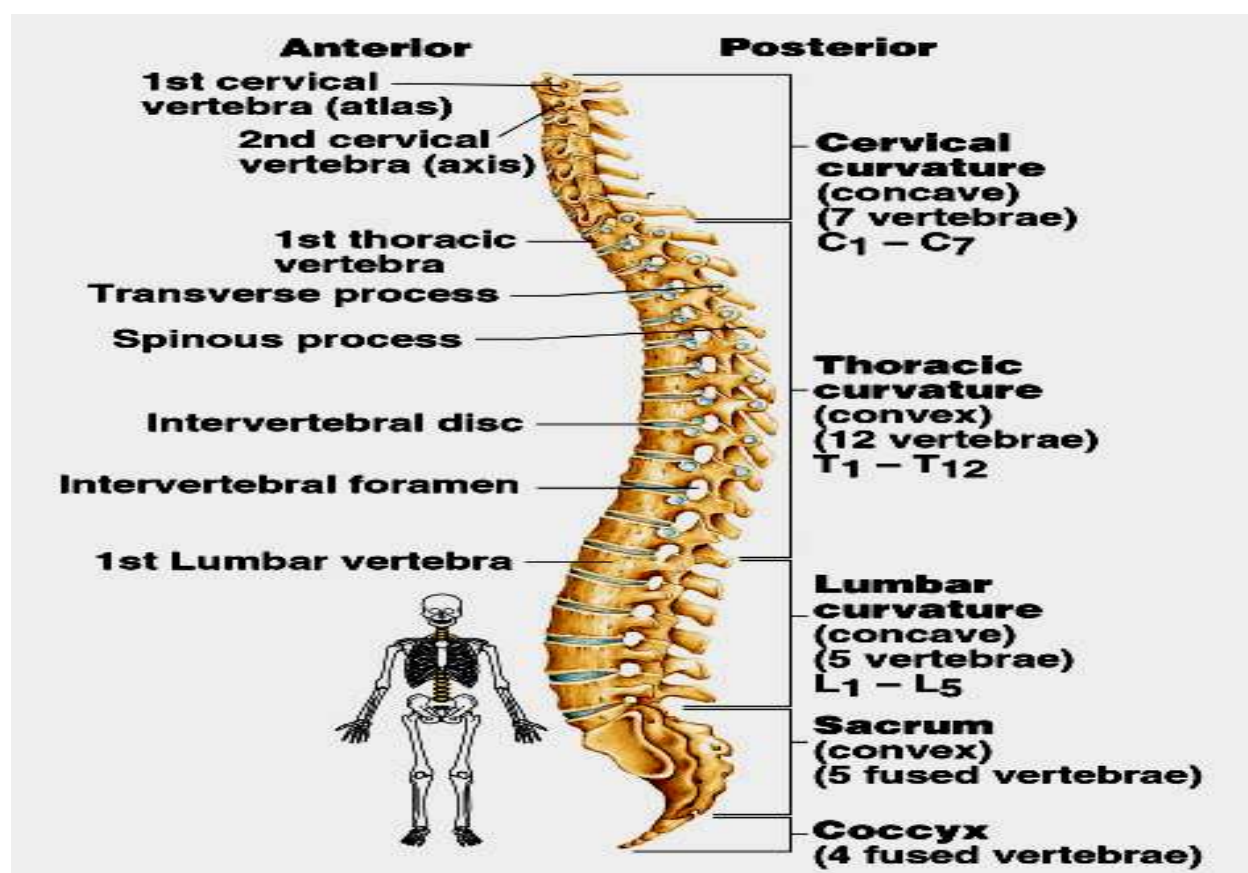


Figure 1.9 structure of vertebral column

Structure of a Typical Vertebrae

Page 29 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
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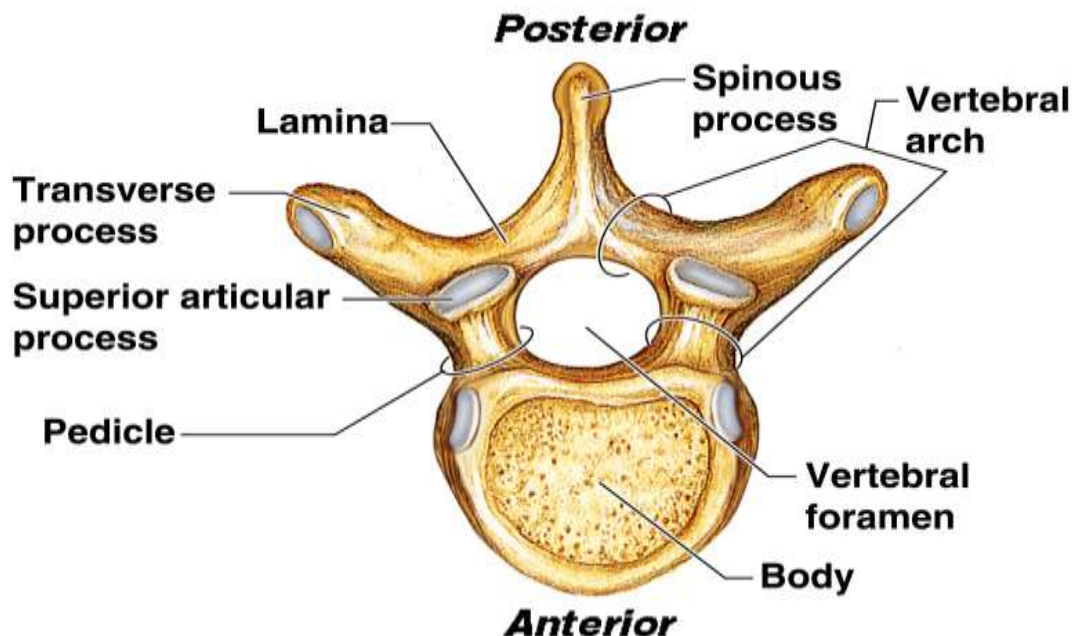


Figure 1.10 Typical Vertebrae

The Bony Thorax

- Forms a cage to protect major organs
- Made-up of three parts
 - Sternum
 - Ribs
 - Thoracic vertebrae

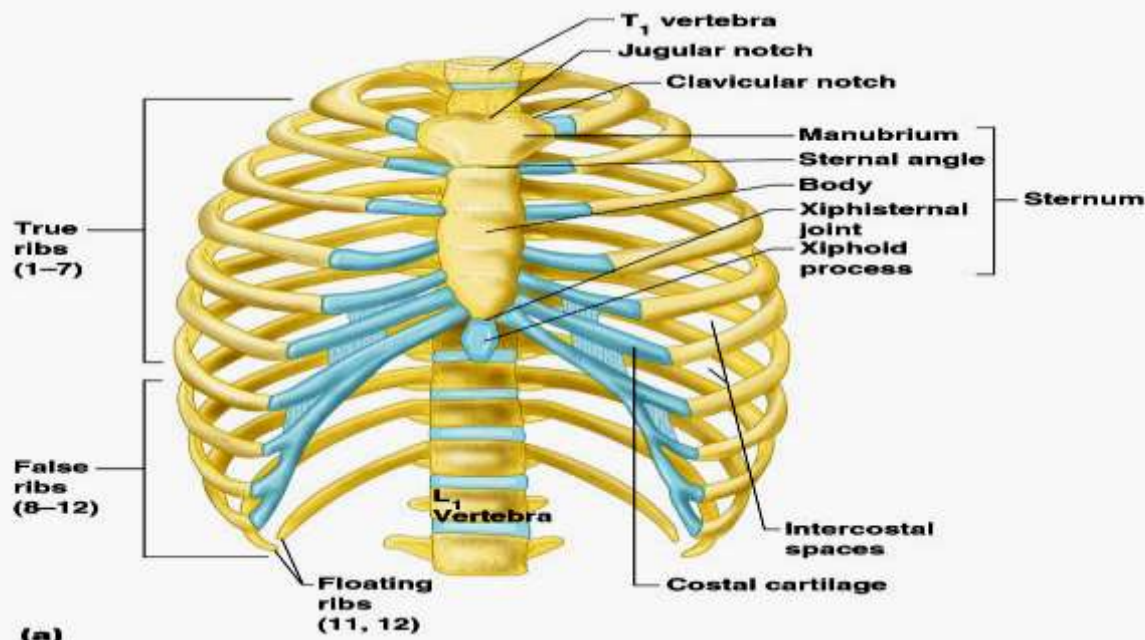


Figure 1.11 Throat

Sternum (breast bone)

- Sternum is flat, narrow bone measuring about 15 cm. (6 inch) located in the median line of anterior thoracic wall.
- It consists 3 basic portions:
 - ✓ The **manubrium** (superior portion),
 - ✓ The **body** (middle & largest portion) and
 - ✓ The **xiphoid process** (inferior & smallest portion).
- The junction of the manubrium and the body forms the **sternal angle**.

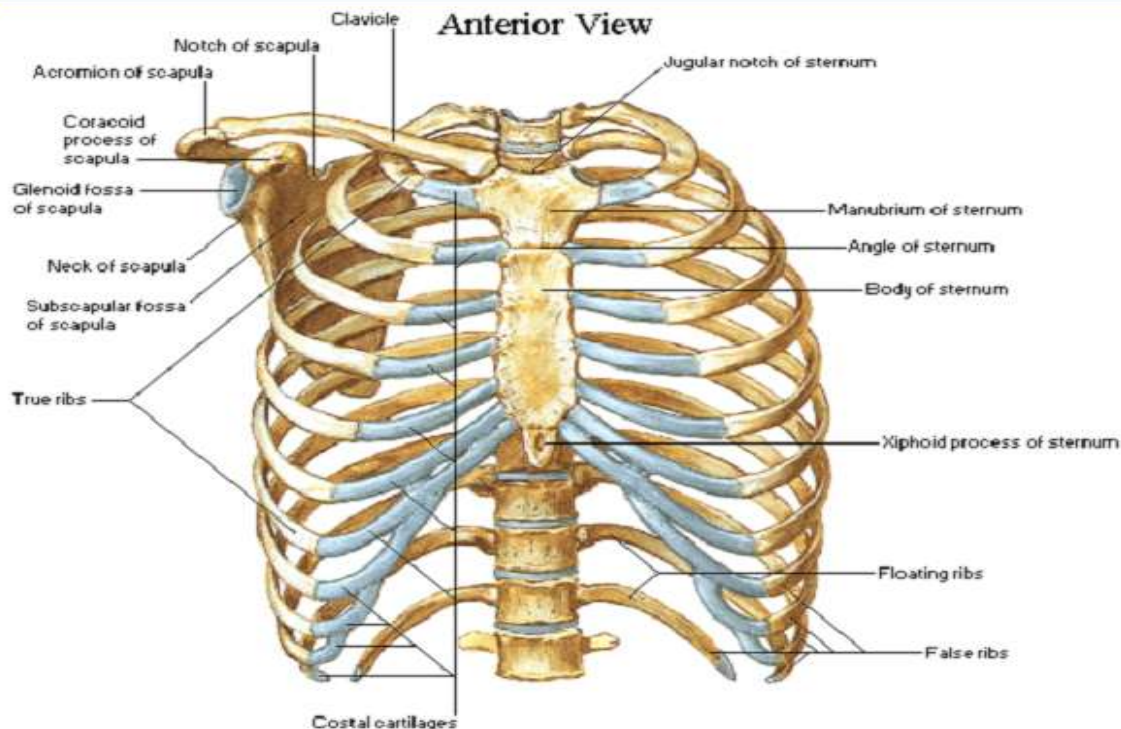


Figure 1.12 Rib Bones
Ribs

You have three different types of ribs

- **True ribs** are the first seven pairs of ribs. True ribs attach directly to the sternum by costal cartilages.
- **False ribs** are the next five pairs. They either attach indirectly to the sternum or not at all.
- **Floating ribs** are the last two pairs of false ribs. They lack sternal attachments.

The Appendicular Skeleton

- There are 126 bones in the Appendicular Skeleton.
- Consists of 3 parts

1) Limbs (appendages) - 120 bones

Upper limb - 60 bones

Lower limb - 60 bones

2) Pectoral girdle (shoulder) - 4 bones

Page 32 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	--	--	--

3) Pelvic girdle (pelvis) - 2 bones

The Appendicular Skeleton

The Pectoral (Shoulder) Girdle

- Composed of two bones
 - ✓ Clavicle (2 bones) – collarbone
 - ✓ Scapula (2 bones) – shoulder blade
- These bones allow the upper limb to have exceptionally free movement

Bones of the Shoulder Girdle

CLAVICLE (2)

- Collarbone; double-curved, long bone with rounded medial end and flattened lateral end; held in place by ligaments.
- Holds shoulder joint and arm away from thorax so upper limb can swing freely.

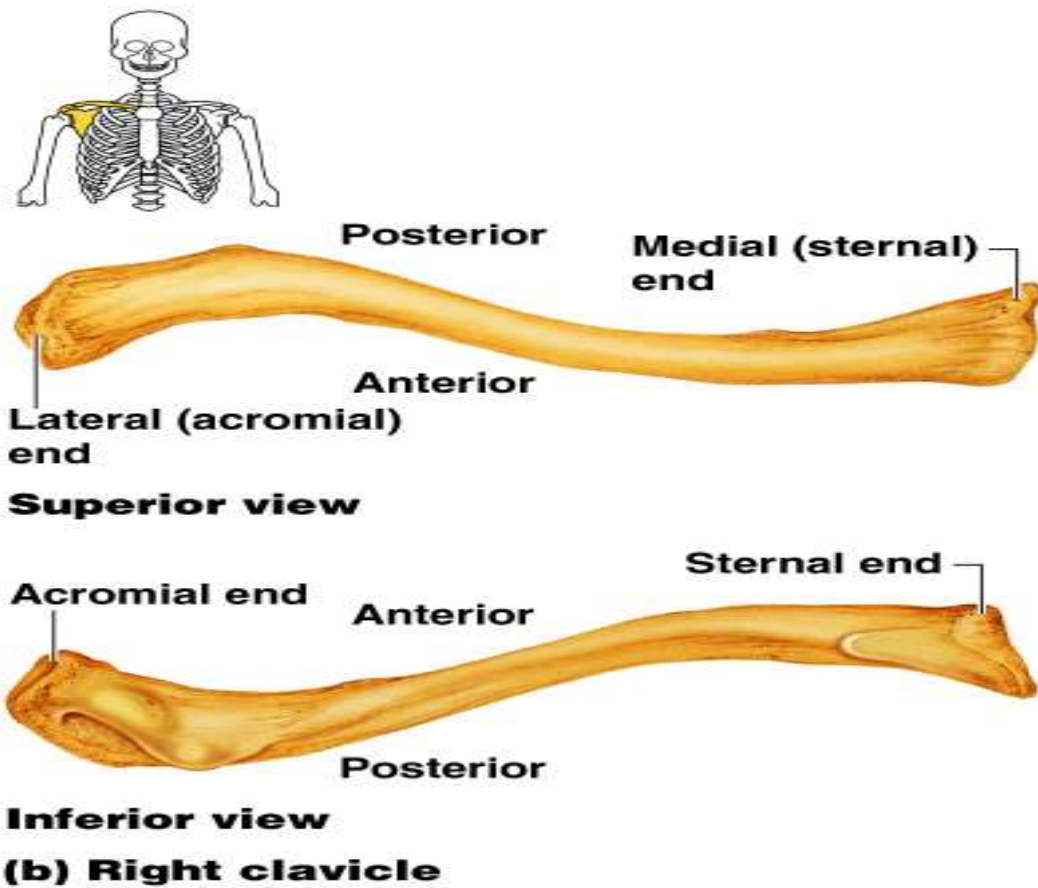


Figure 1.13 the clavicle

Scapula (2)

Shoulder blade; flat, triangular bone with horizontal spine separating fossae.

Site of attachment for muscles of arm and chest.

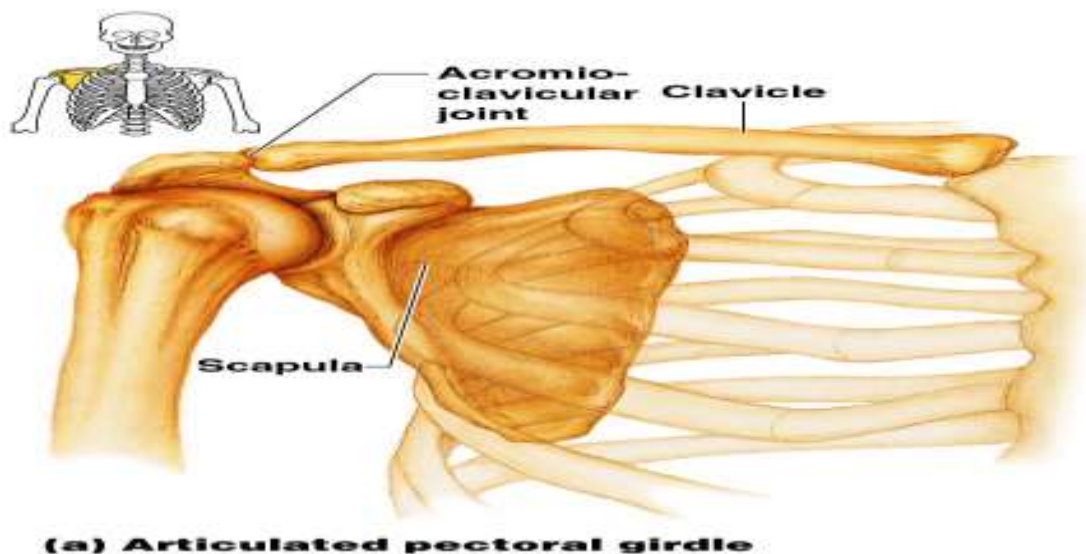


Figure 1.14 the scapula

Bones of the Upper Limb - Arm

- The **arm** is formed by a single bone
 - ✓ Humerus (2)
- Longest, largest bone of upper limb; forms ball and socket joint with glenoid fossa of scapula.
- Permits the arm to flex and extend at elbow

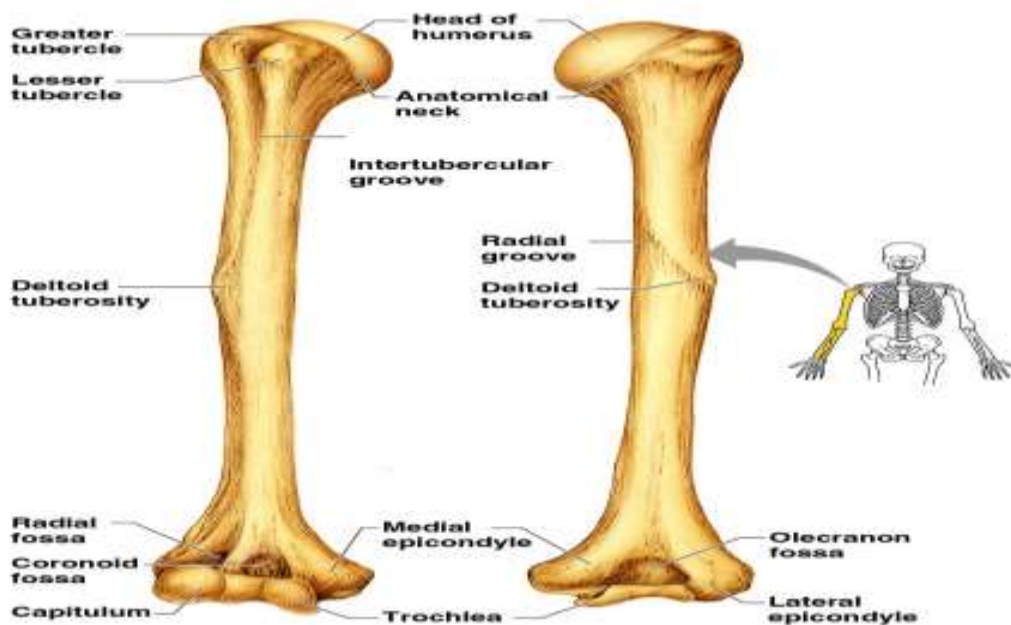


Figure 1.15 the Humerus

Bones of the Upper Limb - Forearm

- The **forearm** has two bones
 - ✓ Ulna
 - ✓ Radius
- **Radius** Larger of two bones in forearm large proximal end consists of olecranon process (prominence of elbow).

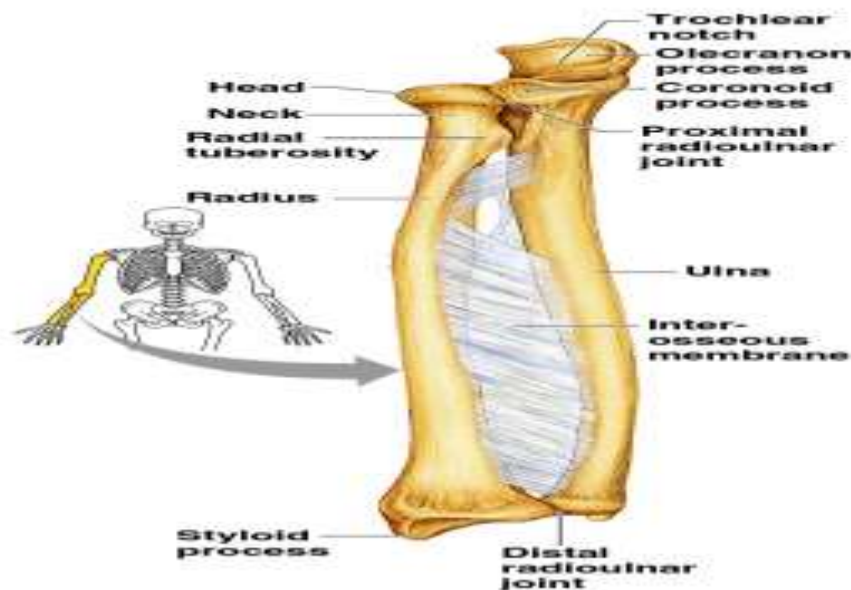


Figure 1.16 radius and ulna

Bones of the Upper Limb- The hand

- The hand
 - Carpals – wrist
 - Metacarpals – palm
 - Phalanges – fingers

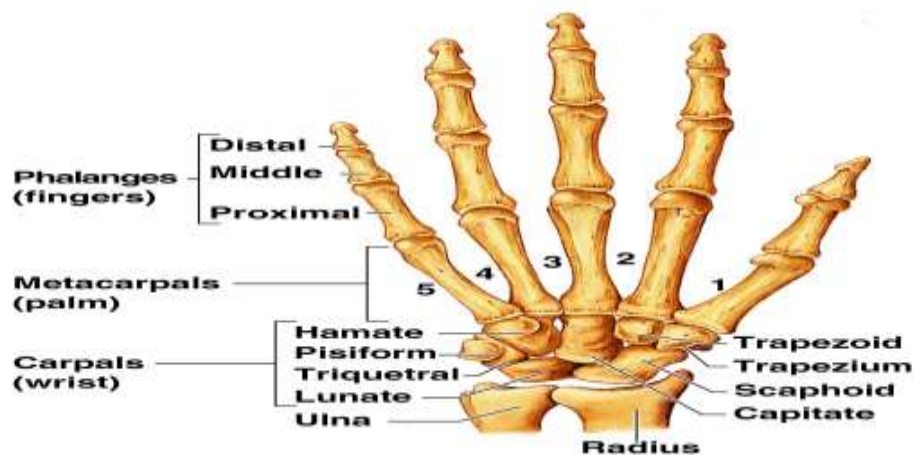


Figure 1.17 bones of the upper limb

Carpals (16) Small short bones; in each wrist, 8 carpal bones in 2 transverse rows of 4. With attached ligaments, allow slight gliding movement.

Metacarpals (10) five miniature long bones in each hand in fanlike arrangement; articulate with fingers at metacarpophalangeal joint (the Knuckle).

Phalanges (28) Miniature long bones, 2 in each thumb, 3 in each finger; articulate with each other at interphalangeal joint.

Allow fingers to participate in stable grips

Bones of the Pelvic Girdle

- Hip bones
- Composed of three pair of fused bones
 - Ilium
 - Ischium
 - Pubic bone
- The total weight of the upper body rests on the pelvis
- Protects several organs
 - Reproductive organs
 - Urinary bladder
 - Part of the large intestine

The Pelvis

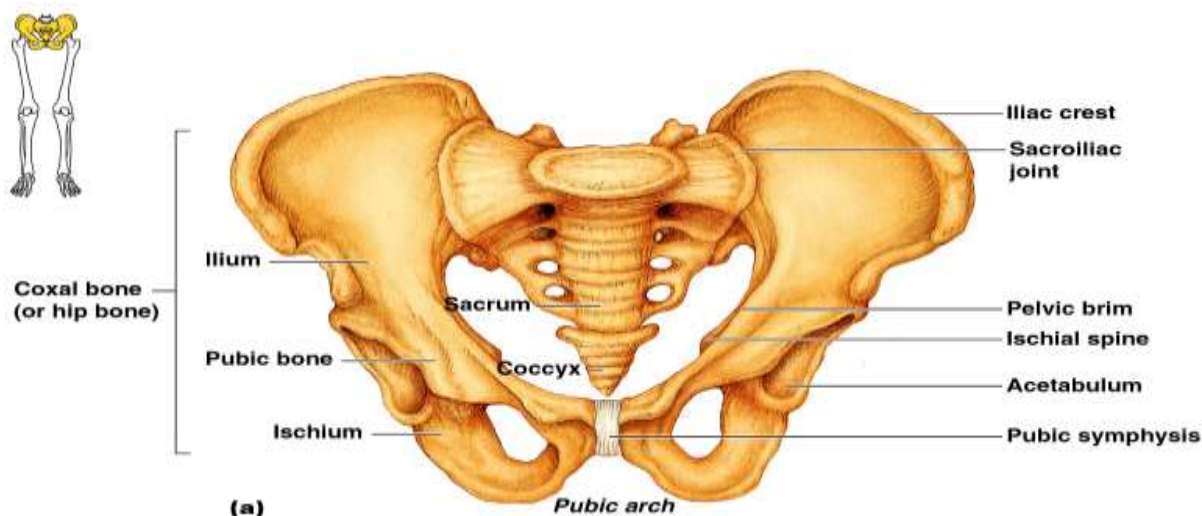


Figure 1.18 the pelvis

Page 38 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
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Bones of the Lower Limbs- The thigh

- The thigh has one bone **Femur** (thigh bone)
- Typical long bone; longest, strongest, heaviest bone;
- Forms ball of ball-and-socket joint with pelvic bones;
- Provides articular surface for knee. Supports body.

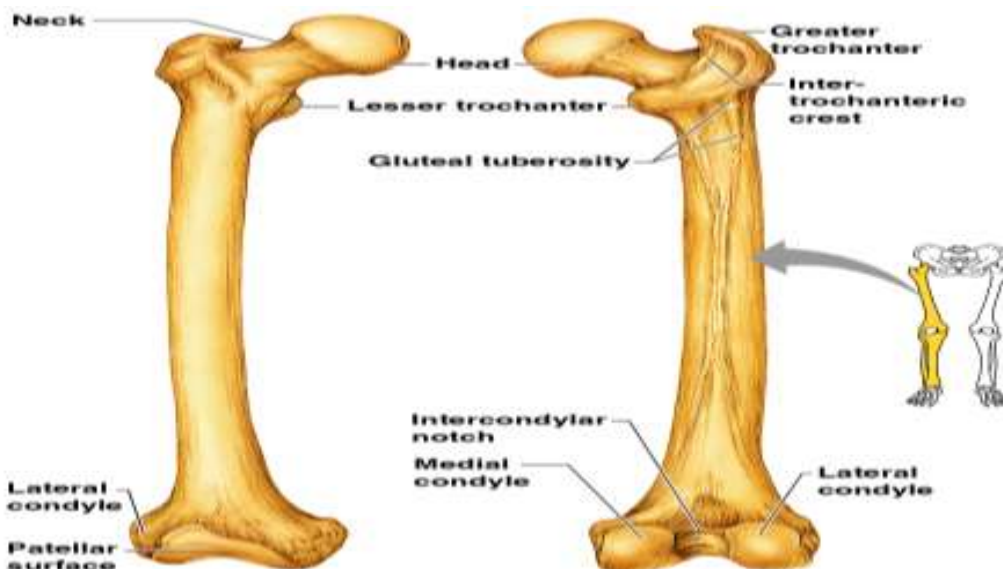


Figure 1.19 the thigh

Patella (2)

Patella – Kneecap sesamoid bone within quadriceps femurs tendon.

Increases leverage for quadriceps muscle by keeping tendon Away from axis of rotation.



Figure 1.20 patella

Bones of the Lower Limbs- The leg

The leg has two bones

- **Tibia;** Smaller long bone of lower leg; articulates proximally with tibia and distally with talus.
- **Fibula;** Larger long bone of lower leg; articulates with femur fibula, talus.

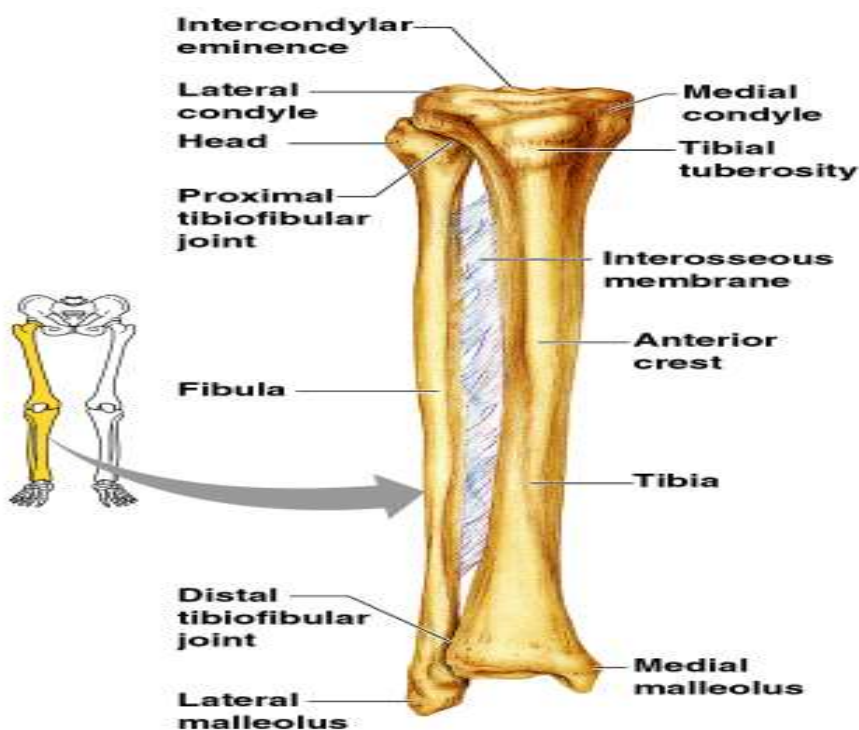


Figure 1.21 fibula

Bones of the Lower Limbs- The foot

The foot consists of

- **Tarsus** – ankle; Bear body weight; raise body and transmit thrust during running and walking.
- **Metatarsals** – sole; Improve stability while standing; absorb shocks; bear weight; aid in locomotion.

Phalanges– toes; Provide stability during locomotion

Page 40 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	--	--	--

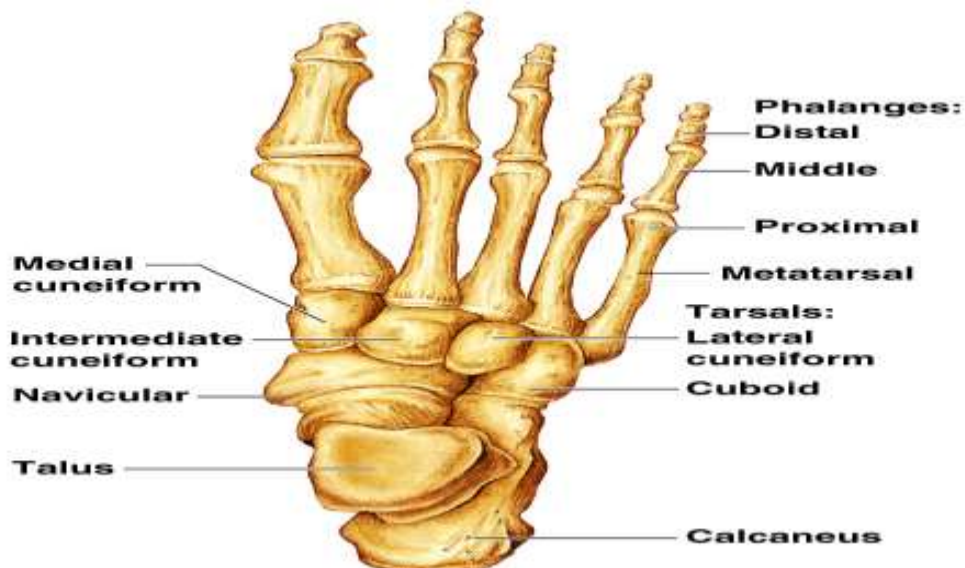


Figure 1.21 phalanges

Tarsals (14) Ankle, heel bones; short bones; 7 in each ankle including talus, calcaneus, cuboid, navicular, 3 cuneiforms; with metatarsals, form arches of foot.

Metatarsals (10) Miniature long bones; 5 in each foot; form sole; with tarsal, form arches of feet.

Phalange (28) Toes; miniature long bones; 2 in each big toe, 3 in each other toe; arranged as in hand.

Joints

- Articulations of bones
- Functions of joints
 - ✓ Hold bones together
 - ✓ Allow for mobility
- Ways joints are classified
 - ✓ Functionally
 - ✓ Structurally

Functional Classification of Joints

- **Synarthroses** – immovable joints
- e.g. Sutures, Teeth, Epiphyseal plates,

Page 41 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	--	--	--

- **Amphiarthroses** – slightly moveable joints e.g. Intervertebral discs
- Pubic symphysis
- **Diarthroses** – freely moveable joints
- e.g. Glenohumeral joint, Knee joint

Structural Classification of Joints

- Fibrous joints
 - ✓ Generally immovable
- Cartilaginous joints
 - ✓ Immovable or slightly moveable
- Synovial joints
 - ✓ Freely moveable

Fibrous Joints

- Bones united by fibrous tissue – synarthrosis or largely immovable.

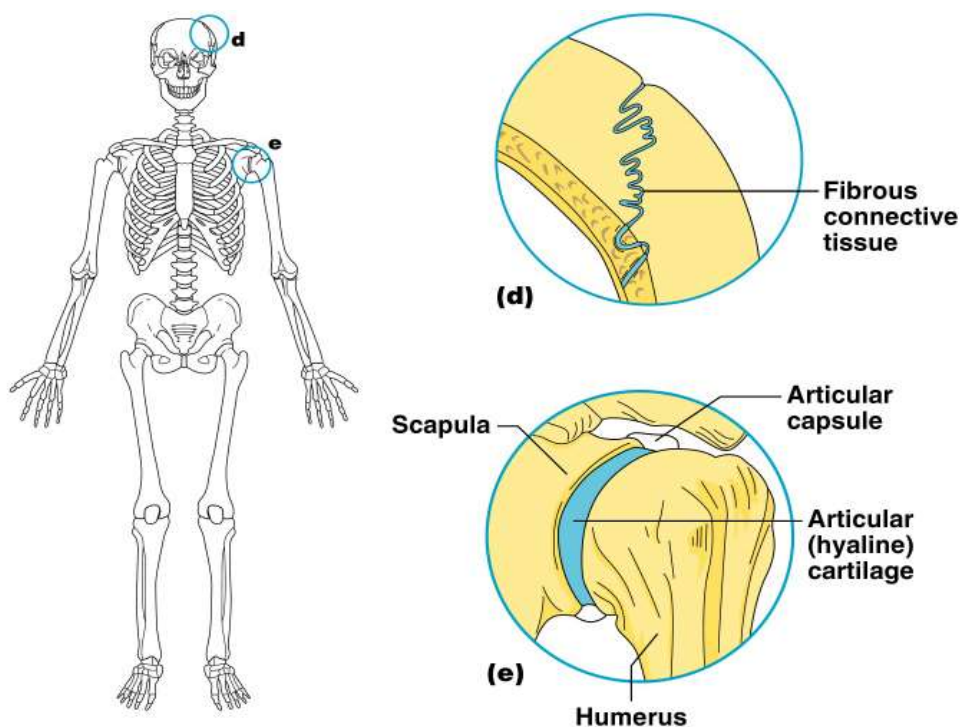
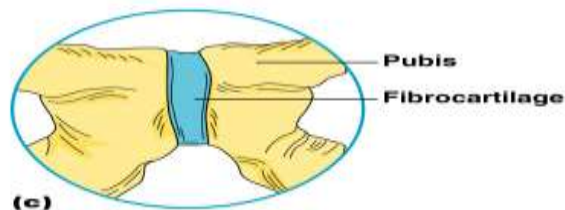
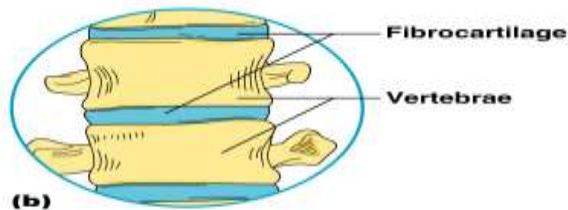
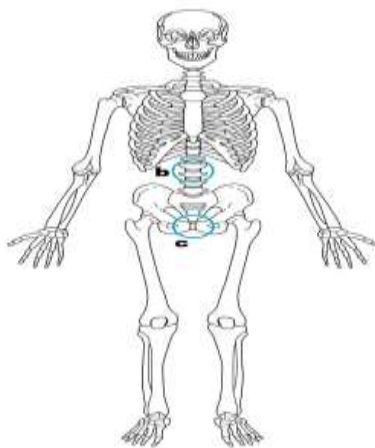


Figure I.22 Fibrous joints

Page 42 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	--	--	--

Cartilaginous Joints – mostly amphiarthrosis

- Bones connected by cartilage
- Examples
 - Pubic symphysis
 - Intervertebral joints



Synovial Joints

- Articulating bones are separated by a joint cavity
- Synovial fluid is found in the joint cavity

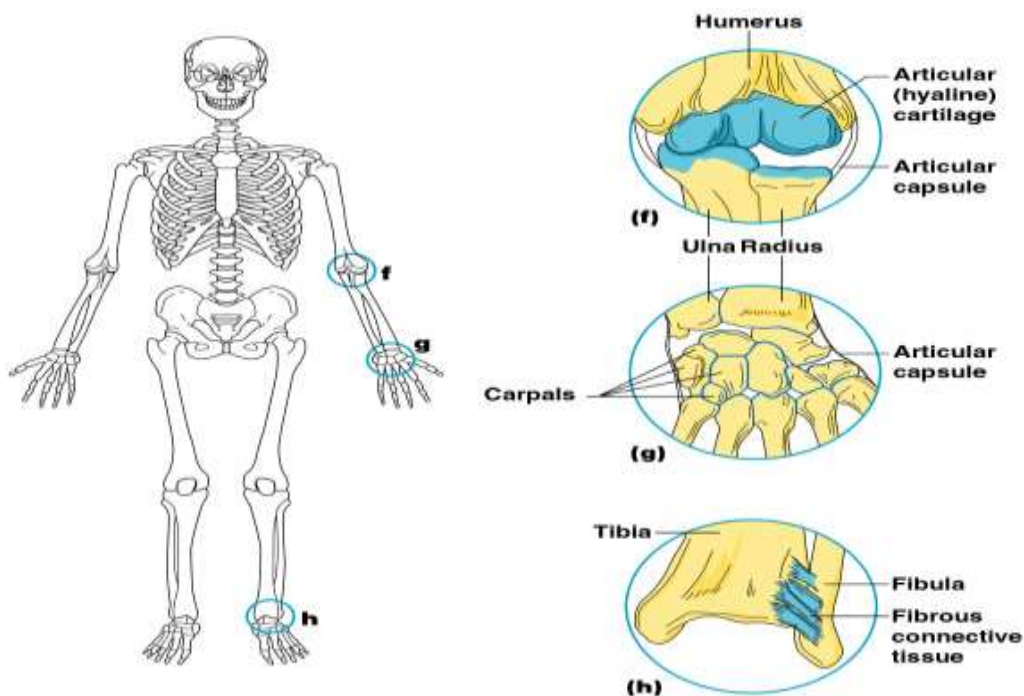


Figure 1.23 synovial joints

Features of Synovial Joints- Diarthroses

- Articular cartilage (hyaline cartilage) covers the ends of bones
- Joint surfaces are enclosed by a fibrous articular capsule
- Have a joint cavity filled with synovial fluid
- Ligaments reinforce the joint

Structures Associated with the Synovial Joint

- Bursae – flattened fibrous sacs
 - Lined with synovial membranes
 - Filled with synovial fluid
 - Not actually part of the joint
- Tendon sheath
 - Elongated bursa that wraps around a tendon

The Synovial Joint

Types of synovial joint: by shape

Page 44 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	--	--	--

Plane: articular surface in flat plane

- Short gliding movement
- (eg) intertarsal, articular processes of vertebrae

Hinge: cylindrical end of one bone fits into **trough shape** of other end

- angular movement-one plane (eg) elbow, ankle, interphalangeal

C. Pivot: round end fits into ring of bone + ligament

- rotation on long axis
- (eg) proximal radio-ulna, atlanto-axial joint

Types of Synovial Joints Based on Shape

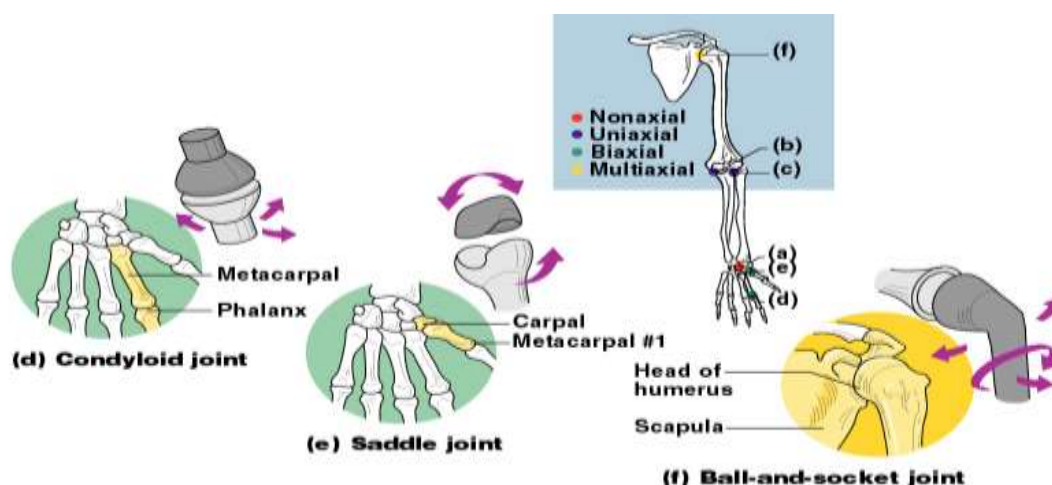


Figure 1.24 types of synovial joints

Condylloid: egg-shape articular surface + oval concavity

- side-to-side, back+forth movement
- (eg) metacarpophalangeal (knuckle)

Saddle: articular surface both concave + convex

- side-to-side, back-forth movement
- (eg) carpometacarpal joint of thumb

Ball + Socket: spherical head + round socket

- multiaxial movement
- (eg) shoulder, femur

Page 45 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	--	--	--

Muscles system

- Muscles are responsible for all types of body movement – they contract or shorten and are the machine of the body
- Half ($\frac{1}{2}$) our body weight comes from muscles
- Consists of over 600 individual muscles.

Characteristics of Muscles

- Muscle cells are elongated
(muscle cell = muscle fiber)
- Contraction of muscles is due to the movement of microfilaments
- All muscles share some terminology
 - ✓ Prefix *myo* refers to muscle
 - ✓ Prefix *mys* refers to muscle
 - ✓ Prefix *sarco* refers to flesh-

Functional Characteristics of Muscle Tissue

- **Excitability**, also termed responsiveness or **irritability**, is the ability to receive and respond to a stimulus,
- **Contractility** is the ability to shorten forcibly when adequately stimulated.
- **Extensibility** is the ability to be stretched or extended.

Elasticity is the ability of a muscle fiber to recoil and resume its resting length after being stretched.

The 3 Types of muscles

Body movements are determined by three types of muscles

- Smooth (involuntary)** – cannot be controlled by will
- Cardiac** – control the contractions of the heart.
- Skeletal (Voluntary)** – can be controlled by will.

Skeletal Muscle Characteristics

- Most are attached by tendons to bones
- Cells are multinucleate

Page 46 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	--	--	--

- Striated – have visible banding
- Voluntary – subject to conscious control
- Cells are surrounded and bundled by connective tissue = great force, but tires easily

Muscle structure

A. Connective Tissue Component

- A skeletal muscle is an organ composed mainly of striated muscle cells and connective tissue. Each skeletal muscle has two parts; the connective tissue sheath that extend to form specialized structures that aid in attaching the muscle to bone and the fleshy part the **belly** or **gaster**. The extended specialized structure may take the form of a cord, called a **tendon**; alternatively, a broad sheet called an **aponeurosis** may attach muscles to bones or to other muscles, as in the abdomen or across the top of the skull.
- A connective tissue sheath called **facia** surrounds and separates muscles. Connective tissue also extends into the muscle and divides it into numerous **muscle bundles** (fascicles). There are three connective tissue components that cover a skeletal muscle tissue. These are:
 1. Epimysium—a connective tissue sheath that surrounds and separates muscle.
 2. Perimysium—a connective tissue that surrounds and holds fascicles together.
 3. Endomysium—a connective tissue that surrounds each muscle fibre.

B. Microscopic structures

- The muscle bundles are composed of many elongated muscle cells called muscle fibres.
- Each muscle fibre is a cylindrical cell containing several nuclei located immediately beneath the cell membrane (sarcolemma). The cytoplasm of each muscle fibre (sarcoplasm) is filled with myofibrils.
- Each myofibril is a thread-like structure that extends from one end of the muscle fibre to the other. Myofibrils consist of two major kinds of protein fibres: actins or thin myofilaments, and myosin or thick myofilaments.
- The actins and myosin myofilaments form highly ordered units called sarcomers, which are joined end-to-end to form the myofibrils (see Figure 6).

Page 47 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

- Sarcomere is a structural and functional unit of muscle tissue. The ends of a sarcomere are a network of protein fibres, which form the Z-lines when the sarcomere is viewed from side.
- The Z-lines form an attachment site for actins myofilaments. The arrangement of the actin and myosin myofilaments in a sarcomere gives the myofibril a banded appearance because the myofibril appears darker where the actin and myosin myofilaments overlap.
- The alternating light (I-band) and dark (A-band) areas of the sarcomers are responsible for striation (banding pattern) seen in skeletal muscle cells observed through the microscope.

The sarcolemma of a muscle fibre forms blind-ended sacs or **T-tubules** which penetrate the cell and lie in the spaces between the myofibrils. The T-tubules contain interstitial fluid and do not open into the interior of the muscle fibre. Within the sarcoplasm of the muscle fibre there is an extensive network of branching and anastomosing channels, which forms the sarcoplasmic reticulum (this structure is a modified endoplasmic reticulum). The channels of the sarcoplasmic reticulum lay in close contact around the ends of T-tubules, and contain stores of calcium.

Muscle contractions

- The thick myofilaments are composed of a protein called myosin. Each myosin filament has small regular projections known as **crossbridges**.
- The crossbridges lie in a radial fashion around the long axis of the myofilament. The rounded heads of the crossbridges lie in apposition to the thin myofilaments.
- The thin myofilaments are composed of a complex protein called actin, arranged in a double stranded coil.
- The actin filaments also contain two additional proteins called **troponin** and **tropomyosin**.
- In a resting muscle fibre the myosin crossbridges are prevented from combining with the actin filaments by the presence of troponin and tropomyosin. When a nerve impulse reaches a muscle fibre it is conducted over the sarcolemma and in to the T-tubules, then to the sarcoplasmic reticulum.

Page 48 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	--	--	--

- The sarcoplasmic reticulum releases calcium ions into the sarcoplasm. The liberated calcium ions combine with troponin causing it to push tropomyosin away from the receptor sites on the actin filaments. The myosin crossbridges interact with the actin receptor sites and pull the actin myofilaments toward the centre (H-zone) of each sarcomere.
- The bond between the myosin crossbridges and actin breaks down under the influence of enzymes and the crossbridges are then free to rejoin with other actin receptor sites. The actin filaments do not shorten but slide past the myosin filaments overlapping them so that the Z lines are drawn toward each other, shortening the sarcomere. As each sarcomere shortens the whole muscle fibre contracts.
- Relaxation of the muscle fibres occurs when the calcium ions are actively reabsorbed by the sarcoplasmic reticulum thus allowing troponin and tropomyosin to again inhibit the interaction of the actins and myosin filaments.

I.4 Anatomy and Physiology of respiratory system

Definitions: is the system that brings oxygen into the body and removes carbon dioxide and other gases (breathing/respiration).

- Breathing consists of two phases, inspiration and expiration
 - ✓ Inspiration- the process of taking in air (O₂)
 - ✓ Expiration- the process of blowing out air (CO₂)
- **Respiration can be classified as**
 - ✓ **External respiration:** gas exchange between air and blood (what can be exposed to the outside of the body)
 - ✓ **Internal respiration:** gas exchange between blood and tissues (what cannot be exposed to the outside of the body)
 - ✓ **Cellular respiration:** oxygen used to produce ATP (energy) and carbon dioxide
- **General Functions of the Respiratory System is :-**
 - ✓ Air Distributor
 - ✓ Gas exchanger

Page 49 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

- ✓ Filters, warms, and humidifies air
- ✓ Influences speech
- ✓ Allows for sense of smell

Organs in the Respiratory System

Table 1.4 organs of the respiratory system

STRUCTURE	FUNCTION
nose / nasal cavity	warms, moistens, & filters air as it is inhaled
pharynx (throat)	passageway for food and air-leads to trachea
larynx	the voice box, where vocal chords are located
trachea (windpipe)	keeps the windpipe "open" trachea is lined with fine hairs called <i>cilia</i> which filter air before it reaches the lungs(larynx to bronchi)
bronchi	two branches at the end of the trachea, each lead to a lung
bronchioles	a network of smaller branches leading from the bronchi into the lung tissue & ultimately to air sacs
alveoli	the functional respiratory units in the lung where gases are exchanged

Divisions of the Respiratory System

I. Upper respiratory tract (outside thorax)

Nose/Nasal Cavity

- located between the roof of the mouth and the cranium,
- Are the two spaces known as the nasal cavities.
- These two spaces are separated from each other by a partition called nasal septum.

Sinuses

- These are air-filled spaces within the skull bones
- Serve to reduce weight of the skull and give your voice a certain tone

Pharynx

- Carries air into the respiratory tract and foods and liquids into the digestive system.
- The Upper portion located immediately behind the nasal cavity is called the ***nasopharynx***
- The middle section located behind the mouth is called the ***oropharynx***, and the lowest portion is called the ***laryngeal pharynx***.
- This last section opens into the larynx toward the front and into the oesophagus toward the back.

Larynx

- Is located between the pharynx and the trachea.
- It has a framework of cartilage that protrudes in the front of the neck and sometimes is referred to as the Adam's apple.
- The larynx is considerably larger in the male than in the female; hence, the Adam's apple is much more prominent in the male.
- At the upper end of the larynx are the vocal cords, which serve in the production of speech.
- A difference in the size of the larynx is what accounts for the difference between the male and female voices; because a man's larynx is larger than a woman's, his voice is lower in pitch.
- The nasal cavities, the sinuses, and the pharynx all serve as resonating chambers for speech

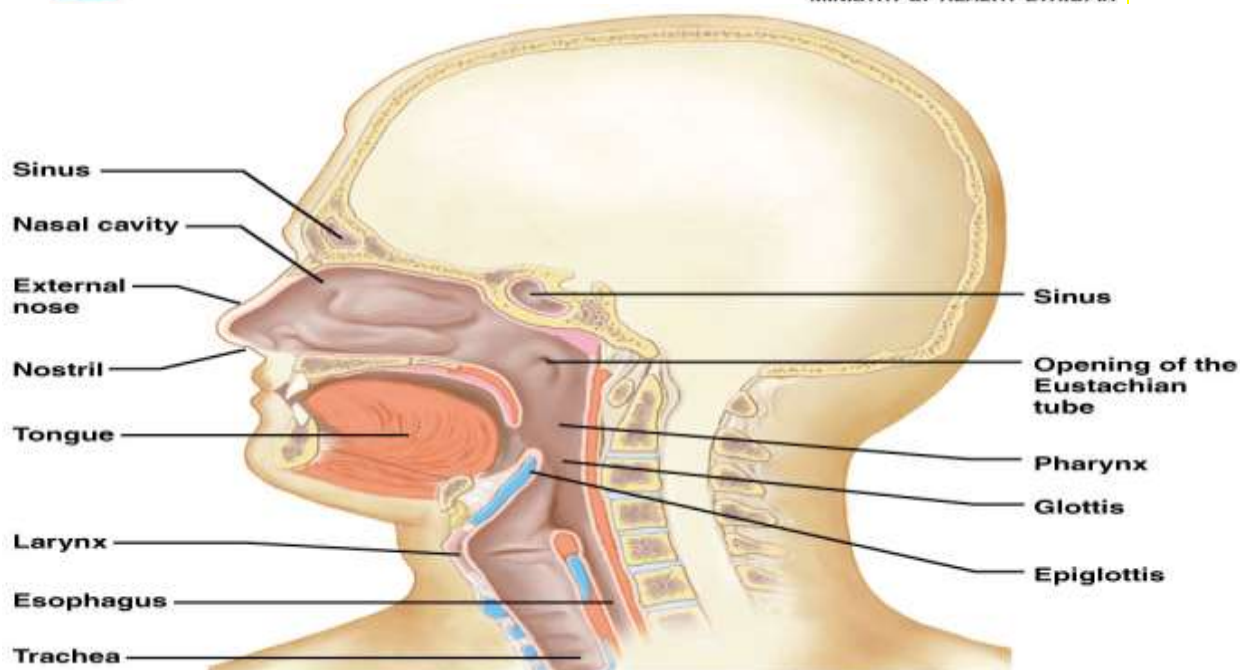


Figure 1.4.1 Components of upper respiratory tract

Function of Upper Respiratory Tract

- Passageway for respiration
- Receptors for smell
- Filters incoming air to filter larger foreign material
- Moistens and warms incoming air
- Resonating chambers for voice (voice box)

2. Lower respiratory tract (within thorax)

Trachea

- Is a tube that extends from the lower edge of the larynx to the upper part of the chest above the heart.
- It has a framework of cartilages to keep it open.
- These cartilages, shaped somewhat like a tiny horseshoe or the letter C, are found along the entire length of the trachea.
- All the open sections of these cartilages are at the back so that the esophagus can bulge into this section during swallowing.

Page 52 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	--	--	--

- The purpose of the trachea is to conduct air between the larynx and the lungs.

Bronchial Tree

- Includes **Bronchi** and **Bronchioles**
- The right bronchus is considerably larger in diameter than the left and extends downward in a more vertical direction.
- Therefore, if a foreign body is inhaled, it is likely to enter the right lung.
- Each bronchus enters the lung at a notch or depression called the **hilus** or **hilum**.
- The blood vessels and nerves also connect with the lung in this region.
- The bronchi subdivide again and again, forming progressively smaller divisions called bronchioles
- At the end of each of the smallest subdivisions of the bronchial tree there is the millions of sacs called alveolus, which is the place where gas exchange take place.

Lungs

- Are the organs in which external respiration takes
- Are two in number(right and left) which are located on each side
 - ✓ Are Extend from diaphragm to clavicles
- Are cone-shaped organs
- Divided into lobes by fissures:-
 - ✓ Right lung has three lobes and the left lung has two lobes
- The membranes surrounding the lungs is called the pleura
- **Components of the Lower Respiratory Tract**

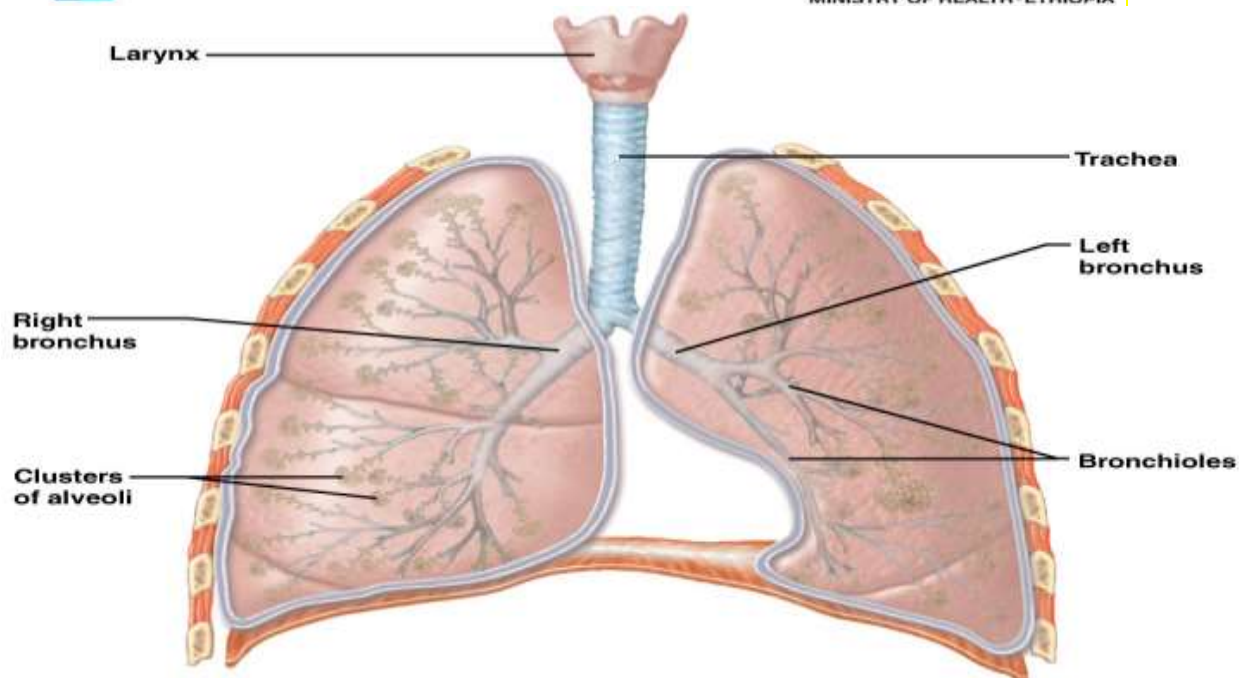


Figure 1.4.2 Components of the Lower Respiratory Tract

Functions of lower respiratory tract

Larynx: maintains an open airway, routes food and air appropriately, assists in sound production

Trachea: transports air to and from lungs

Bronchi: branch into lungs

Lungs: transport air to alveoli for gas exchange

Alveoli: Gas exchange occurs

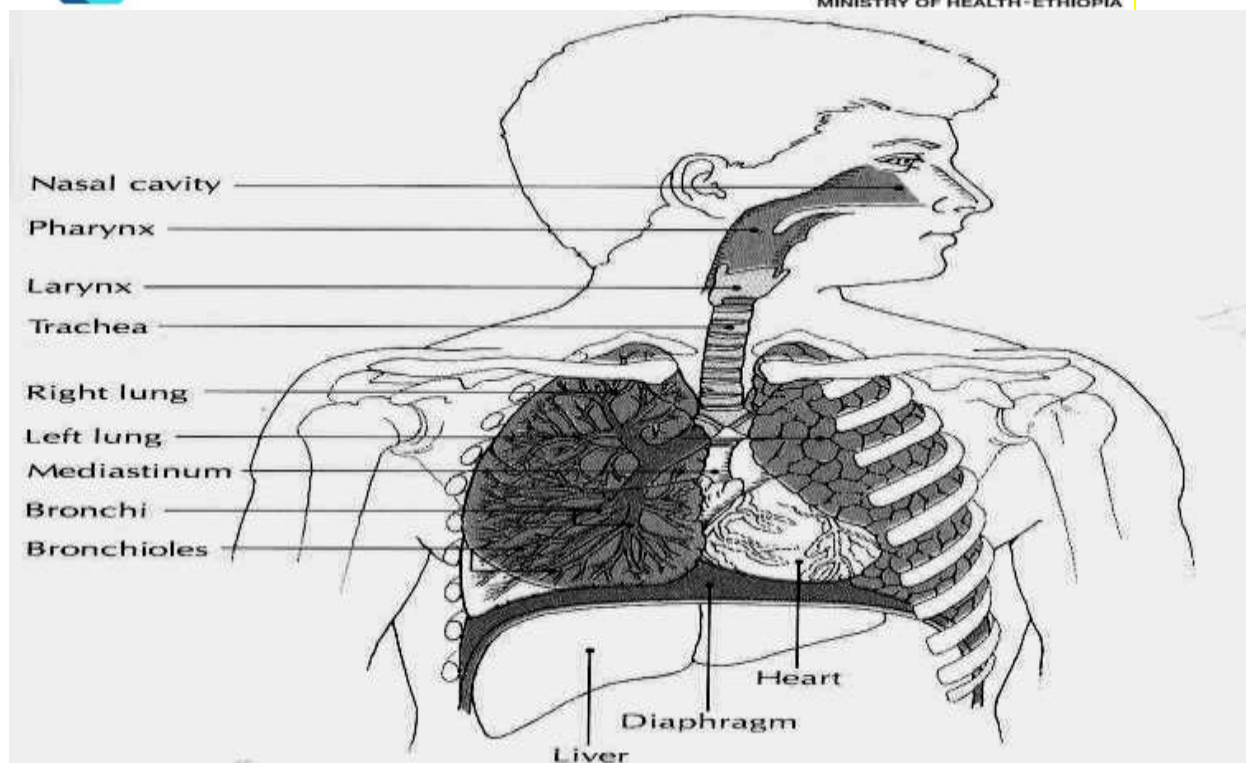


Figure 1.4.3 Components of Respiratory system

Exchange of gases (ventilation)

- **Ventilation:** - the movement of air into and out of the lungs, as in breathing.
- There are two phases of ventilation

1. **Inhalation** is the drawing of air into the lungs

It is characterized by:

- ✓ increase size in thorax
- ✓ Chest expand
- ✓ Diaphragm contract and flattened
- ✓ Intercostals muscles contract
- ✓ Sternum raised
- ✓ Abdominal muscle relaxed

2. **Exhalation** is the expulsion of air from the lungs

It is characterized by:

Page 55 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
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- ✓ decrease size in thorax
- ✓ Chest relax
- ✓ Diaphragm relax
- ✓ Intercostals muscles relax
- ✓ Sternum lowered
- ✓ Abdominal muscle contracted

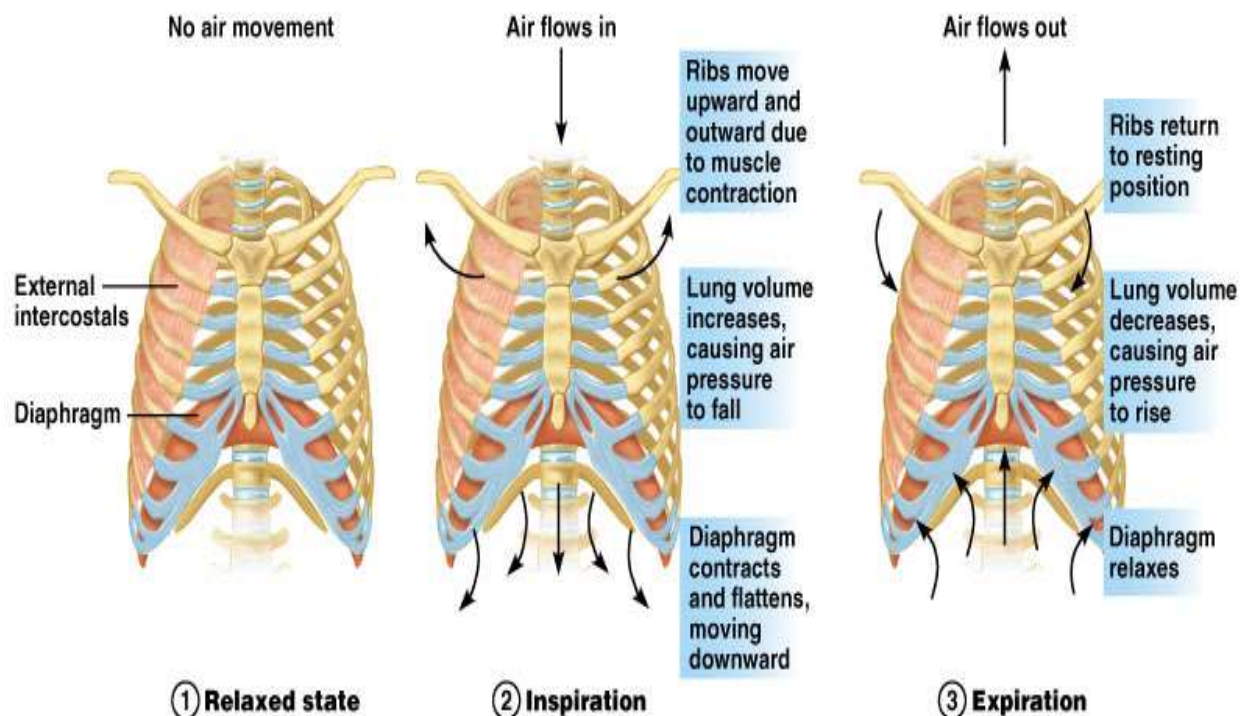


Figure 1.4.4 Comparison b/n the two phases

Respiratory volumes

- **Tidal volume;** The amount of air moved into or out of the lungs in quiet, relaxed breathing
 - ✓ **Average value-** 500 cc
- **Vital capacity:** The volume of air that can be expelled from the lungs by maximum exhalation following maximum inhalation
 - ✓ **Average value-** 4800 cc

- **Residual volume:** The volume of air that remains in the lungs after maximum exhalation
✓ **Average value-** 1200 cc
- **Total lung capacity-**The total volume of air that can be contained in the lungs after maximum inhalation
✓ **Average value** -6000 cc
- **Functional residual capacity:** The amount of air remaining in the lungs after normal exhalation
✓ **Average value** -2400

Regulation of respiration

- Regulation of respiration depends primarily on the respiratory control centers located in the **medulla and pons of the brain stem**.
- Nerve impulses from the medulla are modified by the centers in the pons.
- Respiration is regulated so that the levels of **oxygen, carbon dioxide, and acid** are kept within certain limits.
- The control centers regulate the **rate, depth, and rhythm** of respiration.
- From the respiratory center in the medulla, motor nerve fibers extend into the spinal cord.
- From the cervical (neck) part of the cord, these nerve fibers continue through the phrenic nerve to the diaphragm.
- The diaphragm and the other muscles of respiration are voluntary in the sense that they can be regulated by messages from the higher brain centers, notably the cortex.
- It is possible for a person to deliberately breathe more rapidly or more slowly or to hold his breath and not breathe at all for a time.
- The chemo receptors are found in structures called the carotid and aortic bodies, as well as outside the medulla of the brain stem.
- The carotid bodies are located near the bifurcation of the common carotid arteries, while the aortic bodies are located in the aortic arch.

Page 57 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
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- These bodies contain many small blood vessels and sensory neurons, which are sensitive to decreases in oxygen supply as well as to increases in carbon dioxide and acidity (H^+).
- Impulses are sent to the brain from the receptors in the carotid and aortic bodies.

The receptor cells outside the medulla are affected by the concentration of hydrogen ion in cerebrospinal fluid (CSF) as determined by the concentrations of carbon dioxide in the blood

I.5 Anatomy and Physiology of Digestive System

Definition: - is the system that allows your body to obtain substances required to sustain life.

The digestive system is used for breaking down food into nutrients which then pass into the circulatory system and are taken to where they are needed in the body.

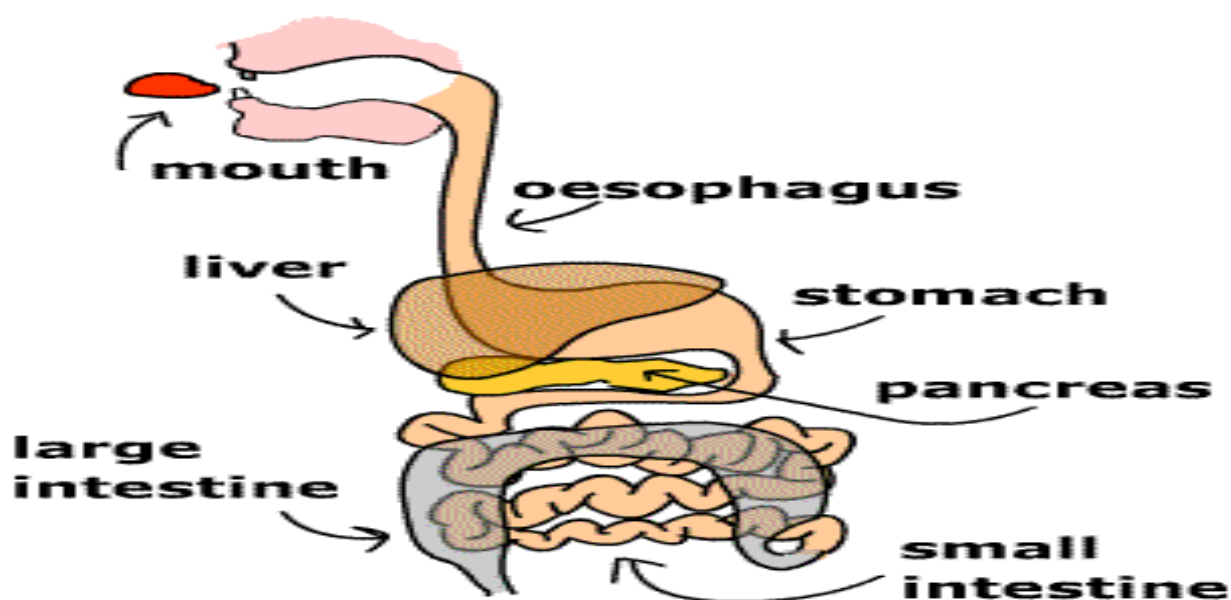


Figure I.5.1 the digestive system

General Function

- **Ingestion** is the introduction of solid or liquid food into the mouth/stomach.
- **Mastication** is the process by which food taken into the mouth and chewed by the teeth.
- **Propulsion** in the digestive tract is the movement of food from one end of the digestive tract to the other

Page 58 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	--	--	--

- **Secretion:** As food moves through the digestive tract, secretions are added to lubricate, liquefy, and digest the food.
- **Digestion** is the breakdown of large organic molecules into their component parts: carbohydrates into monosaccharide's, proteins into amino acids, and triglycerides into fatty acids and glycerol.
- **Mechanical digestion** which involves **mastication** and **mixing** of food, and **chemical digestion**, break down/hydrolyze of complex food macromolecules into molecules small enough to be absorbable occurs in the mouth, stomach and small intestine
- **Absorption** is the movement of molecules out of the digestive tract and into the circulation or into the lymphatic system.
- **Elimination/egestion** is the process by which the waste products of digestion are removed from the body.

Division of digestive system

Based on purpose the digestive system may be divided into two groups of organs:

The **digestive tract/organs**-a continuous passageway beginning at the mouth, where food is taken in, and terminating at the anus e.g. mouth, esophagus, stomach, small intestine, large intestine and rectum

The **accessory organ**, which are necessary for the digestive process but are not a direct part of the digestive tract. They release substances into the digestive tract through ducts e.g. Liver, gall bladder, and pancreas

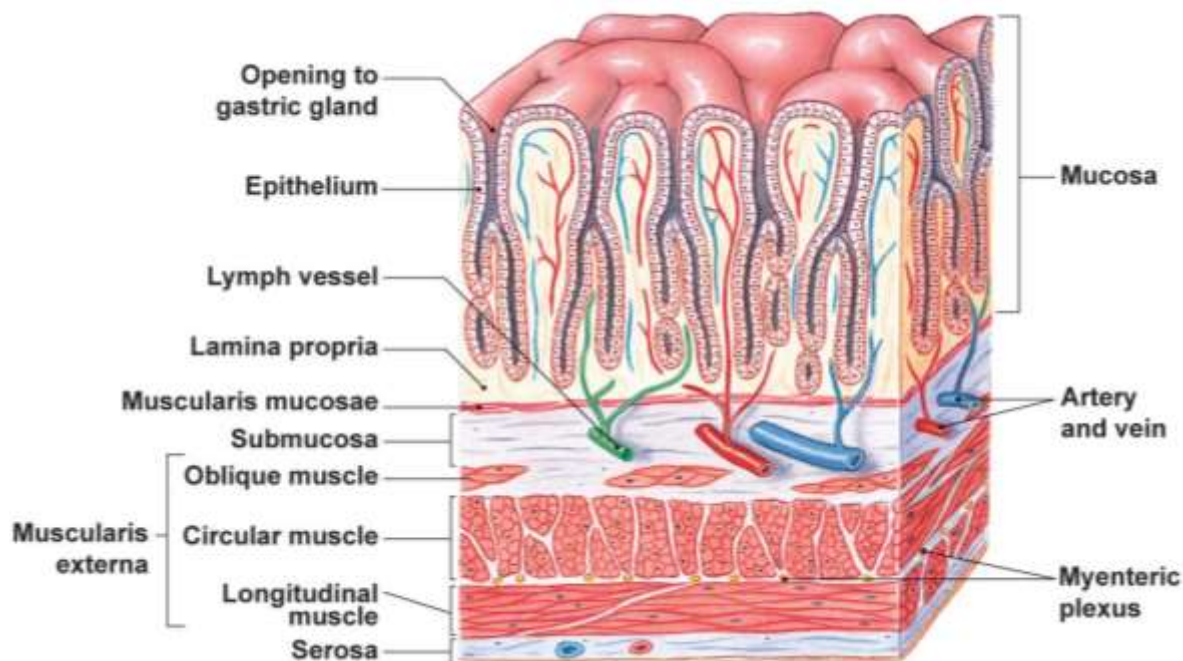


Figure 1.5.2 Layers of the Alimentary Canal Wall

Peritoneum

The abdominal cavity is lined with a thin, shiny serous membrane that also covers most of the abdominal organs called **peritoneum**. The portion of this membrane that lines the abdomen is called the **parietal peritoneum**; that covering the organ is called the **visceral peritoneum**. In addition to these single layered portions of the peritoneum there are a number of double-layered structures that carry blood vessels, lymph vessels, and nerves, and sometimes act as ligaments supporting the organs which is called **mesentery plexus**

The Digestive Tract

The digestive tract includes:-

- mouth,
- pharynx,
- esophagus,
- stomach,

Page 60 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	--	--	--

- small intestine, and
- Large intestine.
- The digestive tract is sometimes called the **alimentary tract**, derived from a Latin word that means "food".
- It is more commonly referred to as the **gastrointestinal** (GI) tract because of the major importance of the stomach and intestine in the process of digestion.

N.B discuss in detail about each digestive tract listed above.

The Accessory Structures

The Liver

The liver, often referred to by the word root *hepat*, is the largest glandular organ of the body. It is located in the upper right portion of the abdominal cavity under the dome of the diaphragm. The lower edge of a normal-sized liver is level with the lower margin of the ribs. The human liver is the same reddish brown color as the animal liver. It has a large right lobe and a smaller left lobe; the right lobe includes two inferior smaller lobes. The liver is supplied with blood through two vessels: the portal vein and the hepatic artery. These vessels deliver about 1 1/2 quarts of blood to the liver every minute. The hepatic artery carries oxygenated blood, whereas the portal system of veins carries blood that is rich in the end products of digestion.

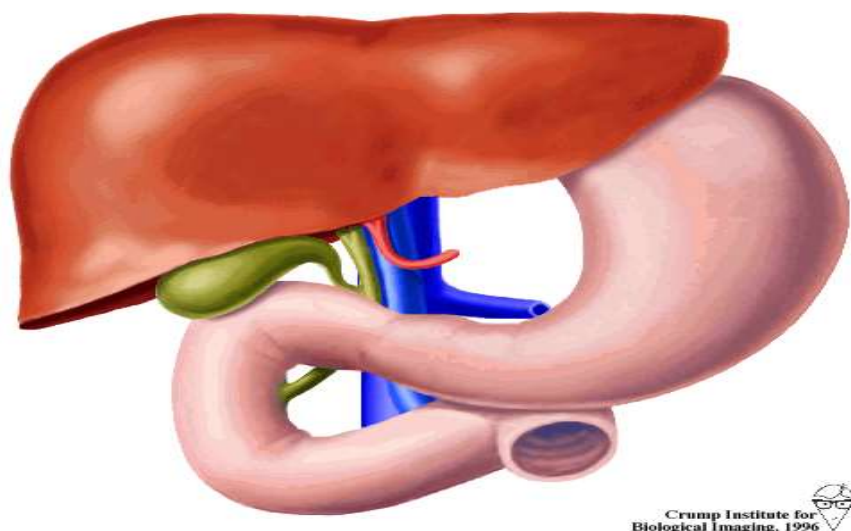
Function of liver

- ✓ production of bile
- ✓ Storage of glucose - glycogen
- ✓ storage of vitamins, B12, A, D, E, K
- ✓ Erythrocytolysis (pigment released eliminated in bile called bilirubin)-destruction of old red blood cells
- ✓ bilirubin gives stool its characteristic dark color
- ✓ removes toxins from blood
- ✓ manufactures blood proteins such as albumin, globulins, and clotting factors
- ✓ The synthesis of urea, a waste product of protein metabolism
- ✓ The main digestive function of the liver is the production of **bile**.

Page 61 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	--	--	--

- ✓ The salts contained in bile act like a detergent to emulsify fat, that is, to break up fat into small droplets that can be acted on more effectively by digestive enzymes.
- ✓ Bile also aids in the absorption of fat from the small intestine.
- ✓ Bile leaves the lobes of the liver by two ducts that merge to form the common hepatic duct.
- ✓ After collecting bile from the gallbladder, this duct, now called common bile duct, delivers bile into the duodenum

Figure 1.5.3 Structure of liver



The Gallbladder

Is a muscular sac on the inferior surface of the liver that serves as a storage pouch for bile. When chyme enters the duodenum, the gallbladder contracts, squeezing bile through the cystic duct and into the common bile duct leading to the duodenum.

The Pancreas

Is a long gland that extends from the duodenum to the spleen. The pancreas produces enzymes that digest fats, proteins, carbohydrates, and nucleic acids. The protein digesting enzymes are produced in inactive forms, which must be converted to active forms in the small intestine by other enzymes. The pancreas also produces large amounts of alkaline fluid, which neutralizes the chyme in the small intestine, thus protecting the lining of the digestive tract. These juices

Page 62 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

collect in a main duct that joins the common bile duct or empaticities into the duodenum near the common bile duct. Most persons also have an additional smaller duct that opens into the duodenum. In some cases of gallbladder disease, infection may extend to the pancreas and cause abnormal activation of the pancreatic enzymes. In either circumstance, the pancreas suffers destruction by its own juice, and the outcome can be fatal; this condition is known as acute pancreatitis. The pancreas also functions as an endocrine gland, producing the hormones **insulin** and **glucagons** that regulate sugar metabolism. These secretions of the islets cells are released directly into the blood.

Digestion and Absorption of Carbohydrates, Fats, and Proteins

Digestion

Is a complex process that occurs in the alimentary canal, consists of **physical** and **chemical** changes that prepare food for absorption.

Mechanical digestion breaks food into tiny particles, mixes them with digestive juices, moves them along the alimentary canal, and finally eliminates the digestive wastes from the body. **e.g.** Chewing or mastication, swallowing or deglutition, peristalsis, and defecation are the main processes of mechanical digestion.

Chemical digestion

Breaks down large, non-absorbable food molecules—molecules that are able to pass through the intestinal mucosa into blood and lymph.

Chemical digestion consists of numerous chemical reactions catalyzed by enzymes in saliva, gastric juice, pancreatic juice, and intestinal juice

Chemical Digestion

Digestive juices and enzyme-substance Digested (or hydrolyzed) -Resulting

Products*

- **Saliva-** Amylase-Starch (Polysaccharide)-Maltose (disaccharide)
- **Gastric Juice** -protease (Pepsin) plus hydrochloric acid -Proteins Partially digested proteins

Page 63 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

- **Pancreatic Juice** -Protease (trypsin) and Lipase-Proteins (intact or partially digested Peptidases) Fats emulsified by bile-Fatty acids, amino acids and glycerol
- **Pancreatic Juice**-Amylase-Starch-Maltose
- **Intestinal Juice**-Peptidases-Peptidases-Amino acids
- **Intestinal Juice**-Sucrase- Sucrose (cane sugar)-Glucose and fructose(simple sugars)
- **Intestinal Juice**-Lactase- Lactase (Milk sugar)-Glucose and galactose
- **Intestinal Juice**-Maltase-Maltase (malt sugar)-(Simple sugars Glucose

Carbohydrate Digestion

Very little digestion of carbohydrates (starches and sugars) occurs before food reaches the small intestine. Salivary amylase usually has little time to do its work because so many of us swallow our food so fast. Gastric juice contains **no** carbohydrate-digesting enzymes. But after the food reaches the small intestine, pancreatic and intestinal juice enzymes digest the starches and sugars. A pancreatic enzyme (amylase) starts the process by changing starches into a double sugar, namely, maltose. Three intestinal enzymes—**maltase**, **sucrase**, and **lactase**—digest double sugars by changing them into simple sugars, chiefly glucose (dextrose). Maltase digests maltose (malt sugar), sucrase digests sucrose (ordinary cane sugar), and lactase digests lactose (milk sugar). The end product of carbohydrate digestion is the so-called simple sugar; the most abundant is **glucose**.

Protein Digestion

Its digestion starts in the stomach. Two enzymes (**renin** and **pepsin**) in the gastric juice cause the giant protein molecules to break up into somewhat simpler compounds. *Pepsinogen*, a component of gastric juice, is converted into active pepsin enzyme by hydrochloric acid (also in gastric juice). In the intestine, other enzymes (trypsin in the pancreatic juice and peptidases in the intestinal juice) finish the job of protein digestion. Every protein molecule is made up of many amino acids joined together. When enzymes have split up the large protein molecule into its separate amino acids, protein digestion is completed.

Fat Digestion

Page 64 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

Very little carbohydrate and fat digestion occurs before food reaches the small intestine. Most fats are undigested until after emulsification by bile in the duodenum (that is, fat droplets are broken into very small droplets). After this takes place, pancreatic lipase splits up the fat molecules into end products fatty acids and glycerol (glycerine).

Absorption

Is the process by which molecules of amino acids, glucose, fatty acids, and glycerol goes from the inside of the intestines into the circulating fluids of the body. Structural adaptations of the digestive tube, including folds in the lining mucosa, villi, and micro villi, increase the absorptive surface and the efficiency and speed of transfer of materials from the intestinal lumen to body fluids.

Regulation of the Digestive System

Both nervous and chemical mechanisms regulate the movement, secretion, absorption, and elimination processes digestive system.

Some of the nervous control is local, occurring as the result of local reflexes within the **enteric plexus**, and some is more general, mediated largely by the **parasympathetic** division of the ANS through the vagus nerve. The digestive tract produces a number of **hormones**, such as gastrin, secretin, and others, which are secreted by endocrine cells of the digestive system and carried through the circulation to target organs of the digestive system or to target tissues in other systems. These hormones help regulate many gastrointestinal tract functions as well as the secretions of associated glands such as the liver and pancreas.

I.6 Anatomy and Physiology of Cardiovascular System

The Heart: - Is a cone-shaped organ about the size of a loose fist.

The cardiovascular system consists of heart and blood vessels

- The heart pumps blood
- Blood vessels allow blood to circulate to all parts of the body

The function of the cardiovascular system is

- To deliver oxygen and nutrients and to remove carbon dioxide and other waste products

Page 65 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

- Heart is bordered:
 - ✓ Laterally by the lungs
 - ✓ Posteriorly by the vertebral column
 - ✓ Anteriorly by the sternum
 - ✓ Rests on the diaphragm inferiorly

Coverings of the Heart

Human heart is covered by the membrane called pericardium.

Pericardium

- Covers the heart and large blood vessels attached to the heart
- Pericardium has two Layers
- **Visceral pericardium**
 - ✓ Innermost layer
 - ✓ Directly on the heart
- **Parietal pericardium**
 - ✓ Layer on top of the visceral pericardium
- There is the space between these layers of pericardium which is called **pericardium space/cavity** which are filled with fluid.

The Function of the Pericardium

- The Function of the Pericardium is to :-
 - ✓ Protects and anchors the heart
 - ✓ Prevents overfilling of the heart with blood
 - ✓ Allows for the heart to work in a relatively friction-free environment

Heart Wall

The wall of human heart has three layers as follow:-

- **Epicardium**
 - ✓ Outermost layer
 - ✓ Fat to cushion heart
- **Myocardium**

Page 66 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

- ✓ Middle layer
- ✓ Primarily cardiac muscle
- **Endocardium**
 - ✓ Innermost layer
 - ✓ Thin and smooth
 - ✓ Stretches as the heart pumps

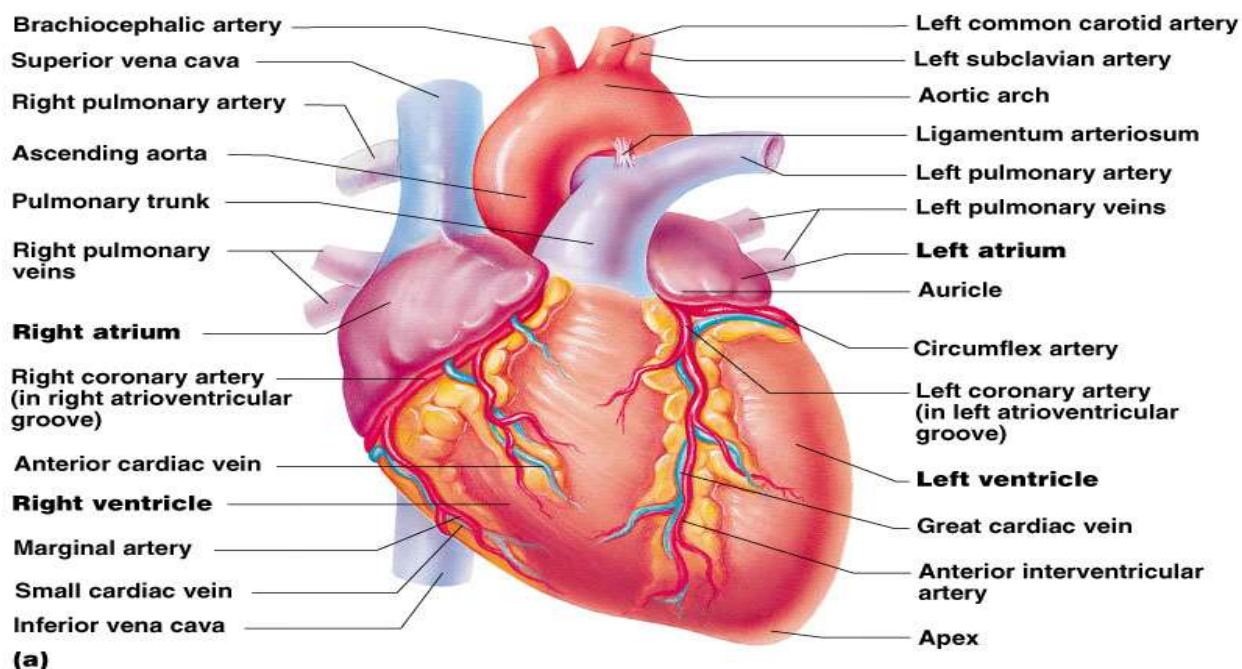


Figure 1.6.1 External Heart Anatomy

Two sides of Heart and a Partition

Human heart has two parts:

- A. Right side
- B. Left side

This sides of heart are separated from each other by a partition called the **septatentum**. The upper part of this partition is called **interatrial septatentum**. While the larger the lower portion is called **interventricular septatentum**. The septatentum, like the heart wall, consists largely of myocardium.

Chambers of heart

Page 67 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	--	--	--

The heart has four chambers namely:-

Two atriums/ upper chambers: Receiving chambers

Right atrium-receive deoxygenated blood from coronary sinus, superior and inferior vena cava

Left atrium-receive oxygenated blood from pulmonary vein.

Two ventricles/ lower chambers

Discharging chambers

Right ventricle-pumps deoxygenated blood to pulmonary artery

Left ventricle-pumps oxygenated blood to aorta

Ventricles of the Heart

Ventricles are the discharging chambers of the heart

Human heart has two ventricles which made up of **papillary muscles** and **trabeculae carneae** muscles which mark ventricular walls

1. **Right ventricle** pumps blood into the pulmonary trunk/artery
2. **Left ventricle** pumps blood into the aorta

There main function is to pump the blood into lung and whole parts of body.

Chambers Myocardial Thickness and Function

Atria are thin walled, deliver blood to adjacent ventricles

Ventricle walls are much thicker and stronger

- right ventricle supplies blood to the lungs (little flow resistance)
- left ventricle wall is the thickest than right ventricle to supply systemic circulation

The Valves of Heart

- Are allow blood to flow in only one direction/unidirection.
- The human heart have four valves

Two Atrioventricular (entrances) valves– between atria and ventricles

- Bicuspid valve (left)
- Tricuspid valve (right)

Two Semi lunar (exit) valves between ventricle and artery

Page 68 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

- Pulmonary semilunar valve
- Aortic semilunar valve

Functions of heart valves

- **Tricuspid valve** – prevents blood from flowing back into the right atrium when the right ventricle contracts
- **Bicuspid (mitral) valve** – prevents blood from flowing back into the left atrium when the left ventricle contracts
- **Pulmonary semilunar valve** – prevents blood from flowing back into the right ventricle
- **Aortic semilunar valve** – prevents blood from flowing back into the left ventricle

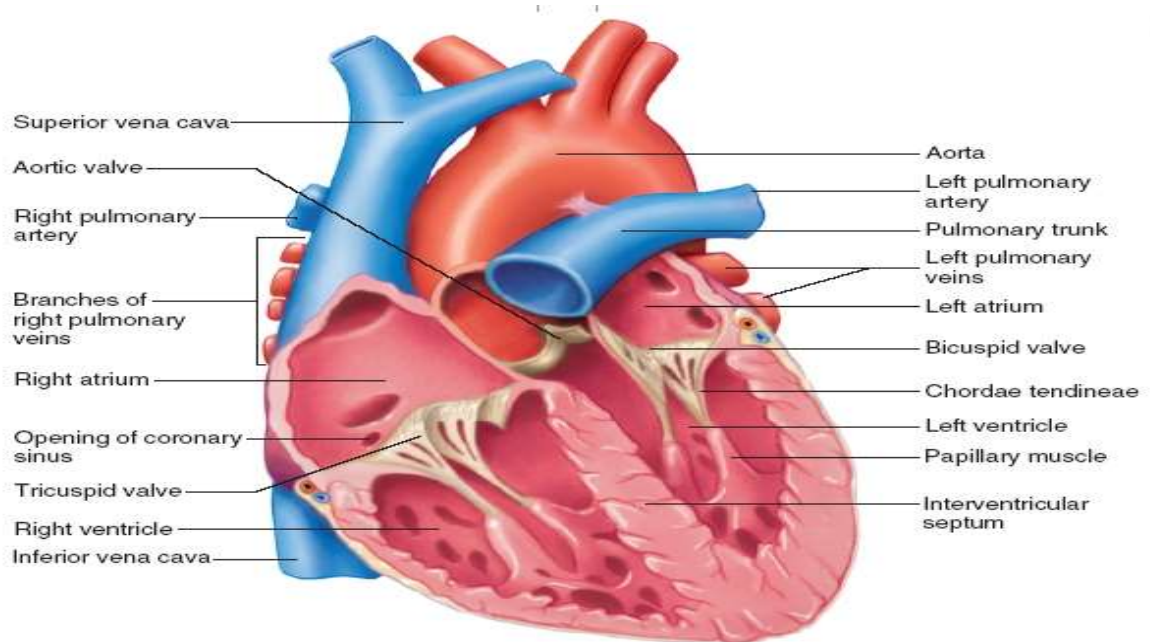


Figure 1.6.2 Blood Supply to the Myocardium

- The myocardium must have its own blood vessels to provide oxygen and nourishment and to remove waste products.
- The arteries that supply blood to the muscle of the heart are called the **right** and **left coronary arteries**.

Page 69 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	--	--	--

- These arteries, which are the first branches of the aorta, arise just above the aortic semilunar valve.
- They receive blood when the heart relaxes. After passing through capillaries in the myocardium, blood drains into the cardiac veins and finally into the coronary (venous) sinus for return to the right atrium.

Physiology of the Heart

Although the right and left side of the heart are separated from each other, they work together. The blood is squeezed through the chambers by a contraction of heart muscle beginning in the thin-walled upper chambers, the atria, followed by a contraction of the thick muscle of the lower chambers, the ventricles. This active phase is called **systole**, and in each case it is followed by a resting period known as **diastole**. The contraction of the walls of the atria is completed at the time the contraction of the ventricles begins. Thus, the resting phase (diastole) begins in the atria at the same time as the contraction (systole) begins in the ventricles. After the ventricles have emptied, both chambers are relaxed for a short period of time as they fill with blood.

Cardiac cycle

- **Cardiac cycle** refers to all events associated with blood flow through the heart
- Cardiac cycle is the sequence of events as blood enters the atria, leaves the ventricles and then starts over
- Cardiac Cycle is alternating periods of systole and diastole
- Each cycle takes an average of 0.8 seconds.
 - ✓ **Systole** – contraction of heart muscle
 - ✓ **Diastole** – relaxation of heart muscle

One heartbeat = one cardiac cycle

- ✓ Atria contract and relax
- ✓ Ventricles contract and relax

Heart Sounds

Are sounds produced associated with closing of heart valves (**lub** and **dub**)

Page 70 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

One cardiac cycle – two heart sounds

1. **First sound(lub)** occurs as AV valves close and signifies beginning of systole (contraction)
 - ✓ When the ventricles contract, the tricuspid and bicuspid valves snap shut (systole)
 - ✓ Shorter than second sound
2. **Second sound (dub)** occurs when SL valves close at the beginning of ventricular diastole (relaxation)
 - ✓ When the atria contract and the pulmonary and aortic valves snap shut
 - ✓ Is longer and sharper.

Some abnormal sounds called **murmurs** are usually due to faulty action of the valves. For example, if the valves fail to close tightly and blood leaks back, a murmur is heard. Another condition giving rise to an abnormal sound is the narrowing (stenosis) of a valve opening.

The many conditions that can cause abnormal heart sounds include congenital defects, disease, and physiological variations.

A murmur due to rapid filling of the ventricles is called a **functional (flow) murmur**; **such a murmur is not abnormal.**

An abnormal sound caused by any structural change in the heart or the vessels connected with the heart is called an **organic murmur.**

Blood vessels and circulation

- Is a closed pathway that carries blood from the heart to cells and back to the heart
- Blood vessels have three layers

Three layers (tunics)

1. Tunic intima
 - Endothelium
 - Inner layer of vessels
2. Tunic media
 - Smooth muscle

Page 71 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

- Controlled by sympathetic nervous system
- Middle layer of the vessels

3. Tunic externa

- Mostly fibrous connective tissue
- Outer layer of vessels

Types of blood vessel

1. Arteries
2. Arterioles
3. Capillaries
4. Venules
5. Veins

N.B Discuss in detail about the types of blood vessels in your notes

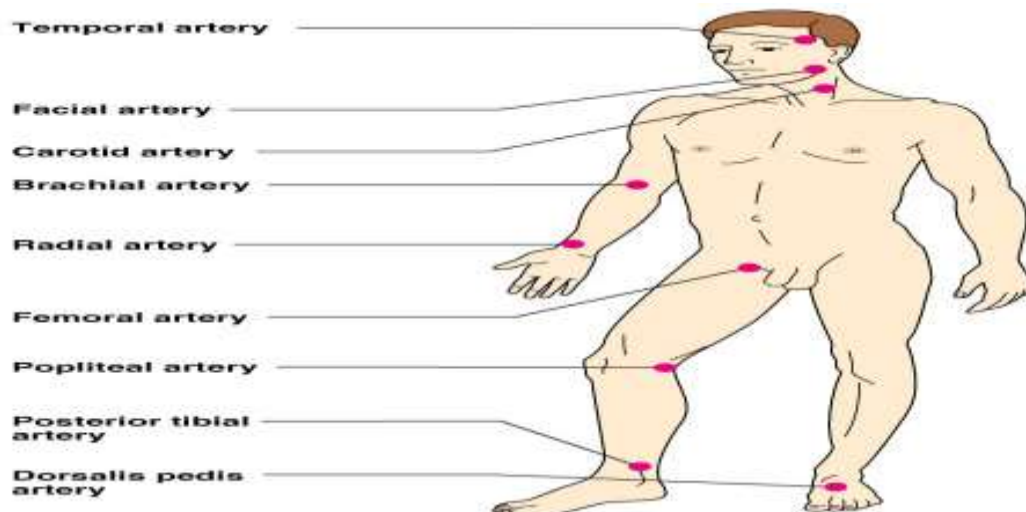


Figure I.6.3 Common artery area of the body

I.7 Anatomy and Physiology of Genitourinary System

The system that removes and eliminates waste products from the body. Is also called the excretory system of the body because of its functions to remove and eliminate waste products from the body

Page 72 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

- **Major functions of the urinary system**

- ✓ Excretion of wastes
- ✓ Hormonal production(rennin-angiotensin and erythropoietin)
- ✓ Acid base balancing

The urinary system consists of:

1. **Two kidneys:** this organ extracts wastes from the blood, balance body fluids and form urine.
2. **Two Ureters:** this tube conducts urine from the kidneys to the urinary bladder
3. **Urinary bladder:** this reservoir receives and stores the urine brought to it by the two ureters.
4. **Urethra:** this tube conducts urine from the bladder to the outside of the body for elimination.

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Urinary System

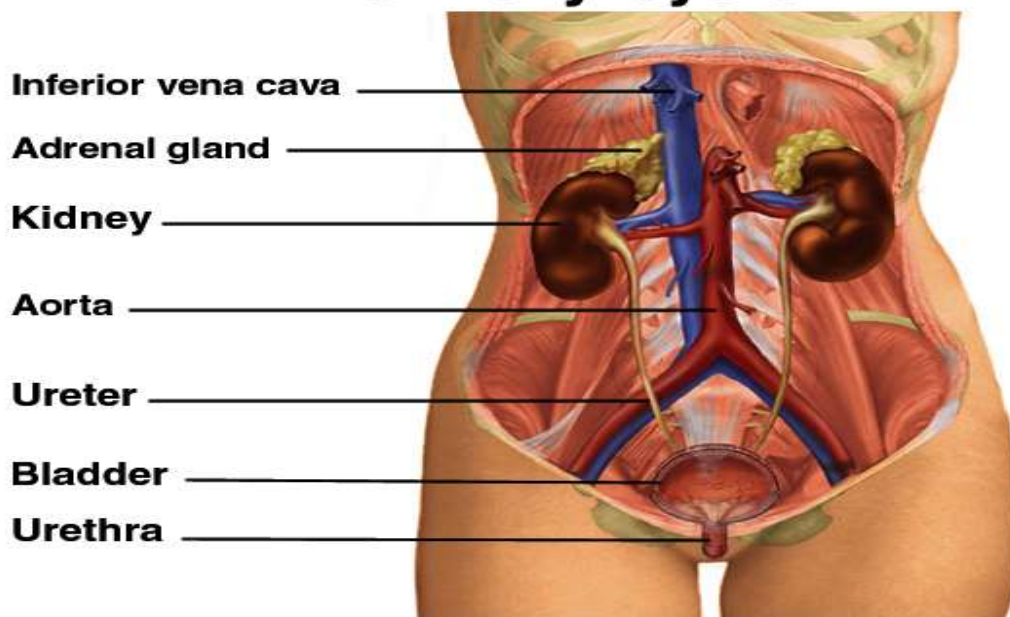


Figure 1.7.1 the external anatomy of kidney

The major functions of the kidneys

Includes:-

- Elimination of wastes

Page 73 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	--	--	--

- Regulation of total body water balance.
- Control of the chemical composition of the blood and other body fluid
- Control of acid base balance
- Filter blood plasma
- Regulate blood volume, pressure
- Regulate fluid osmolarity
- Synthesize calcitriol (Vitamin D)
- Detoxify free radicals, drugs
- Gluconeogenesis
- Secrete rennin
- Secrete erythropoietin (EPO)

Ureters

- It transport urine from the renal pelvis to the urinary bladder.
- 25-30 cm in length
- It pass between the parietal peritoneum and the
- body wall to the pelvic cavity, where they enter the pelvic cavity.
- It is narrow at the kidney and widen near the bladder.
- Peristalsis aids gravity in urine transport

Urinary bladder

- Is a hollow, muscular organ that collects urine from the ureters and store until(temporarily) it is excreted.
- It usually accumulates 300 to 400 ml of urine but it can expand as much twice.
- It is located on the floor of the pelvic cavity like the kidneys and ureters, It is **Retroperitoneal** (behind the peritoneum).
- In males it is anterior to the rectum and above the prostate gland.
- In females, it is located somewhat lower, anterior to the uterus and upper vagina.

Urethra

Page 74 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

- is a tube of smooth muscle lined with mucosal layer.
- It joins the bladder at its inferior surface and transport urine outside the body during urination.
- It is 4cm in female and 12-14cm in length in male.
- In females it opens between vagina and clitoris.
- In male it pass through prostate, membranous portion (pelvic diaphragm muscle), spongy portion (that pass through corpus spongiosus) and open at the tip of penis.

Urine & urination

- It is composed of mainly water, urea, chloride, potassium, sodium, creatinine, phosphate, sulfates and uric acid.
- Proteins, glucose, casts (decomposed blood) and calculi from minerals are abnormal if present in urine.
- The PH of urine is 5.0 to 8.0 (mostly acidic) and has translucent (clear, not cloudy) color.
- To excrete wastes and to maintain proper kidney function the body must excrete at least 450ml of urine per day.
- A healthy person excretes 1000 to 1800 ml of urine daily.

The volume and concentration of urine is controlled by:

- Antidiuretic hormone
- Aldosterone
- The Renin – angiotensin mechanism

Urination/micturition

- Is the process of emptying the bladder;
- it is the process of conscious and unconscious nerve control.

Steps of urination are:

- Conscious desire to urinate
- Pelvic diaphragm muscle relax

Page 75 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

- Urinary bladder neck Moves down, outlet Opens, wall stretch, and Receptors are stimulated
- Smooth muscle of Urinary bladder Contracts & urine ejects

I.8 Anatomy and Physiology of Endocrine System

Introduction to Endocrine System

The endocrine system is the second great **controlling system** of the body. Along with the nervous system, it acts to **coordinate** and **direct** the activities of the bodies' cells. It works by means of chemical messengers called **hormones**. **Glands** of body are composed predominantly of epithelial tissue, which used to secrete hormones

Table 1.8.1 Comparison of features of the endocrine system and nervous system

Feature	Endocrine system	Nervous system
Overall function	Maintain homeostasis	Maintain homeostasis
Control	Virtually all tissue	Muscles and glandular tissue only
Effectors cell	Target cells (throughout the body)	In muscle and glandular cells only
Chemical messenger	Hormone	Neurotransmitter
Secreted by	Glandular epithelial cells	Neurons
Distance travel	Long (by way of circulating blood)	Short (across microscopic synapse)
Speed & action duration	Slow to appear long lasting effect	Fast, short lived

Types of glands

- Endocrine:** its secretions have intracellular, but
- Exocrine glands:** its secretions have extra cellular effect

The **endocrine system** is a collection of glands whose function is to regulate multiple organs within the body to meet the growth and reproductive needs of the organism and respond to fluctuations within the internal environment, including various types of stress.

Hormones

Hormones are chemical messengers of the endocrine system which are released directly into the blood stream & carried to the tissue that they affect, called target tissues.

All hormones are extremely potent, i.e., they are effective in very small quantities.

Hormones chemically fall in two categories:

1. **Proteins:** - All hormones **exception** those of adrenal cortex & the sex glands are proteins.
2. **Steroids**:- are hormones derived from lipids & produced by the adrenal cortex & sex glands.

The blood reaches all cells of the body, but only certain cells respond to specific hormones; these responding cells are unique in that they have receptors to which the hormones attach. Only cells that have receptors for a given hormone will respond to that hormone; these cells make up what is called the **target tissue**.

The Endocrine Glands and Their Hormones

- The endocrine system consists of the glands that secrete hormones.
- Most endocrine glands, like exocrine glands, are made of epithelial tissue.
- Although they have no ducts, they have an extensive blood vessel network.
- pancreas and the sex glands, have other non-endocrine functions as well, but hormone secretion is one of their main functions

Glands of Endocrine System

The endocrine glands include

- the pituitary,
- thyroid,
- parathyroid,
- adrenal,
- pineal, and

Page 77 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

- Thymus glands
- pancreas and
- Gonads (ovaries and testes).

Some body organs, such as the stomach, small intestine, and kidney, produce hormones, but since their main function is not hormone production.

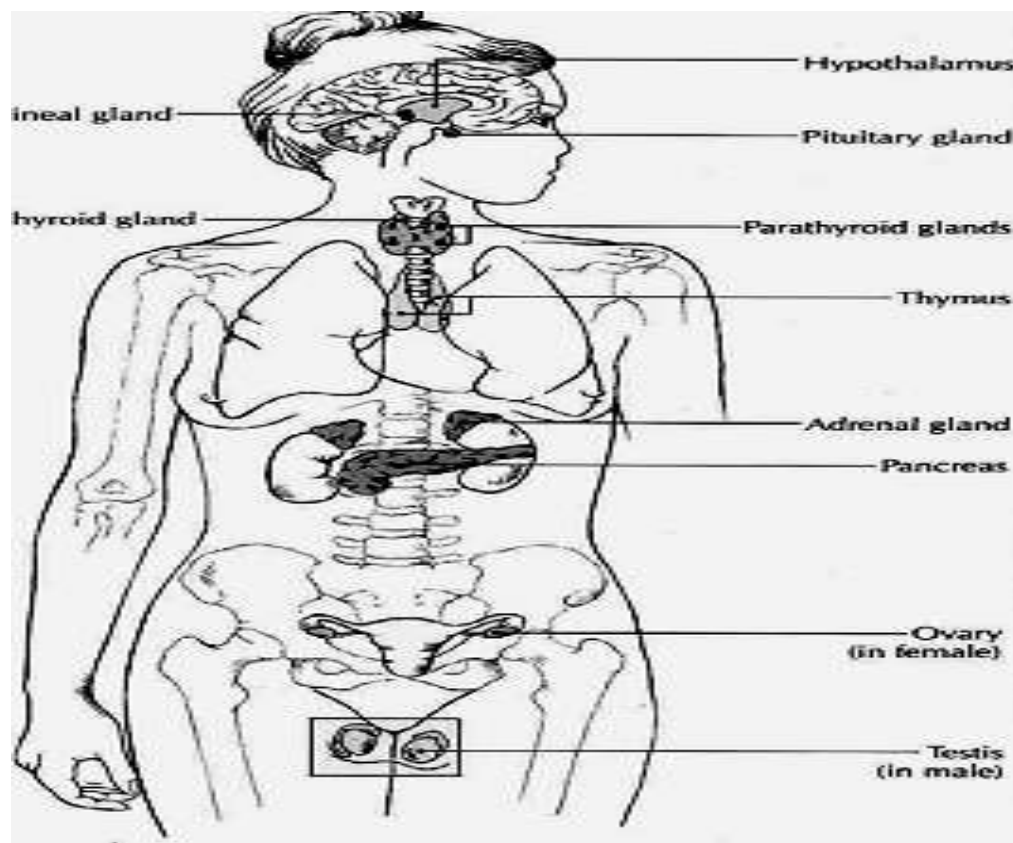


Figure 1.8.1 Different sites for endocrine glands

Table 1.8.2 Names and Abbreviations for Hormones

Abbreviation	Name	Source
ACTH	Adrenocorticotrophic hormone (corticotropin)	Anterior pituitary
ADH	Antidiuretic hormone (vasopressin)	Posterior pituitary

Page 78 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	--	--	--

ANP	Atrial natriuretic pepatientide	Heart
CRH	Corticotropin-releasing hormone	Hypothalamus
DHEA	Dehydroepiandrosterone	Adrenal cortex
EPO	Erythropoietin	Kidney, liver
FSH	Follicle-stimulating hormone	Anterior pituitary
GH	Growth hormone (somatotropin)	Anterior pituitary
GHRH	Growth hormone–releasing hormone	Hypothalamus
GnRH	Gonadotropin-releasing hormone	Hypothalamus
IGFs	Insulin-like growth factors (somatomedins)	Liver, other tissues
LH	Luteinizing hormone	Anterior pituitary
NE	Norepinephrine	Adrenal medulla
OT	Oxytocin	Posterior pituitary
PIH	Prolactin-inhibiting hormone (dopamine)	Hypothalamus
PRH	Prolactin-releasing hormone	Hypothalamus
PRL	Prolactin	Anterior pituitary
PATIENTH	Parathyroid hormone (parathormone)	Parathyroids

T3	Triiodothyronine	Thyroid
T4	Thyroxine (tetraiodothyronine)	Thyroid
TH	Thyroid hormone (T3and T4)	Thyroid
TRH	Thyrotropin-releasing hormone	Hypothalamus
TSH	Thyroid-stimulating hormone	Anterior pituitary

Pituitary Gland

- Also known as hypophysis and called *the master gland*
- Approximately size of 1.2 to 1.5 cm across, & weighs 0.5gm
- Located on the ventral surface of the brain, resting with in the sella turcica of the sphenoid bone.
- Hangs from the inferior surface of hypothalamus by **infundibulum** – stem-like stalk,
- It has two **separate divisions** called: Anterior and Posterior pituitary gland

Infundibulum

- It is stem-like stalk
- It neural & vascular connections between pituitary and hypothalamus,
- It plays a central role in the integration of neuroendocrine activity.

A. Anterior pituitary (Adenohypophysis)

It has no nerve connection to hypothalamus

- but is connected to it by complex of blood vessels called hypothalamo-hypophyseal portal system,
- Which transports hypothalamic regulating hormones to the glandular cells of adenohypophysis.
- The Anterior lobe basically secretes six hormones

Hormones of Anterior lobe

Page 80 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

- GH (Growth hormone) – stimulate growth of bones & muscles by accelerating amino acid transport into the cells.
- Also known as **somatotrophin** (STH)
- TSH (Thyroid Stimulating Hormone) – stimulates thyroid gland
- FSH (Follicle Stimulating Hormone) – Stimulate production of ova & sperm
- LH (Luteinizing Hormone) – Stimulates testosterone production in males & promotes maturation of ovarian follicles to secrete estrogen in females, w/c is responsible for ovulation & formation of corpus luteum.
- ACTH (Adreno Cortico Tropic hormone) -Stimulate Adrenal cortex
- Prolactin (PRL): stimulates milk secretions in the breast of a lactating mother

B. Posterior pituitary (Neurohypophysi)

- Release hormone made by the hypothalamus
- Nerve fibers arise from cell bodies in the hypothalamus & end in the posterior lobe bundle – hypothalamo hypophyseal tract
- Serve as storage & release site for anti – diuretic hormone (ADH) &
- Oxytocin (OT) in to blood stream, which is controlled by nervous stimulation

Hormones

- **ADH**- prevent large volume of urine formation here by helping the body conserve water
- **Oxytocin**- Cause milk ejection from lactating mother
- Also stimulate contraction of uterine muscle during child birth.

Thyroid Gland

- It is the largest endocrine gland
- blood supply by superior thyroid artery & drained by superior thyroid vein
- Situated at the base of the throat just inferior to the Adam's apple
- Has two lobes (right and left) joined by the **thyroid isthmus**

Makes two hormones

A. Thyroxine (T_4) and Tri- iodothyronine(T_3) which

Page 81 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	--	--	--

- Stimulate metabolism of all cells & cell growth (in reproduction & nervous /mental development)
- Control the rate at w/c glucose is burned or oxidized and converted to body heat and chemical energy
- Exert a wide spectrum of metabolic & physiologic actions that affect virtually every tissue in the body.

Abnormal conditions

Hyperthyroidism - ↑ed TH

- Hypothyroidism - ↓ ed TH
- Goiter – the condition in w/c the thyroid gland is unable to produce T_4 & T_3 due to low level of TSH from pituitary to stimulate T.G → the gland becomes enlarged

B. Calcitonin – enhance the storage of calcium in to bone cells by then it decreases blood calcium level

Parathyroid Glands

- Usually four in number, are embedded in the dorsal surface of the thyroid gland
- Secrete parathyroid, or parathormone (PATIENTH) in response to low plasma calcium
- Antagonist to calcitonin and acts to maintain calcium homeostasis

Acts on bone & kidney

- Cause demineralization of bone to elevate plasma calcium & phosphate levels.
- Cause phosphate to be secreted by urine
- Cause increased intestinal absorption of calcium by stimulating the kidney to produce active vitamin D, w/c increase calcium absorption in gut

Adrenal (Suprarenal) Glands

- Paired yellowish masses, situated at superior poles of each kidney
- Each glands consisting of two distinct entities:
- *Adrenal cortex* – is an outer structure which is composed of endocrine tissue.
- Structurally it is arranged into three zones;
- a thin outer *zona glomerusa*,

Page 82 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	--	--	--

- a thick middle *zona fasciculata*, & an inner *zona reticularis* bordering on the medulla
- *Adrenal medulla* – composed of neurosecretory tissue, that secret the catecholamine hormones epinephrine (Adrenalin) and norepinephrine (Noradrenalin).

Adrenal cortex

- produce three major groups of hormone collectively referred to as **corticosteroid**
- **These are**
 1. **Mineralocorticoids,**
 2. **Glucocorticoid**
 3. **Sex hormone**

Pancreas

The pancreas is one of abdominal cavity organs that lies behind the stomach to the left lateral to duodenum. Its endocrine functions is performed by the islets of Langerhans (also called pancreatic islets), which are small, highly vascularized masses of scattered cells throughout the pancreas. It is composed of endocrine & exocrine tissues.

Exocrine tissue – secretes a serious containing fluid; digestive enzyme (pancreatic juice), & releases through ducts w/c drain directly into part of small intestine (duodenum).

Endocrine tissue – contains four primary types of glands w/c secrets hormones;

Four primary types of glands which secrets hormones

- ✓ Alpha cells (A cells) – secrete glucagon - ↑es blood glucose
- ✓ Beta cells (B cells) – secrete insulin - ↓es blood glucose
- ✓ Delta cells (D cells) – secrete somatostatin – indirectly inhibits digestion & absorption of nutrients
- ✓ Pancreatic poly pepatienteide(PP) cells (F cells) – also influence digestion & distribution of food molecule

Pineal gland (" third eye")

Small, cone-shaped gland, which lies in the roof of the 3rd ventricle of the brain, at the Epithalamus. Is also member of the **nervous system** (b/c it receives visual stimuli, called “the 3rd Eye”), and also is a member of the **endocrine system** (because it secretes hormone)

Page 83 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

Principal pineal secretion is **melatonin** hormone. Melatonin is believed to have an important role in establishing the body's **day night cycle** (sleep wake cycle)

In **sun light** sympathetic nerve fibers release nor-**epinephrine** results in wakefulness, and in **darkness** causes lack of nor epinephrine w/c stimulate the secretion of **melatonin** resulting in sleepiness. Also it regulate the release of gonadotropins (GTH) from pituitary gland. Winter (seasonal) **depression** is a condition of abnormal emotional state characterized by **sandiness** (sleepiness) when day length decrease during winter, causing excess melatonin secretion.

Thymus

It is composed of fibrous connective tissue and fat that produces a hormone called **thymosin (thymic hormone)**, Thymosin stimulate development of (T-lymphocytes).

T-cells help protect the body against foreign organisms. The thymus acts as an “incubator” for maturations of T – lymphocytes located on the upper thorax posterior to the sternum, just above the heart. Because it is most active before birth & early in life, its size is larger in infants & children & decrease during adulthood.

Table 1.8.3 Types of Hormones, their source organs & Specific Actions

Hormone	Source	Target	Principal function
GH (STH)	Adenohypophysis	General	- Promotes growth by stimulating protein anabolism and fat mobilization.
PRL (lactogenic)	“	Mammary glands	- Promotes milk secretion by alveolar secretory cells.
Thyroid stimulating hormone (TSH)	“ “	Thyroid gland	- Stimulates development and secretion in the thyroid gland
Adenocorticotrophic hormone (ACTH)	“ “	Adrenal cortex	- promotes dev't and secretion in the adrenal cortex.

Hormone	Source	Target	Principal function
Follicular stimulating Hormone (FSH)	Adenohypophysis	Gonads glands	- Female – promotes dev't of ovarian follicle – stimulates estrogen secretion
Leutinizing hormone (LH)	“ “	Gonads glands (primary sex organs)	- Male – promotes dev't of testis – stimulates sperm production.
Melanocyte stimulating hormone	“ “	Skin	- Female – triggers ovulation secretion - promote dev't of corpus luteum - Male – stimulates production of testosterone /masculinization/ May stimulate production of melanin pigment in skin.
Anti Diuretic hormone (ADH)	Neurohypophysis	Kidney	- Promotes water retention by kidney tubules.
Oxytocin (OT)	“ “	Uterus	- Stimulates uterine contraction
Hormone	Source	Target	Principal function
Melatonin	Pineal gland	Adenohypophysis	- Inhibit LH secretion - Sleep-wake cycle & Person's mood eg, winter depression
T3 & T4	Thyroid gland	General	- increase rate of metabolism
Calcitonin (CT)	“ “	Bone tissue	- increases calcium storage in bone - lowering blood Ca^{2+} levels

Parathormone (PATIENTH)	Parathyroid gland	Bone tissue	<ul style="list-style-type: none"> - Increases calcium removal from the storage in bone - Increase absorption of calcium by intestines - Increase blood ca^{2+} levels
Aldosterone (mineralocorticoid)	Adrenal cortex (Zona glomerulosa)	Kidney	- Promote conservation of H_2O by the kidney.
Hormone	Source	Target	Principal function
Cortisol (hydrocortisol)	Adrenal cortex	General	<ul style="list-style-type: none"> - Influence metabolism of food molecules - It has an anti-inflammatory effect.
Adrenal androgen	Adrenal cortex (zona reticularis)	Sex organ	- May support sexual functions
Thymosin	Thymus gland	T-Lymphocytes	- Stimulate production of specialized lymphocytes involved in the immune response called T- cells
Atrial natriuretic Peptide (ANP)	Heart (Atrium)	Kidney	- Promote the loss of sodium from the body by means of the urine

I.9 Anatomy and Physiology of Nervous System

Introduction

A. The nervous system is composed of neurons and neuroglia.

I. Neurons transmit nerve impulses along nerve fibers to other neurons. Neurons typically have a cell body, axons and dendrites.

Page 86 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

2. Nerves are made up of bundles of nerve fibers.
3. Neuroglia carry out a variety of functions to aid and protect components of the nervous system.

Neurons

The brain is a collection of about 10 billion interconnected neurons. Each neuron is a cell that uses biochemical reactions to receive, process and transmit information.

Neuron Anatomy

- Cell body
- Nucleus
- Large nucleolus

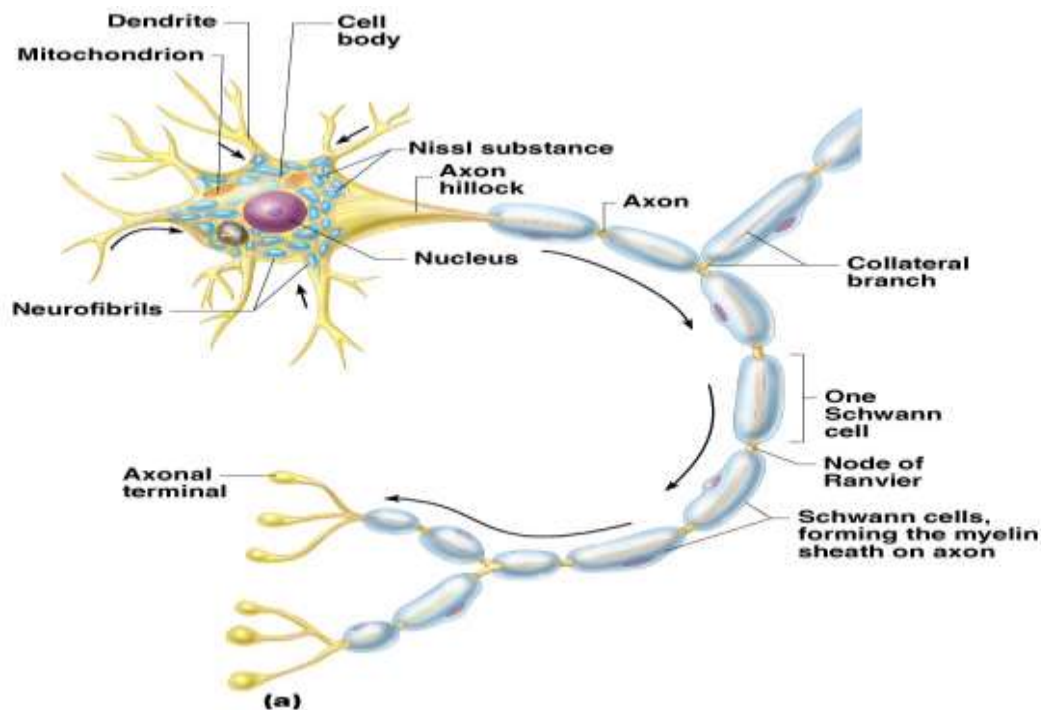


Figure 1.9.1 parts of a neuron

Extensions outside the cell body

Dendrites – conduct impulses toward the cell body

Axons – conduct impulses away from the cell body (only 1!)

Neurotransmitters

Page 87 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	--	--	--

Chemical substances that carry messages from one neuron to another or from a neuron to other body tissues, such as cardiac or skeletal muscles.

Synapses

The synapse is a small gap separating neurons.

Receptors

Proteins embedded in the cell membranes of neurons.

A neurotransmitter must bind to receptors to exert an effect on the next neuron in the chain.

Components of the Nervous System

Central Nervous System

- Brain
- Spinal Cord

Peripheral Nervous System

- Sensory and Motor Nerves
- Cranial Nerves
- Spinal Nerves

Autonomic - controls the involuntary processes of the body.

- Sympathetic
- Parasympathetic

Central Nervous System

Cerebrum – the largest part of the brain distinguished by the folds or convolutions of much of its surface. The cerebrum has four paired lobes – frontal, parietal, occipital, and temporal. Memory and conscious thought, speech, motor and sensory functions are controlled by the cerebrum.

Cerebellum – a mass that occupies the posterior part of the cranium. The cerebellum controls the automatic regulation of movement, balance, and posture, as well as skilled movements.

Medulla Oblongata (Brain Stem) – connects the cerebrum and cerebellum with the spinal cord.

The brain stem controls the heart rate, respiration, and body temperature

Peripheral Nervous System

Page 88 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

Nerves are either motor nerves or sensory nerves.

- Efferent or motor nerves innervate muscles and glands. In order to accomplish this, they conduct nerve impulses from the CNS to the muscles and glands.
- Afferent or sensory nerves send sensory information and nerve impulses from sensory receptors in the skin, muscles, and joints to the brain.
- Cranial Nerves – 12 pairs of cranial nerves which are either sensory or motor nerves.
- 10 of these nerves originate at the brain stem.
 - ✓ Cranial Nerve 1: Olfactory – smell
 - ✓ Cranial Nerve 2: Optic – vision
 - ✓ Cranial Nerve 3,4&6: Oculomotor, trochlear, and abducens – motor nerves controlling movement of the eyes.
 - ✓ Cranial Nerve 5: Trigeminal – sensation of the head, face, and movements of the jaw
 - ✓ Cranial Nerve 7: Facial – taste, facial movements, and secretions of tears and saliva
 - ✓ Cranial Nerve 8: Acoustic – hearing and equilibrium
 - ✓ Cranial Nerve 9: Glossopharyngeal – taste, sensation and movement in the pharynx, and secretion of saliva
 - ✓ Cranial Nerve 10: Vagus – controls taste, and movements in the pharynx and larynx
 - ✓ Cranial Nerve 11: Spinal accessory – movements of the pharynx, larynx, head, and shoulders
 - ✓ Cranial Nerve 12: Hypoglossal – movement of the tongue

Spinal Nerves – there are 31 pairs of spinal nerves branching off the spinal cord.

- ✓ 8 cervical
- ✓ 12 thoracic
- ✓ 5 lumbar
- ✓ 5 sacral
- ✓ 1 coccygeal

Autonomic Nervous System (ANS)

Page 89 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

The autonomic or involuntary nervous system is that portion of the nervous system which regulates the activity of cardiac muscle, smooth muscle, and the glands.

The ANS has two parts:

- Sympathetic
 - ✓ Operates under conditions of stress or emergency
- Parasympathetic
 - operates under normal conditions

Autonomic Functioning

- Sympathetic – “fight-or-flight”
 - ✓ Response to unusual stimulus
 - ✓ Takes over to increase activities
 - ✓ Remember as the “E” division = exercise, excitement, emergency, and embarrassment

I.10 Anatomy and Physiology of Head, Eye, Ear, Nose and Throat (HEENT)

Head

Inspection: Visually inspect the scalp, moving hair as necessary. You are looking for lesions, trauma, parasites, etc.

Palpation: Palpate the scalp, feeling for lesions or tenderness.

Eyes

Inspection

A. Visual Acuity

- Use best corrected vision (contacts or glasses).
- Hold the near card approximately 14 inches from patient, or allow the patient to hold card him/herself.
- Have patient close or cover eye not being tested.
- Have patient read the smallest line they can see clearly. Repeat with other eye.
- If pinhole helps to improve vision, the problem is visual only, not neurological.

Page 90 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

B. Visual Fields (peripheral vision)

1. Both eyes at the same time

- a. Have patient on your eyes with both eyes open.
- b. Hold up different numbers of fingers on both hands and have patient add up how many fingers he/she sees.

2. One eye at a time

- c. Have patient cover one eye. The examiner stands a few feet away from patient and closes opposite eye. (Patient covers right, examiner covers left. Covered eyes should be parallel.)
- d. Tell the patient to fixate his/her open eye on your open eye.
- e. Hold up any number of fingers on one hand and move them slowly into view. Ask the patient to tell you how many they see. Test four quadrants this way. (Coming from the top right, bottom right, top left & bottom left.)
- f. Keep your hand in a plane directly between yourself and the patient.
- g. Compare your (normal) field of vision to the patient's. Your patient should see your fingers at approximately the same time as you do.
- h. Test the other eye.

C. Extraocular Movements/Near Response

1. Have patient keep their head stationary and track your finger as you move it around.
2. Both eyes can be tested at the same time.
3. Since each eye has six muscles with distinct actions, each eye should be Brought through its six cardinal motions. Move your hand in the shape of a giant H or asterisk.
4. Try to test the limits of the muscles by making the shape as big as your arms will allow. Switch hands in the middle to get the same amount of stretch on both sides.
5. Finish the exam by bringing your finger towards the patient's nose to test near response.

The pupils should constrict (miosis) and the patient's eyes should cross (convergence).

D. Sclera, conjunctiva, cornea

Page 91 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

1. Wash your hands! Yes, again! Warn the patient you will be touching their eyelids. Don't touch your own face while explaining this, or you'll have to wash your hands a third time!

2. Both eyes can be tested at the same time.

3. Pull down gently on lower lids, and have patient look up.

4. Pull up gently on upper lids (just below brow), and have patient look down.

You may see a fleshy overgrowth on the sclera at the inside corner of the eye. This is called a pterygium. It can be caused by UV exposure, or it can be genetic in origin. Unless it obscures vision, it is usually only a cosmetic issue.

Ears

Inspection

A. External Inspection 1. Pinna – Check for skin changes that may represent skin cancer, nodules that may indicate gout.

2. External auditory canal – Look for redness, swelling, large amounts of cerumen (ear wax) that may need to be removed before introducing otoscope.

B. Otoscopy

Demonstrate otoscope attachment & ear speculum.

1. Color and shape of eardrum

2. Is it bulging or retracted?

3. Cone of light

4. Umbo

5. Long and short processes of malleus

6. Pars tensa & pars flaccida

7. Annulus

Nose

Inspection

A. Examine external nose.

B. Otoscope

1. Explain otoscope.

Page 92 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

2. Examine septentum.

3. Examine inferior & middle turbinates/meatus. (Superior turbinates are not usually visible.)

Palpation

A. Palpate frontal & maxillary sinus areas.

Throat & Mouth

Inspection

A. Pharynx

1. When inspecting the pharynx, use a penlight. A tongue depressor is helpful, but not necessary.

2. Examine hard & soft palate. You may see a bony abnormality called torus palatinus. It is congenital and not cancerous.

3. Have patient say “Aaaah”, noting whether the uvula rises symmetrically.

4. Examine palatine pillars and tonsils.

Ask patients if they snore. Patients who snore are at risk for sleep apnea, as are patients with a neck circumference greater than 18".

B. Mouth

1. Use a gloved hand or tongue depressor to stretch the cheeks and move the tongue.

2. Use a penlight to examine lips, gums, teeth, tongue, cheeks and the floor of the mouth.

Palpation

A. Bimanual palpation

1. Use a glove on the hand that will be inside the patient’s mouth, leaving the other ungloved.

2. Warn patient you will be putting your finger inside his or her mouth, and ask him/her not to bite down.

3. Place one finger inside mouth, while externally palpating with the ungloved fingers.

4. Palpate the parotid and submandibular salivary glands.

5. Palpate the lateral margins of the tongue and floor of the mouth looking for nodules, ulcerations and carcinoma.

Neck

Page 93 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	--	--	--

Inspection

A. Visually inspect the thyroid gland by having the patient swallow.

Palpation

A. Thyroid

1. Palpate isthmus.
2. Palpate gland from behind patient (in front OK). Stabilize one side with your hand, and palpate opposite lobe with other hand.

B. Lymph Nodes

1. Occipital (base of skull)
2. Postauricular (behind ear)
3. Preauricular (in front of ear)
4. Submandibular (upper middle jawbone)
5. Submental (under chin)
6. Anterior Cervical (in front of SCM)
7. Posterior Cervical (behind SCM)
8. Deep Cervical Chain (under SCM)
9. Supraclavicular (slightly behind collarbone, have patient shrug to locate)

1.1.1 Anatomy and Physiology of the Reproductive System

The female and male gonads (Testes & Ovaries) produce sex hormones

- **Testes** – paired organs with in the scrotum of males
 - ✓ Composed of somniferous tubules & interstitial cells
 - ✓ Secret androgen(testosterone) w/c support sperm formation as well as for the development & maintenance of male secondary sex characteristics
- **Ovaries** – primary paired sex organs in the female that secrete two hormones:
 - ✓ **Estrogen** – promote maintenance & dev't of female 2⁰ sexual characteristics
 - ✓ **Progesterone** – promote growth of uterine lining for successful pregnancy

General function of human reproductive system

Page 94 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

Replication- by means of sexual intercourse produces new human beings and hereditary traits to be passed from both parents to their children's.

To produce and deliver **sperm** to the female reproductive tract-in males

To produce **ova** and carrying the developing **embryo**- in females

The male reproductive system

The male reproductive organs is divided in to two:-

External reproductive organs

- Penis
- scrotum

Internal reproductive organs

- The testes
- The ducts
 - ✓ Epididymis
 - ✓ Vas deferens
 - ✓ Ejaculatory duct
 - ✓ Urethra
- The accessory glands
 - ✓ Seminal vesicle
 - ✓ Prostate
 - ✓ Bulbourethral glands

Male internal reproductive organs

Testicles

- Testicles are paired male reproductive organs (gonads), which produce sperm.
- During fetal life, tests are formed just below the kidneys inside the abdomino-pelvic cavity.
- By third fetal month it starts to descend and by the seventh month of fetal life it passes through the inguinal canal.
- The inguinal canal is a passageway leading to scrotum.
- **Cremaster** muscle elevates tests during cold weather.

Page 95 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

- Each testis is oval-shaped measuring 4.5 c.m. long, 2.5 c.m wide in adult.
- It is enclosed in fibrous sac called **Tunica Albuginea**.
- The sac extends in to a testis to divide the testis into lobules.
- Next to tunica albuginea is **Tunica Vaginalis**, which is a continuation of membrane of abdomino-pelvic cavity.

Genital ducts

- **Seminiferous tubules**
 - ✓ Site for spermatozoa production
 - ✓ Each testis contains 800 tightly coiled **Seminiferous Tubules** which produce thousands of sperm each second.
- **Epididymis**
 - ✓ Cord-like structure at the back of testes
 - ✓ Each connected to one of the vasa deferentia
 - ✓ Place for maturation
- **Vas-deferens**
 - ✓ A passage and storage place for sperm.
 - ✓ Each ends at the base of prostate, joined by the seminal vesicle
- **Ejaculatory duct:**
 - ✓ Is the place at which ductus deferens joins to the duct of seminal vesicle.
 - ✓ It is about 2 cm. long.

They receive secretion from the seminal vesicles and pass through the prostate where they receive additional secretion

Urethra

- It is the final section of the reproductive system.
- It leads from the urinary bladder through the prostate gland and to the tip of the penis.
- Its reproductive function is to transport semen out of penis.

The accessory glands

- Provide the bulk of semen

Page 96 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	--	--	--

Seminal vesicle

- Secretes fluid (Fructose and prostaglandins) that nourishes and enables sperm to move.

Prostate gland

- Secretes an alkaline fluid that neutralizes the acidity.
- **Bulbourethral (Cowper's) glands**
 - ✓ Secretes a lubricant

Semen

- ✓ Is a combination of sperm & fluid.
- Contains
 - ✓ 300-500 million sperm
 - ✓ Sperm food
 - ✓ pH buffers
- Allows sperm to survive for a couple of days inside female's body (hostile environment)

The sperm

- is one of the smallest cells in the body.
- For complete development each sperm need 2 months.
- Normally 300 to 500 million sperms are released during ejaculation.
- A male who releases 20 to 30 million normal sperms tends to be infertile.
- Contains Several Parts:

Head

- Chemical(**acrosome enzyme**) to dissolve egg goo
- Dad's (fathers') genetic chromosome information (DNA)
- **Mitochondria/middle part**
 - ✓ Energy
 - ✓ Tail
 - ✓ Swimming

Male external reproductive organ

Penis

Page 97 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	---	--	--

- is an extension from the perineal area of male.
- It is soft and erectile tissue
- Has two main function, It carries urine through urethra to the out side during urination and it transports semen through the urethra during ejaculation.

In addition to urethra penis contains three cylindrical strands of erectable tissue.

- ✓ Two corpora cavernosa, which run parallel to the dorsum of penis.
- ✓ Corpus spongiosum which contain urethra
- ✓ The corpora cavernosa are surrounded by a dense, relatively inelastic connective tissue called tunica albuginea.
- ✓ It also contains numerous vascular cavities called **venous sinusoids**.
- ✓ The corpus spongiosum extends distally beyond the corpora cavarnosa & becomes expanded at the tip of the penis, which is called **glans penis**.
- ✓ **The loosely fitting skin of the penis is** folded forward over the glans to form the **prepuce or foreskin**.

The scrotum

- is a paunch of skin that hangs between the thighs.
- The tests complete their descent in to the scrotum shortly before or after birth.
- Because the tests hang in scrotum outside the body their temperature is of cooler than the body temperature by 3 Degree Fahrenheit.
- This lower temperature is needed for sperm production and survival, under the skin of scrotum.

Hormonal regulation in the male

- **Follicular** Stimulating Hormone (**FSH**) and **Luteinizing** Hormone (**LH**) produced by the anterior pituitary gland are chiefly responsible for stimulating spermatogenesis and testosterone secretion.
- Follicular Stimulating Hormone (FSH) and Luteinizing Hormone (LH) affect only tests whereas; Testosterone affects not only spermatogenesis but also sex organ development and appearance of secondary male sexual characteristics.

Page 98 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
----------------	--	--	--

Female Reproductive System

Like male reproductive organs, female reproductive organs are divided in to two

External Organs/genitalia includes

- mons pubis,
- labia majora,
- labia minora,
- vestibular glands,
- clitoris and
- Vestibule of vagina, which collectively called **vulva**.

Internal organs/genitalia includes

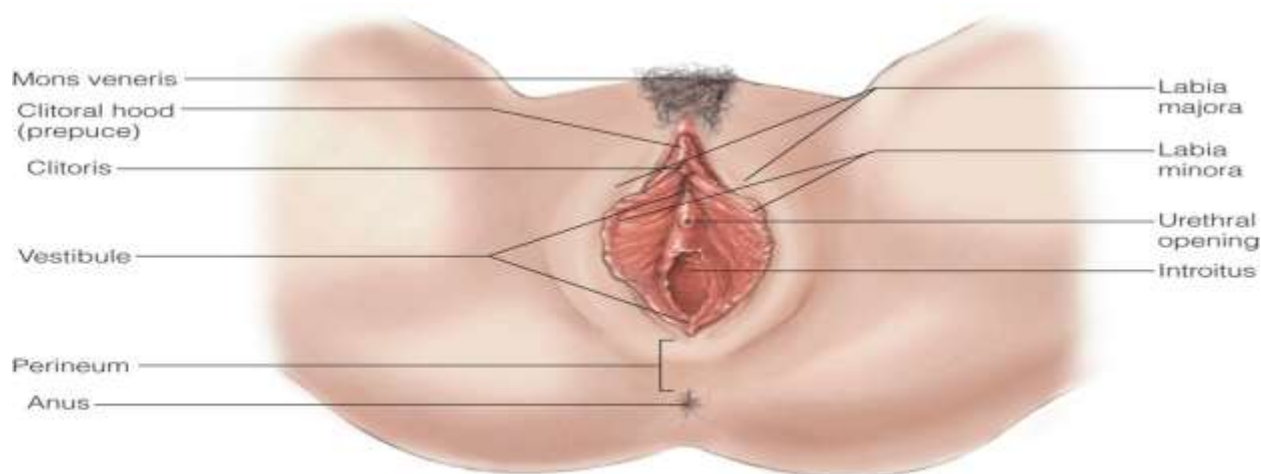
- ✓ ovary
- ✓ uterine tube,
- ✓ the uterus, and
- ✓ the vagina.

External Organs/genitalia

- **The mons pubis**
 - ✓ Mound of fatty tissue covers symphysis pubis
 - ✓ It is covered with hair at puberty.
- **Labia majora/ outer lips**
 - ✓ Are two longitudinal folds of skin that forms the outer border of vulva.
 - ✓ It contains fat, smooth muscle, areolar tissue, sebaceous glands & sensory receptors.
 - ✓ At puberty covered with hair.
- **Labia minora/inner lip**
 - ✓ Is pink tissue folds between vestibule and labia majora;
 - ✓ Have no hair;
 - ✓ Have many oil glands;
 - ✓ darken if sexually aroused

Page 99 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
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- ✓ Labia minora and labia majora surround vaginal & urethral orifices.
- **The clitoris**
 - ✓ Is a small erectile organ at the upper end of vulva below the mons pubis, where the two folds of labia minora meet.
 - ✓ Like the penis it contain many nerve endings, hence it is very sensitive part.
 - ✓ rich in blood supply and nerve endings
- **The vestibule**
 - ✓ is a space between the two labia minora.
 - ✓ Its floor contains the greater vestibular glands and the opening for the urethra & vagina.
 - ✓ During sexual arousal the greater and lesser vestibular gland secrete alkaline mucous for lubrication to aid penetration.
- **Urethral Meatus** – between clitoris and vagina
- **Perineum**
 - ✓ is a diamond shaped region bounded anteriorly by symphysis pubis, posteriorly by coccyx and laterally by ischeal tuberosity.
 - ✓ between anus and vagina



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Figure 1.1.1 female external reproductive organ

Page 100 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Vagina

- 3-4 inch, thin-walled accordion-like tube from the introitus to the cervix, tilted back;
- organ of intercourse and canal for menses and babies;
- lubricant secreted from vaginal wall openings when engorged;
- first 1/3 contains many nerve endings,
- inner 2/3 has little nerves
- It lies behind urinary bladder and rectum & anterior to rectum and anus.
- Its wall is mainly composed of smooth muscle & fibroelastic connective tissue.

Uterus

- 1-inch thick walls, hollow, muscular organ between the bladder and rectum;
- monthly cycle of change; menstruation,
- protects fetus,
- contract to expel menses and fetus;
- 3 inches long, 2 inches wide
 - Has 3 wall layers:
 - Perimetrium-outer layer
 - Myometrium-middle layer
 - Endometrium-inner layer

- has three parts:

- **Fundus:** - the upper, dome shaped part
- **Body:** - the tapering middle portion
- **Cervix:** the body terminate to narrow portion

Page 101 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022



Figure 1.11.3 internal reproductive organs

Fallopian Tubes (oviducts) –

- 4-inch long trumpet shaped tubes
- are a pair of tubes which extend each side of the uterus.
- The uterine tube (fallopian tube) conveys the oocyte to the uterus.
- Is a site where tubal ligation is done for female sterilization
- It has 3 distinct portions -
 - ✓ **Ampulla** – typical site of fertilization
 - ✓ **Infundibulum** – has fimbriae surrounding the ovaries to collect an egg upon release
 - ✓ **Isthmus**: - opens in to the uterus

Ovaries

- The female gonads or sex glands (paired organs).
- On average 3 cm in length, 2 cm in breadth & 1 cm in width and weighing 4–8 g.
- Produce the female sex hormones (progesterone and estrogen) and also release the ovum cyclically.

Page 102 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- contain 250,000 ova

Hormonal regulation

- Females are fertile a few days each month by the action of
- Gonadotrophin Releasing Hormone (GnRH) and FSH & LH.
- In pregnant women additional hormone called Human Chorionic Gonadotrophin (HCG), which affects uterine and other body metabolism is released by placenta.

The Female Menstrual Cycle

Menstrual Cycle-

Is the shedding and tearing down of lining of uterus and rebuild for next month in the absence of fertilization/pregnancy. Menstrual cycle – lasts about 24 to 35 days, average is 28 days

Normal Cycle

- Menstrual blood is predominantly arterial, and usually asymptomatic
- Cycle length: 21-35 days
- Flows for: 3-7 days
- Amount does not exceed 80ml

Any bleeding from the uterus, that differs materially, from the usual menstrual cycle in

frequency, amount, duration of flow or **time** of the occurrence is considered **AUB/ abnormal uterine bleeding**

The normal menstrual cycle results from a complex feedback system involving the hypothalamus, pituitary, ovary, and uterus

Phases of Maturation Cycle

- Menstrual cycle has four phases:
 - ✓ Follicular phase
 - ✓ Ovulation phase
 - ✓ Luteal phase
 - ✓ Menstrual phase

Follicular phase –

- begins after menstruation ends;

Page 103 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- lasts 6-13 days;
- ovarian follicles begin to ripen;
- estrogen promotes development of endometrium to 2-5 millimeters thick

Ovulation phase –

- around day 14,
- an ovum is released due to FSH and LH that have ripened primary follicles; one follicle matures completely (secondary follicle) and ruptures, releasing the egg to be caught by the fimbriae

Luteal phase – corpus luteum forms on the ovary where the secondary follicle ruptured;

- it secretes progesterone and estrogen for 10-12 days to further develop the endometrium to 4-6 millimeters thick; without fertilization, the progesterone and estrogen levels signal to the hypothalamus to decrease LH and the corpus luteum deteriorates and estrogen and progesterone drop significantly

Menstrual phase

- endometrial buildup is expelled through uterine contractions for 3-7 days;
- volume of menses is about 2-4 tablespoons of fluid/80 ml

Self-check-I

Directions: Answer all the questions listed below.

Test I: Essay questions

1. Describe classification of bony skeleton
2. Classify and list bones of skull
3. Classify and list bones of vertebral column
4. Name the bones of shoulder grid
5. Classify and list bones of upper limb
6. Name the bones of pelvic grid
7. Classify and list bones of lower limb

Test II: Multiple Choice Questions

- 1) Which of the following terms describes the body's ability to maintain its normal state?
 - (A) Anabolism
 - (B) Catabolism
 - (C) Tolerance
 - (D) Homeostasis
 - (E) Metabolism
- 2) Which of the following best describes the human body's defense mechanism against environmental bacteria?
 - (A) Hair in the nose
 - (B) Mucous membranes
 - (C) Osteoblasts
 - (D) Saliva
 - (E) Tears
- 3) Which cells in the blood do not have a nucleus?
 - (A) Lymphocyte
 - (B) Monocyte

Page 105 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

(C) Erythrocyte

(D) Basophil

(E) Neutrophil

4) Which of the following is flexible connective tissue that is attached to bones at the joints?

(A) Adipose

(B) Cartilage

(C) Epithelial

(D) Muscle

(E) Nerve

5) Which of the following allows air to pass into the lungs?

(A) Aorta

(B) Esophagus

(C) Heart

(D) Pancreas

(E) Trachea

Test III: Short answer questions

The gluteal region is located on the _____ surface of the body.

Is the shoulder inferior to the knee?

The dermis is superficial to the epidermis.

Regional names are useful in specifying body areas for reference. which of the following regional name combinations do not match? a. Patellar (knee) b. Brachial (arm) c. Cranial (head) d.

Gluteal...

Unit two: Patient/client assessment

Page 106 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

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

- Taking patient /client history
- Principles of physical examination
- Complete patient/client physical examination
- Vital signs
- Patient/client data

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

- Take Patient /client history
- Describe Principles of physical examination
- Perform Complete patient/client physical examination
- Measure Vital sign
- Complete patient/client data

2.1 Take client history

Holistic Approaches of history taking

Holistic and interactive approach through which nursing/midwifery care provision is organised to achieve patient centred nursing interventions

Page 107 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Health History

The process of gathering information regarding patient's problem, obtaining an accurate history is the critical first step in determining the etiology of the patient's problem History taking is done through interview technique

Purpose of History Taking

- To evaluate the past and present health status of each body system.
- To double-check in case any significant data were omitted in the present illness section.
- to make a judgment or a diagnosis about the health status of the individuals

2.1.1 Components of History Taking

I. Biographic Data

- | | |
|--------------|----------------|
| • Name | Age |
| • Sex | Place of birth |
| • Address | Marital status |
| • Occupation | Religion |

II. Chief Complaints

A brief spontaneous statement in the person's own words that describes the most important reason for the visit:

- States one or two signs or symptoms and their duration
- Ask for symptoms rather than diagnostic statement from the patient
- Avoid translating it in the terms of medical diagnosis
- Enclosed in quotation marks to indicate the person's exact words.
- E.g. "Chest pain" for 2 hours

III. History of Present illness

- A chronological record of symptoms
 - ✓ Time of the onset
 - ✓ Its manifestations
 - ✓ Any treatments

- **Location**

- ✓ Be specific
- ✓ Ask the person to point to it. E.g.
- ✓ "pain behind the eyes"/"Jaw Pain" /"Occipital pain"
- ✓ Is the pain localized or radiating?
- ✓ Is the pain superficial or deep?

- **Character or quality**

- ✓ specific descriptive terms e.g. burning, sharp, dull, aching, gnawing, throbbing, and shooting

- **Quantity or severity**

- ✓ E.g. "profuse bleeding", "terrible pain".

- **Timing (onset, duration, frequency)**

- ✓ When did the symptoms first appear? specific date and time
- ✓ How long did the symptoms last (duration)?
- ✓ Was it steady or did it come and go during that time (constant or intermittent)?

- **Aggravating and relieving factors**

- ✓ What makes the pain worse?
- ✓ Is it aggravated by food, medication, time of the day, season?
- ✓ What relieves it, e.g. rest medication, or ice pack?

IV. Past Health History

- **Childhood illnesses-** Record the occurrences of measles, mumps, pertussis and strep. Throat.
- **Accidents or injuries-** Record auto accidents, fractures, penetrating wounds, head injury.
- **Serious or chronic illnesses-** Indicate for example, the presence of diabetes, hypertension, heart disease and seizure disorder.
- **Hospitalizations-** Record the cause, place, result
- **Operations-** Record the type of surgery, date, place and outcome.
- **Immunizations-** Record all childhood immunizations (measles, mumps, polio, DPT,HeTB).

Page 109 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

V. Family History of Illness

The purpose of the family history illness is to obtain data about immediate and blood relatives. The objectives are to determine whether the client is at risk for illnesses of a genetic or familial nature.

VI. Life Style and Social Data

- Life style history shows habits and preferences, including preferred foods, drinks and hobbies.
- A complete social history reveals who the support systems are for the client, including spouse, children, other family members, or close friends. Social history includes information about ways that the client and family typically cope with stress.

VII. Review of Systems (ROS)

On these review questions “yes/no” questions go from “head to toe” to conclude the interview. Selected sections can also clarify the Chief Complaint.

Documents presence or absence of common symptoms related to each of the major body systems.

2.2 Principles of physical examination

Table 2.2 principles of physical examination

TO ASSESS	OBSERVE
Distress	Facial expression, respiratory effort, activity, tone
Color	Tongue, mucous membranes (centrally pink vs. cyanotic), nail beds, hands, feet (peripherally pink vs. cyanotic), skin (jaundice, pallor, ruddiness, mottling), perfusion, meconium staining
Nutrition status	Subcutaneous fat, breast nodule
Hydration status	Skin turgor, anterior fontanel
Gestational age	Skin (smooth vs. peeling), ear cartilage, areola and nipple formation, breast nodule, sole creases, descent of testes, rugae, labia
Neurologic status	Posture, tone, activity, response to stimuli, cry, state, state transition, reflexes
Respiratory/chest status	Respiratory rate and effort, retractions, nasal flaring, grunting, audible stridor or wheezing, chest shape, nipples (number and position), skin color

Cardiovascular status	Precordial activity, visible point of maximal intensity, skin perfusion and color
Abdomen	Size (full, distended, taut, shiny), shape (round, concave), distention (generalized or localized), visible peristaltic waves, visible bowel loops, muscular development/tone, umbilical cord, umbilical vessels, drainage from cord, periumbilical erythema (redness)
Head	Size, shape, fontanelles, suture lines, swelling, hair distribution, condition of hair
Eyes	Shape, size, position, pupils, blink, extraocular movements, color of sclera, discharge, ability to fix and follow
Ears	Shape, position, external auditory canal, response to sound
Nose	Shape, nares, flaring, nasal bridge
Mouth	Shape, symmetry, movement, philtrum, tongue, palate, natal teeth, gums, jaw size
Neck	Shape, range of motion, webbing, masses
Genitalia (male)	Scrotum, descent of testes, rugae, inguinal canals, foreskin, penile size, urine stream, meatus, perineum, anus
Genitalia (female)	Labia majora, labia minora, clitoris, vagina, perineum, inguinal canals, anus
Skin	Color, texture, firmness, vernix caseosa, masses, lanugo, lesions (pigmentary, vascular, trauma-related, infectious)
Extremities	Posture, range of motion (involuntary movement), digits, palmar creases, soles of feet, nails

2.3 Complete patient/client physical examination

Physical Assessment

Is process of assessing or finding any body abnormalities starting from head to toe by using four different techniques.

Purpose of physical assessment

- ✓ Develop and expand base line data
- ✓ To identify and manage variety of patient problem
- ✓ Evaluate effectiveness of care
- ✓ Enhance nurse patient relation
- ✓ Make clinical judgment

Patient preparation for physical assessment

Page 111 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

Patient preparation for physical assessment. It is always advisable to follow the points below while examining the patient. Examination should take place with good lighting and in a quite environment. It is advisable to examine a supine patient from the patient's right side. By words or gestures, be as clear as possible in your instructions. If possible try to demonstrate the patient what to do rather than giving verbal instructions alone. Keep the patient informed as you proceed with your examination. While examining the patient, it is helpful to move "from head to toe."

Techniques of Physical Examination

- I. Inspection
- II. Palpation
- III. Percussion
- IV. Auscultation

I. Inspection

Concentrated watching. Begins the moment you first meet the individual and develop a "general assessment." It compare the right and left sides of the body (are the two sides are nearly symmetric?) which requires good lighting, adequate exposure, and occasional use of certain instruments (otoscope, penlight, nasal and vaginal specula)

II. Palpation

Follows and often confirms points you noted during inspection .it Applies your sense of touch texture, temperature, moisture, organ location, size, swelling, vibration or pulsation, rigidity, crepitation, presence of lumps or masses, and presence of tenderness or pain

Light and Deep Palpation

- Start with light palpation to detect surface characteristics and to accustom the person to being touched.
- Then perform deeper palpation, by helping the person use deep breathing
- Bimanual palpation requires the use of both of your hands to get certain organs, such as the kidneys, or uterus

Different parts of the hands are best suited for assessing different factors

Page 112 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Fingertips

- best for skin texture, swelling, pulsatility and presence of lumps

A grasping action of the fingers

- To detect the position, shape, and consistency of an organ or mass.

The dorsa (backs) of hands and fingers

- Best for determining temperature because the skin here is thinner than on the palms.

Base of the fingers (meta-carpophalangeal joints)

- ulnar surface of the hand vibration.

III. Percussion

Tapping the person's skin with short, sharp strokes in order to assess underlying structures.

The strokes yield a palpable vibration and a characteristics sound that shows the location, size and density of the underlying organ.

Use of Percussion

- Mapping out the location and size of an organ by exploring where the percussion notes changes - between the borders of an organ and its neighbors.
- Signaling the density (air, fluid, or solid) of a structure.
- Detecting an abnormal mass if it is fairly superficial.
- Eliciting pain if the underlying structure is inflamed, as with sinus areas or over kidney or appendix.

The stationary hand

- Hyperextend the middle finger and place its distal portion, the phalanx and distal inter-phalangeal joint, firmly against the person's skin.
- Avoid the person's ribs and scapulae (Percussing over a bone yields no data because it always sounds "dull")
- Lift the rest of the stationary hand up off the person's skin.

The Striking Hand

- Use the middle finger of your dominant hand as the striking finger.

Page 113 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Spread your fingers and bounce your middle finger behind the nail bed.
- Flex the striking finger so that its tip, not the finger-pad, makes contact.
- Normal percussion notes

IV. **Auscultation**

Auscultation is a method that is used to listen to the sounds of your heart, lungs, arteries and abdomen. Using a stethoscope directly onto your chest, back and/or abdomen. A healthcare provider uses auscultation during physical examinations to check your circulatory system, respiratory system and gastrointestinal system.

Physical examination equipments

- Sphygmomanometer
- Stethoscope
- Flexible tape measure
- Thermometer
- Reflex hammer
- Cotton balls

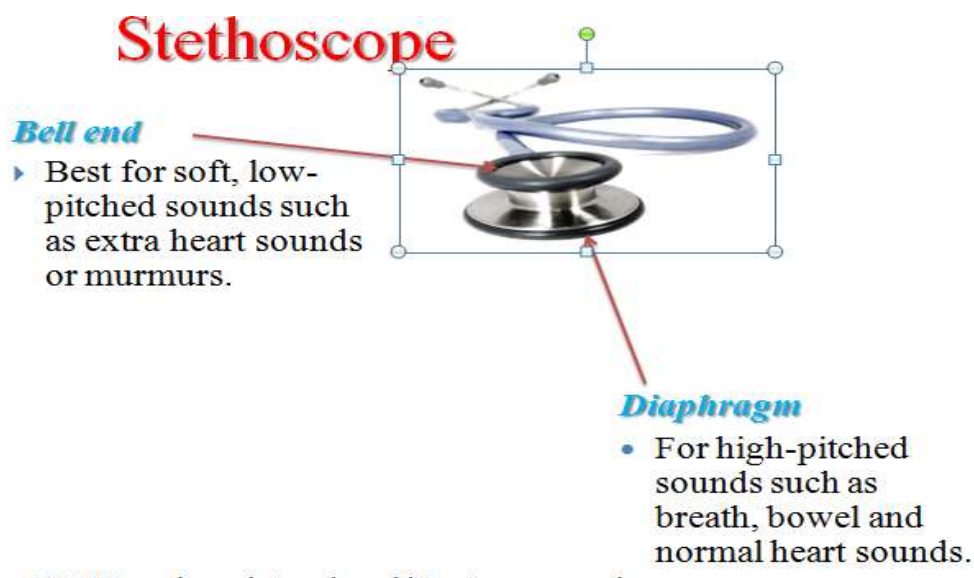


Figure 2.3.1 Parts of stethoscope

Integument (skin)

Page 114 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Inspect color general pigmentation on or hyper-pigmentation; redness, pallor, cyanosis and yellowish of skin) around the fingernails, lips and mucous membranes of mouth, conjunctivae (Anaemia) Palpate skin for temperature, moisture, edema, mobility and turgor (speed with which it returns into place- sign of dehydration), Skin lesion , Inspect and palpate the nails for shape, consistency and color

2.4 Vital Signs

- Assess and record: Radial pulse- assess for its rate, rhythm (regularity), force (weak, absent, full) and elasticity.
- Respirations- normally it is relaxed, regular, automatic and silent
- Blood pressure
- Temperature

Head and Face

- Inspect and palpate the scalp for any deformities, lumps and tenderness
- Inspect the face for facial expression, symmetry (cranial nerve 7)
- Palpate the frontal sinuses, maxillary sinuses for any tenderness

Eyes

- Ask the person to hold the head steady and to follow the movement of your finger or pen with the eyes
- Inspect the conjunctivae, and corneas for smoothness and clarity
- Test pupil for its size and response to light (normally round, regular and of equal size)

Ears

- Inspect the external ear for
 - ✓ Color , Lumps , Lesions , Discharge
- Check the movement of auricle for tenderness
- Using and otoscope inspect the external ear for:
 - ✓ Cerumen ,Discharge ,Foreign bodies ,Lesions

Nose

- Inspect the external nose for symmetry, lesions, or deformity

Page 115 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Inspect the patency of each nostril

Mouth and Throat

- Using a penlight and spatula Inspect for
 - Buccal mucosa ,Teeth ,Gums ,Tongue ,Palate , Uvula
- Note mobility of uvula as the person phonates “ahhh” and test gag reflex (cranial nerve 9,10)
- Ask the person to stick out the tongue (cranial nerves)

Neck

- Inspect for
 - ✓ Symmetry , Lumps , Pulsations
- Palpate the cervical lymph nodes (tensile, maxillary)
- Palpate the carotid pulse
 - ✓ One side at a time and palpate the trachea in midline
- Step behind the person, palpate thyroid gland

Examination of the Respiratory System

Subjective Data

- Ask for Cough
- Shortness of breath
- Chest pain with breathing
- Past history of respirator infections
- Cigarette smoking

Method of Examination

The posterior chest:

- Inspect _ Shape, Configuration of the chest wall ,Spinous processes should appear in a straight line ,Thorax is symmetric ,Scapulae are placed symmetrically.
 - The antero-posterior diameter is less than the transverse diameter (if antero-posterior diameter = transverse diameter, then " barrel chest " in chronic obstructive pulmonary disease)

Page 116 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

Palpate the posterior chest

Symmetric Chest Expansion

- Placing your warmed hands on the postero-lateral chest wall with the thumbs at the level of T9 or T10.
- Ask the person to take a deep breath. As the person inhales deeply, your thumbs should move apart symmetrically. Note any failure in expansion, Unequal chest expansions indicate Pneumonia, fractured ribs or Pneumothorax

Tactile Fremitus

- Fremitus is a palpable vibration
 - ✓ Use the palmar base (the ball) of the fingers of one hand
 - ✓ Touch the person's chest
 - ✓ He or she repeats the words "Ninety-Nine" or "Arba-Arat"
 - ✓ Start over the lung apex and palpate from one side to another
- Fremitus varies among persons but symmetry is most important. Decreased fremitus: anything obstructs transmission of vibrations. E.g. Obstructed bronchus, pleural effusion. Increased fremitus in lobar pneumonia.

Percuss the Posterior Chest

- Start at the apex and percuss across the top of the shoulders
- Make a side-to-side comparison all the way down the lung region. Avoid scapulae and ribs
- Resonance predominates in healthy lung tissue in the adult
- Hyper-resonance is found when too much air is present as in emphysema or pneumothorax
- A dull note signals pneumonia, pleural effusion or tumor

Auscultate the posterior chest

- The passage of air through the tracheobronchial tree creates a characteristic set of noises that are audible through the chest wall

Page 117 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

- These noises also may be modified by obstruction within the respiratory passageways or by changes in the lung, the pleura or the chest wall

Breath Sounds

- Evaluate the presence and quality of normal breath sounds
- Use the flat diaphragm end-piece of the stethoscope and hold it firmly on the person's chest wall
- Listen to at least one full respiration in each location
- Side to side comparison is most important
- Decreased or absent breath sounds occur when the bronchial tree is obstructed by secretions or foreign body, in lungs such as pleurisy or pneumothorax .

The Anterior Chest

- Inspect the anterior chest for
 - ✓ Shape, Symmetry, Facial expression, Level of consciousness, Quality of respiration.
- Abnormal:
 - ✓ Barrel chest
 - ✓ Restlessness (hypoxia)
 - ✓ Noisy breathing (asthma),
 - ✓ Unequal chest expansion with pneumonia or obstruction, tachypnea or bradypnea

Palpate the anterior chest

- Palpate for symmetric chest expansion
- Place your hands on the antero-lateral wall with thumbs along the coastal margins and pointing toward the xiphoid process
- Ask the person to take deep breath
- Watch your thumbs move apart symmetrically
- Note smooth chest expansion with your fingers

Abnormal:

Page 118 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Failure in expansion occurs in pneumonia
- palpable grating sensation with breathing indicates pleural fremitus

Assess tactile fremitus

- Begin palpating over the lung apex in the supra-clavicular areas
- Compare vibrations from one side to the other as the person repeats " Arba-Arat"
- Note skin temperature and moisture

Per cuss the anterior chest

- Begin percussing the apex in the supra-clavicular areas
- Perusing the inter-space and comparing one side to the other, move down the anterior chest
- Do not percuss directly over female breast tissue because it produces dull note
- Note cardiac dullness and not confused with lung pathology
- Check for liver dullness in the Rt. 5th inter-costal space and tympani over the gastric space

Auscultate the Anterior chest

- Auscultate the lung fields over the anterior chest from the apex in the supra clavicular areas down the sixth rib. Progress from side to side as you move downward, and listen to one full respiration in each location. Do not place your stethoscope directly over the female breast.
- Displace the breast and listen directly over the chest wall

Cardiovascular System

Table 2.3.1 Heart Sounds

The first heart sound (S1)	The closure of the AV valves and signaling the beginning of the systole
The second heart sound (S2)	Closure of the semi-lunar valves and signals the end of the systole

Page 119 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Third heart sound (S3)	The ventricles are resistant to fill and creates vibration. Fourth heart sound (S4) occurs at the end of diastole at pre-systole
------------------------	--

Subjective Data

- Ask for chest pain , Dyspnea , Orthopnea ,Cough, Fatigue ,Edema and nocturnal

Methods of Examination

- Palpate each carotid artery medial to the sterno-mastoid
- Palpate gently
- Only one carotid artery at a time
- Feel the pulse
- Abnormal: diminished pulse (feels small and weak)
- Auscultate the carotid Artery for bruit in case of old people, or patients with hypertension (Normally not present)

The Precordium

- **Inspection** - Inspect the anterior chest
 - **Pulsations**- Check the apical impulse
 - Common in children or those with thinner chest walls
- It occurs with ventricular hypertrophy due to increased load

Palpation

- Palpate the apical impulse
- Localize the apical impulse precisely using one finger pad. Asking the person to "exhale and then hold it" aids the examiner in locating the pulsation
- You may need to role the person midway to the left to find it. Palpate in about half of adults
- Not palpable with obese or persons with thick chest walls
- Abnormal: Cardiac enlargement (increased size, force and duration)

- Palpate across the precordium
- Using the palmar of your fingers gently palpate:
 - the apex
 - the left sternal border

Abnormal: a thrill is a palpable vibration that feels like the throat of a purring cat.

Table 2.3.2 Auscultation: landmarks

Second right interspace	Aortic valve area
Second-left-interspace	Pulmonic valve area
Left-lower-sternal-border	Tricuspid valve area
Fifth interspace at around left midclavicular line	Mitral valve area

Listen and Note

- I. The rate and rhythm
- II. Identify S1 and S2
- III. Assess S1 and S2 separately
- IV. Listen for extra heart sounds
- V. Listen for murmurs

Note the Rate and Rhythm

Normal:

- Rate ranges: 60-100 beats/minute
 - The rhythm should be regular

Abnormal:

- **Premature beat**
 - every third or fourth beat sounds early
- **Irregularly irregular**
 - no pattern to the sounds
 - beats come rapidly and at random intervals

- **Identify S1 and S2**

- a pair of sounds close together (lub-dup) and S1 is the first of the pair

❖ **Guidelines to distinguish S1 from S2**

- ✓ S1 is louder than S2 at the apex;
- ✓ S2 is louder than S1 at the base.
- ✓ S1 coincides with the carotid artery pulse.
- ✓ Feel the carotid gently as you auscultate at the apex
- ✓ The sound you hear as you feel each pulse is S1

Focus on systole

- ✓ Focus on systole, then on diastole
- ✓ listen for any extra heart sounds
- ✓ Listen with the diaphragm, then switch to the bell
- ✓ covering all auscultatory areas
 - For extra sounds of S3 and S4
- ✓ Listen for Murmurs

A blowing, swooshing sound that occurs with turbulent blood flow in the heart or great vessels .it may indicate Mitral Stenosis or Aortic stenosis.

Abdominal Examinations

Subjective Data

- Appetite , Dysphagia, Food intolerance, Abdominal pain, Nausea/vomiting, Bowel habits, Rectal conditions ,Past abdominal history

Method of Examination

I. Inspection

- inspects the contour, Symmetry, Umbilicus, Skin, Hair distribution

I. Auscultation

- Auscultate bowel sounds and vascular sounds
- Auscultate abdomen next, because percussion and palpation can increase peristalsis
- Use the diaphragm-end piece because bowel sounds are relatively high pitched

Page 122 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Hold the stethoscope lightly against the skin; pushing too hard may stimulate more bowel sounds
- Begin in the RLQ at the ileocecal valve, because bowel sounds are always present here normal

Bowel sounds

- Movement of air and fluid through the small intestine
- high pitched
- Abnormal:
 - ✓ Hyperactive: loud, high pitched, rushing
 - ✓ Hypoactive or absent- following abdominal surgery or with inflammation of the peritoneum

Vascular Sounds

- Note the presence of any vascular sounds or bruit over the aorta, renal arteries, iliac and femoral arteries, esp. with hypertensive cases
- Usually there is no such sound

II. Percussion

- Percuss general tympany, liver span, and splenic dullness
- Percuss to assess the relative density of abdominal contents to locate organs
- To screen for abnormal fluid or masses
- Tympany should predominate over all four quadrants

Abnormal

- Dullness occurs over a distended bladder, adipose tissue, fluid or a mass

Liver Span

- Measure the height of the liver

In the right mid-clavicular line (mid-way between the acromioclavicular and sterno clavicular joint). Begin in the area of lung resonance and Percuss down the interspaces until the sound changes to a dull quality. Mark the spot, usually in the fifth intercostal space and Find abdominal tympany.

Page 123 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- ✓ Percuss up in the midclavicular line
- ✓ Mark where the sound changes from tympany to a dull sound (Normally at the right costal margin)
- ✓ Measure the distance between the two marks
- Normal liver span in the adult
 - ✓ Ranges from 6-12cm. The height of the liver correlates with the height of the person (taller, longer liver span)
- Abnormal: enlarged liver span- hepatomegally

Splenic Dullness

- Located by a dull note from the 9th, to 11th Intercostals space just behind the left midaxillary line. The area of splenic dullness normally is not wider than 7cm. in the adult. Percuss in the lowest interspaces in the left anterior axillaries line Tympany should result.
- Ask the person to take a deep breath Normally tympany remains through full inspiration
- Abnormal
 - a change in percussion from tympany to a dull sound with full inspiration - positive spleen percussion sign Splenomegally in Malaria or hepatic cirrhosis

Costo-vertebral Angle Tenderness

- ☐ To assess the kidney
 - Place one hand over the 12th Rib at the costo-vertebral angle on the back Thump that hand with ulnar edge of your other fist Normally T he person feels no pain
- ☐ Abnormal
 - Sharp pain occurs with inflammation of the kidney

III. Palpation

- Palpate surface and deep areas, liver edge, spleen and kidneys
- To judge the size, location, and consistency of certain organs

Page 124 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

- To screen for an abnormal mass tenderness.

- **Use Light and Deep palpation**

Light palpation

- With the first four fingers close together, depress the skin about 1cm
- Make a gentle rotary motion, sliding the fingers and skin together
- Then lift the fingers and move clockwise to the next location around the abdomen
- The objective is not to search for organs but to form an overall impression of the skin surface and superficial musculature

Deep palpation

- Push down about 5-8cm
- Moving clockwise, explore the entire abdomen
- In case of very large or obese abdomen, use a bimanual technique
- Place your two hands on top of each other. The top hand does the pushing; the bottom hand is relaxed and can concentrate on the sense of palpation

Liver- Palpation

- Place left hand under the person's back parallel to the 11th and 12th ribs
- Lift up to support the abdominal contents
- Place your right hand on the RUQ, with fingers parallel to the midline
- Push deeply down and under the right costal margin
- Ask the person to take a deep breath

Normal:

- Feel the edge of the liver bump your fingertips as the diaphragm pushes it down during inhalation
- Often, the liver is not palpable and you feel nothing firm

Abnormal:

- Liver palpated more than 1-2cm below the right costal margin is enlarged

Spleen- Palpation

Page 125 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Normally the spleen is not palpable and must be enlarged three times its normal size to be felt. Reach your left hand over the abdomen and behind the left side at the 11th and 12th ribs
- Lift up for support and Place your right hand obliquely on the LUQ with the fingers pointing toward the left axilla and just inferior to the rib margin. Push your hand deeply down and under the left costal margin and ask the person to take a deep breath. You should feel nothing firm

Procedure for palpating internal organs

- To palpate the liver edge, spleen and kidneys to judge the size, location, and consistency of these organs and screen for an abnormal mass tenderness, you need to ensure there is complete muscle relaxation by:
 - ✓ Keeping your palpating hand low and parallel to the abdomen.
 - ✓ Teaching the person to breathe slowly (in through the nose and out through the mouth).
- **Iliopsoas muscle and obturator tests**
 - ✓ Perform this test when acute abdominal pain or appendicitis is suspected.
 - ✓ With the person supine, lift the right leg straight up, flexing at the hip; then push down over the lower part of the right thigh as the person tries to hold the leg up. When the test is negative, the person feels no change/pain. Pain in the right lower quadrant indicates appendix
 - ✓ Again with the person supine, lift the right leg, flexing at the hip and 90 degrees at the knee. Hold the ankle, and rotate the leg internally and externally. Again, normally, there is no pain.

Neurological system

Subjective Data:

- Head ache, head injury, dizziness, seizure, tremors, weakness or incoordination, numbness or tingling, difficulty swallowing, difficulty speaking, significant past history.

Objective Data

Page 126 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Complete Neurological Examination
 - ✓ Mental status
 - ✓ Cranial nerves
 - ✓ Motor system
 - ✓ Sensory system
 - ✓ Reflexes

Cranial Nerves

Cranial Nerve I (Olfactory Nerve)

- Test the sense of smell in those who report loss of smell
- First assess patency by occluding one nostril at a time and asking the person to sniff
- Then, with the person's eyes closed Occlude one nostril and present an aromatic substance like coffee, orange, soap, or alcohol

Cranial Nerve II (Ophthalmic Nerve)

- Test visual acuity
- Snellen eye alphabet chart - lines of letters arranged in decreasing size .Place the Snellen chart in a well lit spot at eye level then Position the person on a mark exactly 20 feet from the chart
- shield one eye at a time with an opaque card during the test and Ask the person to read through the chart to the smallest line of letters possible

Cranial Nerves III (Oculomotor nerve pupils)

Cranial Nerves IV (Trochlear nerve)

Cranial Nerves VI (Abducens nerve)

• Cranial Nerve V (Trigeminal Nerve)

- Motor function:
 - ✓ Assess the muscles of mastication by palpating the temporal and masseter muscles as the person clinches the teeth
 - ✓ Muscles should feel strong on both sides
 - ✓ Try to separate the jaws by pushing down the chin Normally you cannot

Check pupils for size, regularity, equality and light reaction

Page 127 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Sensory Function:
 - ✓ With the person's eyes closed and Test light touch sensation by touching a cotton wisp on persons face: forehead, cheeks, and chin then Ask the person to say “now” whenever the touch is felt
 - ✓ Tests all three divisions of the nerve – ophthalmic, maxillary, and mandibular
- Corneal Reflex:
 - ✓ With the person looking forward
 - ✓ Bring a wisp of cotton, in from the side and lightly touch the cornea
 - ✓ Normally the person will blink bilaterally

Cranial Nerves VII {Facial Nerve}

- Motor Function
 - ✓ Note mobility and facial symmetry as the person responds to smile, frown, close eyes tightly
 - ✓ Lift eyebrows, show teeth and puff cheeks
- Sensory Function
 - ✓ Do not test routinely
 - ✓ When indicated, test sense of taste by applying to the tongue a cotton applicator covered with a small amount of solution of sugar, salt, or lemon juice

Cranial Nerve VIII {Acoustic (vestibulocochlear) nerve}

- Voice test
 - ✓ Placing one finger on the tragus of each ear
 - ✓ Shielding your lips, exhale and whisper slowly such as Monday, fourteen
 - ✓ Normally the person repeats each word correctly after you say it.

Cranial Nerves IX and X (Glosso pharyngeal and vagus nerves).

- Motor function
 - ✓ Depress the tongue with a tongue blade note pharyngeal movement as the person says “ahhh”
 - ✓ the uvulae and soft palate should rise in the midline

Page 128 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Cranial Nerve XI (Spinal Accessory Nerve)

- Examine the sternomastoid and trapezius muscles for equal size .Check equal strength by asking the person to rotate the head forcibly against resistance applied to the side of the chin
- Then ask the person to shrug the shoulders against resistance. These movements should feel equally strong on both sides

Cranial Nerve XII (Hypoglossal Nerve)

- Inspect the tongue
 - ✓ There should be no wasting or tremors

Breasts and Lymphatics

The Breasts

- General Appearance
- Note symmetry of size and shape
 - ✓ A sudden increase in the size of one breast signifies inflammation or new growth
- Skin normally is smooth and of even color. Note any localized areas of redness, bulging, or dimpling

Nipple

- Symmetrically placed on the same plane on the two breasts
- Distinguish a recently retracted nipple
- Note any dry scaling ,Any fissure ,Ulceration ,Bleeding ,Other discharge ,Inspect and palpate the axillae.

Breast Palpation

- Put the woman in a supine position
- Tuck a small pad under the side to be palpated and raise her arm over her head
- Use the pads of your first three fingers and make a gentle rotary motion on the breast
- Start at the nipple and palpate in concentric circles
- Increasing out to the periphery
- Move clockwise taking care to examine every square inch of the breast

Page 129 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Take care to palpate the tail of the spence extending from the upper outer quadrant into the axilla

Breast self-examination

- The best time to conduct breast self-examination is right after the menstrual period, or the fourth through to the seventh day of the menstrual cycle, when the breasts are the smallest and least congested.
- Avoid citing frightening mortality statistics about breast cancer. This may generate excessive fear and denial that actually obstructs a woman's self cares action. Describe the correct technique and rationale, and the expected findings to note as the woman inspects her own breasts.
- Teach the woman to examine in front of a mirror. At home, she can start palpation in the shower where soap and water assist palpation. Then palpation should be performed while lying supine.
- Encourage the woman to palpate her own breasts while you are there to monitor her own technique use the return demonstration to assess her technique

Musculo-skeletal System

The skeletal muscles are attached to bone by a tendon.

Subjective data

- Joints
 - Pain, stiffness, swelling, heat, limitation of movements
- Muscles
 - Pain, (cramps), weakness
- Bones
 - pain, deformity, trauma (fracture, sprains, dislocations)

Order of the Examination

1. Inspection
2. Palpation
3. Range of motion (ROM)

Page 130 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

4. Muscle testing

- Order of the Examination
 - Notice any heat, tenderness, swelling, or masses. Joints normally are not tender to palpation.
 - A small amount of fluid is present in the normal joint, but it is not palpable
 - Palpable fluid is abnormal
- **Temporo-mandibular joint:**
 - Place the tips of your first two fingers in-front of each ear and ask the person to open and close the mouth. Instruct the person to open mouth, maximally, partially and on side.
 - Swelling, crepitus and pain indicate abnormality
- **Cervical spine:**
 - Inspects the alignment of the head and neck.
 - The spine should be straight and the head erect. Palpate the spinous process and the sternomastoid and trapezius muscles. They should feel firm, with no muscle spasm or tenderness. Ask the person to do extension, flexion, lateral bending and rotation of the head and neck.

Measuring Vital signs

Vital signs (V/S) or cardinal signs reflect the body's physiologic status and provide information critical to evaluating homeostatic balance.

- They are indicators of whether the individual is alive.
- They indicate the overall health status of a person.
- These signs reflect changes in the function of the body.

There are four primary vital/cardinal signs. These are:

- A. Body temperature (To)
- B. Pulse rate (PR)
- C. Respiratory rate (RR)
- D. Blood pressure (BP)

Page 131 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

Purposes of taking V/S

- To obtain baseline data about patients' condition
- To aid in diagnosing patients' problem.
- For therapeutic purpose so that to intervene accordingly.

Time to assess V/S

- On admission
- When client has a change in health status
- According to nursing or medical order
- Before & after surgery or invasive diagnostic procedures
- Before & after any nursing intervention that could affect V/S such as ambulation
- According to hospital or other health institution policy.
- Before & after administering of certain medication that will affect V/S (respiratory and cardiovascular system)

Body temperature (T)

It is the hotness or coldness of the body.

It is the balance b/n heat production & heat loss of the body

Types of body temperature

1. **Core body temperature:** - is the temperature of internal organs and it remains constant most of the time (37.5 °C); with range of 37-38 °C.

The core body temperature of a healthy person is maintained within a fairly constant range by thermoregulatory center in the hypothalamus. Under normal condition the thermoregulatory center's set point maintains body temperature, within a range of 35.9-37.4°C.

Core body temperature reflects the temperature of viscera and muscles. It is measured at **rectal & tympanic site**

2. **Surface body temperature:** - is the temperature of the skin, subcutaneous tissue & fat cells and it rises & falls in response to the environment (ranges b/n 20-40oc). It doesn't indicate internal physiology. It is measured at **oral or axillaries'** sites.

B. pulse rate (PR)

Page 132 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Pulse is a wave of distention blood in artery created by the contraction of left ventricle.

Stroke volume and the compliance of arterial wall are the two important factors influencing pulse rate. Pulse rate is regulated by autonomic nervous system.

Purpose

- To determine number of heart beats occurring per minute(rate)
- To gather information about heart rhythm and pattern of beats
- To evaluate strength of pulse
- To assess heart's ability to deliver blood to distant areas of the body
- To assess response of heart to cardiac medications, activity, blood volume and gas exchange
- To assess vascular status of limbs

Characteristics of pulse

There are peripheral and apical pulses.

Pulse deficit-is the difference between peripheral and apical pulse, and it is usually zero.

Pulse rate – refers to the number of pulsations per minute. In adults (60-100) times per minute.

Brad-cardiac; refers to pulse rate below 60 BPM.

Tachycardia refers to pulse rate above 100BPM.

Rhythm -(regularity or irregularity with which pulsations occur). disturbance of rhythm is called dysrhythmia.

The pulse is commonly assessed by palpation (feeling) and auscultation (hearing using a stethoscope).

Sites for taking pulse rate

A pulse may be measured in nine sites in our body. This is by using the following arteries:

Peripheral pulse

- Radial artery-The most commonly assessed in the clinical settings.
- Temporal artery- used for infants when the radial pulse is not accessible.
- Carotid artery-lies beneath of sternomastoid muscle. It is used to assess circulation to the brain.
- Brachial artery- near to the center of anti-cubital space. It used to measure BP.

Page 133 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

A pulse may be measured in nine sites in our body. This is by using the following arteries:

Peripheral pulse with their corresponding arteries

- ✓ Radial artery-The most commonly assessed in the clinical settings.
- ✓ Temporal artery- used for infants when the radial pulse is not accessible.
- ✓ Carotid artery-lies beneath of sternomastoid muscle. It is used to assess circulation to the brain.
- ✓ Brachial artery- near to the center of anti-cubital space. It used to measure BP.
- ✓ Femoral artery- half way b/n anterior superior iliac spine & the symphysis pubis just below the inguinal ligament. It is used to assess circulation to the leg.
- ✓ Popliteal artery-behind the knee in the popliteal fossa. It is used to assess circulation to the lower leg & to measure BP.
- ✓ Posterior tibial:-located behind the medial malleolus/bony prominence on each side of ankle
- ✓ Pedal artery (dorsalis pedis)- dorsal aspect of the foot to the tendon that runs the great toe towards the ankle.

Apical pulse

Is measured by listening over the apex of the heart using stethoscope.

It can be palpated at the level of the **5th intercostal space**, at the left side of mid-clavicular line.



Figure 2.4.1 sites of apical pulse

C. Respiratory Rate

Respiration is the act of breathing includes intake of oxygen and removal of carbon-dioxide. Is method of assessing patientt breathing for depatienth, rate and rhythm

Purpose

- For diagnostic purpose
- To evaluate the progress of patient condition
- To evaluate the effect of administered drugs
- To evaluate breathing for rate, depatienth and rhythm

Respiration involves several physiologic events.

Pulmonary ventilation (breathing):- is the movement of air in & out of the lungs.

Inspiration (inhalation):- is the act of breathing in

Expiration (exhalation):- is the act of breathing out

External respiration: - is the exchange of oxygen and carbon dioxide between the alveoli of the lungs & circulating blood.

Internal respiration: - is the exchange of o₂ & co₂ between the circulating blood & tissue or cells

One respiration is one inhalation & one exhalation.

There are two types of breathing

Costal (thoracic):-observed by the movement of the chest upward and downward.

It is commonly used for adults.

Page 135 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Diaphragmatic (abdominal):- involves the contraction and relaxation of the diaphragm, observed by the movement of the abdomen. Commonly used for children.

D. Blood pressure (BP)

Blood pressure:-is the force exerted by the blood against the walls of arteries.

It is an indication of cardiovascular status.

Cardiac output (CO) is the amount of blood pumped/minute. $CO = SV \times PR$ (peripheral resistance)

$BP = CO \times PR$ (pulse rate)

The pressure is highest when the ventricles of the heart contract & eject blood in to the aorta & pulmonary arteries.

The blood pressure measured during ventricular contraction (cardiac systole) is systolic blood pressure.

During ventricular relaxation cardiac blood pressure is diastolic blood pressure which is due to elastic recoil of the vessels.

The mathematical difference between the measured systolic & diastolic blood pressure is pulse pressure.

Page 136 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022



Figure 2.4.2 BP cuff and stethoscope

Variations in blood pressure (BP)

BP can be within a wide range of normal values

A rise or fall of 20-30mmHg in a person's blood pressure is significant even if it is within normal range. A person's blood pressure is lower in lying position than sitting & standing position. Because of many factors that influence BP, a single measurement is not necessarily significant. Measurement taken after the patient rests for at least 5 minutes after exercise not consumed caffeine or smoked for 30 minutes before measurement.

Blood pressure=Systolic pressure/Diastolic pressure → BP=100-140/60-90mmHg

Systolic pressure:-is the first sound heard through stethoscope and

Diastolic pressure:-is the cessation of the loud sounds or disappearance of the heart sound.

2.5 Complete patient/client data

Page 137 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

It is essential that patient data is kept safe and secure, to protect your confidential information.

There are four ways that privacy is protected:

- ✓ Removing details that identify a person and taking further steps to anonymize information.
- ✓ Using an independent review process to make sure the reason for using patient data is appropriate.
- ✓ Ensuring strict legal contracts are in place before data is transferred or accessed.
- ✓ Implementing robust IT security.

A patients full record will only be seen by healthcare professionals who are directly involved in your care.

There are strict controls on how anyone else can access patient information. The purpose must be approved before anyone can use data, and they are only given access to the minimum amount of data necessary. The types of organisations that can use patient data include:

Concerned health care providers and commissioners: use data to monitor trends and patterns in hospital activity, to assess how care is provided, and to support local service planning.

University researchers: use data to understand more about the causes of disease, to develop new ways of diagnosing illness or to identify ways to develop new treatments. Explore our case studies for some examples.

Charities: use data to evaluate services and identify ways to improve care.

Companies: use data if they are partnering with the national MoH to provide care and research. The MoH can't do all of the analysis on its own, and companies may have the best expertise and technologies for making sense of large and complex data from hospitals, or for developing new treatments. People often have lots of questions about how and why companies can access data.

How are decisions made about who can access patient data?

At a national level, some key organisations hold patient data or have responsibility for oversight about the purposes for which it can be used. They work with others to make decisions about how to safeguard data and set the conditions under which it can be accessed.

What are the risks?

Page 138 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Sharing patient data will never be totally risk-free, but there must be appropriate measures in place to make any risks as low as reasonably possible. Data is anonymized wherever possible. There are audit processes to check who is accessing data, and robust penalties can be issued where data is misused.

Self-check-2

Directions: Answer all the questions listed below.

1. What are the components of comprehensive patient care?
2. What are the components of medical history?

MCQ

1. Making eye contact is _____. that creates rapport and trust..
 - A. A verbal cue
 - B. A subliminal cue
 - C. A nonverbal cue
 - D. An avoidance behavior
2. Treating a patient without consent may make the health care provider liable in both criminal and civil court proceedings.
 - A. True
 - B. False
3. The nurse positions the client sitting upright during palpation of which area?
 - A. Abdomen
 - B. Genitals
 - C. Breast
 - D. Head and neck
4. After auscultating the abdomen, the nurse should report which finding to the primary care provider?
 - A. Bruit over the aorta
 - B. Absence of bowel sounds for 60 seconds

Page 139 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022



- C. Continuous bowel sounds over the ileocecal valve
- D. A completely irregular pattern of bowel sounds

Page 140 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

Unit three: Apply basic patient/client care

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

- Patient/client care procedures
- Basic patient care
- Correct and faulty posture in different activities
- Follow up and monitoring

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

- Describe and demonstrate patient/client care procedures
- Describe and perform basic patient care
- Explain correct and faulty posture in different activities
- Carry out follow up and monitoring

Page 141 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

3.1 patient client care procedures

3.1.1 Bed making

Is the ability of the nurse to keep the bed clean and comfortable. The technique of preparing different types of bed in making patients/clients comfortable in his/her suitable position for a particular condition. This requires keen inspection to be sure that the linens are clean, dry and wrinkle-free

Fanfold

Is done by grasping the upper edge of the linen with both hands. Specifically folding the edge of the sheet used in the bed 6-8 inches outward

Mitered corner

A means of anchoring sheets on mattresses or a method of folding the bed clothes at the corners to secure them in place while the bed is occupied. It is accomplished on the bottom sheet by placing the end of the sheet evenly under the mattress

Toe pleat

A fold made in the top bed clothes to provide additional space for patient's toes

Foot drop

Dropping of the foot from paralysis of the anterior muscle of the leg

Plantar flexion of the foot with permanent contracture of the gastrocnemius (calf) muscle and tendon

Bed cradle

Is a curved, semi-circular device made of metal that can be placed over a portion of the patient's body. Is sometimes called an Anderson frame, is a device designed to keep the top bedclothes off the feet, legs, and even abdomen of a client

Magic corner

Corners of a folded linen when upon opening it automatically positions the sheets the way it is placed on the bed

PURPOSE OF BED MAKING

A. On changing an unoccupied bed

Page 142 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

To promote the client's comfort

To provide a clean near environment for the client

To provide a smooth, wrinkle-free bed foundation, thus minimizing sources of skin irritation

B. On changing an occupied bed

To conserve the client's energy and maintain current healthy status

To promote the client's comfort

To provide a clean near environment for the client

To provide a smooth, wrinkle-free bed foundation, thus minimizing sources of skin irritation

3.1.1.2 IMPOPRTANCE OF BED MAKING

1. It helps maintain a clean, orderly and comfortable room which contributes to the patients sense of well-being.

2. Helps the patient secure proper rest and comfort which are essential for health and refresh him/her by providing cleanliness

3. It helps prevent or avoid microorganisms to come in contact with the patient which could cause tribulations.

4. It minimizes the sources of skin irritation by providing smooth, wrinkle-free bed foundation.

3.1.2 TYPES OF BED

Bed - is primarily divided into 3 sections

- length: 1.9m (6.5ft).
- weight: 0.9m (3ft.)
- high: 66cm (26in.)
- but sometimes varies depending on circumstances

A. Common Types of Bed

Occupied bed: - the occupied bed is made when the patient is not able or not permitted to get out of the bed

The important part of making an occupied bed is to get the sheets smooth and tight under the patient so that there will be no wrinkles to rub against the patient's skin. The client's privacy, comfort and safety is also important when making the bed

Page 143 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Unoccupied bed: - the unoccupied bed is made when there is no patient confined in bed

1. Open bed

The top covers are generally folded back so that a client can easily get into bed. Surgical, recovery and postoperative bed is a modified version of the open bed; the top bed line is arranged for easy transfer of the client from a stretcher to the bed

The top sheets are folded to one side or fanfolded to the bottom third of the bed

2. Closed bed

The top sheet blankets and bedspreads are drawn up to the head of the mattress and under the pillows, this is prepared in a hospital room before a new client is admitted to that room

3. Cradle Bed

Contains cradle, a device for holding the top covers off.

The outer cradle is made of wood, metal or at home for a brief period, a cardboard art to shape.

4. Postoperative Bed

Also known as recovery bed or anesthetic bed.

Used not only for clients who have undergone surgical procedures but also for clients who have given anesthetics for a certain examination.

Used for a patient with a large cast or other circumstance that would make it difficult for him to transfer easily into bed.

B. Special Types of Beds

1. Water bed

Special mattress filled with water.

It controls temperature of water, reducing pressure on body parts.

Indications:

Patients confined to bed for long periods

2. Turning Frames (Stryker Wedge)

It allows repeated changes between the supine and prone positions without disturbing spinal alignment.

Page 144 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Indications:

Complication of immobility such as atelectasis, pneumonia, decubitus ulcer and renal calculi.

3. Rotation Bed

Promote postural drainage, peristalsis and helps prevent the complications of mobility

Indication:

Patients with spinal cord injury, severe burns

4. Circoelectric Bed

Permits frequent turning of several injured or immobilized patient with minimal trauma or extraneous movement.

Helps prevent and treat pressure ulcers, respiratory and circulatory complications

Indications:

Patients confined to bed for long periods of time

5. Clinton Therapy Bed

Also called the air-fluidized bed

Indications:

Patients with managing burns and patients with various disabilities.

6. Air Therapy Bed

Provide different levels of support to different body parts.

Indications:

Patients who are at risk to skin breakdown

COMMON BED POSITIONS

Contour

- Head section is elevated; the knee and foot section are elevated.

Indications: used for certain injuries or disease of the lower extremities.

3.1.3 KINDS OF LINENS

A. Blanket

A large piece of cloth often soft, woolen and is used for warmth as a bed cover

B. Top sheet

Page 145 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Used to cover the patient to provide warmth, made of thick cotton, thermal material

C. Cotton drawn sheet

A piece of cloth that covers the rubber sheet and is used to absorb and protect moisture

D. Bottom sheet

Used to cover the bed after mattress cover

E. Rubber sheet

Used to protect the bottom sheet from soiling due to patient secretions and prevent the patients from getting bedsores. It is usually placed over the center of the bottom sheet

F. Mattress cover

A piece of cloth to cover the mattress

G. Woolen blanket

A large rectangle piece of cloth of soft fabric often either bound edges used especially for warmth as a bed covering. It should be light, warm and large enough to cover the shoulder and to tuck in well at the foot and to extend over sides.

3.2 Catheterization

Urinary Catheterization

Definition of catheterization: Is the introduction of a tube (catheter) through the urethra into the urinary bladder. Is performed only when absolutely necessary. Fear of infection and trauma

Note. Strictly a sterile procedure, i.e. the nurse should always follow aseptic technique

Catheter: is a tube with a hole at the tip.

Types of Catheter

1. Straight (plain or Robinson)
2. Retention (Foleys, indwelling)

Catheterization using a straight catheter

Purpose

- To relieve discomfort due to bladder distention
- To assess the anti of residual urine
- To obtain a urine specimen

Page 146 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- To empty the bladder prior to surgery

3.3 NG (Nasogastric) tube insertion

Indications

By inserting a nasogastric tube, you are gaining access to the stomach and its contents. This enables to drain gastric contents, decompress the stomach, obtain a specimen of the gastric contents, or introduce a passage into the GI tract. This will allow to treat gastric immobility, and bowel obstruction. It will also allow for drainage and/or lavage in drug over dosage or poisoning. In trauma settings, NG tubes can be used to aid in the prevention of vomiting and aspiration, as well as for assessment of GI bleeding. NG tubes can also be used for **enteral feeding** initially.

Contraindications

Nasogastric tubes are contraindicated in the presence of severe facial trauma (cribriform plate disruption), due to the possibility of inserting the tube intracranially. In this instance, an orogastric tube may be inserted.

Complications

The main complications of NG tube insertion include aspiration and tissue trauma. Placement of the catheter can induce gagging or vomiting, therefore suction should always be ready to use in the case of this happening.

Universal precautions:

The potential for contact with a patient's blood/body fluids while starting an NG is present and increases with the inexperience of the operator. Gloves must be worn while starting an NG; and if the risk of vomiting is high, the operator should consider face and eye protection as well as a gown. Trauma protocol calls for all team members to wear gloves, face and eye protection and gowns.

3.4 Medication Administration

Principles of drug action

Drug action has two phases to be effective and inaction to achieve its target effect. These are pharmacokinetics and pharmacodynamics phases.

Page 147 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Pharmacodynamics: - is the phase of drug action that describes the process by which the physiologic and biochemical effects of a drug on the body such as therapeutic effects and side effects.

Pharmacokinetics: - is the phase of drug action that describes the process by which a drug moves through the body and is eventually eliminated. These are absorption distribution, metabolism and excretion.

First-pass effect reduced bioavailability of an orally administered drug due to metabolism in GI epithelial cells and liver or to biliary excretion. Effect may be avoided by use of sublingual tablets or rectal suppositories.

Half-life ($t_{1/2}$) time required for concentration of a drug in the body to decrease by 50%. Half-life also represents the time necessary to reach steady state or to decline from steady state after a change (i.e., starting or stopping) in the dosing regimen. Half-life may be affected by a disease state and age of the drug user.

Factors affecting drug action

A number of variables can alter the effects of medications. Among these are

- Age of the patient
- Weight of the patient
- Gender
- Genetic factor
- Time of administration
- Organ system function
- Route of administration
- Psychological state

Principles of drug administration

Whenever we going to administer medication we have to follow the following safety rules

I. The “Ten Rights” of Medication Administration

1. Right Drug.
2. Right Patient.
3. Right Dose.
4. Right Route.
5. Right Time and Frequency.
6. Right Documentation.

Page 148 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

7. Right History and Assessment.
8. Drug approach and Right to Refuse.
9. Right Drug-Drug Interaction and Evaluation.
10. Right Education and Information.

2. The “Three- check” of Medication Administration

- Check when pick up from the medication board/cabinet
- Check when reconstitute/ prepare the medication
- Check just before administering

Different Routes of Drug Administration

- Oral
- Topical
- Parenteral
 - ✓ Intradermal
 - ✓ Subcutaneous
 - ✓ Intramuscularly
 - ✓ Intravenous
- Rectal
- Vaginal
- Inhalation

Administering oral Medications

Medications that are given by mouth are designed to be swallowed (oral route), to be held under the tongue until they dissolve (sublingual route), to be held in the side of the mouth until they dissolve (buccal route).

Purpose

Provide a safe, effective, economical route for administering medications

Provide a sustained drug action with minimal discomfort.

Advantages of giving medications by mouth (per os) include:-

- ✓ It is usually the simplest and easiest way to take medications

Page 149 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- ✓ Minimal discomfort is experienced
- ✓ It usually has the fewest S/E of any route
- ✓ Oral medications tend to be less expensive and more widely available than medications given by other routes

Contraindications:-

Medications should not be given by mouth when:-

A patient is unable to swallow

A patient is nauseated or vomiting

A patient NPO

Forms of oral medication

Oral medications, commonly termed P.O (Per os) ``by Mouth`` are supplied liquids, capsules and tablets.

Liquid medications are commonly used for small children of adults who are not able to swallow pills easily.

Syrups usually contain sugar and alcohol capsules contain medication particles, powder, or liquid inside a gelatin case. Tablets are made of medication combined with ingredients that bind them together; they may be coated with sugar or films to make them less likely to break apart. Medications whose ingredients are irritating to the stomach may be covered with an enteric coating, which remains intact until it comes in contact in contact with alkaline intestinal secretions.

Topical Medications

Medication that are placed on the skin surface or in body cavities to treat local (skin) conditions or to treat systemic conditions. Medications used to treat local skin conditions or infections are prepared in irrigation solutions of in creams or lotions. When transdermal Medications is absorbed through the skin, and they have systemic effects.

Ophthalmic Medications

Page 150 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Solutions or ointments may be placed in the eye to treat eye irritation, infections and glaucoma. The lower eyelid is gently retracted and the solutions or ointments are placed in the conjunctival sac.

Otic Medications

Solutions may be dropped into the ear to treat external ear infections or to soften and remove ear wax. Solutions used in the ear should be at room T^0 , use of hot or cold solutions in the ear may cause vertigo, nausea, and pain.

Nasal Medications

Solutions are usually sprayed in to the nose to treat nasal congestion. The patient should sit up and lean his/her head back and then squeezes the bottle while the patient inhales. Rebound nasal congestion, causing symptoms of nasal congestion that are as bad as or worse than original symptoms, commonly occur if decongestant nasal sprays are used for longer than several days.

Rectal Medications

Medication in suppository form may be placed in the rectum to treat systematic complaints or to encourage bowel movements. Liquid medications may be instilled in to the rectum using an enema to encourage bowel movement.

Vaginal Medications

Medications given vaginally come in a variety of forms: foams, juices liquids, creams tablets or suppositories. These medications may be used for contraception to help kill any bacterial in the vaginal area before gynecologic surgery, to treat vaginal itching or infections, or to induce labor.

Inhaled Medications Administration

Inhaled medications may be used to induce anesthesia during surgery and to treat respiratory disorders. They given by nurses may be delivered through a mechanical ventilator, though a hand-held nebulizer, or through a metered dose inhaler. Inhaled medications have a rapid effect on the lungs and are rapidly absorbed by the systemic circulation. Bronchodilator medications,

Page 151 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

used to open lung airways and to promote easier breathing, are frequently part of the therapy for patients with chronic obstructive lung disease.

Parenteral Routes

Parenteral administration involves injecting a medication in to body tissue. The following are the four major sites of injection:-

1. Intradermal (ID) – in to the dermis just under the epidermis
2. Subcutaneous (SC) – into tissues just below the dermis of the skin
3. Intramuscular (IM) – into a muscle
4. Intravenous (IV) - in to a vein

Advantages and Dis-advantages

Medications given by a parenteral route usually are absorbed more completely and have a faster onset of action than medications given by other routes.

Parenteral medications are injected through the skin by passing the skin barrier makes infection more likely to occur if aseptic technique or not used when preparing and administering parenteral medications. Complications may occur parenteral medications are not given into the tissue site or space intended. Specialized equipment required for parenteral administration usually makes medications given by these routes more expensive than medications given by other routes.

Equipment

Equipment needed to administer parenteral medications includes a container for the medications and a system to deliver the medication used for parenteral injections are unusually supplied in vials, ampoules, or prefilled syringes.

Syringes & Needles

- Syringe consists of; a barrel, a plunger & a syringe Tip.
- Needle consists of ; a gauge number, a hub, a shaft, and a bevel
- The Three common types of syringe are tuberculin, insulin and standard syringes
- Tuberculin syringes are supplied with small- gauge(25-28) & short length needle(0.5-0.625 inch)

Page 152 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Insulin syringes are supplied with U-100 syringe and with a very small gauge needle (26-29)
- Standard syringes are supplied with 3ml, 5ml, & 10ml size & 18, 21, 23, or 25 gauge needle.
- Needle gauge (size) varies from 14-29; the needle with smallest gauge (size) or diameter are labeled with largest number.

Medication Preparation Techniques

Before administering a parenteral medication, it may need to be drawn up in to a syringe, be reconstituted or mixed with another medication.

Drawing up medications

Is the process of moving medications from an ampoule or vial in to the syringe. If the drawing up medication from an ampoule, the nurse first opens the ampoule, then removes the needle cap from a syringe. The needle is placed directly in to the open ampoule, and the syringe plunger is pulled back until all the medications from the ampoule added to the syringe. Air is usually drawn on the syringe along with the liquid medication. To rid the air, the syringe is held with the needle pointed up-wards. The air and any volume of unneeded medication should be slowly expelled.

Reconstituting medications is:- accomplished by adding the proper diluents to a powdered medication vials of powdered medications may be packaged a long with vials of the proper type and volume of diluents.

Mixing medications:- mixing medications together in the same syringe may allow a patient. To receive fewer injections at a lower cost. Medications may be mixed together if they are compatible with each other.

Equipment disposal:- disposal of equipment in a careful manner helps to decrease the risk of inadvertent exposure to a patients blood. After administering an injection, the syringe and needle should be placed in a needle disposal box. Recapping a needle or breaking the needle off increase the risk that the nurse will inadvertently poke him or herself with the needle.

Intradermal Injection (IDI)

Page 153 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

Are given into the dermis the layer of tissue located underneath the skin surface allergy or tuberculin skin test are administered by intradermal injections.

Usually administered using 1ml syringe and a small gauge needle (25 to 28 gauges).

Purpose of IDI

Intradermal injection has three main purposes to administer it.

For **diagnostic** purpose e.g. TB ;Tine test (Mantoux test)

For **allergic reaction** test e.g. TAT. PPF

May also be given for **therapeutic** purpose E.g. BCG vaccine

Site of IDI

The inner part of fore arm (mid way b/n the wrist and elbow). For TAT

Upper arm, at deltoid area for BCG vaccination

Upper crest and across the scapula may also be used

Sites of abnormal sub cutaneous tissue, such as area lying:-

Underneath burns

Birth mark

Inflamed tissue and

Edema should be avoided as injection site.

Precautions

Don't massage the site

Check for immediate reaction of the skin. 15-20 minutes later for tetanus test 20-30 minutes later for penicillin

If it is for tine test, mark the area

N.B. Chart the date and time of administration

Subcutaneous Injections

Are given in to the sc tissue, the layer of fat located below the dermis and above the muscle tissue. When a medication is injected into sc tissue absorption is usually slow sustained, and complete.

Page 154 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Insulin, adrenalin, heparin, antirabies, & measles are common examples of subcutaneously administered medications.

Insulin is administered subcutaneously to regulate blood glucose levels.

SC Insulin Administration

When administering insulin, an insulin syringe is used. The needle on an insulin syringe is not detachable. The syringe is calibrated in units; most syringes today contain 100 units per ML and are referred to as U-100 syringes. When administering insulin, the number of units prescribed is measured in the syringe.

If SCI of insulin are given repeatedly in to the same site, unpredictable insulin absorption and lipid atrophy (atrophy) may occur. Each injection should be given about 1 inch from the last injection site. So, site rotation should be planned and well documented to prevent repeated use of the same site. Injection of cold insulin has also been related to lipoatrophy formation; insulin need not be refrigerated for short term use and we have to teach the patient about site rotation.

Common Sites used for Subcutaneous Injections

Subcutaneous injection may be administered into upper arm, the upper back, the abdomen, the upper buttocks, and the thigh.

Sites of abnormal sub cutaneous tissue, such as area lying:-

- Underneath burns
- Birth mark
- Inflamed tissue
- Edema should be avoid as injection site

Purpose of SC Injection

To obtain quick absorption than oral route

When it is impossible to give medications orally

To administer medication that are not active by the oral route or are inactivated by the digestive enzyme (such as heparin & insulin)

Speed of absorption depends on the site selected.

Page 155 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

In to abdomen are most rapidity

In to the upper arm are at intermediate rate

In to the thigh (anterior) at the slowest rate

Sites of SC Injection

Outer part of the upper arm

The abdomen below the costal margin to the iliac crest

The anterior aspects of the thigh

The upper back lower to the scapula

The upper buttocks

Intramuscular injections

Intramuscular injections are given into the muscle layer, beneath the dermis and SC tissue. In a standard intramuscular injection, the needle is inserted at a 90° angle through the layers of the skin and into the muscle layer. The caregiver ensures that the needle tip is not in a blood vessel. E.g. PPF, De pron, Diclofenac, Benzyl Penicillin, Depo Provera, TT, DPATIENT, vit. B complex & many others.

As the plunger is slowly depressed, the medication enters the muscle forming a bubble at the tip of the needle.

Once the needle is withdrawn, the medication *remains in the muscle tissue*. From there it is slowly absorbed into the muscle's capillaries.

Medications administered by IM injection usually are absorbed at an intermediate rate, slower than IV administration and more rapid than SC administration. IM injection may be administered into sites in the upper arm (deltoid muscle), the hip (ventral gluteus), the thigh (vastus lateralis or rectus femoris), and the buttocks (dorsogluteal).

Site choices are influenced by the age of the patient the medication to be injected, the amount of medication to be injected and the general condition of the patient. Injections should not be given into abnormal muscle tissue, such as tissue underneath burns, scars, or inflamed areas.

The Deltoid Site

Page 156 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

The deltoid site has a small amount of muscle mass with little overlying subcutaneous fat; medication injected into this site is absorbed rapidly.

The deltoid site is used infrequently because the muscle is small and because it lies close to the radial nerve and the brachial artery. Children under the age of 18 months have poorly developed deltoid muscles and should not receive IM injections into site.

The rectus femoris and vastus lateralis sites

Injection sites in the thigh; offer rapid rates of medication absorption. Because these muscles contain no large blood vessels or nerves, they are safe injection sites to use for IM injections for most patients. The rectus femoris site, is the site of choice for infants and children, but may be also used for adults.

The ventrogluteal site

The site on the lateral hip is a site free of major blood vessels, nerves and fat.

To locate the site, the heel of the opposite hand is placed over the greater trochanter, with the index and middle fingers angled towards the anterior superior iliac spine and toward the iliac crest, respectively. The injection is given in the center of the triangular area thus formed.

The Dorsogluteal site

The dorsogluteal site of the buttocks has been used commonly for IM injections. To locate the dorsogluteal site the index fingers are (both hands) used to locate the greater trochanter and the posterior superior iliac spine. An imaginary line is drawn b/n these landmarks, and the injection is given lateral and superior to the midpoint of this line drawn b/n the greater trochanter and the posterior superior iliac spine. The four quadrants i.e. the upper-outer-quadrant is the derivative of the dorsogluteal site.

N.B. The sciatic nerve and gluteal artery lie close to this site.

Infants <18 months and debilitated adults may not have enough muscle mass to allow a safe injection in to this site.

Complications Associated with IMI

Pain with injection

Page 157 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Damage to SC. Or IM tissue, including sterile abscesses, sc tissue, discoloration hematomas, and muscle contractions.

Nerve injury due to nerve struck during injection

Bone injury due to bone struck during IM injection

Speed shock (rapid absorption of med) due to medication administered directly into a vein or artery. To prevent this complications we have to aspirate after inserting needle into toe muscle to check for blood

Infection of muscle or bone due to an introduction of organism into tissue or bone during injection. It is good to follow strict aseptic technique when administering IM injections

Contraindication for IMI

IMI should not be given into abnormal muscle tissue such as:-

- Underneath burns
- Scars
- Inflamed areas
- Muscle atrophy

Administering Intravenous Medications

It is introduction of a drug in solution form using catheters inserted in to veins, often the amount is not more than 10ml at a time.

Intravenous medications are given by way of catheters inserted into veins. IV catheters are placed in the peripheral or the central circulation.

The medication, diluted in IV carrier fluid, mixes with venous blood and is carried along the route of the blood in the veins.

A medication administered into the brachial vein of the forearm is carried to the right side of the heart.

From there it is pumped through the lungs and back to the left side of the heart.

From the left side, it is pumped through the aorta and into the arterial tree of the body to the upper and lower parts of the body, and then to the tissues.

Purpose of IVI:-

Page 158 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

When the given medication is irritating to the body tissue if given through other routes.

When we desire quick action

When it is desirable to eliminate the variability of absorption

When blood drawing is needed

Precautions!!!

Make yourself as well as the patient comfortable before giving injection

We have to do-3 checks strictly since it has fastest way of drug administration

Never recap a used needle

Types of IV Administration/Technique

By IV push (bolus)

Intermittent infusions

Continuous drip infusion

The IV Push (bolus) Technique

It is used to administer medications that must be given rapidly to have the desired therapeutic effect of medications that are incompatible with intravenous fluids e.g. phenytoin. Generally, IV push medications are given over a period of at least 1 min.

The Intermittent Infusion technique;

It is used to administer medications that need to be infused over an intermediate length of time (usually, 30min to 1 hours) and medications that are not stable for long periods of time. Medications administered by this technique are supplied in bags that contain IV fluid.

The Continuous Infusion Technique

Is used to infuse medications that need to be given continuously in order to have their desired effect, or medications that are toxic if given over short periods of time (e.g. multivitamins).

Advantages and Disadvantages IVI

Advantages:-

The onset of medication action is usually rapid

Predictable, therapeutic blood levels of medications can be obtained

The route can be used when GI dysfunction

Page 159 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Larger doses of medications can be administered by this route than by In injection

Disadvantages:-

The high cost of treatment

The difficulty of administering IV medications outside of hospital setting

The difficulty of maintaining it peripheral IV catheters in patients with limited numbers of adequate venous sites

The increased risk of complications with this route

IV medication that is not sterile may cause generalized infection/sepsis/

Complications Associated with IV Medications Administration

Speed Shock

Signs (Symptoms):-

Headache

Tightness in chest

Shock

Cardiac arrest

Causes:-

Medication administered more rapidly than intended

Nursing Measures

Know time period recommended for medication administration

If administering by IV bolus technique, time infusion with a watch with a second hand

If administering by continues drip or intermittent drip methods, regulate drip rate accurately

Check rate of infusion of medication at least several times per hour

Catheter Insertion Site Infection or Systemic Infection

Signs /Symptoms/

Redness warmth, or pain at catheter – insertion site,

Fever, increased leukocyte count,

Organisms present on blood culture samples, shaking, increase on body temperature

Causes:-

Page 160 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Break in aseptic technique when preparing or administering IV medications

Contamination of IV catheter site when IV dressing is changed

IV equipment changed infrequently (the IV cannula should be changed within 48 hrs to 72 hrs)

Contaminated IV solution

Nursing Measures

Catheter securely taped to skin

Check catheter insertion taped to skin

Check catheter insertion site at least once per shift and before and after infusion of medication

Change IV tubing every 48 to 72 hours

Thrombophlebitis

It is inflammation and clot formation accompanied by redness and warmth along cannulated vein, burning pain, slow flow rate and when palpated vein feels hard cord-like structure

Causes:-

Trauma to vein during catheter insertion or from catheter movement

Irritation of vein resulting from medication administered

Nursing measures (the same to n.o 2-3)

5. Air embolism: - entering of the air into the blood system most of the time due to negligence to rid off the air in the syringe and in the IV bag and tube. If a few bubbles enter the system no harm. If large, patient becomes hypotensive, tachycardia, loss of consciousness, cardiac arrest, and cyanotic

Management of air Embolism

Placing the patient on the left side with head down. This will allow the air to rise into the right ventricle and allow blood to pass into the lungs.

Body Mechanics

Body mechanics involves the coordinated effort of muscles, bones, and the nervous system to maintain balance, posture, and alignment during moving, transferring, and positioning patients. Proper body mechanics allows individuals to carry out activities without excessive use of energy, and helps prevent injuries for patients and health care providers.

Page 161 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Musculoskeletal injuries

A **musculoskeletal injury (MSI)** is an injury or disorder of the muscles, tendons, ligaments, joints or nerves, blood vessels, or related soft tissue including a sprain, strain, or inflammation related to a work injury. MSIs are the most common health hazard for health care providers

Table 3.1 lists risk factors that contribute to an MSI

Factor	Special Information
Ergonomic risk factors	Repetitive or sustained awkward postures, repetition, or forceful exertion
Individual risk factors	Poor work practice; poor overall health (smoking, drinking alcohol, and obesity); poor rest and recovery; poor fitness, hydration, and nutrition

Heat/Cold compression

We treat everything from arthritis to pulled muscles to inflammation with ice packs or heating pads. Treating pain with hot and cold can be extremely effective for a number of different conditions and injuries, and easily affordable. The tricky part is knowing what situations calls for hot, and which calls for cold. Sometimes a single treatment will even include both.

As a general rule of thumb, use ice for acute injuries or pain, along with inflammation and swelling. Use heat for muscle pain or stiffness.

Heat therapy

How it works

Heat therapy works by improving circulation and blood flow to a particular area due to increased temperature. Increasing the temperature of the afflicted area even slightly can soothe discomfort and increase muscle flexibility. Heat therapy can relax and soothe muscles and heal damaged tissue.

Types

There are two different types of heat therapy: dry heat and moist heat. Both types of heat therapy should aim for “warm” as the ideal temperature instead of “hot.”

- Dry heat (or “conducted heat therapy”) includes sources like heating pads, dry heating packs, and even saunas. This heat is easy to apply.
- Moist heat (or “convection heat”) includes sources like steamed towels, moist heating packs, or hot baths. Moist heat may be slightly more effective as well as require less application time for the same results Trusted Source.

Professional heat therapy treatments can also be applied. Heat from an ultrasound, for example, can be used to help pain in tendonitis.

When applying heat therapy, you can choose to use local, regional, or whole body treatment. Local therapy is best for small areas of pain, like one stiff muscle. You could use small heated gel packs or a hot water bottle if you only want to treat an injury locally. Regional treatment is best for more widespread pain or stiffness, and could be achieved with a steamed towel, large heating pad, or heat wraps. Full body treatment would include opatientions like saunas or a hot bath.

When not to use

There are certain cases where heat therapy should not be used. If the area in question is either bruised or swollen (or both), it may be better to use cold therapy. Heat therapy also shouldn't be applied to an area with an open wound.

People with certain pre-existing conditions should not use heat therapy due to higher risk of burns or complications due to heat application. These conditions include:

- diabetes
- dermatitis
- vascular diseases
- deep vein thrombosis
- multiple sclerosis (MS)

If you have either heart disease or hypertension, ask your doctor before using heat therapy. If you are pregnant, check with your doctor before using saunas or hot tubs.

Applying heat therapy

Page 163 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Heat therapy is often most beneficial when used for a good amount of time, unlike cold therapy, which needs to be limited.

Minor stiffness or tension can often be relieved with only 15 to 20 minutes of heat therapy.

Moderate to severe pain can benefit from longer sessions of heat therapy like warm bath, lasting between 30 minutes and two hours.

Cold therapy

How it works

Cold therapy is also known as cryotherapy. It works by reducing blood flow to a particular area, which can significantly reduce inflammation and swelling that causes pain, especially around a joint or a tendon. It can temporarily reduce nerve activity, which can also relieve pain.

Types

There are a number of different ways to apply cold therapy to an affected area. Treatment options include:

- ice packs or frozen gel packs
- coolant sprays
- ice massage
- ice baths

Other types of cold therapy that are sometimes used include:

Cryostretching, which uses cold to reduce muscle spasms during stretching

Cryokinetics, which combines cold treatment and active exercise and can be useful for ligament sprains

whole-body cold therapy chambers

When not to use

People with sensory disorders that prevent them from feeling certain sensations should not use cold therapy at home because they may not be able to feel if damage is being done. This includes diabetes, which can result in nerve damage and lessened sensitivity.

You should not use cold therapy on stiff muscles or joints.

Cold therapy should not be used if you have poor circulation.

Applying cold therapy

Page 164 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

For home treatment, apply an ice pack wrapped in a towel or ice bath to the affected area. You should never apply a frozen item directly to the skin, as it can cause damage to the skin and tissues. Apply cold treatment as soon as possible after an injury.

Use cold therapy for short periods of time, several times a day. Ten to 15 minutes is fine, and no more than 20 minutes of cold therapy should be used at a time to prevent nerve, tissue, and skin damage. You can elevate the affected area for best results.

Risks of heat therapy

Heat therapy should utilize “warm” temperatures instead of “hot” ones. If you use heat that’s too hot, you can burn the skin. If you have an infection and use heat therapy, there is a chance that the heat therapy could increase the risk of the infection spreading. Heat applied directly to a local area, like with heating packs, should not be used for more than 20 minutes at a time.

If you experience increased swelling, stop the treatment immediately.

If heat therapy hasn’t helped lessen any pain or discomfort after a week, or the pain increases within a few days, make an appointment to see your doctor.

Risks of cold therapy

If you’re not careful, cold therapy applied for too long or too directly can result in skin, tissue, or nerve damage.

If you have cardiovascular or heart disease, consult your doctor before using cold therapy.

If cold therapy hasn’t helped an injury or swelling within 48 hours, call your doctor.

Notice

Knowing when to use cold therapy and when to use heat therapy will significantly increase the effectiveness of the treatment. Some situations will require both. Arthritic patients, for example, may use heat for joint stiffness and cold for swelling and acute pain.

If either treatment makes the pain or discomfort worse, stop it immediately. If the treatment hasn’t helped much with regular use in a few days, you can make an appointment to see your doctor to discuss other treatment options.

It’s also important to call your doctor if you develop any bruising or skin changes over the course of treatment.

Page 165 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

3.2 Oral hygiene/care

Oral hygiene is the practice of keeping your mouth clean and disease-free. It involves brushing and flossing your teeth as well as visiting your dentist regularly for dental X-rays, exams and cleanings.

Oral hygiene is preventative care. This means you can stop oral health problems — such as cavities, gum disease, bad breath (halitosis) and other issues — before they start by taking good care of your teeth and gums.

Oral health is also linked to whole-body health. For example, if an infection is present in your mouth, your bloodstream can carry the bacteria to other areas of your body, leading to other health concerns like heart disease and stroke. Keeping your teeth and gums healthy is an important part of long-lasting overall health.

Risk factors for oral health

Research shows that gingivitis and periodontitis can contribute to certain health conditions, including:

- Cardiovascular disease.
- Stroke.
- Endocarditis (infection of your heart's inner lining).
- Pneumonia.
- Pregnancy complications, such as premature birth and low birth weight.

Conversely, there are certain health conditions that can have a negative impact on your teeth and gums, including:

- Diabetes.
- Osteoporosis.
- HIV/AIDS.

Page 166 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Alzheimer's disease.

If you or a loved one has any of the conditions listed above, ask your dentist how to promote and support overall health through proper oral hygiene.

Signs of poor oral hygiene

There are several warning signs that could indicate oral health problems. The most common signs of poor oral hygiene include:

- Bleeding gums.
- Tooth decay.
- Chronic bad breath.
- Loose teeth.
- Gum recession.
- Mouth sores that don't go away.
- Toothache.
- Swelling of the jaw.
- Gingivostomatitis, an infection of the mouth caused by certain bacteria or viruses.

Prevention

Excellent oral hygiene protects your teeth and gums and keeps your smile beautiful. Here are some general oral hygiene instructions to keep your smile healthy:

Brush your teeth at least twice a day. Use fluoride toothpaste and a soft-bristled toothbrush. (Medium or hard bristles can damage your gums and tooth enamel.) When you brush, place your toothbrush at a 45-degree angle toward your gums. This helps sweep away plaque and bacteria at the gum line. Be sure to brush all teeth surfaces, including the backs and sides.

Floss once daily. You can't reach the spaces between your teeth with brushing alone. To clean these areas, you need dental floss. Take a piece of floss that's about 18 inches long. Wrap each end around your middle fingers. Using your thumbs and forefingers, guide the floss between two teeth. Wrap the floss snugly around one tooth in a C shape and clean it using about 10 up and down strokes. Next, wrap the floss around the other tooth and repeat.

Page 167 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Continue this process on all of your teeth. If you have dexterity issues, you can also use interproximal brushes and dental picks to clean between your teeth. (**A note about water flossers:** While water flossers are excellent for removing large pieces of food and debris, they can't remove the biofilm from your teeth surfaces. So, if you use a water flosser, be sure to use traditional dental floss as well.)

Brush your tongue. Your tongue holds bacteria like a sponge. Whenever you brush your teeth, don't forget to brush your tongue. You can use your toothbrush for this purpose. Or, you can purchase a tongue scraper in the oral health aisle.

Use an antibacterial mouthwash every day. Antibacterial mouthwash helps keep harmful oral bacteria at bay. In addition to washing away food and debris, it also reduces plaque buildup. Be sure to choose an alcohol-free formula to prevent dry mouth.

Visit your dentist regularly. Routine dental exams and cleanings are essential for good oral health. Many people do well with six-month visits. But, if you're prone to cavities, gum disease or other oral health problems, you may need more frequent appointments.

Avoid smoking and other tobacco products. Smoking is a leading cause of gum disease and oral cancer. It's best to avoid these products altogether. If you currently smoke and would like to quit, ask your healthcare provider about treatment options that can help.

Bed Bath

Definition: A bath given to client who is in the bed (unable to bath itself)

Purpose:

1. To prevent bacteria spreading on skin
2. To clean the client's body
3. To stimulate the circulation
4. To improve general muscular tone and joint
5. To make client comfort and help to induce sleep
6. To observe skin condition and objective symptoms

Back care

Page 168 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

Definition: Back care means cleaning and massaging back, paying special attention to pressure points. Especially back massage provides comfort and relaxes the client, thereby it facilitates the physical stimulation to the skin and the emotional relaxation.

Purpose:

1. To improve circulation to the back
2. To refresh the mood and feeling
3. To relieve from fatigue, pain and stress
4. To induce sleep

Perineal care

Definition: Perineal care is bathing the genitalia and surrounding area. Proper assessment and care of the perineal area will need professional clinical judgment.

Purpose:

1. To keep cleanliness and prevent from infection in perineal area
2. To make him/her comfortable

Wound care

Wounds fall into two broad categories: open or closed.

In a closed wound, tissue damage and bleeding occur under the surface of the skin. Examples of closed wounds include bruises.

An open wound involves a break in the skin that leaves the internal tissue exposed. Open wounds may result from falls, blunt trauma, and surgery.

We will cover several types of open wound, as well as how to treat them, in more detail below.

Hair washing

Definition: Hair washing defines that is one of general care provided to a client who cannot clean the hair by himself/ herself.

Purpose:

1. To maintain personal hygiene of the client
2. To increase circulation to the scalp and hair and promote growing of hair
3. To make him/her feel refreshed

Page 169 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Types of wound

Some examples of open wounds include the following.

Abrasion

An abrasion wound occurs when the skin rubs or slides against a rough surface. Examples of abrasions include a scraped knee or road rash.

Although abrasions produce very little blood, it is important to sanitize the wound and remove any debris to prevent infection.

Laceration

A laceration is a deep opening or a tear in the skin. Lacerations usually occur from accidents or incidents involving knives, machinery, or other sharp tools. This type of wound may cause significant bleeding.

Avulsion

An avulsion involves forcefully tearing away the skin and underlying tissue.

Avulsions can result from violent incidents, such as explosions, animal attacks, or motor vehicle accidents.

Puncture

A puncture wound is a small hole in the soft tissue. Splinters and needles can cause acute puncture wounds that only affect the outer layers of tissue.

However, knife or gunshot wounds can damage deep muscles and internal organs, which may result in significant bleeding.

Incision

An incision is a clean, straight cut in the skin. Many surgical procedures use incisions. However, accidents involving knives, razor blades, broken glass, and other sharp objects can cause incisions.

Incisions usually cause heavy, rapid bleeding. Deep incisions can damage the muscles or nerves and will most likely require stitches.

Treatments

Dressing the wound with bandages can help promote healing.

Page 170 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Minor, or acute, open wounds may not require medical treatment. People can treat these types of wound at home. However, severe open wounds that involve significant bleeding will require immediate medical attention.

Open wound care should involve the following steps:

Stop the bleeding: Using a clean cloth or bandage, gently apply pressure to the wound to promote blood clotting.

Clean the wound: Use clean water and a saline solution to flush away any debris or bacteria. Once the wound looks clean, pat it dry with a clean cloth. A doctor may need to perform a surgical debridement to remove debris from severe wounds that contain dead tissue, glass, bullets, or other foreign objects.

Treat the wound with antibiotics: After cleaning the wound, apply a thin layer of antibiotic ointment to prevent infection.

Close and dress the wound: Closing clean wounds helps promote faster healing. Waterproof bandages and gauze work well for minor wounds. Deep open wounds may require stitches or staples. However, leave an already infected wound open until the infection clears.

Routinely change the dressing: The Centers for Disease Control and Prevention (CDC) Trusted Source recommend removing the old bandages and checking for signs of infection every 24 hours. Disinfect and dry the wound before reapplying a clean adhesive bandage or gauze. Remember to keep the wound dry while it heals.

Medications for open wounds

Avoid aspirin, however, as it can cause bleeding and delay the wound healing process.

A healthcare provider may prescribe stronger pain relievers for people with severe or infected wounds.

People can use topical antibiotics on minor cuts and scrapes. A healthcare professional may prescribe oral antibiotics if they believe that someone has a high risk of developing an infection while healing.

3.3 Correct and Faulty Posture in Different Activities

Types of posture

Page 171 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

It's easy to develop a habit of bad posture without thinking about it. You may spend a long time leaning over a small screen, slouching in a chair, or carrying a heavy backpack when you walk. Or you may use repetitive motions in your workplace.

After a while, all of these factors can lead to bad posture.

Being overweight or pregnant, or wearing poor quality shoes or high heels, can also lead you to develop bad posture.

You may be born with scoliosis (an abnormally curved spine) or one leg shorter than the other, which can affect your posture.

Common posture problems

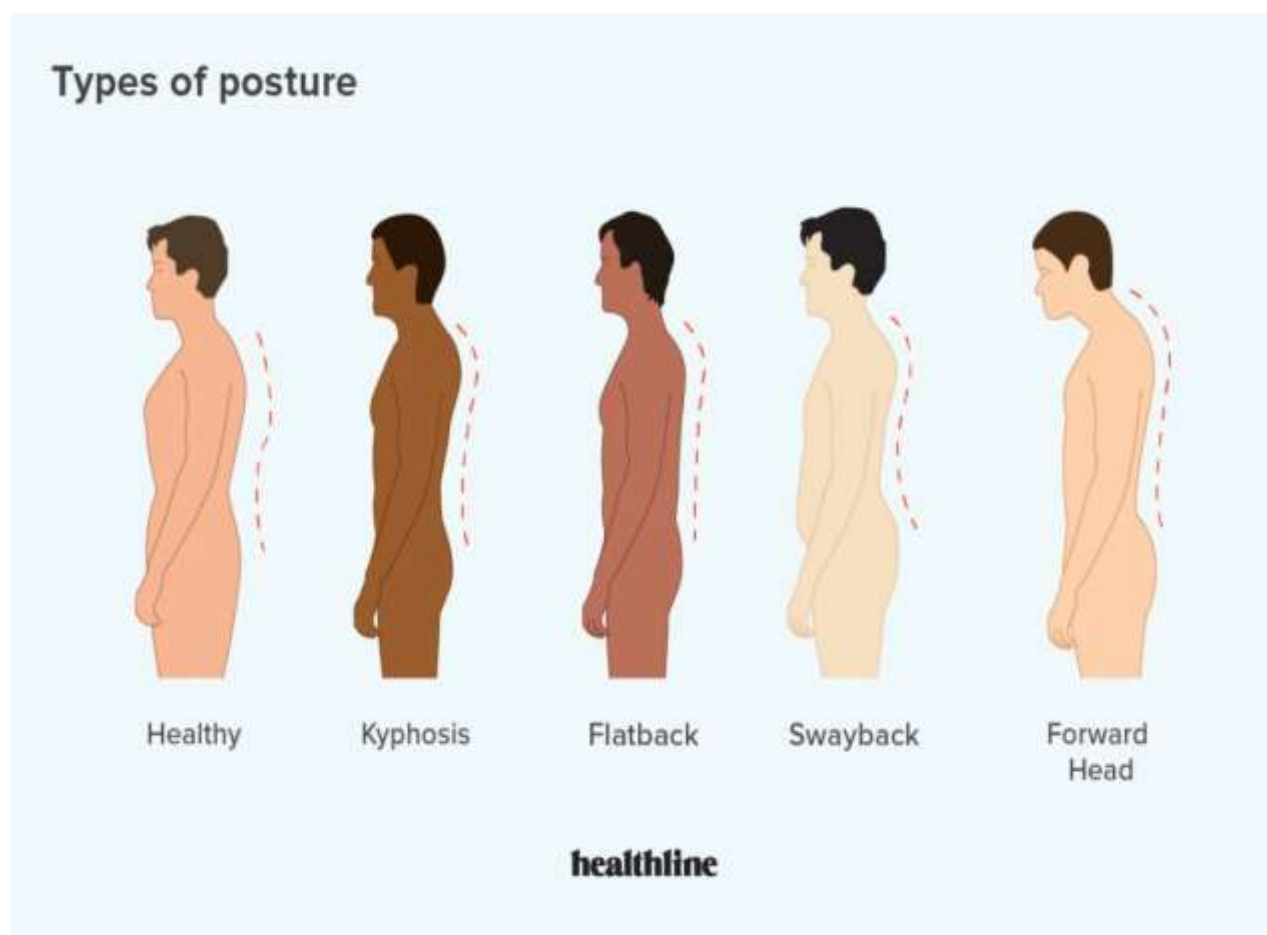


Figure 3.3 different types of postures

Here are four common types of poor posture.

Page 172 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

Forward head

Forward head posture is when your head is positioned with your ears in front of the vertical midline of your body. If your body is in alignment, your ears and shoulders will be lined up with your vertical midline.

Tech neck, text neck, and nerd neck are other names for forward head posture. It often comes from hunching over a cell phone or computer, or your steering wheel if you drive a lot.

It can also result from the aging process, as you lose muscle strength in your upper body.

Kyphosis

Kyphosis refers to an exaggerated curvature of your upper back (the thoracic spine) where the shoulders are rounded forward. It's also called hunchback.

Osteoporosis (bone thinning) can cause the shoulders to round as your spinal bones weaken with age. It's frequently seen in older women. Other age-related causes include degeneration of your spinal disks or vertebrae.

Younger persons may develop kyphosis as a result of diseases such as polio or Scheuermann's disease, infection, or chemotherapy or radiation to treat cancer.

Swayback

Swayback, also called lordosis or hyperlordosis, is when your hips and pelvis tilt forward, in front of your body's midline.

In this position, your lower back has an exaggerated inward curve. You look like you're leaning back when you're standing up, with your stomach and your rear sticking out.

You can develop swayback if you sit a lot, which tightens the muscles in your back. Sitting for prolonged periods can also weaken your abdominal muscles and glutes. In both cases, the core muscles that stabilize your back become weak.

Other causes may be obesity, injury, neuromuscular conditions, and abnormalities of your spine and vertebrae.

Flatback

Flatback is a condition where the normal curve of your lower spine loses some of its curvature. Your lower back looks straight and you stoop forward.

Page 173 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

It can be present at birth, or it can result from some kinds of back surgery or degenerative conditions of the spine, including ankylosing spondylitis (inflammatory arthritis), disc degeneration, and vertebrae compression.

Flatback can make it painful for you to stand for long periods.

Other types of posture

- **Poking chin.** Sitting in a chair that's too low and leaning forward to see your screen or looking up at a screen that's placed too high can result in a chin that pokes forward.
- **Uneven shoulders or hips.** You may tilt to one side when you stand if one leg is longer than the other. It may also affect your gait.
- **Military-style posture.** Here your back is ramrod straight and your chest is thrust forward.

Best type of posture

The optimal or efficient type of posture has your spine in alignment with your head and your limbs.

From the side, it should look like a plumb line from your head would go through the middle of your ears and shoulders and just behind the center of your knee and in front of the center of your ankle.

It's what's meant by the phrase "standing up straight."

Physically, proper spinal alignment means that your muscles and bones are in balance, protecting your body against injury or stresses that might cause degeneration of muscles or joints. It helps your body work more efficiently in keeping you upright against the force of gravity.

Effects of bad posture

Bad posture can lead to many kinds of physical problems, from back pain to pain in your temporomandibular joint, to lack of balance and foot pronation.

Here are some specific effects for each type of misalignment.

Forward head posture

Page 174 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

The effects of a forward head posture range from neck pain, stiffness, and headache to an association with higher mortality rates for elderly men and women.

Text neck tightens muscles and their supporting ligaments and tendons in the front of your neck, and at the same time lengthens the muscle structure at the back of your neck.

A small 2019 study Source of healthy college students found that a forward head posture decreases the lower thorax (mid-spine) mobility, leading to decreased respiratory function.

The more you lean forward, the more head weight and strain you exert on your spine. The effect can be dramatic.

A recent study calculated the force in pounds of flexing the neck forward to different degrees.

In a neutral posture, your head weighs 10 to 12 pounds. When your forward posture is 15 degrees out of alignment, the force on your spine increases to 27 pounds. At 45 degrees forward, it increases to 49 pounds, and at 60 degrees forward, it increases to 60 pounds.

Kyphosis

Kyphosis is a more extreme form of forward head posture. The degree to which you're hunched over determines the amount of pain and dysfunction you'll experience from this misalignment.

When you're severely hunched over, it's harder to walk, and you have an increased risk Trusted Source of falls and injuries. Older women with hyperkyphosis have a 70 percent Trusted Source increased risk of fracture.

Kyphosis affects mobility and mortality in older people. In our aging population, kyphosis is estimated to affect 20 to 40% Trusted Source of older men and women, and the angle of kyphosis continues to increase as you age.

Swayback

When your spine is in the swayback position, it may cause back pain that affects your ability to move.

Swayback also increases your risk of developing back and hip injuries and other musculoskeletal injuries, such as disc degeneration. You may have pain in your neck and lower back.

Flatback

Page 175 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Flatback syndrome may make it hard for you to stand up without pain in your thighs and pelvic area. You may also have neck and back pain.

Pain and fatigue can increase the longer you keep standing. Walking may also be difficult, giving you leg pain and a feeling of weakness.

Ways to correct your posture

A first step in correcting your posture is to become aware of everyday habits that may be affecting how you stand, sit, or lie down. In other words, pay attention and be mindful of what you are doing in your daily activities.

Sometimes the “cure” is simple:

- Change the configuration of your work station.
- Change your chair and the way you sit.
- Change the position in which you look at your cell phone.
- Buy a new mattress.

General fixes include:

- Instead of high heels, optationion for flats, wedges, or other more supportive footwear.
- Breathe more deeply.
- Practice walking properly.

Self-check- 3

Part I. Say true or false

1. Patients discharged from hospitals may leave with wounds that require care at home
2. Comfort is a concept that is inherently linked to the practice of nursing care and in a health context.
3. A person with a chronic wound is also at risk of mental health issues
4. The psychological impact for patients with wounds can be significant

Part II. Short answer

1. Describe wound care plan
2. Describe holistic approach principle in wound care

Page 176 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

3. Discuss potential impact of wound on family

Operation sheet-I

Operation Title: Wound care

Instruction: Perform all steps/tasks according to standard procedures /guideline

Purpose:

To Keep the wound moist and therefore enhance epithelialization

To Keep the wound clean

To keep locally applied drugs in position

To keep edges of the wound together by immobilization

To relief pain and comfort the patient

Provide physical, psychological, and aesthetic comfort

Remove necrotic tissue

Prevent, eliminate, or control infection

Maintain a moist wound environment

Protect wound from further injury

Protect skin surrounding wound

To protect the wound from mechanical injury.

To protect the wound from microbial contamination.

To absorb drainage

To prevent hemorrhage

To splint or immobilize the wound site and there by facilitate healing

General Precautions in wound dressing

- Wash hands thoroughly before, after and between several dressings.
- Dressing should be done after the wards have been cleaned
- Clean wounds should be dressed before wounds with drainage.
- Never do a dressing when the air is dusty from sweeping, bed making or in dust.

Page 177 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Wear gloves when touching blood, body fluids, mucous membrane and handling soiled items with blood or body fluids.
- Do talk , cough and sneeze over wound
- Wear mask and protective eye wear as necessary
- Practice strict aseptic techniques to reduce transmission of micro organism
- Soaked wound with frequent drainage should be changed frequently.
- Clean wound from the cleanest area to the less clean area
- Separate instruments should be used for each dressing.
- Keep forceps lower than the handles at all times
- Saline should be used to remove adherent dressings.
- Medicines are given and applied if necessary.
- 15. Be economical on using gauze , sponges' applicators, adhesive or medication.
- Adhesive marks on skin can be removed with solvent such as ether alcohol or benzene
- **Equipment:-**

Sterile dressing set

- One kidney dish
- Sterile gloves
- Cotton balls in a galipot
- Sterile gauze (4×4 inch) or squares
- Sterile Dressing forceps (3)
- Sterile Scissor
- Sterile galipot

Page 178 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Sterile fenestrated towel (drape)
- Spatula if ointment

Clean try

- Clean glove
- Cleaning solution (Normal Saline, Sterile 0.9% sodium chloride), chlorhexidine, povidone-iodine, and hydrogen peroxide
- Adhesive tape (Plaster)
- Bath Blanket: (if needed)
- Rubber and draw sheet
- Bandage scissors or surgical blade
- Antimicrobial Ointment: if prescribed
- Bath Blanket: (if needed)
- Screen
- Adhesive remover
- Protective apron: as the condition of the wound
- Waste Receiver (disposable plastic container)
- Chart

Page 179 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

Unit four: Identify and manage common medical disorder

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

- Identify and manage HEENT disorders
- Identify and manage common respiratory disorders
- Identify and manage cardiovascular system disorders
- Identify and manage digestive system disorders
- Identify and manage genitourinary system disorders
- Identify and manage endocrine system disorders
- Identify and manage integumentary system disorders
- Identify and manage nervous system disorders
- Identify and manage reproductive system disorders
- Identify and manage musculoskeletal system disorder

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

- Identify common medical disorders
- Manage common medical disorders

Page 180 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

4.1 Identify and Manage HEENT disorders

Cataracts

The eye's natural crystalline lens helps us focus on people and things at varying distances. Unfortunately, as we grow older this lens often stiffens and hardens, and without its youthful suppleness it loses its ability to focus, creating vision problems. This condition — for most, a natural consequence of aging — is called presbyopia.

As we age, these changes occurring to the natural crystalline lens can lead to the development of cataracts, or a loss in clarity of the lens. Since the lens is no longer as flexible or as clear as it used to be, the eye can't focus light properly.

Causes

While cataracts can occur as a result of other eye diseases, they mostly develop naturally with age. In fact, by age 65, many of us will develop a cataract.

There is other, less common causes of cataracts as well, including heredity, birth defects, chronic diseases such as diabetes, excessive use of steroid medications, and certain eye injuries.

Symptoms of Cataracts

At first, symptoms may be undetectable or very slight. However, any noticeable change in vision may be cause for concern, and should be brought to the attention of an eye care professional.

Common symptoms of cataracts include:

- Cloudy or blurred vision
- Sensitivity to light and glare
- Frequent prescription changes for glasses or contact lenses
- Poor night vision
- Color vision changes and dimming
- Double vision in a single eye

Treatment for Cataracts

While there is no way to prevent cataracts, there are things you can do to slow their formation. Modifiable factors that increase the risk of cataract include smoking, high blood

Page 181 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

pressure, obesity, and excessive alcohol intake. You may also slow the formation of cataracts by protecting your eyes from direct sunlight.

In the beginning stages of cataracts, vision may be slightly improved using forms of visual correction. However, in the later stages, surgery may be required. Fortunately, surgery has proven to be extremely successful in the removal of cataracts. During cataract surgery, your physician will replace your natural lens with an IOL.

Color Blindness

Nearly all people who are “color blind” can see colors but have difficulty distinguishing between certain colors. Not all people who are color blind have trouble with the same colors – most cannot distinguish between reds and greens; some cannot separate blues from yellows; and a very small group have a condition called monochromatism which only allows them to see black and white.

Color blindness of various kinds affects roughly 8% of men – and less than 1% of women.

What Causes Color Blindness?

Color blindness is a genetic condition caused by a difference in how one or more of the light-sensitive cells found in the retina of the eye respond to certain colors. These cells, called cones, sense wavelengths of light, and enable the retina to distinguish between colors.

This difference in sensitivity in one or more cones can make a person color blind.

Symptoms of Color Blindness

The symptoms of color blindness are often observed by parents when children are young. In other cases, symptoms are so slight; they may not even be noticed. Common symptoms of color blindness include:

- Difficulty distinguishing between colors
- Inability to see shades or tones of the same color

Treatment for Color Blindness

There is no known cure for color blindness. Contact lenses and glasses are available with filters to help color deficiencies, if needed. Fortunately, the vision of most color-blind people is normal in all other respects and certain adaptation methods are all that is required.

Page 182 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Crossed Eyes (Strabismus)

Crossed eyes (or strabismus) occur when a person's eyes are not able to align on the same point at the same time, and appear to be misaligned or pointed in different directions.

Usually this results from weakness of the muscles in one or both eyes. The weak eye will turn away from the object that it is supposed to be focused on.

The eye that turns off-target may be the same in every incidence, or it could be a different eye at different times.

A young child with strabismus will unconsciously reject the image of the improperly aligned eye and the related nerve connections between their eye and brain may fail to develop.

This can lead to reduction in vision in the eye - known as **amblyopia, or lazy eye**.

Crossed eyes develop most often in babies. It is easier to correct when caught early.

This is often not a condition babies or children simply outgrow so children with eyes that seem to be misaligned should be examined and treated if necessary.

Causes

There are many different causes for crossed eyes and it does seem to run in families.

In some cases, it may be caused by severe farsightedness that has been left untreated. Significant head trauma may also cause crossed eyes, as it can affect the portion of the brain that controls eye muscles.

Signs of Crossed Eyes

The most obvious sign of crossed eyes is when the eyes appear to be pointed in different directions.

There are, however, more signs of crossed eyes that can most often be observed in children, including:

- ✓ Eyes that do not move together
- ✓ Unsymmetrical points of reflection in each eye
- ✓ Tilting the head to one side
- ✓ Inability to gauge depth
- ✓ Squinting with only one eye

Page 183 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Treatments for Crossed Eyes

In order to improve vision, the weakened muscles in the affected eye or eyes must be put to work. Several treatments may be used alone or in combination, depending on the type, severity, and cause of strabismus, including:

- Eyeglasses or contact lenses – this method may help people who have crossed eyes due to an uncorrected farsightedness
- Medication (eye drops) – In some cases, as an alternative to patching, eye drops are used in the stronger (good) eye to temporarily blur the vision in the good eye. This forces use of the weaker eye.
- Surgery – straightens and realigns muscles in the eyes; this method has a high success rate although it is expensive and involves more risk than other opatientions.
- Patching or covering the better-seeing eye – similar to eye drops, this method works to strengthen the weakened eye.

Glaucoma

The term glaucoma is used to refer to a group of ocular conditions characterized by opatientic nerve damage.

In the past, glaucoma was seen more as a condition of elevated intraocular pressure (IOP) than of opatientic neuropathy. Increasingly, that is no longer the case. There is no doubt that increased

IOP damages the opatientic nerve and nerve fiber layer, but the degree of harm is highly variable. The opatientic nerve damage is related to the IOP caused by congestion of aqueous humor in the eye.

Most cases are asymptomatic until extensive and irreversible damage has occurred.

Glaucoma affects people of all ages but is more prevalent with increasing age (above 40 years). Others at risk are patients with diabetes, African Americans, those individuals with a family history of glaucoma, and people with previous eye trauma or surgery or those who have had long-term steroid treatment.

There is no cure for glaucoma, but the disease can be controlled.

Page 184 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Classification of Glaucoma

There are several types of glaucoma. Current clinical forms of glaucoma are identified as open-angle glaucoma, angle-closure glaucoma (also called pupillary block), congenital glaucoma, and glaucoma associated with other conditions.

Glaucoma can be primary or secondary, depending on whether associated factors contribute to the rise in IOP.

The two common clinical forms of glaucoma encountered in adults are primary openangle glaucoma (POAG) and angle-closure glaucoma, which are differentiated by the mechanisms that cause impaired aqueous outflow.

Clinical Manifestations

- Most patients are unaware that they have the disease until they have experienced visual changes and vision loss.
- Symptoms may include blurred vision or “halos” around lights, difficulty focusing, difficulty adjusting eyes in low lighting, loss of peripheral vision, aching or discomfort around the eyes, and headache.
- Pallor and cupping of the opatientic nerve disc; as the opatientic nerve damage increases, visual perceptation in the area is lost.

Assessment and Diagnostic Methods

- Ocular and medical history (to investigate predisposing factors)
- Diagnostic tests include tonometry (measures IOP), ophthalmoscopy (to inspect the opatientic nerve), gonioscopy (to examine the filtration angle of the anterior chamber), and perimetry (visual fields assessment) are major diagnostic tests.

Medical Management

- The aim of all glaucoma treatment is prevention of opatientic nerve damage.
- Lifelong therapy is almost always necessary because glaucoma cannot be cured.
- Treatment focuses on pharmacologic therapy, laser procedures, surgery, or a combination of these approaches, all of which have potential complications and side effects.

Page 185 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- The objective is to achieve the greatest benefit at the least risk, cost, and inconvenience to the patient.
- Although treatment cannot reverse opatientic nerve damage, further damage can be controlled. The goal is to maintain an IOP within a range unlikely to cause further damage.

Pharmacologic Therapy

- Medical management of glaucoma relies on systemic and topical ocular medications that lower IOP.
 - Periodic follow-up examinations are essential to monitor IOP, the appearance of the opatientic nerve, the visual fields, and side effects of medications.
 - Therapy takes into account the patient's health and stage of glaucoma.
- Patient is usually started on the lowest dose of topical medication and then advanced to increased concentrations until the desired IOP level is reached and maintained.
- One eye is treated first, with the other eye used as a control in determining the efficacy of the medication.
- Several types of ocular medications are used to treat glaucoma, including miotics (medications that cause papillary constriction), adrenergic agonists (ie, sympathomimetic agents), beta-blockers, alpha2-agonists (ie, adrenergic agents), carbonic anhydrase inhibitors, and prostaglandins.

Surgical Management

- Laser trabeculoplasty or iridotomy indicated when IOP is inadequately controlled by medications.
- Filtering procedures: an opening or a fistula in the trabecular meshwork; trabeculectomy is standard technique.
- Drainage implant or shunt surgery may be performed.
- Trabectome surgery is reserved for patients in whom pharmacologic treatment and/or laser trabeculoplasty do not control the IOP sufficiently.

Nursing Management

Page 186 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Create a teaching plan regarding the nature of the disease and the importance of strict adherence to the medication regimen to help ensure compliance.
- Review the patient's medication program, particularly the interactions of glaucoma-control medications with other medications.
- Explain effects of glaucoma-control medications on vision (eg, miotics and sympathomimetics result in altered focus;
- Provide reassurance and emotional support.
- Integrate patient's family into the plan of care, and because the disease has a familial tendency, encourage family members to undergo examinations at least once every 2 years to detect glaucoma early.

Otitis

Acute otitis media is an acute infection of the middle ear, usually lasting less than 6 weeks. The pathogens that cause acute otitis media are usually *Streptococcus pneumoniae*, *Haemophilus*

influenzae, and *Moraxella catarrhalis*, which enter the middle ear after eustachian tube dysfunction caused by obstruction related to upper respiratory infections, inflammation of surrounding structures (eg, rhinosinusitis, adenoid hypertrophy), or allergic reactions (eg, allergic rhinitis).

Clinical Manifestations

- Symptoms vary with the severity of the infection; usually unilateral in adults.
- Pain in and about the ear (otalgia) may be intense and relieved only after spontaneous perforation of the eardrum or after myringotomy.
- Fever; drainage from the ear, hearing loss.
- Tympanic membrane is erythematous and often bulging.
- Conductive hearing loss due to exudate in the middle ear.
- Even if the condition becomes subacute (3 weeks to 3 months) with purulent discharge, permanent hearing loss is rare.

Complications

Page 187 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Perforation of the tympanic membrane may persist and develop into chronic otitis media.
- Secondary complications involve the mastoid (mastoiditis), meningitis, or brain abscess (rare).

Management

- With early and appropriate broad-spectrum antibiotic therapy, otitis media may clear with no serious sequelae. If drainage occurs, an antibiotic otic preparation may be prescribed.
- Outcome depends on efficacy of therapy (the prescribed dose of an oral antibiotic and the duration of therapy), the virulence of the bacteria, and the physical status of the patient.

Otitis Media, Chronic

Chronic otitis media results from repeated episodes of acute otitis media, causing irreversible tissue pathology and persistent perforation of the tympanic membrane.

Chronic infections of the middle ear cause damage to the tympanic membrane, can destroy the ossicles, and can involve the mastoid.

Clinical Manifestations

- Symptoms may be minimal, with varying degrees of hearing loss and a persistent or intermittent foul-smelling otorrhea (discharge).
- Pain may be present if acute mastoiditis occurs; when mastoiditis is present, postauricular area is tender; erythema and edema may be present.
- Cholesteatoma (sac filled with degenerated skin and sebaceous material) may be present as a white mass behind the tympanic membrane visible through an otoscope.
- If untreated, the cholesteatoma continues to grow and destroys structures of the temporal bone, possibly causing damage to the facial nerve and horizontal canal and destruction of other surrounding structures. Auditory tests often show a conductive or mixed hearing loss.

Medical Management

Page 188 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Careful suctioning and cleansing of the ear are done under microscopic guidance.
- Antibiotic drops are instilled or antibiotic powder is applied to treat purulent discharge.
- Tympanoplasty procedures (myringoplasty and more extensive types) may be performed to prevent recurrent infection, reestablish middle ear function, close the perforation, and improve hearing.
- Ossiculoplasty may be done to reconstruct the middle ear bones to restore hearing.
- Mastoidectomy may be done to remove cholesteatoma, gain access to diseased structures, and create a dry (noninfected) and healthy ear.

Headache

Headache (cephalgia) is one of the most common of all human physical complaints. Headache is actually a symptoms rather than a disease entity and may indicate organic disease (neurologic), a stress response, vasodilation (migraine), skeletal muscle tension (tension headache), or a combination of these factors. A primary headache is one for which no organic cause can be identified. These types of headache include migraine, tension-type, and cluster headaches.

A secondary headache is a symptoms associated with organic causes, such as a brain tumor or aneurysm, subarachnoid hemorrhage, stroke, severe hypertension, meningitis, and head injury.

Examples of secondary headaches include the following:

- Miscellaneous headaches associated with structural lesions
- Headache associated with head trauma
- Headache associated with vascular disorders

1.7.1 Migraine Headache

Migraine is a complex of symptoms characterized by periodic and recurrent attacks of severe headache.

The cause of migraine has not been clearly demonstrated, but it is primarily a vascular disturbance that occurs more commonly in women and has strong familial tendencies.

Onset typically occurs in puberty, and the incidence is 18% in women and 6% in men.

Clinical Manifestations

Headache often begins in early morning (headache on awakening).

Page 189 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

The classic migraine attack can be divided into four phases: prodrome, aura, headache, and recovery.

Prodrome Phase

- Present in 60% of patients with migraine headache.
- Symptoms may occur consistently hours to days before onset of migraine.
- Depression, irritability, feeling cold, food cravings, anorexia, change in activity level, increased urination, diarrhea, or constipation may be noted with each migraine

Aura Phase

- Occurs in a minority of patients and lasts less than 1 hour.
- Focal neurologic symptoms, predominantly visual disturbances (light flashes), occur and may be hemianopatientic (occurring in half of the visual field).
- Numbness and tingling of lips, face, or hands; mild confusion; slight weakness of an extremity; and drowsiness and dizziness may be present.

Headache Phase

- This phase, occurring in 60% of patients, involves a unilateral, throbbing headache that intensifies over several hours. Pain is severe and incapacitating, often associated with photophobia, nausea, and vomiting. Duration varies from about 4 to 72 hours.

Recovery Phase (Termination and Postdrome)

- Pain gradually subsides.
- There is a period of muscle contraction in the neck and scalp with associated muscle ache and localized tenderness, exhaustion, and mood changes.
- Any physical exertion exacerbates the headache pain.
- Patient may sleep for an extended period.

Assessment and Diagnostic Methods

- Physical assessment of head and neck
- Neurologic examination
- Detailed health and headache assessment and history; medication history

Page 190 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Cerebral angiography, computed tomography (CT), or magnetic resonance imaging (MRI) if abnormalities on neurologic examination
- Electromyography (EMG) and laboratory tests (complete blood cell [CBC] count, electrolytes, glucose, creatinine, erythrocyte sedimentation rate, electrolytes, glucose, creatinine, and thyroid hormone levels)

Medical Management

Therapy is divided into abortive (symptomatic) and preventive approaches. Abortive approach is used for frequent attacks and is aimed at relieving or limiting a headache at onset or while in progress. Preventive approach is used for those who have frequent attacks at regular or predictable intervals and may have medical conditions that preclude abortive therapies.

Nursing Management

Relieving Pain

- Attempt patient to abort headache early.
- Provide comfort measures (eg, a quiet, dark environment); elevate the head of bed 30 degrees.

Administer medications

If non pharmacologic measures are ineffective.

- Provide symptomatic treatment, such as antiemetics, as indicated.

4.2 Common respiratory disorders

Problems of the upper respiratory tract include disorders of the:

- Nose
- Pharynx
- Tonsils,
- Epiglottis
- Larynx, and trachea

A deviated septum & Nasal polyps

- **A deviated septum** is a deflection of the normally straight nasal septum
- Nasal septum deviates from the midline and can cause a partial obstruction

Page 191 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- **Nasal polyps** are tissue growths usually due to prolonged inflammation

Cause: trauma to the nose or congenital disproportion.

Clinical manifestations/assessment

- Stertorous respirations (snoring)
- Dyspnea
- Postnasal drip

Management

- Medical management/nursing interventions
- Pharmacological management
- Corticosteroids, antihistamines, antibiotics, analgesics

Allergic rhinitis

- Allergic rhinitis is the reaction of the nasal mucosa to a specific allergen.
- The most important step in managing allergic rhinitis involves identifying and avoiding triggers of allergic reactions.
- Acute viral rhinitis (also known as the common cold or acute coryza):

Cause: adenovirus

Management of acute viral rhinitis

- If viral rhinitis is the cause, medications are given to relieve the symptoms. Corticosteroids may be required
- If symptoms suggest a bacterial infection, an antimicrobial agent will be used
- Rest, fluids, proper diet, antipyretics, and analgesics are recommended.

Pharmacologic Therapy

- Medication therapy for allergic and non allergic rhinitis focuses on symptoms relief.
- **Antihistamines** are administered for sneezing, itching, and rhinorrhea.
- **Oral decongestant agents** are used for nasal obstruction.
- In addition, intranasal corticosteroids may be used for severe congestion, and ophthalmic agents are used to relieve irritation, itching, and redness of the eyes.

Acute rhinitis (common cold)

Page 192 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Etiology/pathophysiology
 - Inflammation of the mucous membranes of the nose and accessory sinuses
 - Virus(es)
- Clinical manifestations/assessment
 - Thin, serous nasal exudate
 - Productive cough
 - Sore throat
 - Fever
- Medical management/nursing interventions
 - Pharmacological management
 - Analgesic
 - Antipyretic
 - Expectorant
 - Antibiotic (if infection present)
 - No specific treatment
 - Encourage fluids

Acute Sinusitis

- Acute sinusitis is an infection of the paranasal sinuses.

Cause

- It frequently develops as a result of an upper respiratory infection, such as an unresolved viral or bacterial infection, or allergic rhinitis.
- Nasal congestion, caused by inflammation, edema, and transudation of fluid, leads to obstruction of the sinus cavities
- This provides an excellent medium for bacterial growth, namely *Streptococcus pneumoniae*,

Clinical Manifestations

- Symptoms of acute sinusitis may include facial pain or pressure over the affected sinus area

Page 193 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Nasal obstruction, fatigue, purulent nasal discharge
- Fever, headache, ear pain and fullness, dental pain, cough, a decreased sense of smell, sore throat or facial congestion or fullness.

Diagnostic Findings

- There may be tenderness to palpation over the infected sinus area.
- Complications
- Acute sinusitis, if left untreated, may lead to severe and occasionally life-threatening complications such as meningitis, brain abscess, ischemic infarction, and osteomyelitis.

Medical Management

- First-line antibiotics include amoxicillin, trimethoprim/sulfamethoxazole (Bactrim), and erythromycin.
- Second-line antibiotics include cephalosporins and amoxicillin clavulanate (Augmentin).

Nursing Management

- The nurse instructs the patient about methods to promote drainage such as inhaling steam
- Increasing fluid intake, and applying local heat (hot wet packs).
- The nurse stresses the importance of following the recommended antibiotic regimen, because a consistent blood level of the medication is critical to treat the infection.

Chronic Sinusitis

- Chronic sinusitis is an inflammation of the sinuses that persists for more than 3 weeks in an adult and 2 weeks in a child.

Clinical Manifestations

- Impaired mucociliary clearance and ventilation
- Cough (the thick discharge constantly drips backward into the nasopharynx)
- Chronic headaches in the periorbital area, and facial pain.
- In addition, some patients experience a decrease in smell and taste and a fullness in the ears.

Medical Management

Page 194 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Medical management of chronic sinusitis is almost the same as for acute sinusitis.
- The antimicrobial agents of choice include amoxicillin clavulanate (Augmentin) or ampicillin .
- Clarithromycin and third-generation cephalosporins may also be used.
- The course of treatment may be 3 to 4 weeks
- Decongestant agents, antihistamines, saline sprays, may also provide some symptoms relief.

Surgical Management

- When standard medical therapy fails, surgery, may be indicated to correct structural deformities that obstruct the openings of the sinus.
- Excising and cauterizing nasal polyps, correcting a deviated septum, incising and draining the sinuses and removing tumors are some of the specific procedures performed.

Nursing Management

- The nurse teaches the patient how to promote sinus drainage by increasing the environmental humidity (steam bath, hot shower)
- Increasing fluid intake, and applying local heat.
- The nurse also instructs the patient about the importance of following the medication regimen

Acute Pharyngitis

- Acute pharyngitis is an inflammation or infection in the throat.

Cause

- Most cases of acute pharyngitis are viral infection.
- Group A beta-hemolytic streptococcus, the most common bacterial Organism

Clinical Manifestations

- The signs and symptoms of acute pharyngitis include:
- Swollen lymphoid follicles with white- exudate
- Tender cervical lymph nodes and no cough.

Page 195 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Fever, malaise, and sore throat also may be present.

Medical Management

- Viral pharyngitis is treated with supportive measures since antibiotics will have no effect on the organism.
- Bacterial pharyngitis is treated with a variety of antimicrobial agents.

Pharmacologic Therapy

- If a bacterial cause is suggested, penicillin is usually the treatment of choice.
- For patients who are allergic to penicillin or have organisms that are resistant to erythromycin cephalosporins may be used.
- Antibiotics are administered for at least 10 days to eradicate the infection from the oropharynx.
- Severe sore throats can also be relieved by analgesic medications, as prescribed. For example, acetaminophen
- For patients who are allergic to penicillin or have organisms that are resistant to erythromycin cephalosporins may be used.
- Antibiotics are administered for at least 10 days to eradicate the infection from the oropharynx.
- Severe sore throats can also be relieved by analgesic medications, as prescribed. For example, acetaminophen

Complications

- Include sinusitis, otitis media, mastoiditis.
- In rare cases the infection may lead to bacteremia, pneumonia, meningitis, rheumatic fever, or nephritis.

Nursing Management

- The nurse instructs the patient to stay in bed to rest.
- Used tissues should be disposed properly to prevent the spread of infection.
- Warm saline gargles or irrigations are used Irrigating the throat properly is an effective means of reducing spasm in the pharyngeal muscles and relieving soreness of the throat.

Page 196 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Chronic Pharyngitis

- Chronic pharyngitis is a persistent inflammation of the pharynx.
- It is common in adults who, use their voice to excess, suffer from chronic cough, and habitually use alcohol and tobacco.

Clinical Manifestations

- Patients with chronic pharyngitis complain of a constant sense of irritation or fullness in the throat.
- Mucus that collects in the throat and can be expelled by coughing.
- Difficulty swallowing.

Medical Management

- Treatment of chronic pharyngitis is based on relieving symptoms,
- Avoiding exposure to irritants
- If there is a history of allergy, one of the antihistamine decongestant medications, is taken orally every 4 to 6 hours.
- Aspirin or acetaminophen is recommended for its antiinflammatory and analgesic properties.

Nursing Management

- The nurse instructs the patient to avoid contact with others until the fever subsides.
- Alcohol, tobacco, second-hand smoke, and exposure to cold are avoided.
- The patient may minimize exposure to pollutants
- The nurse encourages the patient to drink plenty of fluids.
- Gargling with warm saline solutions may relieve throat discomfort.
- Lozenges will keep the throat moistened.

Tonsillitis

- The tonsils are composed of lymphatic tissue and are situated on each side of the oropharynx.
- They frequently serve as the site of acute infection.

Cause

Page 197 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Group A beta-streptococcus is the most common organism associated with tonsillitis.

Clinical Manifestations

- The symptoms of tonsillitis include:
- Sore throat
- Fever and difficulty swallowing.
- Swollen cervical lymph nodes
- White exudates on the throat

Medical Management

- Tonsillectomy is usually performed for recurrent tonsillitis when medical treatment is unsuccessful and there is severe hypertrophy.
- Appropriate antibiotic therapy is initiated.
- The most common antimicrobial agent is oral penicillin, which is taken for 7 days.
- Amoxicillin and erythromycin are alternatives.

Laryngitis

- **Laryngitis:** is an inflammation of the larynx.

Cause

- Almost always a virus
- Bacterial invasion may be secondary

Predisposing factor

- Voice over use or exposure to dust, chemicals, smoke, and other pollutants.

Clinical Manifestations

- Signs of acute laryngitis include hoarseness or **aphonia** (complete loss of voice)
- Severe cough.
- Chronic laryngitis is marked by persistent hoarseness.

Medical Management

- Management of acute laryngitis includes resting the voice, avoiding smoking, resting, and inhaling steam.

Page 198 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- If the laryngitis is due to a bacterial organism or if it is severe, appropriate antibacterial therapy is instituted.
- The majority of patients recover with conservative treatment; however, laryngitis tends to be more severe
- in elderly patients and may be complicated by pneumonia.
- For chronic laryngitis, the treatment includes resting the voice, eliminating any primary respiratory tract infection
- Eliminating smoking, and avoiding second-hand smoke.
- Topical corticosteroids, inhalation, may also be used. These preparations have no systemic
- or long-lasting effects and may reduce local inflammatory reactions.

Nursing Management

- The nurse instructs the patient to rest the voice and to maintain a well-humidified environment.
- If laryngeal secretions are present during acute episodes, a daily fluid intake of 3 L are suggested to thin secretions.

Acute bronchitis

- Acute bronchitis is an infection of the lower respiratory tract that is generally an acute sequela to an upper respiratory tract infection.

Etiology and pathophysiology

- Primarily viral etiology, but may also arise from bacterial agents.
- Airways become inflamed and irritated with increased mucus production.

Clinical Manifestations

- Dyspnea, fever, tachypnea.
- Productive cough, clear to purulent sputum.
- Pleuritic chest pain.

Diagnostic Evaluation

Page 199 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Sputum for Gram stain, culture, and sensitivity tests may be obtained to determine presence of bacterial infection.

Management

- Antibiotic therapy for 7 to 10 days may be indicated for patients with bacterial infection and/or underlying lung disease.
- Hydration and humidification.
- Secretion clearance interventions (may include controlled cough, chest physical therapy).
- Bronchodilators for bronchospasm and related cough in patients with evidence of airflow limitation.
- Symptoms management for fever, cough.

Epistaxis

- **Epistaxis is a** hemorrhage from the nose, referred to as **epistaxis**.

Cause

- Rupture of tiny, distended vessels in the mucous membrane of any area of the nose.
- There are a variety of causes associated with epistaxis, including trauma, infection, inhalation of illicit drugs, cardiovascular diseases, a foreign body in the nose.

Medical Management

- Initial treatment may include applying direct pressure.
- The patient sits upright with the head tilted forward to prevent swallowing and aspiration of blood
- Pinch the soft outer portion of the nose for 5 or 10 minutes continuously.
- If this measure is unsuccessful, a Topical vasoconstrictors, such as adrenaline ,may be prescribed.

Pneumonia

- Is an acute inflammation of the lung parenchyma.
- Pneumonia can be classified according to the causative organism, such as bacteria, viruses, *Mycoplasma*, *fungi*, *parasites*, and *chemicals*.

Page 200 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Aspiration pneumonia occurs from abnormal entry of secretions or substances into the lower airway.
- Opportunistic pneumonia presents in certain patients with altered immune responses who are highly susceptible to respiratory infections.
- Examples of pneumonia in the immunocompromised host are *Pneumocystis carinii* pneumonia (PCP),
- PCP has been associated with AIDS.
- Fungal pneumonias, and mycobacterium tuberculosis.
- Immunocompromised states occur with the use of corticosteroids or other immunosuppressive agents
- Chemotherapy, nutritional depletion, use of broad-spectrum antimicrobial agents, AIDS, and genetic immune disorders

Risk Factor

- Cigarette smoking, (COPD)
- Immuno suppressed.
- Prolonged immobility.
- Depressed cough reflex (due to medications)
- Aspiration of foreign material into the lungs during a period of unconsciousness (head injury, anesthesia,)

Clinical Manifestations

- A sudden onset of shaking chills
- Fever (38.5° to 40.5°C)
- Pleuritic chest pain that is aggravated by deep breathing and coughing.
- The patient is severely ill, with marked tachypnea (25 to 45 breaths/min)
- Rapid pulse

Diagnostic Findings

- History (particularly of a recent respiratory tract infection)

Page 201 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Physical examination, chest x-ray studies, blood culture (bloodstream invasion, called bacteremia, occurs frequently), and sputum examination.

Medical Management

- The treatment of pneumonia includes administration of the appropriate antibiotic as determined by the results of the Gram Stain.
- Recommendations for treatment of pneumonia include: erythromycin, a doxycycline, amoxicillin [Augmentin]), trimethoprim–sulfamethoxazole and third-generation cephalosporins (ceftriaxone).

Preventive Measure

- Encourage smoking cessation.
- Perform suctioning and chest physical therapy if indicated.
- Minimize risk for aspiration by proper positioning of patient.
- Encourage reduced or moderate alcohol intake.
- Promote frequent turning, early ambulation and mobilization,
- Effective coughing, breathing exercises, and nutritious diet.
- Hydration is a necessary because fever and tachypnea may result in fluid losses.
- Antipyretics may be used to treat headache and fever
- A Warm, moist inhalations are helpful in relieving bronchial irritation.
- If hypoxemia develops, oxygen is administered.
- Pulse oximetry analysis is performed to determine the need for oxygen.

Complications

- SHOCK AND RESPIRATORY FAILURE**
- These complications are encountered chiefly in patients who have received no specific treatment or inadequate or delayed treatment.
- ATELECTASIS AND PLEURAL EFFUSION**
- Atelectasis** (from obstruction of a bronchus by accumulated secretions)
- Pleural effusions:** after the pleural effusion is detected on a chest x-ray, a thoracentesis may be performed to remove the fluid.

Page 202 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Nursing Process

• THE PATIENT WITH PNEUMONIA

Assessment

- The nurse should monitor the following:
- Changes in temperature and pulse
- Amount, odor, and color of secretions
- Frequency and severity of cough
- Degree of tachypnea or shortness of breath

Nursing Diagnosis

- Based on the assessment data, the patient's major nursing diagnoses may include:
- Ineffective airway clearance related to copious tracheobronchial secretions
- Activity intolerance related to impaired respiratory function.
- Risk for deficient fluid volume related to fever and dyspnea
- Imbalanced nutrition: less than body requirements
- Deficient knowledge about the treatment regimen and preventive health measures

Potential Complications

- potential complications that may occur include:
- Shock
- Respiratory failure
- Atelectasis
- Pleural effusion
- Confusion
- Super infection

Planning

- Goals
- The major goals for the patient may include:
- Improved airway patency

Page 203 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Nursing Interventions for improving airway patency
- Remove secretions
- Hydration (2 to 3 L/day) thins and loosens pulmonary secretions.
- Humidification may be used to loosen secretions and improve ventilation.

Expected Patient Outcomes

- Expected patient outcomes may include:
- Exhibits no complications
- Has normal vital signs
- Reports productive cough
- Maintains or increases weight
- Complies with treatment protocol and prevention strategies

Pleural Effusion

- Pleural effusion, a collection of fluid in the pleural space, usually secondary to other diseases.
- Normally, the pleural space contains a small amount of fluid (5 to 15 mL),
- Which acts as a lubricant that allows the pleural surfaces to move without friction
- **In pleural effusion**, an abnormal volume of fluid collects in the pleural space, causing shortness of breath.

Clinical Manifestations

- A large pleural effusion causes shortness of breath.
- When a small to moderate pleural effusion is
- present, dyspnea may be absent or only minimal.

Diagnostic Findings

- Physical examination, chest x-ray, chest CT scan, and thoracentesis confirm the presence of fluid.

Medical Management

- Thoracentesis is performed to remove fluid, and to relieve dyspnea.
- Other treatments for malignant pleural effusions include surgical pleurectomy

Page 204 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Pulmonary edema

- **Pulmonary edema** is defined as abnormal accumulation of fluid in the lung tissue and/or alveolar space.
- It is a severe, life threatening condition.

Cause:

- Hypervolemia or a sudden increase in the intravascular pressure
- Right heart failure

Clinical Manifestations

- Respiratory distress, characterized by:
- Dyspnea, air hunger, and central cyanosis.
- May become confused or stuporous.

Assessment and Diagnostic Findings

- Auscultation reveals crackles
- The patient may be tachycardic, the pulse oximetry values begin to fall

Medical Management

- Management focuses on correcting the underlying disorder.
- Vasodilators, or contractility medications may be given.
- If the problem is fluid overload, diuretics are given and the patient is placed on fluid restrictions.
- Oxygen is administered to correct the hypoxemia

Nursing management

- Nursing management of the patient with pulmonary edema includes
- Assisting with administration of oxygen if respiratory failure occurs.
- The nurse also administers medications (ie, morphine, vasodilators) as prescribed

4.14 Pulmonary Embolism

- **Pulmonary embolism:** refers to the obstruction of the pulmonary artery or one of its branches by a thrombus (or thrombus) that originates somewhere in the venous system or in the right side of the heart.

Page 205 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Cause:

- Most commonly, it is due to a blood clot or thrombus.
- **Emboli:** Air, fat, and sepatientic.
- Most thrombi originate in the deep veins of the legs.
- A venous thrombosis can result from slowing of blood flow (stasis)
- When a thrombus completely or partially obstructs a pulmonary artery or its branches, the alveolar dead space is increased.
- Thus, gas exchange is impaired or absent in this area.

Clinical Manifestations

- Dyspnea is the most frequent symptoms
- Tachypnea (very rapid respiratory rate) is the most frequent sign .
- Chest pain is common

Risk Factors for Pulmonary Embolus

- Venous Stasis (slowing of blood flow in veins)
- Prolonged immobilization (especially postoperative)
- Prolonged periods of sitting
- Varicose veins
- Spinal cord injury

Predisposing Conditions

- Advanced age
- Obesity
- Pregnancy
- Oral contraceptientive use
- Prevention
- Active leg exercises to avoid venous stasis, early ambulation

Medical Management

- The treatment of Pulmonary Embolism may include a variety of modalities:
- General measures to improve respiratory and vascular status

Page 206 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Emergency management
- Anticoagulation therapy
- Surgical intervention
- Emergency management consists of the following:
 - Nasal oxygen is administered immediately to relieve hypoxemia,
 - Respiratory distress, and central cyanosis.
 - Intravenous infusion lines are started to establish routes for medications or fluids that will be needed.

Pharmacologic Therapy

- Anticoagulant therapy (heparin, warfarin)
- sodium for managing acute deep vein thrombosis
- Heparin is used to prevent recurrence of emboli but has no effect on emboli that are already present.
- A surgical embolectomy is rarely performed

Nursing Management

- The nurse encourages ambulation and active and passive leg exercises to prevent venous stasis in patients on bed rest.
- The nurse also advises the patient not to sit or lie in bed for prolonged periods, not to cross the legs, and not to wear constricting clothing.

4.15 Lung Cancer

- Lung Cancer is an abnormal cell growth, and eventually a malignant cell.
- The pulmonary epithelium undergoes malignant transformation from normal epithelium to eventual invasive carcinoma.

Risk Factors

- Risk factors for lung cancer, include:
 - Tobacco smoke, second-hand (passive) smoke
 - Environmental and occupational exposures, gender, genetics, and dietary deficits.

Clinical Manifestations

Page 207 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

- The most frequent symptoms of lung cancer is:
- Cough.
- The cough starts as a dry, persistent cough, without sputum production.
- When obstruction of airways occurs, the cough may become productive due to infection.
- Wheezing is noted (occurs when a bronchus becomes partially obstructed by the tumor).
- Patients also may report dyspnea.
- Hemoptysis or bloodtinged sputum.
- Pain also is a late manifestation and may be related to metastasis to the bone.
- Dysphagia, head and neck edema.
- weakness, anorexia, and weight loss also

Diagnostic Findings

- A chest x-ray is performed to search for pulmonary density.
- CT scans of the chest are used to identify small nodules not visualized on the chest x-ray
- Sputum cytology is rarely used to make a diagnosis of lung cancer

Treatment

- In general, treatment may involve surgery, radiation therapy, or chemotherapy—or a combination of these.

Surgical Management

- The most common surgical procedure for a small, apparently curable tumor of the lung is lobectomy (removal of a lobe of the lung).
- In some cases, an entire lung may be removed (pneumonectomy)

Radiation Therapy

- Radiation also may be used to reduce the size of a tumor, to relieve the pressure of the tumor on vital structures.

Chemotherapy

Page 208 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Chemotherapy is used to alter tumor growth patterns, to treat patients with distant metastases or small cell cancer of the lung.
- Chemotherapy may provide relief, especially of pain, but it does not usually cure the disease.

Palliative Therapy

- Palliative therapy may include radiation therapy to shrink the tumor to provide pain relief

Nursing Management

- Nursing care includes strategies to ensure relief of pain and discomfort and to prevent complications.

Managing Symptoms

Relieving Breathing Problems

- Airway clearance techniques. This may be include: Deep-breathing exercises, chest physiotherapy, cough, and suctioning.

4.16 Chronic Obstructive Pulmonary Disease

- Chronic obstructive pulmonary disease (COPD) is a disease state characterized by airflow limitation that is not fully reversible.
- COPD may include diseases that cause airflow obstruction (eg, emphysema, chronic bronchitis) , bronchiectasis, and asthma

Chronic Bronchitis

- Chronic **bronchitis, a disease of the airways, is defined as the presence** of cough and sputum production for at least 3 months in each of 2 consecutive years.
- Bronchitis is narrowed and has impaired air flow due to multiple mechanisms: inflammation, excess mucus production,
- and potential smooth muscle constriction (bronchospasm).

Bronchiectasis: chronic dilation of a bronchus or bronchi.

Emphysema: a disease of the airways characterized by destruction of the walls of over distended alveoli.

Page 209 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Emphysema

- In emphysema, impaired gas exchange (oxygen, carbon dioxide)
- results from destruction of the walls of over distended alveoli.
- “Emphysema” is a pathological term that describes an abnormal distention of the air spaces beyond the terminal bronchioles, with destruction of the walls of the alveoli.
- As the walls of the alveoli are destroyed (a process accelerated by recurrent infections)
- Impaired oxygen diffusion, which leads to hypoxemia.
- In the later stages of the disease, carbon dioxide elimination is impaired,
- Resulting in increased carbon dioxide tension in arterial blood (hypercapnia) and causing respiratory acidosis.
- Thus, right-sided heart failure (cor pulmonale) is one of the complications of emphysema.
- Congestion, edema, distended neck veins, or pain in the region of the liver suggests the development of cardiac failure.

Clinical Manifestations

- COPD is characterized by three primary symptoms: cough, sputum production, and dyspnea on exertion.
- Dyspnea may be severe and often interferes with the patient’s activities.
- Weight loss is common because dyspnea interferes with eating.
- Often the patient cannot participate in even mild exercise because of dyspnea.
- The patient with COPD is at risk for respiratory infections, which in turn increase the risk for acute and chronic respiratory failure.
- In COPD patients, chronic hyperinflation leads to the “barrel chest”,
- This results from fixation of the ribs in the inspiratory position (due to hyperinflation) and from loss of lung elasticity.

Management of Client with COPD

- For patients with chronic obstructive pulmonary disease (COPD), physical activity is an important part of their quality of life.

Page 210 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Pharmacologic Therapy

- Bronchodilators relieve bronchospasm and reduce airway obstruction.
- **Corticosteroids.** Inhaled and systemic corticosteroids (oral or intravenous) may also be used in COPD but are used more frequently
- Oxygen therapy can be administered to prevent acute dyspnea.

Pulmonary Rehabilitation

- Pulmonary rehabilitation for patients with COPD is well established and widely accepted as a means to alleviate symptoms

Nursing Process for patient with COPD

Assessment

- Assessment involves obtaining information about current symptoms as well as previous disease manifestations.

Nursing Diagnoses

- Based on the assessment data, the patient's major nursing diagnoses may include the following:
- Ineffective airway clearance related to broncho constriction, increased mucus production, and ineffective cough.
- Ineffective breathing pattern related to shortness of breath, mucus, bronchoconstriction, and airway irritants
- Activity intolerance due to fatigue, ineffective breathing patterns, and hypoxemia
- Ineffective coping related to reduced socialization, anxiety, depression, and the inability to work

Potential Complications

- Based on the assessment data, potential complications that may develop include:
- Respiratory insufficiency or failure
- Atelectasis
- Pulmonary infection
- Pneumothorax

Goal of Nursing Process

- The major goals for the patient may include:
- improve gas exchange, airway clearance,
- Improve breathing pattern
- Improve activity tolerance, maximal self-management,
- Improve coping ability, adherence to the therapeutic program and home care, and absence of complications.

Nursing Interventions

- The nurse should educate the patient regarding the hazards of smoking and cessation strategies and provide, counseling.
- Education is focused on rehabilitative therapies to promote independence in executing activities of daily living.
- The nurse instructs the patient to avoid extremes of heat and cold.
- Heat increases the body temperature, thereby raising oxygen requirements.
- Cold tends to promote broncho spasm.
- Air pollutants such as fumes, smoke, initiate bronchospasm.
- High altitudes aggravate hypoxemia.
- The nurse monitors pulse oximetry values to assess the patient's need for oxygen and administers supplemental oxygen as prescribed.

Expected Patient Outcomes

- Demonstrates knowledge of hazards of smoking
- Demonstrates improved gas exchange
- Shows no signs of restlessness
- Has stable pulse oximetry
- Achieves maximal airway clearance
- Stops smoking
- Maintains adequate hydration

Page 212 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Knows signs of early infection and is aware of how and when to report them if they occur
- Improves breathing pattern
- Practices and uses pursed-lip and diaphragmatic breathing

Bronchiectasis

- **Bronchiectasis** is a chronic, irreversible dilation of the bronchi and bronchioles.

Cause:

- Airway obstruction
- Diffuse airway injury
- Pulmonary infections and obstruction of the bronchus
- Genetic disorders such as cystic fibrosis
- A person may be predisposed to bronchiectasis as a result of recurrent respiratory infections.

Clinical Manifestations

- Symptoms of bronchiectasis include:
 - Chronic cough and the production of purulent sputum.
 - Hemoptysis.
 - Clubbing of the fingers because of respiratory insufficiency.
 - Repeated episodes of pulmonary infection

Assessment and Diagnostic Findings

- A definite sign is offered by the prolonged history of productive cough.
- Sputum consistently negative for tubercle bacilli. The diagnosis is
- A computed tomography (CT) scan, which demonstrates presence of bronchial dilation.

Medical Management

- Postural drainage is part of all treatment plans because draining the bronchiectatic areas by gravity reduces the amount of secretions and the degree of infection.

Page 213 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

- Chest physiotherapy, including percussion and postural drainage, is important in secretion management.
- Infection is controlled with antimicrobial therapy based on the results of sensitivity tests.

Asthma

- **Asthma** is a chronic inflammatory disease of the airways.
- Predisposing factor for asthma.
- Exposure to airway irritants or allergens

Symptoms

- Wheezing
- Cough
- Dyspnea
- Chest tightness

Complications

- Complications of asthma may include
- Status asthmaticus
- Respiratory failure
- Pneumonia
- Atelectasis.

Medical Management

PHARMACOLOGIC THERAPY

- Corticosteroids eg prednsolone
- Aminophylline
- Theophylline
- Adrenaline

4.3 Cardiovascular System disorders

Health History

When conducting a health assessment of the cardiovascular system, a thorough history should include the following:

- Any past history of chest pain, shortness of breath, alcoholism and/or tobacco use, anemia, rheumatic fever, streptococcal sore throat,
- congenital heart disease, stroke, hypertension, thrombophlebitis, and edema Current and past use of medications
- Information about specific treatments, past surgeries, or hospital admissions related to cardiovascular problems
- Information about cardiovascular risk factors (i.e., elevated serum lipids, hypertension)
- The patient's current weight and weight history
- The number of pillows needed for comfort
- Information about stressful situations should be explored (e.g., marital relationships)

Physical Examination

- General appearance, and vital signs
- Inspection of the skin, extremities, and the large veins of the neck
- Auscultation of the heart with stethoscope

Diagnostic Studies

- Chest x-ray
- Electrocardiogram

Page 215 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Hypertension

- Hypertension, or high blood pressure (BP), is defined as a persistent systolic blood pressure (SBP) greater than or equal to 140 mm Hg, diastolic blood pressure (DBP) greater than or equal to 90 mm Hg.
- BP is the force exerted by the blood against the walls of the blood vessel.
- It must be adequate to maintain tissue perfusion during activity and rest.

Etiology of Hypertension

- Primary (essential or idiopathic) hypertension: elevated BP without an identified cause; accounts for 90% to 95% of all cases of hypertension.
- Secondary hypertension: elevated BP with a specific cause; accounts for 5% to 10% of hypertension in adults.

Clinical Manifestations

- Physical examination may reveal no abnormalities other than high blood pressure.
- In severe hypertension, papilledema (swelling of the optic disc) may be seen.
- People with hypertension can be asymptomatic and remain so for many years.
- Coronary artery disease with angina or myocardial infarction is a common consequence of hypertension.
- Pathologic changes in the kidneys (indicated by increased blood urea nitrogen [BUN] and creatinine levels).
- Cerebrovascular involvement may lead to a stroke or ischemic attack ,
- Manifested by alterations in vision or speech, dizziness, weakness, a sudden fall, or temporary paralysis on one side (hemiplegia).
- Often called the “silent killer” because it is frequently asymptomatic until it becomes severe and target organ disease occurs.
- Target organ diseases occur in the heart (hypertensive heart disease), brain (cerebrovascular disease), peripheral vasculature (peripheral vascular disease), kidney (nephrosclerosis), and eyes (retinal damage).
- Hypertension is a major risk factor for coronary artery disease (CAD).

Page 216 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Hypertension is a major risk factor for cerebral atherosclerosis and stroke.
- Hypertension speeds up the process of atherosclerosis in the peripheral blood vessels,
- Leading to the development of peripheral vascular disease, aortic aneurysm.

Diagnostic Studies

- Routine urinalysis, BUN, serum creatinine, and creatinine clearance levels are used to screen for renal involvement.
- Lipid profile provides information about additional risk factors that predispose to atherosclerosis and cardiovascular disease.
- ECG and echocardiography provide information about the cardiac status.
- Blood pressure monitoring.

Medical Management

- The goal of hypertension treatment is to prevent death and complications by achieving and maintaining the arterial blood pressure at 140/90 mm Hg or lower.
- For patients with uncomplicated hypertension and no specific indications for another medication, the recommended initial medications include diuretics, beta-blockers, or both.
- Patients are first given low doses of medication. If blood pressure does not fall to
- Less than 140/90 mm Hg, the dose is increased gradually.
- Alpha Blocker
- prazosin hydrochloride (Minipress)

Action

- Peripheral vasodilator acting directly on the blood vessel; similar to hydralazine

Contraindications:

- *Angina pectoris* and coronary artery disease.
- Induces tachycardia if not preceded by administration of propranolol and a diuretic.
- Occasional vomiting and diarrhea,
- Urinary frequency, and cardiovascular collapse.
- Patients occasionally experience drowsiness, lack of energy, and weakness.

Page 217 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Vasodilators

- fenoldopam mesylate
- Given intravenously for hypertensive emergencies.

Action

- Stimulates dopamine and alpha-2 adrenergic receptors

Contraindication

- Use with caution in persons with glaucoma, recent stroke (brain attack), asthma, hypokalemia, or diminished liver function.

Side effect

- Headache, hypotension, sweating
- Hydralazine hydrochloride (Apresoline)

Action

- Decreases peripheral resistance
- but concurrently elevates cardiac output
- Acts directly on smooth muscle of blood vessels

Contraindication

- Not used as initial therapy; used in combination with other medications.
- *Angina or* coronary disease, congestive
- heart failure, hypersensitivity

Side effect

- Headache, tachycardia, and dyspnea may occur

Diuretics

- Thiazide diuretics (such as bendroflumethiazide) and (chlorthalidone and indapamide) are cheap, easy to use, and can be given once daily.
- They are effective and are the drugs of choice in elderly people.
- Thiazides reduce blood pressure by increasing excretion of sodium and water.

Non pharmacological treatment

- Maintain normal body weight for adults (body mass index 20–25 kg/m²)

Page 218 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Reduce dietary sodium intake to (6 g/day
- Engage in regular aerobic physical activity, such as walking
- (30 minutes per day on most days of the week)
- Limit alcohol consumption.
- Consume a diet rich in fruit and vegetables.
- Consume a diet with low levels of saturated fat
- A complete history is obtained to assess for symptoms that indicate target organ damage. Such symptoms may include:
- Angina pain; shortness of breath; alterations in speech, vision, or balance; nosebleeds; headaches; dizziness; or nocturia.

Nursing process

- Diagnosis
- NURSING DIAGNOSES
- Based on the assessment data, nursing diagnoses for the patient may include the following:
- Deficient knowledge regarding the relation between the treatment regimen and control of the disease process
- Noncompliance with therapeutic regimen related to side effects of prescribed therapy

Collaborative Problems/Potential Complications

- Based on the assessment data, potential complications that may develop include the following:
- Left ventricular hypertrophy
- Myocardial infarction
- Heart failure
- Cerebrovascular accident (stroke or brain attack)

Nursing Interventions

- The objective of nursing care for hypertensive patients focuses on lowering and controlling the blood pressure without adverse effects and without undue cost.

Page 219 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- To achieve these goals, the nurse must support and teach the patient to adhere to the treatment regimen by implementing necessary lifestyle changes.

Increasing Knowledge

- The patient needs to understand the disease process and how lifestyle changes and medications can control hypertension.
- The nurse needs to emphasize the concept of controlling hypertension rather than curing it.
- The nurse can encourage the patient to restrict sodium and fat intake, increasing intake of fruits and vegetables, and implementing regular physical activity.

Coronary artery disease (CAD)

- **Coronary artery disease (CAD)** is a type of blood vessel disorder included in the general category of atherosclerosis.
- **Atherosclerosis** is characterized by a focal deposit of cholesterol and lipids within the wall of the artery.

Risk factors:

- Non modifiable risk factors are age, gender, and genetic inheritance.
- Modifiable risk factors include:
 - Elevated serum lipids, hypertension, tobacco use, physical inactivity, obesity, diabetes.
 - Lipids combine with proteins to form lipoproteins and are vehicles for fat mobilization and transport.
 - The different types of lipoproteins are classified as high-density lipoproteins (HDLs), low-density lipoproteins (LDLs), and very-low-density lipoproteins (VLDLs).
 - HDLs carry lipids away from arteries and to the liver for metabolism.
 - HDL levels are increased by physical activity, moderate alcohol consumption, and estrogen administration.
 - Elevated LDL levels correlate most closely with an increased incidence of atherosclerosis and CAD.

Page 220 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

- Tobacco use is also a major risk factor in CAD.
- Obesity.
- Diabetes.
- Certain behavioral states (i.e., stress) have also been found to be contributing risk factors for CAD.

Prevention of CAD

- Persons with a serum cholesterol level greater than 200 mg/dl are at high risk for CAD.
- A regular physical activity program should be implemented.
- Therapeutic lifestyle changes to reduce the risk of CAD include:
- Lowering LDL cholesterol by adopting a diet that limits saturated fats and cholesterol and emphasizes complex carbohydrates (e.g., whole grains, fruit, vegetables).
- Low-dose aspirin is recommended for people at risk for CAD.
- Common side effects of aspirin therapy include GI upset and bleeding.

Chronic Angina

- **Chronic angina** refers to chest pain that occurs intermittently over a long period.
- Angina is rarely sharp, and it usually does not change with position or breathing.
- Many people with angina complain of indigestion or a burning sensation in the epigastric region.
- Anginal pain usually lasts for only a few minutes (3 to 5 minutes) and commonly subsides when the precipitating factor is relieved.
- Pain at rest is unusual.
- The treatment of chronic angina is aimed at decreasing oxygen demand and/or increasing oxygen supply and reducing CAD risk factors.
- The most common drugs used to manage chronic angina are nitrates.
- Short-acting nitrates are first-line therapy for the treatment of angina.
- Nitrates produce their principal effects by dilating peripheral blood vessels.
- B-Adrenergic blockers are the preferred drugs for the management of chronic angina.
- Calcium channel blockers are used if b-adrenergic blockers are contraindicated.

The primary effects of calcium channel blockers are:

- (1) systemic vasodilation (2) decreased myocardial contractility, and (3) coronary vasodilation.

Acute Coronary Syndrome

- **Acute coronary syndrome** develops when ischemia is prolonged and not immediately reversible.
- **Unstable angina (UA)** is chest pain that is new in onset, occurs at rest, or has a worsening pattern.
- **Myocardial infarction (MI)** occurs as a result of sustained ischemia, causing irreversible myocardial cell death.
- Eighty percent to 90% of all MIs are due to the development of a thrombus.
- Contractile function of the heart stops in the infarcted area(s).
- Severe, immobilizing chest pain not relieved by rest, position change, or nitrate administration.
- The pain is usually described as a heaviness, pressure, tightness, or burning.
- Complications after MI
- The most common complication after an MI is dysrhythmias.
- Heart failure occurs when the pumping power of the heart has diminished.
- Cardiogenic shock

Drug Therapy

- Initial management of the patient with chest pain includes aspirin, sublingual nitroglycerin, morphine sulfate for pain unrelieved by nitroglycerin, and oxygen.
- IV nitroglycerin, aspirin, b-adrenergic blockers, and systemic anticoagulation.
- Heparin are the initial drug treatments of choice.

Nursing Management

The following nursing measures should be instituted for a patient experiencing angina:

1. Administration of supplemental oxygen.
2. Determination of vital signs.

Page 222 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

3. Prompt pain relief first with a nitrate followed by an opioid analgesic if needed.
4. Comfortable positioning of the patient.
5. Physiologic monitoring, promotion of rest and comfort.

Sudden Cardiac Death

- **Sudden cardiac death (SCD)** is unexpected death from cardiac causes.
- CAD is the most common cause of SCD and accounts for 80% of all SCDs.
- SCD involves, producing an abrupt loss of cardiac output and cerebral blood flow.
- Death usually occurs within 1 hour of the onset of acute symptoms (e.g., angina, palpitations).
- The majority of cases of SCD are caused by acute ventricular dysrhythmias (e.g., ventricular tachycardia, ventricular fibrillation).

Etiology and Pathophysiology

- **Heart failure (HF)** is an abnormal clinical condition involving impaired cardiac pumping
- Risk factors include:
- Coronary artery disease (CAD) and advancing age.
- Hypertension, diabetes, cigarette smoking, obesity, and high serum cholesterol also contribute to the development of HF.

Classification

- Heart failure is classified as systolic or diastolic failure.
- **Systolic failure**, the most common cause of HF, results from an inability of the heart to pump blood.
- **Diastolic failure** is an impaired ability of the ventricles to relax and fill during diastole.
- Decreased filling of the ventricles will result in decreased stroke volume and cardiac output (CO).
- The most common form of HF is left-sided failure from left ventricular dysfunction.
- Blood backs up into the left atrium and into the pulmonary veins causing pulmonary congestion and edema.

Page 223 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

Clinical Manifestations

- Common symptoms include:
- Fatigue, dyspnea, tachycardia,
- Edema, and unusual behavior.

Complication

- Pleural effusion, atrial fibrillation, thrombus formation, renal insufficiency, and
- hepatomegaly are all complications of HF.

Diagnostic Studies

- A thorough history, physical examination, chest x-ray, electrocardiogram (ECG), and echocardiogram.

Management for heart failure

- The goals of therapy for HF are to decrease patient symptoms, improve quality of life, and decrease mortality and morbidity.
- Treatment strategies should include the following:
- Decreasing intravascular volume with the use of diuretics to reduce venous return and preload.
- Decreasing venous return (preload) to reduce the amount of volume returned to the LV during diastole.
- Decreasing after load (the resistance against which the LV must pump) improves CO and decreases pulmonary congestion.
- Reduction of anxiety is an important nursing function, since anxiety may increase the SNS response and further increase myocardial workload.

Chronic Heart Failure

- The main goal in the treatment of chronic HF is to treat the underlying cause and contributing factors, maximize Cardiac out put.
- Provide treatment to alleviate symptoms, improve ventricular function.
- Improve quality of life, preserve target organ function, and improve mortality and morbidity.

Page 224 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Administration of oxygen improves saturation and assists greatly in meeting tissue oxygen needs and helps relieve dyspnea and fatigue.
- Physical and emotional rest allows the patient to conserve energy and decreases the need for additional oxygen.
- The degree of rest recommended depends on the severity of HF.

General therapeutic objectives for drug management of chronic HF include:

- Identification of the type of HF and underlying causes
- Correction of sodium and water retention and volume overload
- Reduction of cardiac workload
- Improvement of myocardial contractility.

Diuretics are used in HF to mobilize edematous fluid, reduce pulmonary venous pressure.

General therapeutic objectives for drug management of chronic HF include:

- Identification of the type of HF and underlying causes
- Correction of sodium and water retention and volume overload
- Education of cardiac workload
- Improvement of myocardial contractility.
- Diuretics are used in HF to mobilize edematous fluid, reduce pulmonary venous pressure.
- Thiazide diuretics may be the first choice in chronic HF because of their convenience, safety, low cost, and effectiveness.
- Vasodilator therapy in the treatment of HF:

Major effect

- increasing venous capacity
- Slowing the process of ventricular dysfunction
- Decreasing heart size
- Nitrates are used to treat HF by acting directly on the smooth muscle of the vessel wall.

Major effects include a vasodilation of coronary arteries.

Page 225 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Digitalis glycosides [e.g., digoxin (Lanoxin)] remain the mainstay in the treatment of HF, however, they have not been shown to prolong life.

Nursing Management

- Diet education and weight management are critical to the patient's control of chronic HF.
- Assisting the patient to adapt to both the physiologic and psychologic changes, and
- Integrating the patient and the patient's family or support system in the overall care plan.
- Many patients with HF are at high risk for anxiety and depression, and major.
- Patients should be taught how to take their pulse rate and to know under what circumstances drugs, especially digitalis, should be withheld if pulse rate is below 60 beats per minute..
- Patients should be taught the symptoms of hypo- and hyperkalemia if diuretics that deplete or spare potassium are being taken.
- Frequently the patient who is taking thiazide or loop diuretics is given supplemental potassium.

Dysrhythmias

- The ability to recognize normal and abnormal cardiac rhythms, called dysrhythmias.
- Four properties of cardiac cells (automaticity, excitability, conductivity, and contractility) enable the conduction system to initiate an electrical impulse, transmit it through the cardiac tissue, and stimulate the myocardial tissue to contract.
- A normal cardiac impulse begins in the sinoatrial (SA) node in the upper right atrium.
- The impulse then travels to the atrioventricular (AV) node through the bundle of His and down the left and right bundle branches, ending in the Purkinje fibers, which transmit the impulse to the ventricles, resulting in ventricular contraction.
- The autonomic nervous system plays an important role in the rate of impulse formation,
- The parasympathetic nervous system and fibers of the sympathetic nervous system.

Page 226 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Normal sinus rhythm refers to a rhythm that originates in the SA node and follows the normal conduction pattern of the cardiac cycle.
- The P wave represents the depolarization of the atria (passage of an electrical impulse through the atria), causing atrial contraction.
- The PR interval represents the time period for the impulse to spread through the atria, AV node, bundle of His, and Purkinje fibers.
- The QRS complex represents depolarization of the ventricles (ventricular contraction), and the QRS interval represents the time it takes for depolarization.
- The ST segment represents the time between ventricular depolarization and repolarization.
- The T wave represents repolarization of the ventricles.
- The QT interval represents the total time for depolarization and repolarization of the ventricles.

Mechanisms of Dysrhythmias

- Normally the main pacemaker of the heart is the SA node, which spontaneously discharges 60 to 100 times per minute.
- Disorders of impulse formation can cause dysrhythmias.
- A pacemaker from another site can lead to dysrhythmias.
- Secondary pacemakers may originate from the AV node or His-Purkinje system.
- Triggered beats (early or late) may come from an ectopic focus (area outside the normal conduction pathway) in the atria, AV node, or ventricles.

Types of Dysrhythmias

- **Sinus bradycardia** has a normal sinus rhythm, but the SA node fires at a rate less than 60 beats/minute and is referred to as absolute bradycardia.

Clinical associations

- Sinus bradycardia may be a normal sinus rhythm (e.g., in hypothermia, and administration of parasympathomimetic drugs).

Page 227 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Disease states associated with sinus bradycardia are: increased intracranial pressure, obstructive jaundice, and myocardial infarction (MI).

Treatment

- Administration of atropine (an anticholinergic drug) for the patient with symptoms.

Sinus tachycardia

Sinus tachycardia has a normal sinus rhythm, but the SA node fires at a rate greater than 100 beats/minute as a result of vagal inhibition or sympathetic stimulation.

Clinical manifestation

- Sinus tachycardia is associated with physiologic and psychologic stressors such as exercise, fever, pain, hypotension, hypovolemia, anemia, hypoxia, hypoglycemia, myocardial ischemia, heart failure (HF), anxiety, and fear.
- It can also be an effect of certain drugs.

Atrial fibrillation

- **Atrial fibrillation** is characterized by a total disorganization of atrial electrical activity resulting in loss of effective atrial contraction.
- Atrial fibrillation usually occurs in the patient with underlying heart disease, such as CAD, rheumatic heart disease, hypertensive heart disease, HF, and pericarditis.
- It can be caused by thyrotoxicosis, alcohol intoxication, caffeine use, electrolyte disturbances, stress, and cardiac surgery.
- Atrial fibrillation can often result in a decrease in CO, and thrombi may form in the atria as a result of blood stasis.
- An embolized clot may develop and pass to the brain, causing a stroke.

Junctional dysrhythmias refer to dysrhythmias that originate in the area of the AV node, primarily because the SA node has failed to fire or the signal has been blocked.

- In this situation, the AV node becomes the pacemaker of the heart.
- Junctional dysrhythmias are often associated with CAD, HF, electrolyte imbalances, MI, and rheumatic heart disease. Certain drugs
- (e.g., digoxin, amphetamines, caffeine, nicotine) can also cause junctional dysrhythmias.

Page 228 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Premature ventricular contraction (PVC) is a contraction originating in an ectopic focus in the ventricles.

- PVCs are associated with stimulants such as caffeine, alcohol, nicotine, epinephrine, and digoxin.
- They are also associated with electrolyte imbalances, hypoxia, fever, exercise, and emotional stress.
- Disease states associated with PVCs include MI, mitral valve prolapse, HF, and CAD.
- PVCs may reduce the CO and precipitate angina and HF.
- Treatment is often based on the cause of the PVCs (e.g., oxygen therapy for hypoxia, electrolyte replacement). Drugs that can be considered include b-adrenergic blockers.

Ventricular tachycardia (VT) is a run of three or more PVCs. It occurs when an ectopic focus fire repetitively and the ventricle takes control as the pacemaker.

- VT is a life-threatening dysrhythmia because of decreased CO.
- VT is associated with MI, CAD, significant electrolyte imbalances, mitral valve prolapse, and digitalis toxicity.

Treatment.

- Precipitating causes must be identified and treated (e.g., electrolyte imbalances, ischemia).

Ventricular fibrillation (VF) is a severe interruption of the heart rhythm characterized on ECG.

- Mechanically the ventricle is simply “quivering,” (shake) and no effective contraction, and consequently no CO, occurs.
- VF occurs in acute MI and myocardial ischemia and in chronic diseases such as CAD.
- VF results in an unresponsive, pulseless, and apneic state. If not rapidly treated, the patient will die.

Treatment

- Consists of immediate initiation of CPR and advanced cardiac life support (ACLS) measures with the use of defibrillation.

Page 229 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

PACEMAKERS

- The artificial **cardiac pacemaker** is an electronic device used to pace the heart when the normal conduction pathway is damaged or diseased.
- A permanent pacemaker is one that is implanted totally within the body.
- A specialized type of cardiac pacing has been developed for the management of HF.
- A temporary pacemaker is one that has the power source outside the body.
- Patients with temporary or permanent pacemakers will be ECG monitored to evaluate the status of the pacemaker.

Complications of temporary or permanent pacemaker

- Infection and hematoma formation at the site of insertion.
- symptomatic bradycardia, perforation of the atrial or ventricular septum by the pacing

Syncope

- Syncope, a brief lapse in consciousness (fainting).
- The causes of syncope can be categorized as cardiovascular or noncardiovascular.
- Cardiovascular causes of syncope include:
 - (I) neurocardiogenic syncope
 - Dysrhythmias (e.g., tachycardias, bradycardias).
- Noncardiovascular causes can include:
 - Hypoglycemia, hysteria.

Infective Endocarditis

- Infective endocarditis is an infection of the endocardial surface of the heart that affects the cardiac valves.
- Causative organisms
 - Staphylococcus aureus and Streptococcus.

Clinical manifestation

- Low-grade fever, chills, weakness, malaise, fatigue, and anorexia

Page 230 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Arthralgias (pain in a joint), myalgias (pain in a muscle), back pain, abdominal discomfort, weight loss, headache, and clubbing of fingers

Treatment

- Drug therapy consists of long-term treatment with IV antibiotic therapy with subsequent blood cultures to evaluate the effectiveness of antibiotic therapy.
- It is treated with penicillin.
- Fever is treated with aspirin, acetaminophen , ibuprofen, fluids, and rest.

MYOCARDITIS

- **Myocarditis** is inflammation of the myocardium.

Cause

- Bacteria, fungi, radiation therapy, and pharmacologic and chemical factors.
- Myocarditis is frequently associated with acute pericarditis

Clinical manifestations include:

- Fever, fatigue, malaise, myalgias, dyspnea, lymphadenopathy, and
- Nausea and vomiting are early systemic manifestations.
- Late cardiac signs relate to the development of HF and may include jugular venous distention, syncope, peripheral edema, and angina.

Management

- Digoxin to treat ventricular failure
- Diuretics to reduce fluid volume
- Immunosuppressive therapy to reduce myocardial inflammation and to prevent irreversible myocardial damage.
- Oxygen therapy, bed rest, and restricted activity.

Nursing interventions:

- Nursing interventions include
- Assessing the level of anxiety.
- keeping the patient and family informed about therapeutic measures.

RHEUMATIC FEVER

Page 231 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Rheumatic fever is an inflammatory disease of the heart potentially involving all layers of the heart.
- Rheumatic heart disease is a chronic condition resulting from rheumatic fever that is characterized by scarring and deformity of the heart valves.
- Acute rheumatic fever is a complication that occurs as a delayed treatment of a group A streptococcal pharyngitis and affects the heart, and joints.

Clinical manifestations of ARF include:

- Evidence of a preceding group A streptococcal infection.
- Murmurs of mitral or aortic regurgitation, or mitral stenosis
- Cardiac enlargement and HF
- Muscle weakness, and disturbances of speech and gait.
- Small, hard, painless swellings located over extensor surfaces of the joints.
- Fever, polyarthralgia
- Laboratory findings: elevated ESR, elevated WBC
- prevention of rheumatic fever
- Early detection and treatment of group A streptococcal pharyngitis with antibiotics, specifically penicillin.
- The success of treatment requires strict adherence to the full course of antibiotic therapy.

Management

- The primary goals of managing a patient with ARF are:
- To control and eradicate the infecting organism.
- Prevent cardiac complications.
- Relieve joint pain, fever, and other symptoms with antibiotics; optimal rest; and antipyretics, NSAIDs, and corticosteroids.
- Secondary prevention aims at preventing the recurrence of rheumatic fever with monthly injections of long-acting penicillin.

Valvular Heart Disease

Page 232 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- **Valvular stenosis** refers to a constriction or narrowing of the valve opening.
- **Valvular regurgitation** (also called valvular incompetence or insufficiency) occurs with incomplete closure of the valve and results in the backward flow of blood.

Mitral Valve Stenosis

- Adult mitral valve stenosis results from rheumatic heart disease. Less commonly, it can occur congenitally, from rheumatoid arthritis.

Clinical manifestations of mitral stenosis include;

- Exertional dyspnea, fatigue, palpitations from atrial fibrillation

Mitral Regurgitation

- Mitral regurgitation (MR) is caused by MI, chronic rheumatic heart disease, mitral valve prolapse.
- In acute MR, there is a sudden increase in pressure and volume that is transmitted to the pulmonary bed, resulting in pulmonary edema and life-threatening shock.

Clinical manifestations of acute MR include:

- Thready, peripheral pulses and cool, clammy extremities.
- Surgery considered before significant left ventricular failure or pulmonary hypertension develops.

Mitral Valve Prolapse

- **Mitral valve prolapse** is an abnormality of the mitral valve prolapse, back into the left atrium during systole.

Clinical manifestations include:

- Murmur from regurgitation that gets more intense through systole, chest pain, dyspnea, palpitations, and syncope.

Aortic Valve Stenosis

- In older patients, aortic stenosis is a result of rheumatic fever or senile fibrocalcific Degeneration..

- Aortic stenosis results in left ventricular hypertrophy and increased myocardial oxygen consumption, and eventually, reduced cardiac output leading to pulmonary hypertension and HF.

Clinical manifestations include a systolic:

- Murmur, angina, syncope, and exertional dyspnea.

Aortic Valve Regurgitation

Acute aortic regurgitation (AR) is caused by IE, trauma, or aortic dissection.

- Chronic AR is generally the result of rheumatic heart disease, a congenital bicuspid aortic valve, syphilis, or chronic rheumatic conditions.

Clinical manifestations of acute AR include:

- Severe dyspnea, chest pain, and hypotension indicating left ventricular failure and shock that constitute a medical emergency.

Clinical manifestations of chronic AR include:

- Exertional dyspnea, orthopnea, and paroxysmal nocturnal dyspnea after considerable myocardial dysfunction has occurred.

ANEURYSMS

- Aneurysms are dilations of the arterial wall.
- Causes of aortic aneurysms
- Degenerative, congenital, inflammatory, or infectious.
- Aortic aneurysms may involve the aortic arch, thoracic aorta, and/or abdominal aorta, but most are found in the abdominal aorta.

Clinical manifestation

- Thoracic aorta aneurysms:
- The most common manifestations are deep, diffuse chest pain that may extend to the interscapular area
- Hoarseness as a result of pressure on the recurrent laryngeal nerve; and dysphagia from pressure on the esophagus.

Abdominal aortic aneurysms:

Page 234 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- symptoms include pain associated with abdominal disorders

Management

- The goal of management is to prevent the aneurysm from rupturing.
- Surgical repair incising the diseased segment of the aorta

VENOUS THROMBOSIS

- **Venous thrombosis** is the most common disorder of the veins and involves the formation of a thrombus (clot) in association with inflammation of the vein.
- **Superficial thrombophlebitis** occurs in about 65% of all patients receiving IV therapy
- **Deep vein thrombosis** involves a thrombus in a deep vein, most commonly the iliac and femoral veins and can result in embolization of thrombi to the lungs.

Clinical manifestation

- Superficial thrombophlebitis presents as a palpable, firm, vein.
- The area surrounding the vein may be tender to the touch, reddened, and warm. A mild systemic temperature elevation and leukocytosis may be present.

Management:

- Management of superficial thrombophlebitis includes: elevating the affected extremity to promote venous return and decrease the edema and applying warm, moist heat.
- Anticoagulation
- Nursing diagnoses for the patient with venous thrombosis include the following:
 - Acute pain related to venous congestion, impaired venous return, and inflammation
 - Ineffective health maintenance related to lack of knowledge about the disorder and its treatment
 - Risk for impaired skin integrity related to altered peripheral tissue perfusion

Potential complication:

- Bleeding related to anticoagulant therapy
- Pulmonary embolism related to embolization of thrombus, and immobility

Goals for the patient with venous thrombosis include:

Page 235 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

- Relief of pain
- decrease edema,
- no skin ulceration
- no complications from anticoagulant therapy
- no evidence of pulmonary emboli.

Nursing intervention

- Patients on warfarin should be instructed to follow a consistent diet of foods containing vitamin K and to avoid any additional supplements that contain vitamin K.
- Exercise programs should be developed with an emphasis on walking, and swimming.
- The expected outcomes for the patient with venous thrombosis include:
 - (1) minimal to no pain
 - (2) intact skin
 - (3) no signs of hemorrhage or occult bleeding
 - (4) no signs of respiratory distress.

Cerebrovascular accident

- Cerebrovascular accident (CVA), or “stroke,” is the interruption of normal blood flow in one or more of the blood vessels that supply the brain.
- The tissues become ischemic, leading to hypoxia or anoxia with destruction or necrosis of the neurons.
- A CVA is an acute neurological injury that occurs because of changes in the blood vessels of the brain.
- The changes can be intrinsic to the vessel (atherosclerosis, inflammation, dilation of the vessel, weakening of the vessel, obstruction of the vessel)
- Extrinsic, such as when an embolism travels from the heart.
- Total cessation of blood flow produces irreversible brain infarction within 3 minutes.
- Once the blood flow stops, cerebral edema, and alterations in local blood flow contribute to neuron dysfunction and death.

Complications of CVA include:

Page 236 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Unstable blood pressure, sensory and motor impairment, infection (encephalitis), pneumonia, contractures, and pulmonary emboli.

Causes

- Thrombosis, embolism, and hemorrhage are the primary causes of CVA.
- In cerebral thrombosis, the most common cause of CVA, a blood clot obstructs a cerebral vessel.
- Hemorrhagic CVA results from hypertension, rupture of an aneurysm, arteriovenous malformations, or bleeding disorder

Clinical manifestation

- Memory loss (amnesia).
- Speech difficulties (aphasia).
- visual difficulties such as double vision (diplopia)
- Defective vision, or blindness in the right or left halves of the visual fields of both eyes
- Inability to move the muscles (akinesia).
- Poor coordination, impairment of voluntary movement (dyskinesia).
- Muscular weakness or partial paralysis affecting one side of the body (hemiparesis).
- Or paralysis of one side of the body (hemiplegia).

Physical Examination

- If the patient appears unconscious, quickly determine his or her airway status and level of consciousness.
- Determine the level of orientation; ability to speech, hearing, and vision ability.
- Lightly touch the patient's skin on various parts of the body to test skin sensations.

Treatment

- The treatment needs to be initiated rapidly, within 6 hours of the onset of symptoms.
- Passive range-of-motion exercises on the affected side.

Cardiac Arrest

- Cardiac arrest occurs when the heart ceases to produce an effective pulse and blood circulation.

Page 237 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

Cause

- Ventricular tachycardia or ventricular fibrillation
- Bradycardia or AV block.
- when there is no heart rate at all (asystole)

Clinical Manifestations

- Consciousness, pulse, and blood pressure are lost immediately.
- Ineffective respiratory gasping may occur.
- The pupils of the eyes begin dilating within 45 seconds.
- Seizures may or may not occur.

Emergency Management

Cardiopulmonary Resuscitation

The ABCDs of basic cardiopulmonary resuscitation (CPR) are *airway*, *breathing*, *circulation*, and *defibrillation*.

Resuscitation consists of the following steps:

1. Airway: maintaining an open airway
2. Breathing: providing artificial ventilation by rescue breathing
3. Circulation: promoting artificial circulation by external cardiac compression
4. Defibrillation: restoring the heartbeat

Nursing Management

- The most reliable sign of cardiac arrest is the absence of a pulse.
- The carotid pulse is assessed.
- Valuable time should not be wasted taking the blood pressure, listening for the heartbeat
- CPR is performed initially only if the defibrillator is not immediately available.
- If the patient has not been defibrillated within 10 minutes, the chance of survival is close to zero.

Maintaining Airway and Breathing

- The first step in CPR is to obtain an open airway.

Page 238 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Any obvious material in the mouth or throat should be removed.
- The chin is directed up and back, or the jaw (mandible) is lifted forward.
- The rescuer “looks, listens, and feels” for air movement.
- Two rescue ventilations over 3 to 4 seconds are provided using a bag-mask or mouth mask.
- The rescuer (facing the patient’s side) places the heel of one hand on the lower half of the sternum, two finger widths (3.8 cm) from the tip of the xiphoid and positions the other hand on top of the first hand.
- The fingers should not touch the chest wall.
- The chest compression is two ventilations to every 30 cardiac compressions.

Lymphangitis and Lymphadenitis

- Lymphangitis is an acute inflammation of the lymphatic channels.
- It arises most commonly from a focus of infection in an extremity.
- Usually, the infectious organism is a hemolytic *Streptococcus*.

Clinical manifestation

- The lymph nodes become enlarged, red, and tender (acute lymphadenitis).
- The nodes involved most often are those in the groin, axilla, or cervical region.

Lymphedema and Elephantiasis

- Lymph edemas are classified as primary (congenital malformations) or secondary (acquired obstructions).
- Tissue swelling occurs in the extremities because of an increased quantity of lymph that results from obstruction of lymphatic vessels.
- Initially, the edema is soft, pitting, and relieved by treatment.
- As the condition progresses, the edema becomes firm, non pitting, and unresponsive to treatment.
- The most common type is congenital lymphedema .
- The obstruction may be in the lymph nodes and the lymphatic vessels.
- Lymphatic obstruction usually is caused by chronic lymphangitis.

Page 239 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Lymphatic obstruction caused by a parasite (filaria) is seen frequently in the tropics.
- This condition, in which chronic swelling of the extremity, is referred to as elephantiasis.

Medical Management

- The goal of therapy is to reduce and control the edema and prevent infection.
- Active and passive exercises assist in moving lymphatic fluid into the bloodstream.
- When the leg is affected, strict bed rest with the leg elevated may aid in mobilizing the fluids.
- As initial therapy, the diuretic furosemide (Lasix) is prescribed as needed to prevent the fluid overload that can result from the mobilization of extracellular fluid.
- If lymphangitis or cellulitis is present, antibiotic therapy is initiated.
- The patient is taught to inspect the skin for evidence of infection.

Surgical Management

- Surgery is performed if the edema is severe and uncontrolled by medical therapy.
- If mobility is severely compromised, or if infection persists.
- One surgical approach involves the excision of the affected subcutaneous tissue and fascia, with skin grafting to cover the defect.

Nursing Management

- Constant elevation of the affected extremity and observations for complications are essential.
- Complications may include:
 - Abscess, and cellulitis.
 - Unusual drainage or any inflammation around the wound margin may suggest infection and should be reported to the physician.
 - The patient is informed that there may be a loss of sensation in the skin graft area.
 - The patient is also instructed to avoid the application of heating pads or exposure to sun to prevent burns or trauma to the area.

4.4 Digestive System disorder

HEALTH HISTORY

Page 240 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

- The nurse begins by taking a complete history focusing on symptoms.
- symptoms include pain, indigestion, intestinal gas, nausea and vomiting, hematemesis
- Changes in bowel habits and stool characteristics.
- Past and current medication use and any previous treatment or surgery.
- Questioning about the use of tobacco and alcohol.
- Mouth: teeth, gums, tongue
- Abdomen: look, listen, feel
- Anal and perineal area
- The patient lies **supine with knees flexed** slightly for inspection.
- Inspection, Auscultation, palpation, and percussion of the abdomen.
- The nurse performs **inspection first**-noting skin changes and scars from previous surgery and abdominal distention.

Pain

- Pain can be a major symptoms of GI disease. the character, duration, pattern, frequency, location, distribution of referred pain

Indigestion

- Upper abdominal discomfort or distress associated with eating (commonly called *indigestion*) is the most common symptoms of patients with GI dysfunction.
- **Assesses bowel sounds in all four quadrants** using the diaphragm of the stethoscopes
- *normal* = sounds heard about every 5 to 20 seconds
- *Hypoactive* = one or two sounds in 2 minutes
- *hyperactive* = 5 to 6 sounds heard in less than 30 second
- *absent* = no sounds in 3 to 5 minutes

Abdominal ultrasound

- visualization of the internal organs of the abdomen liver, gallbladder, and bile ducts

Abdominocentesis (Paracentesis)

- For laboratory investigation

Page 241 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Barium Swallow (Upper GI Series)
- Involves oral administration of a radiopaque contrast medium, barium sulfate, which flows into the esophagus as the person swallows
- X-ray films are obtained at time intervals to observe the progression of the barium through the small intestine

Nursing intervention for Barium Swallow

- Preparing the patient includes empathizing and cleansing the lower bowel.
- A clear liquid diet and a laxative the evening before procedure.
- Nothing by mouth after midnight
- Cleansing enemas

Ultrasonography- can detect calculi in the gallbladder.

- It is reported to detect gallstones with 95% accuracy.
- **Computerized tomography (CT) of the abdomen**
- Painless, x-ray procedure
- Produces an image created by the computer representing a detailed cross section of the tissue structure within the abdomen

Esophagogastroduodenoscopy (EGD)

- Process of direct visualization of the esophagus, stomach, and duodenum
- Gastric analysis
- Study of the stomach contents to determine the acid content and to detect the presence of blood, bacteria, bile, and abnormal cells

Liver biopsy

- Piece of liver tissue obtained for examination by inserting a specially designed needle into the liver through the abdominal wall

Liver scan

- Enables visualization of shape, size, and consistency of liver after IV injection of a radioactive compound

Serum Bilirubin

Page 242 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Measurement of bilirubin level in serum
- Serum bilirubin levels are a result of the breakdown of red blood cells
- Total: 0.3–1.0 mg/dL
- Stool analysis for occult blood
- Analysis of a stool sample to determine presence of blood not visible to naked eye

Stool culture

- Collection of a stool specimen placed on one or more culture mediums
- Allowed to grow colonies of microorganisms to identify specific pathogen(s)

Stool examination

- A stool specimen to identifies intestinal parasite

Oral disorder

Dental Plaque and Caries-

- Tooth decay is an erosive process that begins with the action of bacteria on fermentable carbohydrates in the mouth
- Which produces acids that dissolve tooth enamel

The extent of damage to the teeth depends on the following:

- The presence of dental plaque
- The strength of the acids and the ability of the saliva to neutralize them
- The length of time the acids are in contact with the teeth
- The susceptibility of the teeth to decay

Dental plaque is a gluey, gelatin-like substance that adheres to the teeth. The initial action that causes damage to a tooth occurs under dental plaque.

Dental decay begins with a small hole, usually a break in the tooth's enamel or in an area that is hard to clean.

The affected area penetrates the enamel into the dentin. Because dentin is not as hard as enamel

Decay progresses more rapidly and in time reaches the pulp.

Page 243 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

When the blood, lymph vessels, and nerves are exposed, they become infected and an abscess may form, either within the tooth or at the tip of the root.

Soreness and pain usually occur with an abscess. As the infection continues, the patient's face may swell, and there may be pulsating pain.

The dentist can determine by x-ray studies the extent of damage and the type of treatment needed.

Treatment

- Treatment for dental caries includes
- Fillings, dental implants, and extractions.
- If treatment is not successful, the tooth may need to be extracted.

Prevention

- Measures used to prevent and control dental caries include
- practicing effective mouth care, reducing the intake of starches and sugars
- Applying fluoride to the teeth or drinking fluoridated water, refraining from smoking
- Controlling diabetes
- MOUTH CARE-Healthy teeth must be conscientiously and effectively cleaned on a daily basis.
- Brushing break up the bacterial plaque that collects around teeth.

Diet

- Dental caries may be prevented by decreasing the amount of sugar and starch in the diet.

Disorders of the, Lips, Mouth, and Gums

Abnormalities of the lips

Herpes simplex I (cold sore or fever blister)

Cause

- An opportunistic infection; frequently seen in immunosuppressed patients, very contagious

Signs and symptoms

- Symptoms may be delayed up to 20 days after exposure;

Page 244 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Singular or clustered painful vesicles that may rupture.

Management

- Use acyclovir or zovirax ointment or systemic medications as prescribed
- Administer analgesics as prescribed
- Instruct patient to avoid irritating foods

Contact dermatitis

Cause:

- Allergic reaction to cosmetic ointments, or toothpaste

Signs and symptoms

- Red area or rash; itching

Management

- Instruct patient to avoid possible causes
- Administer corticosteroids as prescribed

Abnormalities of the Mouth

- Candidiasis (moniliasis/thrush)
- Cause- Candida albicans fungus
- predisposing factors include:
- Diabetes, and immunosuppression

Signs and symptoms

- Cheesy white plaque that looks like milk
- when rubbed off, it leaves an erythematous and often bleeding

Page 245 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--



Figure 4.4 Cabdidiasis

Management

- Antifungal medications such as nystatin (Mycostatin)
- Amphotericin B, clotrimazole, or ketoconazole may be prescribed
- These may be taken in pill form or as a suspension

Stomatitis

Cause

- Associated with emotional or mental stress, fatigue, hormonal factors
- Minor trauma (such as biting),
- Allergies, acidic foods and juices, and dietary deficiencies
- Associated with HIV infection

Signs and symptoms

- Shallow ulcer with a white or yellow center and red border

Page 246 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Seen on the inner side of the lip and cheek or on the tongue
- It begins with a burning or tingling sensation and slight swelling; painful; usually lasts 7–10 days and heals without a scar

Management

- Instruct the patient in comfort measures, such as saline rinses, and a soft diet
- Antibiotics or corticosteroids may be prescribed

Abnormalities of the Gums

Gingivitis

Cause

- Poor oral hygiene: food debris, bacterial plaque accumulate
- Signs and symptoms
- Painful, inflamed, swollen gums; usually the gums bleed in response to light contact

Management

- Teach patient proper oral hygiene
- Daily oral hygiene practices will reverse gingivitis.



Figure 4.5 oral caries

Gastroesophageal reflux disease (GERD)

- **Gastro esophageal reflux** : is a back-flow of gastric or duodenal contents into the esophagus
- GERD occurs because of inappropriate relaxation of the lower esophageal sphincter (LES) in response to an unknown stimulus.
- Reflux occurs in most adults, but if it occurs regularly, the esophagus cannot resist the irritating effects of gastric acid and pepsin because the mucosal barrier of the esophagus breaks down.
- Without this protection, tissue injury, inflammation, and even erosion occur.
- Repeated exposure may also lead to scarring, which can cause esophageal stricture to occur.
- Stricture leads to difficulty in swallowing. Chronic reflux is often associated with hiatus hernia.

Causes

Page 248 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- The causes of GERD are not well understood.

Predisposing factor

- Aging and obesity. Environmental and physical factors that lower tone and contractility.
- Diet (fatty foods, alcohol, caffeine, chocolate) and drugs (nicotine, beta-adrenergic blockers, nitrates, theophylline, anticholinergic drugs).
- Genetic component

Assessment

HISTORY.

- Elicit a history of contributing factors, including the regular consumption of fatty foods, caffeinated beverages, chocolate, nicotine, alcohol. Take a drug history to determine
- If the patient has been taking drugs that may contribute to GERD: beta-adrenergic blockers, calcium channel blockers, nitrates, theophylline, diazepam, anticholinergic drugs, estrogen, and progesterone.
- Patients may describe the characteristic symptoms of heartburn (also known as pyrosis or dyspepsia). The discomfort is often a pain that radiates upward to the neck, jaw, or back. Patients describe a worsening pain when they bend over, or lie flat.
- With severe inflammation, discomfort occurs after each meal and lasts for up to 2 hours. Patients may describe coughing, hoarseness, or wheezing at night.
- Patients may also report regurgitation, with a sensation of warm fluid traveling upward to the throat
- Other symptoms may include difficulty swallowing (dysphagia) and painful swallowing (odynophagia)

Physical Examination

- Generally, the patient's physical appearance is unchanged by GERD.
- Unexplained weight loss.
- Abnormal contractions and peristalsis
- Esophagogastroduodenoscopy (EGD)

Primary Nursing Diagnosis

Page 249 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Pain related to esophageal reflux and esophageal inflammation.

Interventions

- Medication administration
- Pain management;
- Positioning- elevating the head of the bed during sleep
- Nutritional monitoring
- Weight management
- Dietary modifications that may decrease symptoms include reducing intake of fatty foods, caffeine beverages, chocolate, nicotine, alcohol. Reducing the intake of spicy and acidic foods.
- Encourage the patient to eat five to six small meals during the day rather than large meals. Ingestion of large amounts of food increases gastric pressure and thereby increases esophageal reflux.
- Both weight loss and smoking cessation programs are also important for any patients who have problems with obesity and tobacco use.
- Surgical procedures to relieve reflux are generally reserved for those who have not responded to medications.

Pharmacological Treatment

- Antacids(Aluminum or magnesium salt) to Neutralize gastric acid and relieve heartburn
- Proton pump inhibitors Eg omeprazole
- Cimetidine to Decrease gastric acid production

Oesophageal motility disorders

Diverticular disease

- Diverticulum is an abnormal sac or pouch formed at a weak point in the wall of the alimentary tract.
- Diverticular Disease is a condition in which muscle spasm in the Esophagus causes Esophageal pain and disturbance of bowel function without inflammation

Expression used to characterize both diverticulosis and diverticulitis

Page 250 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Diverticulosis = non-inflamed outpunching or herniations of the muscular layer of the intestines, typically the sigmoid colon
- Diverticulitis = inflammation of these outpouchings

Cause

- The exact cause is unknown.
- **Diverticulitis occur when food and bacteria** retained in diverticulum produce infection and inflammation that can impede drainage and lead to perforation or abscess formation

Signs and symptoms

- patients remain entirely asymptomatic.
- The symptoms manifested due to potential complication:
- Abscesses
- Fistulas
- Obstruction
- Hemorrhage.
- Peritonitis

Management

- Rest
- analgesics
- Antispasmodics
- Antibiotics
- laxative

Disorder of the stomach

Gastritis

- Gastritis means inflammation of the gastric mucosa.

Cause

- It is caused by irritants, such as gastric acid, medications or toxins.
- Gastritis is often associated with an impairment of natural protective mechanisms.

Page 251 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- It can be classified according to its inflammatory pattern as acute gastritis or chronic gastritis.

Acute gastritis

Signs and symptoms

- Acute gastritis often produces no symptoms but may cause dyspepsia, anorexia, nausea or vomiting, haematemesis or melaena.
- Many cases resolve quickly and do not merit investigation in others endoscopy and biopsy may be necessary to exclude peptic ulcer, cancer or bleeding.
- Treatment should be directed to the underlying cause. Acute gastritis almost always responds to conservative therapy with oral antacids.

Chronic gastritis

- Chronic gastritis is common in adults and may be associated with a number of conditions including gastric ulcers and *Helicobacter pylori* (HP).
- Type A (autoimmune)
- Type B (bacterial infection)
- Type C (reflux gastritis)
 - **Type A: autoimmune chronic gastritis (ACG)**
 - ACG involves the body of the stomach and results to gastric atrophy.
 - **Type B: bacterial infection**
 - HP infection is present in about 90% of Type B gastritis cases. It provokes an acute inflammatory response. Type B gastritis can affect the entire stomach.
 - **Type C: reflux gastritis**
 - Reflux gastritis is caused by the regurgitation of duodenal contents into the stomach through the pylorus. It may be present with dyspepsia and vomiting.

Peptic ulcer disease

- Duodenal ulcer and gastric ulcer are often grouped together as peptic ulcers. The term 'peptic ulcer' refers to an ulcer in the lower oesophagus, stomach or duodenum.

Page 252 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Ulcers in the stomach or duodenum may be acute or chronic; both penetrate the muscularis mucosae.
- The development of ulceration may be mechanical, chemical, infectious or ischaemic in nature.

Causes

- Factors that contribute to the development of peptic ulcers include:
- A genetic predisposition to ulcer formation.
- Excessive acid secretion; stress; excessive alcohol intake
- Smoking; ingestion of aspirin and nonsteroidal anti-inflammatory drugs (NSAIDs)
- The *Helicobacter pylori* bacterium

Clinical features of peptic ulcers

- The most common clinical presentation is recurrent abdominal pain, which is localised to the epigastric region.
- Pain occurs intermittently during the day, often when the stomach is empty, such that the patient identifies it as 'hunger pain' and achieves relief by eating.
- Night pain is common in duodenal ulceration and can disrupt sleep.
- In general, ulcer pain is relieved by food, milk or antacids and by belching and vomiting.
- Relief by vomiting is more typical of gastric ulcer than of duodenal ulcer.
- Some patients learn to induce vomiting to gain pain relief.
- Occasionally the only symptoms are anorexia and nausea
- In some patients the ulcer is completely 'silent', presenting for the first time with anaemia from chronic undetected blood loss haematemesis or as acute perforation.

Helicobacter pylori (HP) infection

Cause

- Bacterium *H. pylori* is a causative factor in the development of ulcer disease.
- These spiral Gram-negative bacteria are found in the stomach of over 80% of patients with gastric or duodenal ulcers.

Page 253 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- The vast majority of individuals with a presence of the HP bacteria are usually healthy and asymptomatic and only a minority develop clinical disease

Investigation of peptic ulcer

- Diagnosis can be made by double-contrast barium meal examination or by endoscopic investigation.

Management of peptic ulcer disease

- All patients with proven acute or chronic duodenal ulcer disease, and those with gastric ulcers who are HP-positive, should be offered eradication therapy as first-line treatment.
- Treatment is based upon a proton pump inhibitor taken simultaneously with two antibiotics for a period of seven days.
- Antacids act to neutralise gastric acid and strengthen the gastric mucosal barrier. They are widely available for self-medication and are used for relief of minor dyspeptic symptoms.
- Amoxicillin plus clarithromycin and proton pump inhibitor such as omeprazole-assists with eradicating *H. pylori* bacteria in the gastric mucosa or
- Metronidazole ; use with clarithromycin and proton pump inhibitor
- **Receptientor Antagonists** , Cimetidine (Tagamet)-Inhibits acid secretion
- Lansoprazole-decreases gastric acid secretion
- Surgery was once the definitive treatment for peptic ulcer disease.
- Emergency gastric surgery is indicated for patients who do not adhere to medical therapy, and for peptic ulcers with uncontrolled haemorrhage from a gastric ulcer.
- Three surgical procedures are indicated for the treatment of peptic ulcer disease: partial gastrectomy with gastroduodenostomy, partial gastrectomy with gastrojejunostomy.

Nursing intervention

- Nurses involved in the care of patients with peptic ulcer disease may include behavioral modification techniques by incorporating the following recommendations:
- Cease smoking.
- NSAIDs should be avoided.

Page 254 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

- Alcohol should be taken in moderation.
- Instruct patients to avoid foods known to increase acid secretion include milk, alcohol and coffee.
- Relieve pain by instructing the patient to avoid foods and beverages that may be irritating to the gastric mucosa

Complications of peptic ulcer disease

- The main complications of peptic ulcer disease are:
- perforation
- obstruction
- Bleeding.

Appendicitis

- Appendicitis is an acute inflammation of the appendix
- Appendix is a narrow tube that extends from the inferior part of the cecum.
- Appendicitis begins when the appendix becomes obstructed or inflamed.
- Eventually bacteria accumulate, and the appendix can develop gangrene.
- Appendicitis is the most common cause of acute inflammation in the right lower quadrant of the abdominal cavity.

Causes

- Appendicitis is generally caused by obstruction. Since the appendix is a small, finger-like appendage of the cecum
- It is prone to obstruction as it regularly fills and empties with intestinal contents.
- The obstruction may be caused by a hard mass of feces

Signs and symptoms

- Pain that eventually localizes in the right lower quadrant of the abdomen.
- Anorexia, nausea, vomiting, abdominal distension, and temporary constipation.
- Temperature elevations may also be reported
- Tachycardia, and shallow but rapid respirations.
- Slight abdominal distension may also be observed.

Page 255 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- palpation generally elicits tenderness
- Right lower quadrant rebound tenderness

Diagnostic findings

- The diagnosis of appendicitis is made by clinical evaluation
- Complete blood count
- Infection and inflammation may elevate the WBC count
- Leukocytosis may range from 10,000 to 16,000/ μ L.
- Abdominal x-ray to confirm the diagnosis
- ultrasound (particularly useful in women to rule out gynecological causes)

Surgical treatment

- Appendectomy

Nursing process

- PRIMARY PREOPERATIVE NURSING DIAGNOSIS
- Pain related to inflammation
- INTERVENTIONS.
- Analgesic administration; Anxiety reduction; Environmental management: comfort

Primary Postoperative Nursing Diagnosis

- Risk for infection related to the surgical incision

Interventions

- Infection control
- Wound care
- Nutritional management
- Fluid/electrolyte management

Planning and Implementation

- **Collaborative**

Surgical

- An appendectomy (surgical removal of the appendix) is the preferred method of management for acute appendicitis if the inflammation is localized.

Page 256 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

- If the appendix has ruptured and there is evidence of peritonitis or an abscess
- Conservative treatment consisting of antibiotics and intravenous (IV) fluids is given 6 to 8 hours prior to an appendectomy.
- Generally, an appendectomy is performed within 24 to 48 hours after the onset of symptoms under either general or spinal anesthesia.
- Preoperative management includes IV hydration, antipyretics, antibiotics, and, after definitive diagnosis, analgesics.

POSTOPERATIVE:

- Postoperatively, patient recovery from an appendectomy is usually uncomplicated, with hospital discharge in 24 to 48 hours.
- The physician generally orders oral fluids and diet as tolerated within 24 to 48 hours after surgery.
- Prescribed pain medications are given by the intravenous or intramuscular routes until the patient can take them orally.
- Antibiotics may continue postoperatively as a prophylactic measure.
- Ambulation is started the day of surgery or the first postoperative day.

Peritonitis

- Peritonitis is the inflammation of the peritoneal cavity.
- The peritoneum is a double-layered, semi permeable sac that lines the abdominal cavity and covers all the organs in the abdomen.

Causes

- The most common cause is infection with *Escherichia coli*, but streptococci, staphylococci, and pneumococci infection of an area in the GI tract with leakage of contents into the peritoneal cavity.
- common causes of peritonitis are appendicitis, perforated ulcer, diverticulitis, and bowel perforation
- Peritonitis may also be associated with abdominal surgical procedures

Signs and symptoms

Page 257 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Initially, local type of abdominal pain tends to become constant, diffuse, and more intense.
- Abdomen becomes extremely tender and muscles become rigid; rebound tenderness
- Auscultation: decreased bowel sounds.
- Nausea and vomiting often occur; peristalsis diminishes; anorexia is present.
- Elevation of temperature and pulse as well as leukocytosis.
- Fever; thirst; oliguria; dry, swollen tongue; signs of dehydration.
- Weakness, pallor, diaphoresis, and cold skin are a result of the loss of fluid, electrolytes, and protein into the abdomen.
- Shallow respirations may result from abdominal distention and upward displacement of the diaphragm.
- Ascites
- Diagnostic Evaluation
- WBC to show leukocytosis (leukopenia if severe).
- Peritoneal aspiration (paracentesis) to demonstrate blood, pus, bile, bacteria (Gram's stain).
- Abdominal X-rays may show free air in peritoneal cavity, gas and fluid collection in small and large intestines.
- CT scan of abdomen or sonography may reveal intra-abdominal mass, abscess, ascites.

Management

- Treatment of inflammatory conditions preoperatively and postoperatively with antibiotic therapy may prevent peritonitis
- Broad-spectrum antibiotic therapy to cover aerobic and anaerobic organisms is initial treatment, followed by specific antibiotic therapy after culture and sensitivity results.
- I.V. fluids and electrolytes, possibly TPN.
- Analgesics for pain; antiemetics for nausea and vomiting.
- Abdominal paracentesis may be done to remove accumulating fluid.

Complications

Page 258 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Intra-abdominal abscess formation (ie, pelvic subphrenic space)
- Sepsis
- Hypovolemic problems

Nursing process

- Nursing Diagnoses
- Acute Pain related to peritoneal inflammation
- Deficient Fluid Volume related to vomiting and interstitial fluid shift
- Imbalanced Nutrition: Less Than Body Requirements related to GI symptomsatology

Nursing Interventions

Goal

Achieving Pain Relief

Nursing intervention

- Place the patient in semi-Fowler's position before surgery to enable less painful breathing.
- After surgery, place the patient in Fowler's position to promote drainage by gravity.
- Provide analgesics as prescribed.
- Maintaining Fluid and Electrolyte Volume
- Keep patient NPO to reduce peristalsis.
- Provide I.V. fluids to establish adequate fluid intake and to promote adequate urine output, as prescribed.

Intestinal obstruction

- Intestinal obstruction is an interruption in the normal flow of intestinal contents along the intestinal tract.
- The block may occur in the small or large intestine, may be complete or incomplete
- May be mechanical or paralytic.

Mechanical obstruction- is a physical block to passage of intestinal contents without disturbing blood supply of bowel.

- Three causes of intestinal obstruction.

Page 259 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Intussusception. shortening of the colon by the movement of one segment of bowel into another.
- Volvulus of the sigmoid colon. The twist is counterclockwise in most cases of sigmoid volvulus.
- Hernia (inguinal). Note that the sac of the hernia is a continuation of the peritoneum of the abdomen and that the hernial contents pass through the hernial opening into the hernial sac.

Paralytic

- Peristalsis is ineffective (diminished motor activity perhaps because of toxic or traumatic disturbance of the autonomic nervous system).
- There is no physical obstruction and no interrupted blood supply.

Causes include:

- Spinal cord injuries; vertebral fractures.
- Postoperatively after any abdominal surgery.
- Peritonitis.

Signs and symptoms

- Fever
- peritoneal irritation
- Increased WBC count
- Toxicity, and shock.
- Abdominal distention
- Vomiting may develop
- Increase in bowel sounds
- Minimal diffuse tenderness.
- Abdominal cramping
-

Abdominal and chest X-rays:

- May show presence and location of small or large intestinal distention, gas or fluid

Page 260 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Barium enema may diagnose colon obstruction or intussusception.

Laboratory tests:

- Elevated WBC counts due to inflammation; marked increase with necrosis, strangulation, or peritonitis

4.23 Management

- Nonsurgical Management
- Correction of fluid and electrolyte imbalances with normal saline or Ringer's solution with potassium as required.
- NG suction to decompress bowel.
- Treatment of shock and peritonitis.
- Antibiotics to prevent or treat infection.

Surgery

- Resection of bowel for obstructing lesions, or strangulated bowel with end-to-end anastomosis

Complication

- Dehydration due to loss of water, sodium, and chloride
- Peritonitis
- Shock due to loss of electrolytes and dehydration
- Death due to shock

Nursing Process

- Nursing Assessment
- Assess the nature and location of the patient's pain
- The presence or absence of distention, flatus, defecation, emesis.
- Listen for high-pitched bowel sounds, or absence of bowel sounds.
- Assess vital signs.

Nursing Diagnoses

- Fear related to life-threatening symptoms of intestinal obstruction
- Acute Pain related to obstruction, distention, and strangulation

Page 261 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Risk for Deficient Fluid Volume related to impaired fluid intake, and vomiting, from intestinal obstruction
- Fear related to life-threatening symptoms of intestinal obstruction

Nursing Interventions

- Administer prescribed analgesics.
- A rectal tube may be indicated to pass enough flatus
- Maintaining Electrolyte and Fluid Balance
- Measure and record all intake and output.
- Administer I.V. fluids and parenteral nutrition as prescribed.
- Monitor urine output to assess renal function and to detect urine retention due to bladder compressions by the distended intestine.
- Keep the patient in Fowler's position to promote ventilation and relieve abdominal distention.

Biliary Disorders

- Bile assists in the emulsification (breakdown) of fat; absorption of fatty acids, cholesterol, and other lipids from the small intestine and excretion of conjugated bilirubin from the liver.
- CHOLELITHIASIS, CHOLECYSTITIS, CHOLEDOCHOLITHIASIS
- **Cholelithiasis** is stones in the gallbladder.
- **Cholecystitis**, is inflammation of the gallbladder, may be acute or chronic.
- **Choledocholithiasis** is stones in the common bile duct.

Cholelithiasis

- Stones occur when cholesterol supersaturates the bile in the gallbladder.

Cholecystitis

- Acute cholecystitis, an acute inflammation of the gallbladder, is most commonly caused by gallstone obstruction.
- Secondary bacterial infection may occur and progress to empyema (purulent effusion of the gallbladder).

Page 262 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Cholelithiasis

- Small gallstones can pass from the gallbladder into the common bile duct and proceed to the duodenum.
- More commonly they remain in the common bile duct and can cause obstruction, resulting in jaundice and pruritus.
- A typical clinical picture includes biliary pain in the upper abdomen, jaundice, chills and fever, mild hepatomegaly
- Abdominal tenderness and, occasionally, rebound tenderness.

Clinical Manifestations

- Gallstones that remain in the gallbladder are usually asymptomatic.
- Steady, severe, aching pain or sensation of pressure in the epigastrium or right upper quadrant, which may radiate to the right scapular area or right shoulder.
- Also causes nausea and vomiting, low-grade fever, and jaundice.

Diagnostic Evaluation

- Oral cholecystography, ultrasonography, and HIDA scan may show stones or inflammation.
- Elevated conjugated bilirubin because of obstruction.

Management

- Supportive management may include I.V. fluids, pain management, and antibiotics.

Surgical management:

Cholecystectomy

- Cholecystectomy is surgical removal of the gallbladder for acute and chronic cholecystitis.
- It is one of the most frequent surgical procedures.

Preoperative Management

- I.V. fluids are given before surgery to improve hydration status if the patient has been vomiting.
- Antibiotics are ordered for acute cholecystitis.

Page 263 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Educate the patient about the procedure and what to expect postoperatively.
- Patient must remain NPO from midnight the night before surgery and must void before surgery.

Postoperative Management

- Postoperatively, the patient is evaluated for:
 - Vital signs.
 - Level of pain.
 - Wound or puncture sites appearance: wound drain.
 - Intake and output.
 - Early ambulation is encouraged to prevent thromboembolus, to facilitate voiding, and to stimulate peristalsis.
- Potential Complications
 - Deep vein thrombosis or pulmonary embolism
 - Pneumonia or atelectasis
 - Infection, hemorrhage.

Hepatitis A Virus (HAV)

- Hepatitis A, formerly called infectious hepatitis, is caused by an RNA virus of the Enterovirus family.
- The mode of transmission of this disease is the fecal–oral route, primarily through the ingestion of food or liquids infected by the virus.
- The virus has been found in the stool of infected patients before the onset of symptoms and during the first few days of illness.
- It is more prevalent in developing countries or in areas with overcrowding and poor sanitation.
- Hepatitis B virus
 - etiologic agent of hepatitis B (formerly serum hepatitis) , highly infectious
 - Types of viral hepatitis have been identified: hepatitis A, B, C, D, and E.
 - Hepatitis A and E are similar in mode of transmission (fecal–oral route)

Page 264 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Whereas hepatitis B, C, and D share many characteristics.

Clinical Manifestations

- Low-grade fever. Anorexia, early symptoms
- Later, jaundice and dark urine may become apparent.
- Indigestion is present in varying degrees, marked by vague epigastric distress, nausea, heartburn, and flatulence.

Diagnostic Evaluation

- Elevated serum transferase levels (aspartate transaminase [AST] and Alanine transaminase [ALT]) for all forms of hepatitis.

Management, All Types of Hepatitis

- Rest according to patient's level of fatigue.
- Small, frequent feedings of a high-caloric, low-fat diet;
- Proteins are restricted when the liver cannot metabolize protein by-products, as demonstrated by symptoms.
- Administration of antiemetic for nausea.
- Monitor and report signs of bleeding.
- Monitor patient and administer vitamin K as ordered.

Hepatic Cirrhosis

- Cirrhosis of the liver is characterized by scarring.
- It is a chronic disease liver disease characterized by the degeneration of proper functioning.

Cause

- Usually due to chronic alcohol toxicity and malnutrition.
- Because of previous acute viral hepatitis.

Clinical Manifestations

- Onset is insidious; may take years to develop.
- Early complaints include fatigue, anorexia, ankle edema in the evening, epistaxis and bleeding gums, and weight loss.

Page 265 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Later complaints because of chronic failure of the liver and obstruction of portal circulation include:
- Chronic dyspepsia, constipation, or diarrhea
- Esophageal varices
- Ascites
- Plasma albumin is reduced, leading to edema and contributing to ascites.
- Bleeding tendencies, such as nosebleeds, hematemesis, or profuse hemorrhage from stomach and esophageal varices.

Diagnostic Evaluation

- Esophagoscopy to determine esophageal varices.
- Paracentesis to examine ascitic fluid for cell, protein, and bacterial counts.
- Serum liver function test results are elevated.

Management

- Minimize further deterioration of liver function through the withdrawal of toxic substances, alcohol, and drugs.
- Correction of nutritional deficiencies with vitamins and nutritional supplements and a high-calorie and moderate -protein diet.
- Treatment of ascites and fluid and electrolyte imbalances.
- Restrict sodium and water intake, depending on amount of fluid retention.
- Diuretic therapy, Furosemide (Lasix), a loop diuretic, may also be used in conjunction with spironolactone to help balance potassium depletion.
- Abdominal paracentesis to remove fluid and relieve symptoms
- Administration of albumin to maintain osmotic pressure.
- Symptomatic relief measures, such as pain medication and antiemetics.

4.5 Genitourinary System disorders

Terminology

Aldosterone: hormone synthesized and released by the adrenal cortex; causes the kidneys to reabsorb sodium

Page 266 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Antidiuretic hormone (ADH): hormone secreted by the posterior pituitary gland; causes the kidneys to reabsorb more water

Anuria: total urine output less than 50 ml in 24 hours

Bacteriuria: bacteria in the urine; bacterial count higher than 100,000 colonies/ml

Clearance: volume of plasma that the kidneys can clear of a specific solute (eg, creatinine); expressed in milliliters per minute

Creatinine: endogenous waste product of muscle energy metabolism

Dysuria: painful or difficult urination

Frequency: voiding more frequently than every 3 hours

Hematuria: red blood cells in the urine

Micturition: urination or voiding

Nephron: structural and functional unit of the kidney responsible for urine formation

Nocturia: awakening at night to urinate

Oliguria: total urine output less than 400 ml in 24 hours

Urea nitrogen: nitrogenous end product of protein metabolism

Urinary incontinence: involuntary loss of urine

Glomerulus: capillaries forming part of the nephron through which filtration occurs

Proteinuria: protein in the urine

Pyuria: pus in the urine

Pulse oximetry: monitor the oxygen saturation of hemoglobin

Urea nitrogen: nitrogenous end product of protein metabolism

Urinary incontinence: involuntary loss of urine

Glomerulus: capillaries forming part of the nephron through which filtration occurs

Proteinuria: protein in the urine

Pyuria: pus in the urine

Pulse oximetry: monitor the oxygen saturation of hemoglobin

Assessment

Health History

Page 267 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Obtaining a urologic health history requires excellent communication skills because many patients are uncomfortable discussing genitourinary function or symptoms.
- It is important to use language the patient can understand and to avoid medical jargon.
- When obtaining the health history, the nurse should inquire about the following:
 - The patient's chief concern or reason for seeking health care, the onset of the problem, and its effect on the patient's quality of life
 - The location, character, and duration of pain, if present, and its relationship to voiding; factors that precipitate pain, and those that relieve it
 - History of urinary tract infections, including past treatment or hospitalization for urinary tract infection
 - Fever or chills
 - Previous renal or urinary diagnostic tests or use of indwelling urinary catheters
 - **Dysuria** and when it occurs during voiding (at initiation or termination of voiding)
 - **Hesitancy, straining, or pain** during or after urination
 - **Urinary incontinence**
 - **Hematuria** or change in color or volume of urine
 - **Nocturia** and its date of onset
 - **Renal calculi (kidney stones)**, passage of stones or gravel in urine
 - Presence or history of genital lesions or sexually transmitted diseases
 - Any prescription and over-the-counter medications (including those prescribed for renal or urinary problems)

Physical Examination

- A head-to-toe assessment is indicated. Areas of emphasis include the abdomen, suprapubic region, genitalia and lower back, and lower extremities.
- Direct palpation of the kidneys may help determine their size and mobility.
- It may be possible to feel the smooth, rounded lower pole of the kidney between the hands.
- The right kidney is easier to feel because it is somewhat lower than the left one.

Page 268 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- In obese patients, palpation of the kidneys is generally more difficult.
- Renal dysfunction may produce tenderness over the lower border of the rib and the spine.
- The abdomen (just slightly to the right and left of midline in both upper quadrants) is auscultated to assess low-pitched murmurs that indicate renal artery stenosis.
- The abdomen is also assessed for the presence of peritoneal fluid, which may occur with kidney dysfunction.
- The bladder should be percussed after the patient voids to check for residual urine.
- The bladder, which can be palpated only if it is moderately distended, feels like a smooth, firm, round mass rising out of the abdomen.
- Percussion of the bladder begins at the midline just above the umbilicus and proceeds downward.
- Dullness to percussion of the bladder following voiding indicates incomplete bladder emptying.

Laboratory tests

- *Urinalysis is a basic test for the presence and severity of kidney disease.*
- Testing urine during the menstrual period in women, and within 2–3 days of heavy strenuous exercise in both genders, should be avoided.
- Fresh ‘mid-stream’ urine is best, again to reduce accidental contamination.
- Urine microscopy can add useful information to urinalysis
- Cells (erythrocytes, leucocytes, urinary epithelial cells, and crystals can be reliably identified.

Microscopic Hematuria is commonly defined as the presence of greater than two RBCs per high power field in a centrifuged urine sediment.

- The haematuria represents glomerular (i.e. from the kidney) or extra-glomerular (urological) bleeding.

Page 269 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- The most common imaging technique now used for the kidney is the **renal ultrasound**, which can detect size, shape, symmetry of kidneys, and presence of tumour, stone or renal obstruction.
- Proteinuria > 0.5 g/24 h, and creatinine ratio > 50 suggests glomerular disease.

Infections of the Urinary Tract

- Urinary tract infections (UTIs) are caused by pathogenic microorganisms in the urinary tract (the normal urinary tract is sterile above the urethra)
- UTIs are generally classified as infections involving the upper or lower urinary tract.
- Lower UTIs include bacterial **cystitis** (inflammation of the urinary bladder), bacterial **prostatitis** (inflammation of the prostate gland), and bacterial **urethritis** (inflammation of the urethra).
- Upper UTIs include acute or chronic **pyelonephritis** (inflammation of the renal pelvis), **nephritis** (inflammation of the kidney), and **renal abscesses**.

Cystitis

UTI (cystitis) is inflammation of the urinary bladder

Signs and symptoms

- pain and burning on urination,
- Frequency, urgency, nocturia,
- Suprapubic or pelvic pain.
- Hematuria and back pain may also be present.

Diagnostic Findings

- Results of various tests, such as colony counts, cellular studies, and urine cultures, help confirm the UTI diagnosis.

Colony Counts

- UTI is diagnosed by bacteria in the urine. A colony count of at least 10⁵ colony-forming units (CFU) per milliliter of urine on a clean-catch midstream or catheterized specimen is a major criterion for infection.

Cellular Studies

Page 270 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- **Microscopic hematuria** (greater than 4 red blood cells [RBCs] per high-power field) is present in about half of patients with acute infection.
- **Pyuria** (greater than 4 white blood cells [WBCs] per high-power field) occurs in all patients with UTI; however, it is not specific for bacterial infection.
- **Pyuria** can also be seen with kidney stones, interstitial nephritis, and renal tuberculosis.
- Today, diagnostic studies such as CT scans may detect areas of pyelonephritis, obstruction, abscesses, tumors, and cysts.
- Tests for sexually transmitted diseases (STDs) may be performed because acute urethritis
- caused by sexually transmitted organisms (ie, *Chlamydia trachomatis*, *Neisseria gonorrhoeae*,) or acute vaginitis infections
- (caused by *Trichomonas* or *Candida* species) may be responsible for symptoms similar to those of UTI. Therefore, evaluation for STDs may be performed
- Today, diagnostic studies such as CT scans may detect areas of pyelonephritis, obstruction, abscesses, tumors, and cysts.

Pharmacologic Therapy

- The ideal treatment of UTI is an antibacterial agent that eradicates bacteria from the urinary tract with minimal effects on fecal and vaginal flora.
- The organism in initial, uncomplicated UTIs in women is most likely *E. coli*, the agent should be effective against these organisms.
- Various treatment regimens have been successful in treating uncomplicated lower UTIs in women:
- Single-dose administration, short-course (3 to 4 days) medication regimens, or 7- to 10-day therapeutic courses.
- In a complicated UTI (ie, pyelonephritis), the general treatment of choice is usually a cephalosporin or /aminoglycoside combination.

Page 271 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
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- Other commonly used medications include trimethoprim , sulfamethoxazole. Occasionally, medications such as ampicillin or amoxicillin are used, but *E. coli organisms* have developed resistance to these agents.
- Levofloxacin (Levaquin), another fluoroquinolone, is a good choice for short-course therapy of uncomplicated, mild to moderate UTI.
- Levofloxacin is used only when generic and less costly antibiotics are likely to be ineffective.
- The patient is instructed to take all the doses prescribed, even if relief of symptoms occurs promptly.

Nursing Process:

- Nursing care of the patient with lower UTI focuses on treating the underlying infection and preventing its recurrence.

Assessment

- A history of signs and symptoms related to UTI is obtained from the patient with a suspected UTI.
- The presence of pain, frequency, urgency, and hesitancy and changes in urine are assessed, documented, and reported.
- The patient's usual pattern of voiding is assessed to detect factors that may predispose him or her to UTI.
- Infrequent emptying of the bladder, and personal hygiene are assessed.

The patient's knowledge

- About prescribed antimicrobial medications and preventive health care measures is also assessed.
- Additionally, the urine is assessed for volume, color, cloudiness, and odor, all of which are altered by bacteria in the urinary tract.

Nursing Diagnoses

- Based on the assessment data, the nursing diagnoses may include the following:

Page 272 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Acute pain related to inflammation and infection of the urethra, bladder, and other urinary tract structures
- Deficient knowledge related to factors predisposing the patient to infection and recurrence, detection and prevention of recurrence, and pharmacologic therapy

Collaborative Problems/ Potential Complications

- Based on assessment data, the following complications may develop:
- Renal failure due to extensive damage of kidney
- Sepsis

Planning

- Major goals for the patient may include relief of pain and discomfort
- increased knowledge of preventive measures and treatment

Nursing Interventions

Relieving Pain

- Antispasmodic agents may also be useful in relieving bladder irritability and pain.
- Applying heat to the perineum help relieve pain and spasm.
- The patient is encouraged to drink fluids (water is the best choice) to promote renal blood flow and to flush the bacteria from the urinary tract.
- Urinary tract irritants (eg, coffee, tea, citrus, spices, colas, alcohol) are avoided.
- Frequent voiding (every 2 to 3 hours) is encouraged to empty the bladder completely because this can significantly lower urine bacterial counts, reduce urinary stasis, and prevent reinfection.

Monitoring and Managing Potential Complications

- Early recognition of UTI and prompt patient treatment are essential thus, the patient must be taught to:
- Recognize early signs and symptoms, to test for bacteriuria, and to initiate treatment as prescribed.
- Appropriate antimicrobial therapy, fluid intake, frequent voiding, and hygienic measures are commonly prescribed for managing UTI.

Page 273 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Periodic monitoring of renal function (creatinine clearance, blood urea nitrogen [BUN], and serum creatinine levels) may be indicated for patients with repeated UTIs.
- If extensive renal damage does occur, dialysis may be necessary.

Evaluation

Expected Patient Outcomes

- Expected patient outcomes may include:
 1. Experiences relief of pain
 - a. Reports absence of pain, urgency, dysuria, or hesitancy on voiding
 - b. Takes analgesic and antibiotic agents as prescribed
 2. Explains UTIs and their treatment
 - a. Demonstrates knowledge of preventive measures and prescribed treatments
 - b. Drinks 8 to 10 glasses of fluids daily
 - c. Voids every 2 to 3 hours
 3. Experiences no complications
 - a. Reports no symptoms of infection (fever, dysuria, frequency) or renal failure (nausea, vomiting, fatigue, pruritus)
 - b. Has normal BUN and serum creatinine levels, negative urine and blood cultures
 - c. Exhibits normal vital signs and temperature; no signs or symptoms of sepsis
 - d. Maintains adequate urine output more than 30 mL per hour

Acute glomerulonephritis

- Acute glomerulonephritis: is an inflammation of the glomerular capillaries. .
- The inflammatory changes occur because of deposits of antigen-antibody complexes lodged within the glomerular membrane.
- Antigen-antibody complexes are formed within the circulation in response to an antigen or foreign protein.
- Inflammation at the sites of renal filtration (the glomerular basement membrane) causes leakage of blood proteins into the urinary space.

Page 274 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

- Usually, more than 90% of children recover. The percentage of adults who recover is probably about 70%.
- Some patients become severely uremic within weeks and require dialysis for survival.
- Others, after a period of apparent recovery, insidiously develop chronic glomerulonephritis.

Causes

- Etiologic factors are an infection such as group A betahemolytic streptococcus infection.
- Nonstreptococcal postinfectious glomerulonephritis may occur after an attack of infective endocarditis, sepsis, pneumococcal pneumonia, viral hepatitis, mumps, or measles.
- It may also follow impetigo (infection of the skin) and acute viral infections

Clinical Manifestations

- The primary presenting feature of acute glomerulonephritis is
- hematuria (blood in the urine), which may be microscopic (identifiable through microscopic examination) or macroscopic or gross (visible to the eye).
- Proteinuria (primarily albumin), which is present, is due to the increased permeability of the glomerular membrane.
- BUN and serum creatinine levels may rise as urine output drops.
- The patient may be anemic.
- Some degree of edema and hypertension is noted.
- In the more severe form of the disease, the patient also complains of headache, malaise, and flank pain.

Assessment

History

- Ask about an untreated respiratory tract infection that has occurred in the last 1 to 3 weeks.

Page 275 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Ask the patient about a history of weight gain and edema of the hands and face, ask the patient if his or her rings are tighter than usual.
- Some patients may also describe decreased urine volume, changes in urine color (dark)
- Increased fatigue and activity intolerance, muscle and joint achiness, shortness of breath, and orthopnea.

Physical Examination

- Note any signs of fluid retention, such as edema in the face and hands.
- Inspect the patient's urine output is usually decreased and is often dark or even coffee colored.
- Weigh the patient each day. Provide ongoing monitoring for visual changes, vomiting, and abdominal distension.
- These signs and symptoms indicate the potential onset of the complications and need to be reported to the physician.

Psychosocial

- Patients and families may be anxious about changes in the patient's appearance.
- An uncertain prognosis, and the possibility of lifestyle changes.
- Older children and adults may be concerned about their appearance.
- Assess the patient's and family's coping mechanisms, support systems, and stress levels.

Tests

- **Creatinine clearance:** normal result 100–140 mL/min.
- Abnormal: 50 mL/min
- Indicate damaged glomerulus no longer able to clear or filter normal amounts of creatinine from blood

Serum creatinine: Normal result, 0.5–1.2 mg/dL

- Abnormal result: greater than 2.0 mg/dL
- Indicates decreased ability of glomerulus to filter creatinine leads to accumulation in the blood

- Urinalysis: Normal minimal red blood cells; moderate clear protein casts; negative for protein
- Abnormal Red blood cells and red blood cell casts; elevated protein and urine specific gravity
- Indicates May also have renal tubular cells, white blood cells, increased white blood cell casts

Complications

- Complications of acute glomerulonephritis include hypertensive encephalopathy, heart failure, and pulmonary edema.
- Hypertensive encephalopathy is considered a medical emergency, and therapy is directed toward reducing the blood pressure without impairing renal function.
- Dialysis is initiated in acute glomerulonephritis if signs and symptoms of uremia are severe.

Medical Management

- Management consists primarily of treating symptoms, attempting to preserve kidney function, and treating complications promptly.

Pharmacologic therapy:

- If residual streptococcal infection is suspected, penicillin is the agent of choice.
- Corticosteroids medications may be prescribed for patients with rapidly progressive acute glomerulonephritis.
- Dietary protein is restricted when renal insufficiency and nitrogen retention (elevated BUN) develop.
- Sodium is restricted when the patient has hypertension, edema, and heart failure.
- Diuretic medications and antihypertensive agents may be prescribed to control hypertension.

Nursing Management

- Carbohydrates are given to provide energy and reduce the catabolism of protein.
- Intake and output are carefully measured and recorded.

Page 277 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- The patient is instructed to notify the physician if symptoms of renal failure occur (eg, fatigue, nausea, vomiting, diminishing urine output)

Chronic Glomerulonephritis

- Chronic glomerulonephritis may be due to repeated episodes of acute glomerulonephritis, hypertensive nephrosclerosis, hyperlipidemia.
- Numerous glomeruli and their tubules become scarred.
- The result is severe glomerular damage.

Clinical Manifestations

- The symptoms of chronic glomerulonephritis vary.
- Some patients with severe disease have no symptoms at all for many years.
- Their condition may be discovered when hypertension or elevated BUN and serum creatinine levels are detected.
- The diagnosis may be suggested during a routine eye examination when vascular changes or retinal hemorrhages are found.
- The first indication of disease may be a sudden, severe nosebleed, a stroke, or a seizure.
- Many patients report that their feet are slightly swollen at night.
- Most patients also have general symptoms, such as loss of weight and strength, increasing irritability, and an increased need to urinate at night (nocturia).
- Headaches, dizziness, and digestive disturbances are common

Assessment and Diagnostic Findings

- Urinalysis reveals proteinuria, and urinary casts.
- Chest x-rays may show cardiac enlargement and pulmonary
- Edema.

Medical Management

- Symptoms guide the course of treatment for the patient with chronic glomerulonephritis.
- If the patient has hypertension, the blood pressure is reduced with sodium and water restriction.

Page 278 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Antihypertensive agents.
- Weight is monitored daily, and diuretic medications are prescribed to treat fluid overload.
- Proteins of high biologic value (dairy products, eggs, meats) are provided to promote good nutritional status.
- Adequate calories are also important to spare protein for tissue growth and repair.

Nursing Management

- The nurse observes the patient for changes in fluid and electrolyte status.
- Anxiety levels are often extremely high for both the patient and family.
- The nurse gives emotional support by providing opportunities for the patient and family to verbalize their concerns, have their questions answered, and explore their opatientions.
- The nurse has a major role in teaching the patient and family about the prescribed treatment.
- Instructions to the patient include explanations and scheduling for follow-up evaluations: blood pressure, urinalysis for protein and casts, and blood studies of BUN and creatinine levels.
- If long-term dialysis is needed, the patient and family are taught about the procedure, how to care for the access site, dietary restrictions, and other necessary lifestyle modifications.

Acute Pyelonephritis

- Pyelonephritis is a bacterial infection of the renal pelvis, tubules, and interstitial tissue of one or both kidneys.
- Pyelonephritis is frequently secondary to urinary tract obstruction (which increases the suscepientibility of the kidneys to infection), bladder tumors, strictures, benign prostatic hyperplasia, and urinary stones are some of the other causes.
- Pyelonephritis may be acute or chronic.

Clinical Manifestations of acute pyelonephritis

Page 279 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- The patient with acute pyelonephritis appears acutely ill with chills and fever, leukocytosis
- Bacteriuria and pyuria, flank pain, and tenderness, nausea and vomiting, headache, malaise, and painful urination.
- Dysuria and frequency, are common.

Assessment and Diagnostic Findings

- An ultrasound study or a CT scan may be performed to locate any obstruction in the urinary tract.
- Urine culture and sensitivity tests are performed to determine the causative organism so that appropriate antimicrobial agents can be prescribed.

Medical Management

Pharmacologic Therapy

- For outpatients, a 2-week course of antibiotics is recommended because renal parenchymal disease is more difficult to eradicate than mucosal bladder infections.
- Commonly prescribed agents include ciprofloxacin, gentamicin with or without ampicillin, or a third-generation cephalosporin.
- These medications must be used with great caution if the patient has renal or liver dysfunction.
- A follow-up urine culture is done 2 weeks after completion of antibiotic therapy to document clearing of the infection.

Chronic Pyelonephritis

- Repeated episodes of acute pyelonephritis may lead to chronic pyelonephritis.

Clinical Manifestations

- The patient with chronic pyelonephritis usually has no symptoms of infection unless an acute exacerbation occurs.
- Noticeable signs and symptoms may include fatigue, headache, poor appetite, polyuria, excessive thirst, and weight loss.

Page 280 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Persistent and recurring infection may produce progressive scarring of the kidney, with renal failure the end result.

Assessment and Diagnostic Findings

- Measurements of creatinine clearance and BUN and creatinine levels.
- Complications
- Complications of chronic pyelonephritis include: Scarring, hypertension, and formation of kidney stones.

Medical Management

- The choice of antimicrobial agent is based on which pathogen is identified through urine culture.
- Nitrofurantoin may be used to suppress bacterial growth.

Nursing Management

- Impaired renal function alters the excretion of antimicrobial agents and necessitates careful monitoring of renal function, especially if the medications are potentially toxic to the kidneys.
- When the patient is hospitalized, fluid intake and output are carefully measured and recorded.
- Unless contraindicated, fluids are encouraged (3 to 4 L/day) to dilute the urine, decrease burning on urination, and prevent dehydration.
- The nurse assesses the patient's temperature every 4 hours and administers antipyretic and antibiotic agents as prescribed.
- Patient teaching focuses on prevention of UTIs by consuming adequate fluids, emptying the bladder regularly, and performing recommended perineal hygiene.

Renal Failure

- Renal failure results when the kidneys cannot remove the body's metabolic wastes or perform their regulatory functions.
- The substances normally eliminated in the urine accumulate in the body fluids,

- as a result of impaired renal excretion, leading to a disruption in endocrine and metabolic functions as well as fluid, electrolyte, and acid–base disturbances.

Acute Renal Failure

Categories of Acute Renal Failure

- Three major categories of conditions cause ARF: prerenal (hypoperfusion of kidney), intrarenal (actual damage to kidney tissue), and postrenal (obstruction to urine flow).
- Prerenal conditions occur as a result of impaired blood flow that leads to hypoperfusion of the kidney and a drop in the GFR.
- Intrarenal causes of ARF are the result of actual damage to the glomeruli or kidney tubules.
- Conditions such as burns, crush injuries, and infections, as well as nephrotoxic agents, may lead to acute tubular necrosis and cessation of renal function.
- With burns and crush injuries, myoglobin (a protein released from muscle when injury occurs) and hemoglobin are liberated, causing renal toxicity, ischemia, or both.
- Medications may also predispose a patient to intrarenal damage, especially nonsteroidal anti-inflammatory drugs (NSAIDs).
- These medications interfere with the normal autoregulatory mechanisms of the kidney and may cause hypoperfusion and eventual ischemia.
- Postrenal causes of ARF are usually the result of an obstruction by tumor, blood clot, or kidney stone.
- Somewhere distal to the kidney. Pressure rises in the kidney tubules; eventually, the GFR decreases.
- Some of the factors may be reversible if identified and treated promptly, before kidney function is impaired.
- This is true of the following conditions that reduce blood flow to the kidney and impair kidney function:
 - (1) hypovolemia; (2) hypotension; (3) reduced cardiac output and heart failure; (4) obstruction of the kidney or lower urinary tract by tumor, blood clot, or kidney stone.

Page 282 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- If these conditions are treated and corrected before the kidneys are permanently damaged,
- The increased BUN and creatinine levels, oliguria, and other signs associated with ARF may be reversed.

Clinical Manifestations

- The patient may appear critically ill and lethargic, with persistent nausea, vomiting, and diarrhea.
- The skin and mucous membranes are dry from dehydration, and the breath may have the odor of urine (uremic fetor).
- Central nervous system signs and symptoms include drowsiness, headache, muscle twitching, and seizures

Assessment and Diagnostic Findings

Changes in Urine

- Urine output varies (scanty to normal volume), hematuria may be present, and the urine has a low specific gravity (1.010 or less, compared with a normal value of 1.015 to 1.025). Patients with

Increased Bun and Creatinine Levels (Azotemia)

- The BUN level rises steadily at a rate dependent on the degree of catabolism (breakdown of protein), renal perfusion, and protein intake.
- Serum creatinine rises in conjunction with glomerular damage.
- Serum creatinine levels are useful in monitoring kidney function and disease progression.

Hyperkalemia

- With a decline in the GFR, the patient cannot excrete potassium normally.
- Patients with oliguria and anuria are at greater risk for hyperkalemia.
- Hyperkalemia may lead to dysrhythmias and cardiac arrest.

Metabolic Acidosis

- Patients with acute oliguria cannot eliminate the daily metabolic load of acid-type substances produced by the normal metabolic processes.

Page 283 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Thus, progressive metabolic acidosis accompanies renal failure.

Calcium and Phosphorus Abnormalities

- There may be an increase in serum phosphate concentrations.
- Serum calcium levels may be low in response to decreased absorption of calcium from the intestine and as a compensatory mechanism for the elevated serum phosphate levels.

Prevention

- A careful history is obtained to determine whether the patient has been taking potentially nephrotoxic antibiotic agents or has been exposed to environmental toxins.
- The kidneys are especially susceptible to the adverse effects of medications because the kidneys are repeatedly exposed to substances in the blood.
- In patients taking potentially nephrotoxic medications (aminoglycosides, gentamicin, tobramycin, colistimethate, polymyxin B, amphotericin B, vancomycin, amikacin, cyclosporine), renal function should be monitored closely.
- Serum BUN and creatinine levels should be obtained at baseline by 24 hours after initiation of these medications and at least twice a week while the patient is receiving them.
- Any agent that reduces renal blood flow (eg, chronic analgesic use) may cause renal insufficiency.
- Chronic analgesic use, particularly with NSAIDs, may cause interstitial nephritis.
- Increased age, preexisting renal disease, and the administration of several nephrotoxic agents simultaneously increase the risk for kidney damage.
- Management of ARF is expensive and complex, and even when optimal, the mortality rate remains high. Therefore, prevention of ARF is key.

Medical Management

- The kidney has a remarkable ability to recover

Page 284 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Therefore, the objectives of treatment of ARF are to restore normal chemical balance and prevent complications until repair of renal tissue and restoration of renal function can take place.
- Any possible cause of damage is identified, treated, and eliminated.
- Prerenal azotemia is treated by optimizing renal perfusion.
- postrenal failure is treated by relieving the obstruction.
- Treatment of intrarenal azotemia is supportive, with removal of causative agents and avoidance of associated risk factors.
- Shock and infection, if present, are treated promptly.

Overall, medical management includes:

- Maintaining fluid balance, avoiding fluid excesses, or possibly performing dialysis.
- Maintenance of fluid balance is based on daily body weight, fluid losses, blood pressure, and the clinical status of the patient.
- The parenteral and oral intake and the output of urine, gastric drainage, stools, wound drainage, and perspiration are calculated and are used as the basis for fluid replacement.
- Fluid excesses can be detected by the clinical findings of dyspnea, tachycardia, and distended neck veins.
- The lungs are auscultated for moist crackles. Because pulmonary edema may be caused by excessive administration of parenteral fluids.
- The development of generalized edema is assessed by examining the presacral and pretibial areas several times daily.
- Mannitol, or furosemide, may be prescribed to initiate a diuresis and prevent or minimize subsequent renal failure.
- Adequate blood flow to the kidneys in patients with prerenal causes of ARF may be restored by intravenous fluids or blood product transfusions.
- If ARF is caused by hypovolemia secondary to hypoproteinemia, an infusion of albumin may be prescribed.

Page 285 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Dialysis may be initiated to prevent serious complications of ARF, such as hyperkalemia, severe metabolic acidosis, pericarditis, and pulmonary edema.
- Dialysis corrects many biochemical abnormalities; allows for liberalization of fluid, protein, and sodium intake.
- Hemodialysis, peritoneal dialysis, or any of the new continuous renal replacement therapies may be performed.

Pharmacologic Therapy

- Because many medications are eliminated through the kidneys, medication dosages must be reduced when a patient has ARF.
- Examples of commonly used medications that require adjustment are antibiotic agents (especially aminoglycosides), digoxin, and medications containing magnesium.
- Diuretic agents are often used to control fluid volume.
- Low-dose dopamine (1 to 3 g/kg) is often used to dilate the renal arteries.
- In patients with severe acidosis, the arterial blood gases or serum bicarbonate levels (CO₂) must be monitored because the patient may require sodium bicarbonate therapy or dialysis.

Nutritional Therapy

- ARF causes severe nutritional imbalances (because nausea and vomiting contribute to inadequate dietary intake), impaired glucose use and protein synthesis, and increased tissue catabolism.
- The patient is weighed daily and can be expected to lose 0.2 to 0.5 kg daily if the patient's caloric intake falls below caloric requirements.
- If the patient gains or does not lose weight or develops hypertension, fluid retention should be suspected.
- Dietary proteins are limited to about 1 g/kg during the oliguric phase to minimize protein breakdown and to prevent accumulation of toxic end products.

Page 286 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Caloric requirements are met with high-carbohydrate meals because in a high-carbohydrate diet, protein is not used for meeting energy requirements but is “spared” for growth and tissue healing.
- Foods and fluids containing potassium or phosphorus (bananas, citrus fruits and juices, coffee) are restricted.
- Blood chemistry evaluations are made to determine the amounts of sodium, potassium, and water needed for replacement, along with assessment for overhydration or underhydration.

Nursing Management

- The nurse has an important role in caring for the patient with ARF.
- The nurse monitors for complications, participates in emergency treatment of fluid and electrolyte imbalances, assesses progress and response to treatment, and provides physical and emotional support.
- Additionally, the nurse keeps family members informed about the patient’s condition, helps them understand the treatments, and provides psychological support.
- Because of the serious fluid and electrolyte imbalances that can occur with ARF, the nurse monitors the patient’s serum electrolyte levels
- Hyperkalemia is the most immediate lifethreatening imbalance seen in ARF.
- Parenteral fluids, all oral intake, and all medications are screened carefully to ensure that hidden sources of potassium are not inadvertently administered or consumed.
- Intravenous solutions must be carefully selected according to the patient’s fluid and electrolyte status.
- The patient’s cardiac function and musculoskeletal status are monitored closely for signs of hyperkalemia.
- The nurse monitors fluid status by paying careful attention to fluid intake (intravenous medications should be administered in the smallest volume possible).
- Urine output, apparent edema, distention of the jugular veins, alterations in heart sounds and breath sounds, and increasing difficulty in breathing.

Page 287 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Accurate daily weights, as well as intake and output records, are essential.
- Indicators of deteriorating fluid and electrolyte status are reported immediately to the physician, and preparation is made for emergency treatment.
- Hyperkalemia is treated with glucose and insulin, and calcium gluconate
- The nurse also directs attention to reducing the patient's metabolic rate during the acute stage of renal failure to reduce catabolism and the subsequent release of potassium and accumulation of endogenous waste products (urea and creatinine).
- Bed rest may be indicated to reduce the metabolic rate during the most acute stage of the disorder.
- Fever and infection, both of which increase the metabolic rate and catabolism, are prevented or treated promptly.
- Attention is given to pulmonary function, and the patient is assisted to turn, cough, and take deep breaths frequently to prevent atelectasis and respiratory tract infection.
- Asepsis is essential to minimize the risk of infection and increased metabolism.
- An indwelling urinary catheter is avoided whenever possible because of the high risk for UTI associated with its use.

Chronic Renal Failure (End-Stage Renal Disease)

- Chronic renal failure, or ESRD, is a progressive, irreversible deterioration in renal function in which the body's ability to maintain metabolic and fluid and electrolyte balance fails,
- Resulting in uremia or azotemia (retention of urea and other nitrogenous wastes in the blood).

Causes

- Diabetes mellitus (leading cause)
- Hypertension
- Chronic glomerulonephritis
- Pyelonephritis

Page 288 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Obstruction of the urinary tract; hereditary lesions, vascular disorders; infections; medications; or toxic agents.
- Dialysis or kidney transplantation eventually becomes necessary for patient survival.
- Dialysis is an effective means of correcting metabolic toxicities at any age.

Clinical Manifestations

- Hypertension (due to sodium and water retention).
- Heart failure and pulmonary edema (due to fluid overload).
- Pericarditis (due to irritation of the pericardial lining by uremic toxins).
- Anorexia, nausea, vomiting, and hiccups.
- Neurologic changes, including altered levels of consciousness, inability to concentrate, muscle twitching, and seizures

Assessment and Diagnostic Finding

- The serum creatinine and BUN levels increase.
- Serum creatinine is the more sensitive indicator of renal function because of its constant production in the body.
- Erythropoietin, a substance normally produced by the kidney, stimulates bone marrow to produce RBCs.
- In renal failure, erythropoietin production decreases and profound anemia results,
- Producing fatigue, angina, and shortness of breath.

Complications

Complications of chronic renal failure include:

Hyperkalemia due to decreased excretion,

Metabolic acidosis, catabolism, and excessive intake (diet, medications, fluids)

Pericarditis, due to retention of uremic waste products and inadequate dialysis

Hypertension due to sodium and water retention

Anemia due to decreased erythropoietin production, bleeding in the GI tract from irritating toxins

Medical Management

Page 289 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- The goal of management is to maintain kidney function.
- Management is accomplished primarily with medications and diet therapy.
- Although dialysis may also be needed to decrease the level of uremic waste products in the blood.

5.10.6 Pharmacologic Therapy

- Complications can be prevented or delayed by administering prescribed antihypertensives, and iron supplements.
- Heart failure and pulmonary edema may also require treatment with fluid restriction, low-sodium diets, diuretic agents, and dialysis.
- The metabolic acidosis of chronic renal failure usually treatment with sodium bicarbonate supplements
- Dialysis may be needed to correct the acidosis if it causes symptoms

Nutritional Therapy

- Dietary intervention is necessary with deterioration of renal function
- and includes careful regulation of protein intake, fluid intake to balance fluid losses
- Protein is restricted because urea, uric acid, and organic acids—the breakdown products of dietary and tissue proteins—accumulate rapidly in the blood
- Calories are supplied by carbohydrates and fat to prevent wasting. Vitamin supplementation

Kidney Stone

- Kidney stone (Urolithiasis) refers to the presence of stone(calculi) in the urinary tract.

Causes

- Urinary concentration of substances such as calcium oxalate, calcium phosphate and uric acid.

Clinical Manifestation

- Infection (pyelonephritis and cystitis with chills,fever and dysuria) can occur from constant irritation by the stone.
- Hematuria and pyuria may be noted.

Page 290 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Pain originating in the renal area radiates down ward toward the bladder in the female and toward the tests in the male.
- Stones lodged in the ureter causes acute, colicky pain radiating down the thigh and to the genitalia.
- Often the patient has a desire to void, but very little urine is passed and is usually contains blood.
- In general, the patient will spontaneously pass stones 0.5-1cm in diameter.
- Those over 1 CM in diameter usually must be removed.
- Stones lodged in the bladder usually produce urinary tract infection and hematuria
- If the stones obstruct the bladder neck, there will be urinary retention.

Management

- Relieve pain until its causes can be eliminated.
- Morphine may be prescribed to prevent shock
- Encourage fluids, it assists downward passage
- Any patient with renal stones should drink at least eight glasses of water daily to keep the urine dilute

Surgical removal

- Nephrolithotomy-incision in to the kidney with removal of the stone.
- Nephrectomy- removal of the kidney and stone, if the kidney is non functional secondary to infection.
- Pyelolithotomy-removal of stone in the kidney pelvis
- **Ureterolithotomy**-removal of stone in the ureter.
- **Cystotomy**- removal of stone in the bladder.

Nursing process for a patient with kidney stone

- Pain related to inflammation, obstruction, and abrasion of the urinary tract.
- Knowledge deficit regarding prevention of recurrence of renal stone.

Goals

- Relief of pain and discomfort

Page 291 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Prevention of recurrence of renal stones.
- Nursing Intervention
- Administer prescribed narcotic analgesic
- Encourage to drink enough fluid
- Increased mobility is encouraged because prolonged immobilization slows renal drainage

Dialysis

- Dialysis is a process used to remove fluid and waste products from the body when the kidneys are unable to do so.
- Methods of therapy include: hemodialysis and peritoneal dialysis
- In dialysis solute molecules diffuse through a semipermeable membrane.
- In hemodialysis- the membrane is part of artificial kidney.
- In peritoneal dialysis- the surface of the peritoneum serves as the semipermeable membrane.
- Dialysis is used in renal failure to remove toxic substances

Management of the patient on long term hemodialysis

- Dietary restriction of protein will reduce the accumulation of nitrogenous wastes.
- Restriction of fluid to prevent fluid accumulation that lead to congestive heart failure and pulmonary edema.

4.6 Endocrine system disorders

Assessments

History

- Patients with diseases of the endocrine system commonly report nonspecific complaints. Commonly, symptoms may reflect changes in general well-being, such as fatigue, weakness, weight change, appetite, sleep patterns, or psychiatric status

Physical Examination

- The patient is observed for obvious changes in appearance.
- Changes in the skin texture are common with both hypo function and hyper function of the thyroid gland.

Page 292 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

- Eye changes, such as exophthalmos, may occur with hyperthyroidism and Graves' disease.
- Changes in physical appearance (eg, appearance of facial hair in women,
- “moon face,” “buffalo hump,” thinning of the skin, obesity of the trunk and thinness of the extremities, increased size of the feet and hands, edema) may signify disorders of the thyroid, adrenal cortex, or pituitary gland.
- Vital signs are measured and compared with previous values if known.
- Elevated blood pressure may occur with hyperfunction of the adrenal cortex or tumor of the adrenal medulla.
- Decreased blood pressure may occur with hypofunction of the adrenal cortex.
- Objective findings may be obvious and related to the patient's complaints.
- Thorough physical examination of all body systems, particularly the integumentary, cardiovascular, and neurologic systems,
- May reveal key findings for endocrine dysfunction.

Diagnostic Tests

- Various blood tests are available to evaluate endocrine function.
- These tests may measure the amount of hormone secreted by a specific endocrine gland
- Determine functioning of the hypothalamic-pituitary-thyroid axis, measure rate of functioning of an endocrine gland, or determine pathologic substances (eg, autoantibodies).
- Radiologic and imaging studies also evaluate endocrine disorders by measuring function and structure of the glands.

Tests of Thyroid Function

- This is a direct measurement of the concentration of total thyroxine (T₄) in the blood
- Using a radioimmunoassay technique.

Management of Patient with Pituitary Disorders

HYPOPITUITARISM

- Hypofunction of the pituitary gland (hypopituitarism) can result from disease of the pituitary gland itself or of the hypothalamus.

Page 293 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Hypopituitarism may result from destruction of the anterior lobe of the pituitary gland.
- Hypopituitarism is also a complication of radiation therapy to the head and neck area.
- The total destruction of the pituitary gland by trauma, tumor, or vascular lesion removes all stimuli that are normally received by the thyroid, the gonads, and the adrenal glands.
- The result is extreme weight loss, emaciation, atrophy of all endocrine glands and organs, hair loss, impotence, amenorrhea, hypometabolism, and hypoglycemia.
- Coma and death occur if the missing hormones are not replaced.

DIABETES INSIPIDUS

- Diabetes insipidus is a disorder of the posterior lobe of the pituitary gland characterized by a deficiency of antidiuretic hormone (ADH).
- Great thirst (polydipsia) and large volumes of dilute urine characterize the disorder.
- It may be secondary to head trauma, brain tumor, or irradiation of the pituitary gland.
- It may also occur with infections of the central nervous system (meningitis, encephalitis, tuberculosis).
- Another cause of diabetes insipidus is failure of the renal tubules to respond to ADH; this nephrogenic form may be related to hypokalemia, hypercalcemia.

Clinical Manifestations

- Daily output of very dilute, water-like urine.
- The urine contains no abnormal substances such as glucose and albumin.
- Because of the intense thirst, the patient tends to drink 2 to 20 liters of fluid daily.

Medical Management

The objectives of therapy are:

- To replace ADH (which is usually a long-term therapeutic program).
- To ensure adequate fluid replacement.
- to identify and correct the underlying causes

Pharmacologic Therapy

- Intramuscular administration of ADH.

Page 294 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

- It is administered every 24 to 96 hours.

Nursing Management

- The nurse needs to provide specific verbal and written instructions, show the patient how to administer the medications.
- The nurse also advises the patient to wear a medical identification bracelet and to carry medication and information about this disorder at all times.

HYPOTHYROIDISM

- Hypothyroidism results from suboptimal levels of thyroid hormone.
- Thyroid deficiency can affect all body functions and can range from mild, subclinical forms to **myxedema, an advanced** form.
- The most common cause of hypothyroidism in adults is autoimmune thyroiditis (**Hashimoto's disease**), in which the immune system attacks the thyroid gland.
- **Goiter also commonly occurs** with iodine deficiency.
- Lack of iodine results in low levels of circulating thyroid hormones, which causes increased release of TSH.
- The elevated TSH causes hypertrophy of the thyroid gland.

Clinical Manifestations

- Early symptoms of hypothyroidism are nonspecific
- Extreme fatigue makes it difficult for the person to participate in usual activities.
- Hair loss, and dry skin are common
- Numbness and tingling of the fingers may occur.
- Menstrual disturbances such as menorrhagia or amenorrhea occur.
- The patient usually begins to gain weight even without an increase in food intake.
- The skin becomes thickened because of an accumulation of mucopolysaccharides in the subcutaneous tissues.
- The patient often complains of being cold even in a warm environment.
- The patient frequently complains of constipation.

Medical Management

Page 295 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- The primary objective in the management of hypothyroidism is to restore a normal metabolic state by replacing the missing hormone.

Pharmacologic Therapy

- Synthetic levothyroxine (Synthroid or Levothroid) is the preferred
- If replacement therapy is adequate, the symptoms of myxedema disappear and normal metabolic activity is resumed.

Prevention of Cardiac Dysfunction

- Any patient who has had hypothyroidism for a long period is almost certain to have:
Elevated serum cholesterol level
Atherosclerosis
Coronary artery disease.
- In the elderly patient with mild to moderate hypothyroidism, thyroid hormone replacement must be started with low dosages and increased gradually to prevent serious cardiovascular side effects.
- Angina, for example, may occur with rapid thyroid replacement in the presence of coronary artery disease secondary to the hypothyroid state.

6.8.5 Nursing Interventions

- Assist in ventilatory support if respiratory depression and failure occur.
- Administer prescribed medications (eg, thyroxine) with extreme caution.
- Turn and reposition patient at intervals.
- Avoid use of hypnotic, sedative, and analgesic agents.

HYPERTHYROIDISM

- Hyperthyroidism is the second most prevalent endocrine disorder, after diabetes mellitus.
- **Graves' disease, the most common** type of hyperthyroidism.

Cause

- Stress, or an infection, but the exact significance of these relationships is not understood.

Page 296 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

- Thyroiditis and excessive ingestion of thyroid hormone.

Pharmacologic Therapy

- Two forms of pharmacotherapy are available for treating hyperthyroidism and controlling excessive thyroid activity:
- use of irradiation
- antithyroid medications that interfere with the synthesis of thyroid hormones.
- Surgical removal of most of the thyroid gland is a nonpharmacologic alternative.

Management of Patients with Parathyroid Disorders

- The parathyroid glands (normally four) are situated in the neck and embedded in the posterior aspect of the thyroid gland.
- surgical removal is the most common cause of hypoparathyroidism.

PARATHYROID FUNCTION

- Parathormone, from the parathyroid glands, regulates calcium and phosphorus metabolism.
- Increased secretion of parathormone results in increased calcium absorption from the kidney, intestine, and bones, thereby raising the blood calcium level.
- Parathormone also tends to lower the blood phosphorus level.
- Excess parathormone can result in markedly elevated levels of serum calcium, a potentially life-threatening situation.
- Renal calculi (kidney stones), obstruction, pyelonephritis, and renal failure.
- Bone loss attributable to hyperparathyroidism increases the risk for fracture.

Medical Management

- The recommended treatment of primary hyperparathyroidism is the surgical removal of abnormal parathyroid tissue.
- Because kidney involvement is possible, patients with hyperparathyroidism are at risk for renal calculi.
- Therefore, a fluid intake of 2,000 mL or more is encouraged to help prevent calculus formation.

Page 297 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Avoid a diet with excess calcium.
- Physical activity, along with increased fluid intake, help to reduce constipation, which is common postoperatively.

Nursing Management

- The nurse closely monitors the patient to detect symptoms of tetany (muscular spasm)- which may be an early postoperative complication.
- The nurse reminds the patient and family about the importance of follow-up to ensure return of serum calcium levels to normal

HYPOPARATHYROIDISM

Cause: surgical removal of parathyroid gland tissue during thyroidectomy or parathyroidectomy.

Pathophysiology

- Symptoms of hypoparathyroidism are caused by a deficiency of parathormone that results in elevated blood phosphate (hyperphosphatemia) and decreased blood calcium (hypocalcemia) levels.
- In the absence of parathormone, there is decreased intestinal absorption.

Clinical Manifestations

- Hypocalcemia causes irritability of the neuromuscular system and contributes to the chief symptom of hypoparathyroidism—tetany.
- Tetany is a general muscle hypertonia, with tremor and spasmodic or uncoordinated contractions occurring with or without efforts to make voluntary movements.
- Numbness, tingling, and cramps in the extremities, and the patient complains of stiffness in the hands and feet.

Medical Management

- The goal of therapy is to raise the serum calcium level and eliminate the symptoms of hypoparathyroidism.
- When hypocalcemia and tetany occur after a thyroidectomy, the immediate treatment is to administer calcium gluconate intravenously.

Page 298 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

- If this does not decrease neuromuscular irritability and seizure activity immediately, sedative agents such as pentobarbital may be administered.
- Parenteral parathormone can be administered to treat acute hypoparathyroidism with tetany.
- Because of neuromuscular irritability, the patient with hypocalcemia and tetany requires an environment that is free of noise,, bright lights, or sudden movement.
- A diet high in calcium and low in phosphorus is prescribed.
- Although milk, milk products, and egg yolk are high in calcium, they are restricted because they also contain high levels of phosphorus.
- Oral tablets of calcium salts, such as calcium gluconate, may be used to supplement the diet.

Nursing Management

- Care of postoperative patients having thyroidectomy, or parathyroidectomy, is:
- Detecting signs of tetany, and seizures.
- Calcium gluconate is kept at the bedside, with equipment necessary for intravenous administration.
- An important aspect of nursing care is teaching about medications and diet therapy.
- The patient needs to know the reason for high calcium and low phosphate intake and the symptoms of hypocalcemia and hypercalcemia.

Management of Patients with Adrenal Disorders

ADRENOCORTICAL INSUFFICIENCY (ADDISON'S DISEASE)

- Addison's disease (adrenocortical insufficiency) results when adrenal cortex function is inadequate to meet the patient's need for cortical hormones.

Cause

- Autoimmune.
- Surgical removal of either adrenal glands or infection of the adrenal glands.
- Tuberculosis-destroy adrenal gland tissue.

Page 299 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Inadequate secretion of ACTH from the pituitary gland also results in adrenal insufficiency because of decreased stimulation of the adrenal cortex.
- The symptoms of adrenocortical insufficiency may also result from the sudden cessation of exogenous adrenocortical hormonal therapy, which interferes with normal feedback mechanisms.
- Treatment with daily administration of corticosteroids for 2 to 4 weeks may suppress function of the adrenal cortex.
- Therefore, adrenal insufficiency should be considered in any patient who has been treated with corticosteroids.

Clinical Manifestations

- Addison's disease is characterized by:
- Muscle weakness, anorexia, gastrointestinal symptoms, fatigue, emaciation, dark pigmentation of the skin,
- Hypotension, and low blood glucose levels, low serum sodium levels, and high serum potassium levels.
- The disturbance of sodium and potassium metabolism may be marked by depletion of sodium and water and severe, chronic dehydration.
- With disease progression and acute hypotension, the patient develops **addisonian crisis**.

Signs and symptoms of addisonian crisis

- Cyanosis
- Classic signs of circulatory shock: pallor, rapid and weak pulse, rapid respirations, and low blood pressure.
- In addition, the patient may complain of headache, nausea, abdominal pain, diarrhea and show signs of confusion and restlessness.
- Even slight overexertion, exposure to cold, acute infections, or a decrease in salt intake may lead to circulatory collapse, shock, and death if untreated.

Diagnostic Findings

Page 300 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Laboratory findings include:
- Decreased blood glucose (hypoglycemia)
- Sodium (hyponatremia) levels
- Increased serum potassium (hyperkalemia) level.

Medical Management

- Immediate treatment is directed toward combating circulatory shock:
- Restoring blood circulation, administering fluids and corticosteroids, and monitoring vital signs.
- Hydrocortisone is administered intravenously, followed with 5% dextrose in normal saline.
- Mineralocorticoid is administered as ordered.
- Antibiotics may be administered if infection has precipitated adrenal crisis in a patient with chronic adrenal insufficiency.
- If the adrenal gland does not regain function, the patient needs lifelong replacement of corticosteroids and mineralocorticoids to prevent recurrence of adrenal insufficiency.
- Additionally, the patient may need to supplement dietary intake with added salt during times of gastrointestinal losses of fluids through vomiting and diarrhea.

Nursing Management

ASSESSING THE PATIENT

- Monitors the blood pressure and pulse rate
- Assesses the skin color and turgor for changes related to chronic adrenal insufficiency and hypovolemia.
- Other key assessments include checking for weight changes, muscle weakness, and fatigue and investigating any illness or stress that may have precipitated the acute crisis.

RESTORING FLUID BALANCE

- The nurse assesses the patient's skin turgor, mucous membranes, and weight while instructing the patient to report increased thirst, which may indicate impending fluid imbalance.

Page 301 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- A decrease in systolic pressure (20 mm Hg or more) may indicate depletion of fluid volume, especially if accompanied by symptoms.
- The nurse encourages the patient to consume foods and fluids that will assist in restoring and maintaining fluid and electrolyte balance.
- The nurse assists the patient to select foods high in sodium during gastrointestinal disturbances.
- The nurse instructs the patient and family to administer hormone replacement as prescribed and to modify the dosage during illness and other stressful occasions.

Diabetes Mellitus

- Diabetes occurs either because of a lack of insulin or because of the presence of factors that oppose the action of insulin.
- The result of insufficient action of insulin is an increase in blood glucose concentration (hyperglycaemia).
- Many other metabolic abnormalities occur, notably an increase in ketone bodies in the blood when there is a severe lack of insulin.

Types of diabetes

1. **Type 1 diabetes** (insulin dependent diabetes).
2. **Type 2 diabetes** (non-insulin dependent diabetes).
3. **Gestational diabetes.**Hyperglycemia develops during pregnancy because of the secretion of placental hormones.

Type 1 diabetes (insulin dependent diabetes) is due to B-cell destruction, usually leading to absolute insulin deficiency).

- It can be immune mediated or idiopathic.

Type 2 diabetes (non-insulin dependent diabetes) is due to insulin resistance associated with relative insulin deficiency.

- The division is important both clinically in assessing the need for treatment, and also in understanding the causes of diabetes.

Type 1 diabetes

Page 302 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Type 1 diabetes is due to destruction of B-cells in the pancreatic islets of Langerhans with resulting loss of insulin production.
- Autoimmune attack on the B-cells is responsible, occurring in genetically susceptible individuals.
- The process of islet destruction probably begins very early in life and is known to start several years before the clinical onset of diabetes.

Type 2 diabetes

- There are numerous causes of Type 2 diabetes.
- **Decreasing insulin secretion**—that is, an islet defect.
- **Increasing insulin resistance**__ to the action of insulin resulting in decreased peripheral glucose uptake, or increased hepatic glucose output.
- Obesity is the commonest cause of insulin resistance.
- Diabetes can occur at any age. Type 2 diabetes is most common after middle age and occurs most often at 50-70 years of age.
- Affecting both sexes equally.
- The peak incidence of Type 1 diabetes is at 10-12 years with a small male predominance.
- Despite the impaired insulin secretion that is characteristic of type 2 diabetes, there is enough insulin present to prevent the breakdown of fat and the accompanying production of ketone bodies.
- Therefore, DKA does not typically occur in type 2 diabetes.

Gestational diabetes

- Gestational diabetes is any degree of glucose intolerance with its onset during pregnancy.
- Hyperglycemia develops during pregnancy because of the secretion of placental hormones, which causes insulin resistance.
- Selective screening for diabetes during pregnancy is now being recommended between the 24th and 28th weeks
- Initial management includes dietary modification and blood glucose monitoring.

Page 303 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- If hyperglycemia persists, insulin is prescribed.
- Oral antidiabetic agents should not be used during pregnancy.
- After delivery of the infant, blood glucose levels in the woman with gestational diabetes return to normal.
- However, many women who have had gestational diabetes develop type 2 diabetes later in life.
- Therefore, all women who have had gestational diabetes should be counseled to maintain their ideal body weight and to exercise regularly to reduce their risk for type 2 diabetes.

Clinical Manifestations

- Clinical manifestations of all types of diabetes include:
- The “three Ps”: polyuria, polydipsia, and polyphagia.
- Polyuria (increased urination)
- polydipsia (increased thirst) occur as a result of the excess loss of fluid associated with osmotic diuresis.
- polyphagia (increased appetite) resulting from the catabolic state induced by insulin deficiency and the breakdown of proteins and fats.
- Other symptoms include:
- Fatigue and weakness, sudden vision changes, tingling or numbness in hands or feet, dry skin, skin lesions or wounds that are slow to heal, and recurrent infections.
- The onset of type 1 diabetes may also be associated with sudden weight loss or nausea, vomiting, or abdominal pains, if DKA has developed.

ASSESSMENT AND DIAGNOSTIC FINDINGS

- An abnormally high blood glucose level is the basic criterion for the diabetes diagnose
- **Fasting plasma glucose (FPG) levels of 126 mg/dL or more**
- **Or random plasma glucose levels exceeding 200 mg/dL or more.**
- Symptoms in patients with Type 2 diabetes

Page 304 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Microvascular and macrovascular complications are frequently already present when Type 2 diabetes is diagnosed.
- Type 2 diabetes is commonly detected at routine medical examinations or on admission to hospital with another illness.

Management

- Treatment aims to minimize the long-term complications and reduce early mortality.
- There are three distinctive aspects in management, each of which requires entirely different approaches
- To alleviate symptoms and improve quality of life, achieved by reducing hyperglycaemia and weight
- To maintain health by reduction of risk factors (especially hypertension, hyperlipidaemia, and smoking)

Healthy lifestyle

- People with diabetes can help themselves considerably by attention to healthy eating, appropriate exercise levels and weight reduction, and cessation of smoking.
- Educate patients and encourage self-management

Healthy eating

- Healthy eating is the cornerstone of diabetic treatment, and control of the diet should always be the first treatment offered to Type 2 diabetic patients before drugs are considered.
- Eliminating sugar (sucrose and glucose) lowers blood glucose concentrations in both Type 1 and Type 2 diabetic patients.

Simple dietary guidelines

- Never take any form of sugar
- Do not take too much fat
- There is no need to restrict most meat, fish, or vegetables
- Control your weight
- *Fresh fruit and vegetables should be included at least twice daily.*

Page 305 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- The skin and of fruit and vegetables such as apples, tomatoes, and potatoes should be eaten
- *Eat frequently Brown rice, peas and all varieties of beans*
- Diabetic patients; if they eat too much, diabetic control deteriorates; if they eat too little they become hypoglycaemic.
- Carbohydrate intake should be steady from day to day and that it should be taken at fairly regular times each day.

Alcohol

- Alcohols containing simple sugar should not be drunk by people with diabetes, especially sweet wines and liqueurs
- **Glycaemic control and reducing risk factors**
- **Healthy lifestyle advice**—healthy eating plan, exercise, and weight reduction plan.
- **Oral hypoglycaemic agents-** should be given only when dietary treatment alone has failed after a proper trial period, usually lasting at least three months.
- They should not normally be given as the initial treatment.
- **Sulphonylureas-** stimulate insulin secretion.

Identifying patients in need of insulin

- Patients in need of treatment with insulin must be identified early.
- This is done by judging the patient's clinical features.
- The following groups of patients are likely to need insulin:
- Almost all children and most of those under 30-40 years of age
- women who present during pregnancy
- Diabetic patients whose tablet treatment has failed
- All patients who have undergone pancreatectomy

Insulin Therapy

- Insulin may be grouped in to three main categories:

I. Short acting insulin (Crystalline zinc insulin)

- - Regular insulin-

Page 306 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- The onset of regular insulin action is-half to one hour. Duration 4 to 6 hours.
- Regular insulin is clear in appearance and usually administered 20 to 30 minutes before a meal.

2. Intermediate-Acting insulin

- NPH insulin (neutral protamine hagedorn)
- Lente insulin

- The onset of intermediate acting insulin is 3 to 4 hours, duration 16 to 20 hours. Intermediate-acting insulin are white and milky in appearance.
- Administered half hour before the meal.

3. Long Acting Insulin

- Ultralente insulin
- The onset of long acting insulin is 6-8 hours.
- Duration, 20 to 30 hours.

Prevention of Type 2 diabetes

- Lifestyle changes in those prone to Type 2 diabetes can effectively delay the onset of this disease.
- Weight reduction.
- Improved diet (less fat, less saturated fat, and more dietary fibre).
- Increased physical activity.

Diabetic complications

- Patients with long-standing diabetes, both Type 1 and Type 2, may develop complications affecting the eyes, kidneys or nerve (microvascular complications) or major arteries.
- The major arteries are affected in people with diabetes.
- Both coronary artery disease and strokes as well as peripheral vascular disease (affecting feet and legs).

Chronic diabetic complications includes:

- I.-Macrovascular disease

Page 307 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

- 2.-Microvascular disease
- 3.-Neuropathy

Macrovascular disease include:

- A) **Coronary artery disease** - Atherosclerosis in the coronary artery lead to occurrence of myocardial infraction
- B) **Cerebrovascular disease**-Atherosclerotic changes in cerebral blood vessels- can lead to occurrence of ischemic attacks and strokes.
- C) **Peripheral vascular disease**-Atherosclerosis in the large blood vessel of the lower extremity.
- Can lead to occurrence of gangrene and amputation

Micro vascular Complications

A. Diabetic Retinopathy:

- Diabetic retinopathy is caused by changes in the small blood vessels in the retina of the eye.
- Maintenance of blood glucose to a normal level through intensive insulin therapy decreased the risk for development of retinopathy.

B. Nephropathy:

- Person with diabetes have a 20 to 40 % chance of developing renal disease
- 3. Neuropathies
- Neuropathy in diabetes refers to a group of disease that affect all types of nerves, including, peripheral, autonomic, and spinal nerves.
- Control of glucose levels to normal or near normal levels decreases the incidence of neuropathy.

Nursing diagnose

- Based on the assessment data, the patient's major nursing diagnoses may include the following:
- Altered nutrition related to imbalance in insulin, food and physical activity.

Page 308 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

- Risk for impaired skin integrity related to immobility and lack of sensation (caused by neurothpy).
- Potential knowledge deficit about diabetes self care skills related to lack of basic diabetes education.
- Goal:
- Improve nutritional status
- Maintenance of skin integrity
- Able to perform basic diabetes self care skills

Improve nutritional status

Nursing Intervention

- The patient's nutritional intake is monitored carefully along with blood glucose, urine ketones, and daily weight.
- Blood glucose records are assessed for patterns of hypoglycemia and hyperglycemia at the same time of day.

Maintenance of skin integrity:

Nursing Intervention

- The skin is assessed daily for dryness or breaks
- The feet are cleaned with warm water and soap.
- The feet are dried thoroughly, especially between the toes.
- Lotion is applied to the entire foot
- The nurse promotes optimal blood glucose control in patients with skin break down.

Able to perform basic diabetes self care skills

Nursing Intervention

- Plan and implement a teaching plan that includes basic information about diabetes, its cause and symptoms and long and short term complications and their treatment.
- The patient is taught self care activities for the prevention of long term complications including foot care, eye care and risk factor management.

Expected out comes (Evaluation criteria).

Page 309 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Avoids extremes of hypoglycemia and hyperglycemia.
- Skin remains smooth without dryness and cracking.
- Verbalizes diabetes survival skills and preventive care.

4.7 Integumentary System disorders

Assessment

HEALTH HISTORY AND CLINICAL MANIFESTATIONS

- When caring for patients with dermatologic disorders, the nurse
- Obtains important information through the health history and direct observations.
- During the health history interview, the nurse asks about any family and personal history of skin allergies.

Assessing the colour of the skin

- Evaluate the colour of skin:
- Pallor- Anemia—decreased hematocrit
- Albinism—total absence of pigment melanin
- Vitiligo—a condition characterized by destruction of the melanocytes in circumscribed areas of the skin (may be localized or widespread)
- Cyanosis-Increased amount of unoxygenated hemoglobin.
- Erythema-Hyperemia—increased blood flow through engorged arterial vessels, as in inflammation
- Jaundice-Increased serum bilirubin concentration due to liver dysfunction or hemolysis, as after severe burns or some infections
- After the color of the skin has been evaluated.
- Skin moisture, temperature, and texture are assessed primarily by palpation.

Page 310 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

- The elasticity (ie, turgor) of the skin, which decreases in normal aging, may be a factor in assessing the hydration status of a patient.

ACNE VULGARIS

- Acne vulgaris is a common follicular disorder affecting susceptible hair follicles.
- Most commonly found on the face, neck, and upper trunk.
- It is characterized papules, pustules, nodules, and cysts.
- Acne is the most commonly encountered skin condition in
- Adolescents and young adults between ages 12 and 35.
- Acne becomes more marked at puberty and during adolescence because the endocrine glands that influence the secretions of the sebaceous glands are functioning at peak activity.

Clinical Manifestations

- The primary lesions of acne are comedones.
- Closed comedones (ie, whiteheads) are obstructive lesions formed from impacted lipids or oil
- They are small, whitish papules
- These closed comedones may evolve into open comedones, in which the contents of the ducts are in open communication with the external environment.
- The color of open comedones (ie, blackheads) results not from dirt, but from an accumulation of lipid, bacterial, and epithelial debris.
- An inflammatory response may result from the action of certain skin bacteria.
- Acne is usually graded as mild, moderate, or severe based on the number and type of lesions (eg, comedones, papules, pustules, cysts).

Assessment and Diagnostic Findings

- The diagnosis of acne is based on the history and physical examination, evidence of lesions characteristic of acne, and age.
- Acne does not occur until puberty.

Page 311 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- The presence of the typical comedones (ie, whiteheads and blackheads) along with excessively oily skin is characteristic.
- When there are numerous lesions, some of which are open, the person may exude a distinct sebaceous odor.

Medical Management

- The goals of management are to reduce bacterial colonies.
- Decrease sebaceous gland activity, prevent the follicles from becoming plugged
- Reduce inflammation, combat secondary infection, minimize scarring
- The therapeutic regimen depends on the type of lesion (eg, comedonal, papular, pustular, cystic).
- For mild cases of acne, washing twice each day with a cleansing soap may be all that is required.
- These soaps can remove the excessive skin oil and the comedo in most cases.
- Acne medications contain salicylic acid and benzoyl peroxide, both of which are very effective at removing the sebaceous follicular plugs.
- Oil-free cosmetics and creams should be chosen.

Topical Pharmacologic Therapy

Benzoyl Peroxide. produce a rapid and sustained reduction of inflammatory lesions.

- They depress sebum production and promote breakdown of comedo plugs.
- They also produce an antibacterial effect
- Typically, the patient applies a gel of benzoyl peroxide once daily.

Topical Antibiotics. Topical antibiotic treatment for acne is common.

- Topical antibiotics decrease comedones, papules, and pustules; and produce no systemic side effects.
- Common topical preparations include tetracycline, clindamycin, and erythromycin.

Systemic Pharmacologic Therapy

Antibiotics

Page 312 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Oral antibiotics, such as tetracycline, doxycycline, and minocycline, are very effective in treating moderate and severe acne
- Especially when the acne is inflammatory and results in pustules, abscesses, and scarring.
- The tetracycline family of antibiotics is contraindicated in children younger than age 12 and in pregnant women.
- Broad-spectrum antibiotics may suppress normal vaginal bacteria and predispose the patient to candidiasis, a fungal infection.

IMPETIGO

- Impetigo is a superficial infection of the skin
- Impetigo is contagious

Cause:

- Staphylococci, or streptococci bacteria.

Predisposing factor

- It often follows pediculosis capitis (head lice), scabies (itch mites) , or eczema.
- Poor hygiene and malnutrition may predispose an adult to impetigo.

Clinical Manifestations

- The lesions begin as small, red macules.
- Thin-walled vesicles that soon rupture and become covered with a loosely adherent yellow crust.
- These crusts are easily removed to reveal smooth, red, moist surfaces.

Medical Management

- Systemic antibiotic therapy is the usual treatment.
- It reduces contagious spread, treats deep infection, and prevents acute glomerulonephritis
- Benzathine penicillin or oral penicillin may be prescribed.

Furunculosis

- **Furunculosis** (boil) is caused by *Staphylococcus aureus*

Signs and symptoms

Page 313 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Tender, erythematous area.
- Commonly occur on the back of neck, axillae, or buttocks.

Management

- Warm compresses to reduce inflammation and promote drainage.
- Nursing intervention
- Suggest warm compresses.
- Warn patient not to squeeze or incise the lesion.
- Suggest mild analgesics, if needed.

SCABIES

- Scabies is an infestation of the skin by the itch mite *Sarcoptes scabiei*.
- The disease may be found in people living in substandard hygienic conditions,
- The mites frequently involve the fingers, and hand.
- Transmitted by close personal contact

Clinical Manifestations

- The patient complains of severe itching
- Red, pruritic eruptions
- One classic sign of scabies is the increased itching that occurs at night, perhaps because the increased warmth of the skin has a stimulating effect on the parasite.
- Small erythematous papules and short, wavy burrows are seen on skin surface.
- Secondary lesions are quite common and include vesicles.

Assessment and Diagnostic Findings

- The diagnosis is confirmed by microscopic examination of skin scraping.
- The scrapings are placed on a microscope slide and examined through a low-powered microscope to demonstrate the mite

Medical Management

- The patient is instructed to take a warm, soapy bath or shower to remove the scaling debris from the crusts and then to dry thoroughly and allow the skin to cool.

Page 314 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

- A prescription scabicide, such as lindane (Kwell), crotamiton (Eurax), or 5% permethrin (Elimite), is applied thinly to the entire skin.
- The medication is left on for 12 to 24 hours, after which the patient is instructed to wash thoroughly.
- One application may be curative, but it is advisable to repeat the treatment in 1 week.

Nursing Management

- The patient should wear clean clothing and sleep between freshly laundered bed linens.
- All bedding and clothing should be washed in hot water and dried on the hot dryer cycle, because the mites can survive up to 36 hours in linens.
- If bed linens or clothing cannot be washed in hot water, dry-cleaning is advised.
- All family members and close contacts should be treated simultaneously to eliminate the mites.

Dermatitis

- Non infective Inflammatory condition of the skin.

Contact dermatitis:

- Caused by direct contact with irritating substance

Allergic dermatitis:

- Affects those people who are hypersensitive (caused by allergen substance) such as:
plants
- Cosmetics
- Cleaning products
- Soaps and detergents, hair dyes, metals, and rubber

Seborrheic dermatitis:

- Mainly affects the scalp, causing itchy, red skin and stubborn dandruff
- Signs and symptoms
- Itching
- Burning
- Erythema, and vesiculation at point of contact.

Page 315 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Thickening of skin and pigmentation changes may occur with chronicity.

Management

- Topical or oral steroids, depending on severity.
- Oral steroids usually given in tapered dose.
- Start with high dose and gradually decrease to provide greatest anti-inflammatory effect without adrenal suppression.
- Removal or avoidance of causative agent.
- Antipruritics-systemic or topical antihistamines or topical calamine lotion.

Nursing Intervention

- Advise patient to perform patch test (piece of drug) by applying substance behind ear or on inside of the wrist before trying new cosmetics
- Teach patient to use allergen-free products.
- Advise patient that rash even oozing lesion is not contagious.

Burn

- Burns are caused by a transfer of energy from a heat source to the body. Heat may be transferred through conduction or electromagnetic radiation.
- Burns are categorized as thermal (which includes electrical burns), radiation, or chemical.
- Disruption of the skin can lead to increased fluid loss, infection, hypothermia, scarring, compromised immunity, and changes in function, appearance, and body image.

Causes of burns

- Most burns are due to flame injuries.
- Burns due to scalds are the next most common.
- The most infrequent burns are those caused by electrocution and chemical injuries.

Severity of Burns

Severity of burns is determined by:

- **Depth**-first, second (partial thickness), third degree (full thickness).
- **Extent**-percentage of TBSA.

Page 316 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- **Age**-the very young and very old have a poor prognosis; the prognosis alters for adults after age 45.
- **Area of the body burned**-face, hands, feet, perineum, and circumferential burns require special care.

Classification of Burns

- Burn injuries are described according to the depth of the injury and the extent of body surface area injured.

Burn Depth

- Burns are classified according to the depth of tissue destruction as superficial partial-thickness injuries, deep partial-thickness injuries, or full-thickness injuries.
- The following factors are considered in determining the depth of the burn:
 - How the injury occurred
 - Causative agent, such as flame or scalding liquid
 - Temperature of the burning agent
 - Duration of contact with the agent
 - Thickness of the skin

Extent of Body Surface Area Injured

- Various methods are used to estimate the TBSA affected by burns; among them are the rule of nines.

RULE OF NINES

- The rule of nines is a quick way to calculate the extent of burns.
- The system assigns percentages in multiples of nine to major body surfaces
- The body is divided into areas of 9%, and the total burn area can be calculated. It is not accurate in children.
- Estimated percentage of total body surface area (TBSA) in the adult
 - Head-----9%
 - Anterior chest-----18%
 - Posterior chest(Back)-----18%

Page 317 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

- Geniteal area-----1%
- Right Arm-----9%
- Left Arm-----9%
- Right leg----- 18%
- Left leg-----18%

LOCAL AND SYSTEMIC RESPONSES

TO BURNS

- Burns that do not exceed 25% TBSA produce a primarily local response.
- Burns that exceed 25% TBSA may produce both a local and a systemic response and are considered major burn injuries.
- **Burn Edema**
- Local swelling due to thermal injury is often extensive. Edema is defined as the presence of excessive fluid in the tissue spaces.
- As previously noted, in burns involving less than 25% TBSA, the loss of capillary integrity and shift of fluid are localized to the burn itself, resulting in blister formation and edema only in the area of injury.

Effects on Fluids, Electrolytes, and Blood Volume

- Circulating blood volume decreases dramatically during burn shock.
- At the time of burn injury, some red blood cells may be destroyed and others damaged, resulting in anemia.
- Blood transfusions are required periodically to maintain adequate hemoglobin levels for oxygen delivery.
- Abnormalities in coagulation, including a decrease in platelets (thrombocytopenia) and prolonged clotting, also occur with burn injury.

Criteria for Classifying the Extent of Burn Injury

Minor Burn Injury

- Second-degree burn of less than 15% total body surface area (TBSA) in adults or less than 10% TBSA in children

Page 318 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Third-degree burn of less than 2% TBSA not involving special care areas (eyes, ears, face, hands, feet, perineum, joints)
- Excludes electrical injury, inhalation injury, concurrent trauma, all poor-risk patients (eg, extremes of age, concurrent disease)

Moderate, Uncomplicated Burn Injury

- Second-degree burns of 15%–25% TBSA in adults or 10%–20% in children
- Third-degree burns of less than 10% TBSA not involving special care areas
- Excludes electrical injury, inhalation injury, concurrent trauma, all poor-risk patients (eg, extremes of age, concurrent disease)

Major Burn Injury

- Second-degree burns exceeding 25% TBSA in adults or 20% in children
- All third-degree burns exceeding 10% TBSA
- All burns involving eyes, ears, face, hands, feet, perineum, joints
- All inhalation injury, electrical injury, concurrent trauma, all poor-risk patients

Signs and symptoms

- Signs & symptoms of First degree burn
- Pink to red: slight edema, which subsides quickly.
- Pain may last up to 48 hours; relieved by cooling.
- No scarring.

Signs & symptoms of second Degree

- Pink or red; blisters (vesicles) form; edematous, and elastic.
- Superficial layers of skin are destroyed; wound moist and painful. Scarring may occur.

Signs & symptoms of Third Degree (Full thickness).

- Destruction of epithelial cells-epidermis and dermis destroyed.
- Not painful; inelastic; coloration varies from waxy white to brown
- Destruction of epithelium, fat, muscles, and bone.
- Expect scarring and loss of skin functions.
- Management of the Patient With a Burn Injury

Page 319 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Burn care must be planned according to the burn depatienth and local response
- The extent of the injury, and the presence of a systemic response.

Care of a major burn injury

- The main aims of burn care are to restore form, function, and feeling, and burn management can be divided up into
- Rescue, resuscitate, retrieve, resurface, rehabilitate, reconstruct.
- **Rescue**—*The aim is to get the individual away from the source of the injury and provide first aid. This is often done by non-professionals—friends, relatives, etc.*
- **Resuscitate**—*Immediate support must be provided for any failing organ system.*
- This usually involves administering fluid to maintain the circulatory system but may also involve supporting the cardiac, renal, and respiratory systems.
- **Retrieve**—*After initial evacuation to an accident and emergency department, patients with serious burns may need transfer to a specialist burns unit for further care.*
- **Resurface**—*The skin and tissues that have been damaged by the burn must be repaired.*
- This can be achieved by various means, from simple dressings to aggressive surgical debridement and skin grafting.
- **Rehabilitate**—*This begins on the day a patient enters hospital and continues for years after he or she has left.*
- The aim is to return patients, as far as is possible, to their pre-injury level of physical, emotional, and psychological wellbeing.
- **Reconstruct**—*The scarring that results from burns often leads to functional impairment that must be addressed.*
- The operations needed to do this are often complex and may need repeating as a patient grows or the scars re-form.

First aid management

- The aims of first aid should be to stop the burning process
- Cool the burn, provide pain relief, and cover the burn.
- Stop the burning process—The heat source should be removed.

Page 320 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

- Flames should be doused with water or smothered with a blanket or by rolling the victim on the ground.
- Rescuers should take care to avoid burn injury to themselves.
- Clothing can retain heat, even in a scald burn, and should be removed as soon as possible.
- In the case of electrical burns the victim should be disconnected from the source of electricity before first aid is attempted.
- *Cooling the burn—Active cooling removes heat and prevents progression of the burn.*
- This is effective if performed within 20 minutes of the injury.
- Immersion or irrigation with running tepid water (15°C) should be continued for up to 20 minutes.
- Iced water should not be used as intense vasoconstriction can cause burn progression.
- Cooling large areas of skin can lead to hypothermia, especially in children.
- *Analgesia—Exposed nerve endings will cause pain.*
- *Cooling* and simply covering the exposed burn will reduce the pain.
- Opioids may be required initially to control pain, but once first aid measures have been effective non-steroidal anti-inflammatory drugs such as ibuprofen taken orally.

Emergent/Resuscitative Phase of Burn Care

- It is important to remember the ABCs of all trauma care during the early postburn period:
 - Airway
 - Breathing
 - Circulation
- The circulatory system must also be assessed quickly.
- Apical pulse and blood pressure are monitored frequently.
- Tachycardia (abnormally rapid heart rate) and slight hypotension are expected soon after the burn.
- The neurologic status is assessed quickly in the patient with extensive burns.

Page 321 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Establish an airway, supply oxygen, and insert intravenous line.

Management of Fluid Loss And Shock

- The most urgent need is preventing irreversible shock by replacing lost fluids and electrolytes.
- Survival of burn victims depends on adequate fluid resuscitation.

Fluid Requirements.

- The projected fluid requirements for the first 24 hours are calculated by the clinician based on the extent of the burn injury.
- Some combination of fluid categories may be used: colloids (whole blood, plasma, and plasma expanders) and crystalloids/electrolytes (physiologic sodium chloride or lactated Ringer's solution- Adequate fluid resuscitation results in slightly decreased blood volume levels during the first 24 post-burn hours and restores plasma levels to normal by the end of 48 hours.
- Oral resuscitation can be successful in adults with less than 20% TBSA and children with less than 10% to 15% TBSA

Wound Cleansing and Debridement

- Treatment of the burn wound includes:
- Daily or twice-daily wound cleansing with debridement or hydrotherapy (showering) and dressing changes.
- Burn wounds must be cleansed initially and usually daily with a mild antibacterial cleansing agent or saline solution.
- Nonviable tissue (eschar) may be removed through surgical debridement.

Topical Antimicrobials

- Topical medications are used to cover burn areas and to reduce the number of organisms.
- They are applied directly to the burn area as ointments, creams, or solutions.
- Desired characteristics in a topical antimicrobial:

Page 322 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- ✓ Demonstrates action against a broad spectrum of bacteria.
- ✓ Has the ability to diffuse through the wound and penetrate the eschar.
- ✓ Nontoxic and noninjurious to body tissue.
- ✓ Inexpensive, pleasant to use, odorless or has pleasant odor, will not stain skin or clothing.
- ✓ Generally, all of the previously applied topical cream should be removed and the wound gently cleansed before applying new cream with each dressing change.

Surgical Management

- **Skin Graft**-Skin is transplanted to replace skin damaged or lost due to burns.
- A special blade is used to slice off thin layers of damaged skin.
- Commonly used with deep partial-thickness burns and followed with immediate coverage with an autograft.

Prevention and Treatment of Complications

- Primary causes of morbidity and mortality in burn victims are those related to infection and pulmonary problems.
- I.V. antibiotics may be given prophylactically to prevent gram-positive infection.
- Topical antibacterial agents help to retard the proliferation of pathogenic organisms.
- Broad-spectrum antibiotics may be necessary to treat systemic gram-positive and gram-negative infections.

NURSING MANAGEMENT OF THE BURN PATIENT

Nursing Diagnoses:

- Impaired Gas Exchange related to inhalation injury
- Ineffective Breathing Pattern related to, upper airway obstruction.
- Decreased Cardiac Output related to fluid shifts and hypovolemic shock
- Risk for Excess Fluid Volume related to fluid resuscitation.
- Impaired Skin Integrity related to burn injury.
- Risk for Infection related to loss of skin barrier and altered immune response
- Impaired Physical Mobility related to edema, pain, skin and joint contractures

Page 323 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Acute Pain related to injured nerves in burn wound and skin tightness.
- Ineffective Coping related to fear and anxiety

Goal:

- Achieving Adequate Oxygenation and Respiratory Function

Nursing Interventions:

- Provide humidified 100% oxygen until carbon monoxide level is known.
- Assess for signs of hypoxemia (anxiousness, tachypnea, tachycardia).
- Monitor respiratory rate, depth, rhythm, and cough.
- Auscultate chest and note breath sounds.
 - In mild inhalation injury: Encourage coughing and deep breathing.
 - In moderate to severe inhalation injury: Initiate more frequent bronchial suctioning.
 - Administer bronchodilator treatments as ordered.

Goal:

- Facilitating Fluid Balance

Nursing Intervention:

- Maintain accurate intake and output records.
- Weigh the patient daily.
- Be alert to signs of fluid overload and heart failure, especially during initial fluid resuscitation.
- Administer diuretics as ordered.

Goal:

- Protecting and Reestablishing Skin Integrity

Nursing Intervention:

- Cleanse wounds and change dressings twice daily.
- Perform debridement of dead tissue.
- Apply topical bacteriostatic agents as directed.
- Observe all wounds daily and document wound status on the patient's record.

Goal:

Page 324 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Avoiding Wound and Systemic Infection

Nursing Intervention:

- Wash hands with antibacterial cleansing agent before and after all patient contact.
- Cover hair and wear mask when wounds are exposed or when performing a sterile procedure.
- Be alert for reservoirs of infection and sources of cross-contamination in equipment.
- Check history of tetanus immunization and provide passive or active tetanus prophylaxis as prescribed.
- Administer antibiotics, as prescribed, and be alert for toxic effects and incompatibilities.
- Assess wounds daily for local signs of infection-swelling and redness around wound edges, purulent drainage, discoloration.

Goal:

- Promoting Mobility and Ability to Perform Activities of Daily Living.

Nursing intervention:

- Encourage the patient to be as active as possible and to perform active ROM exercises throughout the day.
- Position the patient to decrease edema and avoid flexion of burned joints.
- Initiate passive and active ROM and breathing exercises during early postburn period.

Goal:

- Ensuring Adequate Nutrition.

Nursing Intervention:

- Weigh the patient daily with dressings removed.
- Administer vitamins and mineral supplements as prescribed.
- Generally, for burns less than 10% TBSA, a well-balanced diet with emphasis on protein intake is necessary.
- For 10% to 20% TBSA, a high-protein, high-calorie diet is ordered.
- From 20% to 30% TBSA, supplementary enteral nutrition is necessary.

Goal

Page 325 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Reducing Pain

Nursing Intervention:

- Offer analgesics before wound care or before particularly painful treatments.
- Teach relaxation techniques, such as breathing exercises, and progressive muscle relaxation.

Goal:

- Enhancing Coping

Nursing Intervention:

- Provide opportunities for the patient to express thoughts, feelings, fears, and anxieties regarding injury.
- Explore with the patient alternative mechanisms for coping with the burn injury and its consequences. Interpret patient behavior to concerned family members and significant others.
- Offer antianxiety medications as prescribed.

Goal:

- Preserving Positive Body Image

Nursing Intervention:

- Gather data on the patient's preburn self-image and lifestyle.
- When ready, encourage the patient to express concerns regarding changes in self-image or lifestyle that may result from burn injury.
- Arrange for the patient to talk with other patients who have had a similar injury and are progressing satisfactorily.

Cellulites

- Cellulites is a bacterial infection of the tissue
- Cause – Streptococcus

Signs and symptoms

- -Pain
- -Swelling

Page 326 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- -Redness

Management

- Systemic Antibiotics eg penicillin
- Apply heat to promote local blood circulation
- Elevate the part to reduce edema
- Encourage Rest to reduce muscular contraction that could introduce the organisms into the circulatory system.

Wound Care

- The skin acts as a barrier to protect the body from the potentially harmful external environment. When the skin's integrity (intactness) is broken, the body's internal environment is open to microorganisms that cause infection.
- Any abnormal opening in the skin is a wound.
- A wound is any disruption in the skin's intactness.
- It may be accidental or intentional such as abrasion (rubbing off the skin's surface); a puncture wound (stab wound); or laceration (a wound with torn, edges).
- A wound may be intentional, such as surgical incision (a wound with clean edges). A wound that occurs accidentally is contaminated; intentional wounds are made under sterile conditions.

Dressing Wounds

Definition

- **Wound:** A cut or breaks in the continuity of the skin caused by injury or operation.
- **Dressing:** any of various materials used for covering and protecting a wound.
- **A pressure dressing:** is used for maintaining constant pressure, as in the control of bleeding.
- **A protective dressing:** is applied to shield a part from injury or from septic infection.
- **Dry dressing:** a plain dressing containing no medication, applied directly to an incision or a wound to prevent contamination or trauma or to absorb secretions.

Page 327 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

- **Biological dressing:** skin grafts.
- **Wet dressing:** soaking of a bulky dressing to aid in cleansing, drainage and debridement of a wound. May be applied intermittently or continuously

Purpose

- To reduce pain, Ease pain
- Absorb exudates – Soak up blood, plasma and other fluids exuded from the wound, containing it in one place
- Debride the wound – The removal of slough and foreign objects from the wound
- To apply compression for hemorrhage or venous stasis,
- To immobilize an injured body part,
- To protect the wound from infection and surrounding tissue
- To Promote tissue repair and regeneration so that skin integrity is restored

Equipment

- Pick up forceps in a container
- Sterile bowl or kidney dish
- Sterile cotton balls
- Sterile galipot
- Sterile gauze
- Three sterile forceps
- Rubber sheet with its cover
- Antiseptic solution as ordered
- Adhesive tape or bandages
- Scissors
- Ointment or other types of drugs as needed
- Receiver
- benzene or ether.
- *spatula*

Dressing of Septic Wound

Page 328 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

purpose

- Absorb materials being discharge from the wound
- Apply pressure to the area
- Apply local medication
- Prevent pain, swelling and injury

Equipment

- Sterile galipot
- Sterile kidney dish
- Sterile gauze
- Sterile forceps 3
- Sterile test tube or slide
- Sterile cotton- tipped application
- Sterile pair of gloves, if needed, in case of gas gangrene rabies etc.
- Rubber sheet and its cover
- Local medication if ordered
- Spatula
- Receiver with strong disinfectant to immerse used instrument
- Scissors
- Benzene or ether
- Bandages or adhesive tape
- Bucket to put in soiled dressing

N.B.

- If sterile forceps are not available, use sterile gloves
- Immerse used forceps, scissors and other instrument in strong antiseptic solution before cleansing and discard soiled dressing properly.
- In a big ward it is best to give priorities to clean wounds and then to sepatientic wounds, to lessen the risk of cross infection.

Page 329 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Consideration should be given to provide privacy for the patient while dressing the wound.
- Wounds should not be too tightly packed in effort to absorb discharge as this may delay healing.
- **All infected wounds will show at least some of the following signs:**
 - Fever
 - Pus
 - Abscess
 - Abnormal smell
 - Persistent inflammation with an exudates
 - Warmth and redness
 - Delayed healing
 - Continued or increasing pain
 - Edema
 - Weak, crumbly granulation tissue that bleeds easily

Complication of wound healing

Infection

- We are constantly exposed to various bacteria, but the skin keeps the rest of the body insulated from becoming infected.
- When the skin barrier is broken, such as from a wound, it creates an opening for bacteria to enter. Infections are some of the most common complications in wounds.

Tissue Necrosis

- When tissues do not receive enough blood supply, the cells start to die in a process called necrosis.

Scarring

- Scarring is an inevitable part of wound healing.

Contracture formation

Page 330 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- An exaggeration of normal wound edge contraction forming deformities (particularly after burn injuries)

4.8 Nervous System disorders

Management of the client with disruption of nervous system

Assessment

- A Neurologic assessment includes a patient history, general physical examination, and thorough neurologic examination.
- An important principle underlying neurologic assessment is: maximum stimulation for maximum response.
- Common manifestations of neurologic dysfunction include motor, sensory, autonomic, and cognitive deficits.
- Computed tomography (CT) scan is a structural imaging study that uses a computer-based X-ray to provide a cross-sectional image of the brain.
- Lumbar Puncture

Obtaining CSF for examination (microbiologic, serologic, cytologic, or chemical analysis).

PARAMETER	FINDING	Score
Eye opening	Spontaneously	4
	To speech	3
	To pain	2
	Do not open	1
Best verbal response	Oriented	5
	Confused	4
	Inappropriate speech	3
	Incomprehensible sounds	2
	No verbalization	1
Best motor response	Obeys command	6
	Localizes pain	5
	Withdraws from pain	4
	Abnormal flexion	3
	Abnormal extension	2
	No motor response	1

- **Assess eye opening** (level of responsiveness):

Eye opening = arousal

Assess cognitive function:

A. Orientation

1. Person, place, and time
2. Where are you, why are you here

B. Speech

1. Inability to express self
2. Difficulty speaking
3. Inability to understand spoken language

Assess motor function:

- Voluntary movement
- Reflexive movement

CEREBROVASCULAR ACCIDENT (STROKE, BRAIN ATTACK)

- Stroke, cerebrovascular accident (CVA), or brain attack is the disruption of blood supply to the brain.

Cause

- Ischemic (more than 70% of strokes)
- Hemorrhagic (associated with greater morbidity and mortality).

Clinical Manifestations

- Numbness (paresthesia), weakness (paresis), or loss of motor ability (plegia) on one side of the body.
- Difficulty in swallowing (dysphagia).
- Loss of half of a visual field (hemianopsia), double vision, photophobia.
- Altered cognitive abilities and psychological affect.
- Self-care deficits.
- Diagnostic Evaluation
- CT scan to determine cause and location of stroke.

Page 332 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Management

- Maintain airway, breathing, oxygenation, circulation.
- Diuretic treatment to reduce cerebral edema.
- Calcium channel blockers, nimodipine , to reduce BP, promote vasodilatation, and prevent cerebral vasospasm.
- Anticoagulation after hemorrhage is ruled out.
- Treatment of poststroke depression with antidepressants.

Complications

- Aspiration pneumonia
- Deep vein thrombosis, pulmonary embolism
- Poststroke depression
- Dysphagia in 25% to 50% of patients after stroke

Nursing Assessment

- Assess for voluntary or involuntary movements, tone of muscles, presence of deep tendon reflexes.
- Assess mental status, sensation.
- Monitor bowel and bladder function/control.
- Monitor effectiveness of anticoagulation therapy.
- Assess for skin breakdown, contractures, and other complications of immobility.
- Impaired Physical Mobility related to motor deficits
- Disturbed Thought Processes related to brain injury
- Impaired Verbal Communication related to brain injury
- Self-Care Deficit: Bathing, Dressing, Toileting related to hemiparesis/paralysis
- Imbalanced Nutrition: Less Than Body Requirements related to impaired self-feeding, chewing, swallowing
- Impaired Urinary Elimination related to motor/sensory deficits
- Disabled Family Coping related to illness, and care giving burden

Goal

Page 333 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Optimizing Cognitive Abilities
- Nursing intervention
- Be aware of the patient's cognitive alterations, and adjust interaction.
- Participate in cognitive retraining program: reality orientation (rehabilitation).
- Be aware that depression is common and therapy should include psychotherapy and pharmacological agents.
- Attaining Bladder Control
- Insert indwelling bladder catheterization during acute stage.
- Strengthening Family Coping
- Teach stress management techniques, such as relaxation exercises.
- Provide information about stroke and expected outcome.
- Teach family that stroke survivors do show depression in the first 3 months of recovery.

Evaluation: Expected Outcomes

- Oriented to person, place, and time
- Brushing teeth, putting on shirt and pants independently
- Feeds self two-thirds of meal
- Voids on commode.

Encephalitis

- Encephalitis is inflammation of the brain.
- Usually occurs when the cerebral hemispheres, brainstem, or cerebellum is infected by a microorganism.
- Complications of encephalitis include epilepsy, parkinsonism, behavioral and personality changes, and mental retardation.
- A comatose state may last for days, weeks, or months after the acute infectious state.

Causes

- Most cases of encephalitis are related to viruses, and the most common cause is herpes simplex Virus

Clinical Manifestations

Page 334 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Fever, headache, and nuch rigidity (stiff neck).
- Altered mental status; confusion in older patients.
- Signs of meningeal irritation include nuchal rigidity and positive Brudzinski's and Kernig's signs.
- To elicit Brudzinski's sign, place the patient supine and flex the head upward.
- Resulting flexion of both hips, knees, and ankles with neck flexion indicates meningeal irritation.
- To test for Kernig's sign, once again place the patient supine.
- Keeping the bottom leg straight, flex the other hip and knee to form a 90-degree angle.
- Slowly extend the upper leg, resulting in pain and spasm of the muscle. Resistance to further extension can be felt.

Diagnostic Evaluation

- Complete blood count to detect an elevated leukocyte count in bacterial and viral meningitis.
- Blood cultures are obtained to indicate the organism.
- CSF evaluation for pressure and leukocytes.
 - ✓ In acute bacterial meningitis, the CSF may indicate elevated pressure and elevated leukocytes.
 - ✓ In viral encephalitis, the CSF may indicate normal/moderately elevated pressure, few elevated leukocytes.
 - ✓ Most patients are given I.V. antibiotics until the laboratory findings determine the type of meningitis (eg, viral, bacterial).
 - ✓ However, cultures should be taken before initiating antibiotics.
 - ✓ To manage inflammation, dexamethasone (Decadron) or another corticosteroid is given I.V.
 - ✓ This steroid should be used before or with the first dose of antibiotics

Complications

- Seizures occur in 20% to 30% of patients.

Page 335 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Increased ICP may result in cerebral edema, decreased perfusion, and tissue damage.
- Severe brain edema may result in herniation or compression of the brain stem.

Nursing Diagnoses

- Hyperthermia related to the infectious process and cerebral edema
- Risk for Imbalanced Fluid Volume related to fever and decreased intake
- Ineffective Tissue Perfusion (cerebral) related to infectious process and cerebral edema
- Acute Pain related to meningeal irritation
- Impaired Physical Mobility related to prolonged bed rest

Goal

- Reducing Fever

Nursing Interventions

- Administer antimicrobial agents on time to maintain opatientimal blood levels.
- Monitor temperature frequently or continuously, and administer antipyretics as ordered.
- Institute other cooling measures, such as tepid sponging.

Goal

- Maintaining Fluid Balance

Nursing intervention

- Prevent I.V. fluid overload, which may worsen cerebral edema.
- Monitor intake and output closely.

Goal

- Reducing Pain

Nursing intervention

- Administer analgesics as ordered; monitor for response and adverse reactions.
- Darken the room if photophobia is present.
- Assist with position of comfort for neck stiffness.
- Elevate the head of the bed to decrease ICP and reduce pain.

Traumatic Brain Injury

Page 336 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Traumatic brain injury (TBI), also known as head injury, is the disruption of normal brain function due to trauma-related injury.
- The goal of treatment is to prevent secondary brain injury by providing supportive care.

Classification

- Mild (GCS 13 to 15, with loss of consciousness to 15 minutes)
- Moderate (GCS 9 to 12, with loss of consciousness for up to 6 hours)
- Severe (GCS 3 to 8, with loss of consciousness greater than 6 hours)

Clinical Manifestations

- Disturbances in consciousness: confusion to coma
- Headache, vertigo
- Restlessness
- Respiratory irregularities
- Cognitive deficits (confusion, aphasia, reading difficulties, writing difficulties, acalculi, memory deficits such as amnesia and difficulty learning new information)
- Pupillary abnormalities
- Diagnostic Evaluation
- CT scan to identify and localize lesions, edema, bleeding.

Management

- Assess and maintain patent airway.
Intubate for GCS less than 8 (comatose)
Placement of nasogastric tube with intubation to prevent aspiration
 - Administer oxygen as needed.
 - Treat asymptomatic anemia with iron supplements.
- Antibiotics to prevent infection with open skull fractures or penetrating wounds
- Surgery to evacuate intracranial hematomas, debridement of penetrating wounds, elevation of skull fractures, or repair of CSF leaks.
- Treatment of hyponatremia (due to cerebral salt wasting) by monitoring daily fluid status, fluid restriction, oral salt replacement, and I.V. saline 0.9%.

Page 337 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

Complications

- Infections: neurologic(meningitis, ventriculitis)
- Increased intra cranial pressure (ICP).
- Posttraumatic seizure disorder
- Permanent neurologic deficits: cognitive, motor, sensory, speech
- Death
- Nursing Interventions
- Maintain a patent airway.
- Monitor respiratory rate, and deapatienth.

Seizure Disorders

- Seizures (also known as epileptientic seizures and, if recurrent, epilepsy) are defined as a sudden alteration in normal brain activity.
- Seizures are thought to result from disturbances in the cells of the brain that cause uncontrolled electrical discharges.

Classification

1. Simple partial seizures without impairment of consciousness.
2. Complex partial seizures have an impairment of consciousness.
3. Generalized seizures have a loss of consciousness with convulsive or non convulsive behaviors.
4. Simple partial seizures can progress to complex partial seizures, and complex partial seizures can secondarily become generalized.

Etiology

- Trauma to head or brain resulting in scar tissue or cerebral atrophy
- Tumors
- Cranial surgery
- Drug toxicity, such as theophylline.
- CNS infection

Clinical Manifestations

Page 338 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Impaired consciousness
- Disturbed muscle tone or movement
- Disturbances of behavior, mood, sensation, or perception
- Disturbances of autonomic functions

Diagnostic Evaluation

- CT scan to identify lesion that may be cause of seizure

Management

- Pharmacological
- Phenobarbital: 2-6 mg/kg/day
- Phenytoin: 4-12 mg/kg/day divided BID to TID.
- Carbamazepine: 10-40 mg/kg/day divided BID

Nursing Management

Nursing Diagnoses

- Ineffective Tissue Perfusion (cerebral) related to seizure activity
- Risk for Injury related to seizure activity
- Ineffective Coping related to psychosocial and economic consequences of epilepsy

Goal

- Maintaining Cerebral Tissue Perfusion

Nursing Intervention

- Maintain a patent airway until patient is fully awake after a seizure.
- Provide oxygen during the seizure if color change occurs.
- Stress the importance of taking medications regularly.
- Monitor patient for toxic adverse effects of medications.
- Monitor liver functions for toxicity due to medications.

Status epilepticus

- Status epilepticus (acute, prolonged, repetitive seizure activity) is a series of generalized seizures without return to consciousness between attacks.

Page 339 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- The term has been broadened to include continuous clinical and/or electrical seizures lasting at least 5 minutes.
- Status epilepticus is considered a serious neurologic emergency.
- It has high mortality and morbidity (permanent brain damage, severe neurologic deficits).

Predisposing factor:

- medication withdrawal
- Fever
- Metabolic or environmental stresses
- Alcohol withdrawal
- Sleep deprivation.

Nursing Interventions

- Establish airway, and maintain blood pressure (BP).
- Administer oxygen there is some respiratory depression associated with each seizure, which may produce hypoxia of brain.
- Administer I.V. Diazepam [Valium]) slowly to ensure effective brain tissue and serum concentrations.
- If initial treatment is unsuccessful, general anesthesia may be required.

Preventing Injury

- Place the bed in a low position.
- Do not put anything in the patient's mouth during a seizure.
- Place the patient on side during a seizure to prevent aspiration.
- Provide a helmet to the patient who falls during seizure.

Headache Syndromes

- Headaches are one of the most common complaints of people seeking health care. Pain in the head is a symptoms of underlying pathology.
- Headaches is divided into two categories:

I. Primary headache disorders, which include

Migraine

Page 340 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Tension-type headache

Cluster headache

2. Secondary headache disorders.

Path physiology and Etiology

Primary Headaches

- Diagnosis is generally based elimination of other pathology such as stroke, intracranial bleed, or brain tumor.
- **Migraine headache** consists of initial vasospasm followed by dilation of intracranial and extracranial arteries; occurs in about 10% of population
 - Caused by hyperactivity to the neurotransmitter serotonin; familial predisposition.

Tension headache is due to irritation of sensitive nerve endings in the head, jaw, and neck from prolonged muscle contraction in the face, head, and neck.

- Precipitating factors include fatigue, stress, poor posture.

Cluster headache release of increased histamine results in vasodilatation

-Usually unilateral, recurring.

Secondary Headaches

- Headache due to a neurologic or systemic disease.
- Mass lesion (tumor, abscess)
- Intracranial infection (bacterial/viral/fungal meningitis or encephalitis)
- Inflammation
- Cerebrovascular disease (intracranial hemorrhage)
- Increased intracranial pressure
- Low-pressure headache (postlumbar puncture, trauma induced)
- Sinus infection, viral infection such as influenza, systemic illness

Clinical Manifestations

- Migraine: gradual onset of severe unilateral headache, may become bilateral.

Page 341 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

- Nausea, vomiting, and photophobia may accompany moderate to severe headache
- Worsened by activity
- May last 4 to 72 hours and greatly impair activities.
- Migraine head ache may be triggered in women by hormonal fluctuations (menses, pregnancy), excess or lack of sleep, and change in eating habits.

Tension/muscle contraction:

- Persistent pain and pressure in the back of the head and neck, across forehead; may be tender points of head or neck.
- Not aggravated by activity, but may be worsened by noise and light.
- No nausea and vomiting, but may be associated with anorexia.

Cluster headache:

- sudden, sharp, burning, unilateral pain
- Always involving facial area from neck to temple, and often occurs during the evening or night; more frequent in men.

-Associated with unilateral excessive tearing, redness of the eye, and stuffiness of nostril on affected side, facial swelling, flushing, and sweating.

Diagnostic procedure

- CT scan to rule out lesions, hemorrhage, and chronic sinusitis
- Erythrocyte sedimentation rate and other blood studies to help determine inflammatory process with temporal arteritis

Management

- Pharmacologic Treatment
- Medications are intended to reduce the frequency, severity, and duration of the headache.
- Aspirin, acetaminophen, for mild to moderate pain of tension, sinus, or mild vascular headaches.
- Antihistamines and decongestants may be effective for sinus headaches.

Page 342 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Occasionally, opioid analgesics, muscle relaxants, and antianxiety agents may be needed for severe pain.

Nursing Interventions

- Reduce environmental stimuli: light, noise, and movement to decrease severity of pain.
- Apply warm, moist heat to areas of muscle tension.
- Teach progressive muscle relaxation to treat and prevent tension headaches.
 - Alternately tense and relax each group of muscles for a count of five, starting with the forehead and working downward to the feet.
 - Relaxation of just head and neck may also be helpful if time is limited.

Disorders that cause paralysis

Hemiplegia

- Loss of muscle control & sensation on one side of the body (L or R)
- Cause: most frequently stroke
 - Also intracranial tumor or hemorrhage
- S/S: weakness of half of the face, aphasia, etc.

Paraplegia

- Paraplegia refers to loss of motion and sensation in the lower extremities and all or part of the trunk.

Cause

- Damage to the thoracic or lumbar spinal cord or to the sacral root.
- Quadriplegia
- Quadriplegia refers to the loss of movement and sensation in all four extremities and the trunk.

Cause:

- Associated with injury to the cervical spinal cord.

Paraplegia & Quadriplegia

- Both conditions most frequently follow trauma such as falls, injuries, and gunshot wounds,

Page 343 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

- But they may also be the result of spinal cord lesions (tumor), infections and abscesses of the spinal cord.

Signs and symptoms of Paraplegia & Quadriplegia :

- loss of bowel & bladder control
- Sexual dysfunction.
- Low blood pressure and pulse

Management of the Quadriplegic or Paraplegic Patient

Nursing Interventions

- Rehabilitation care:
- Nursing care is one of the key factors determining the success of the rehabilitation program.
- The main objective is for the patient to live as independently as possible in the home and community.

Increasing Mobility

Exercise Programs

- The unaffected parts of the body are built up to optimal strength to promote maximal self-care.
- The muscles of the hands, arms, shoulders, chest, spine, abdomen, and neck must be strengthened in the paraplegic patient because he or she must bear full weight on these muscles to ambulate.
- To strengthen these muscles, the patient can do push-ups when in a prone position.
- Extending the arms while holding weights
- Squeezing rubber balls promotes hand strength.
- The sooner muscles are used, the less chance there is muscle atrophy.
- Weight-bearing also reduces the possibility of renal calculi and enhances many other metabolic processes.
- Ambulation using crutches requires a high expenditure of energy.
- Wheelchairs provide greater independence and mobility.

Page 344 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Every effort should be made to encourage the patient to be as mobile and active as possible.

Intervention for clients with peripheral Nervous system disorder

CRANIAL NERVE DISORDERS

BELL'S PALSY

- Bell's palsy is an acute peripheral facial paralysis of the seventh cranial nerve (facial) unilaterally.
- It is typically a self-limiting process that usually improves in 3 to 6 months.

Cause

- Cause is unknown. Possible etiologies include:
- Vascular ischemia, and autoimmune.
- Virus

Clinical Manifestations

- Facial muscles weak throughout forehead, cheek, and chin;
- Can affect speech
- Diminished taste from anterior two-thirds of tongue.
- Inability to close eye
- Painful eye sensations
- Photophobia

Management

- Corticosteroid therapy initiated early to decrease inflammation (eg, prednisone 1 mg/kg/day for 10 to 14 days, followed by a tapering dose).
- Eye care to maintain lubrication and moisture if unable to close. May need to be patched during sleep.
- Surgery to anastomose facial nerve to other cranial nerve.

Complications

- Corneal ulceration
- Impairment of vision

Page 345 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Nursing Intervention

- Patch eye to keep shut at night as directed.
- Inspect eye for redness or discharge.
- Advise patient to report eye pain immediately.
- Administer or teach patient to administer corticosteroids to reduce inflammation.
- Teach patient to apply moist heat to face.
- Perform or teach patient to perform facial massage.

Parkinson's Disease

- Parkinson's disease is a chronic, progressive neurologic disease affecting the brain centers responsible for control and regulation of movement.
- Population older than age 60 is affected by Parkinson's disease.

Cause

- A deficiency of dopamine
- Underlying etiology may be related to a virus; toxicity from pesticides, herbicides or repeated head injuries.

Signs and Symptoms

- Bradykinesia (slowness of movement), loss of spontaneous movement and delay in initiating movements.
- Tremor.
- Rigidity in performance of all movements.
- Rigidity is always present but increases during movement. May lead to sensations of pain, especially in the arms and shoulders.
- Poor balance when moving. May lead to falls.
- Sleeplessness, salivation, sweating, dizziness.
- Depression, dementia.

Management

Pharmacologic

Page 346 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Anticholinergics to reduce transmission of cholinergic pathways, which are thought to be overactive when dopamine is deficient.
- These medications are most effective in controlling tremor.
- Levodopa, a dopamine precursor.

Complications

- Dementia
- Aspiration
- Injury from falls

Nursing Interventions

- Improving Mobility
- Encourage the patient to participate in daily exercise, such as walking, or gardening.
- Encourage the patient to take warm baths and receive massages to help relax muscles.
- Instruct the patient to take frequent rest periods to overcome fatigue and frustration.
- Assess safety in environment to reduce risk of falls.

4.9 Reproductive System disorders

Assessment of the reproductive system

Pelvic Pain

- Characteristics: what is frequency, duration, severity, location of pain? Was the onset sudden or gradual? What aggravates and what relieves it?
- Associated factors: fever, nausea, vomiting, dizziness, abnormal bleeding with it?
- History of STDs, obstetric trauma, or abdominal surgery? Pregnancy history and history of ectopic pregnancy?

Physical Examination

- Physical examination for a patient with a gynecologic disorder should focus on the abdomen and genitalia.
- Palpate the lower abdomen for masses or tenderness.
- Inspect the external genitalia for lesions, discharge, or tissue bulging from the vagina.

Menstrual Conditions

Page 347 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

DYSMENORRHEA

- Dysmenorrhea is painful menstruation; most common of gynecologic dysfunctions.

Primary Cause

- Increased prostaglandin production by the endometrium.

Secondary cause

- Endometriosis, pelvic infection, congenital abnormality, uterine fibroids, ovarian cyst.

Clinical Manifestations

- Pain may be caused by increased uterine contractility and uterine hypoxia.
- Nausea, vomiting, diarrhea, headache, chills, tiredness, nervousness, and lower backache may be experienced.

Diagnostic Evaluation

- Tests to rule out underlying lesion:
- Chlamydia and gonorrhea tests may show infection.
- Pelvic ultrasound may detect tumor, endometriosis, cysts.
- Pregnancy test to rule out ectopic pregnancy.

Management

- The following measures are for primary dysmenorrhea
- Treatment of secondary dysmenorrhea is aimed at underlying pathology.
- Local heat, to increase blood flow and decrease spasms.
- Exercise, to suppress prostaglandin release.
- Nonsteroidal anti-inflammatory agents, such as ibuprofen.
- Hormonal contraceptives to decrease contractility and menstrual flow.

AMENORRHEA

- Amenorrhea is absence of menstrual flow.

Primary cause

- Menarche does not occur by age 16, or by age 14.
- Chromosomal disorders.

Secondary causes

Page 348 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

- Menstruation stops for 3 cycles or 6 months in a woman in whom normal menstruation has been established.
- May be caused by normal pregnancy or lactation, menopause, or ovarian cysts.
- Inadequate nutrition with decreased body fat stores is a significant cause of amenorrhea in young women.
- Ovarian, adrenal, or pituitary tumor and thyroid disease (hyperthyroidism) are hormonal causes.
- Hormonal contraceptives, may also induce amenorrhea.
- It may be a result of depression, or severe psychological trauma.

Diagnostic Evaluation

- Pregnancy test.
- Hormonal levels LH and FSH to detect ovarian failure.
- Prolactin level (elevated) with pituitary tumor.

Management

- Discontinue causative medications if desired.
- Nutritional or psychological counseling as indicated.
- Hormonal replacement therapy to regulate cycle.
- Treatment of tumor or other underlying cause.

VULVITIS

- Vulvitis is inflammation of the vulva.

Causes

- Trichomonas
- Bacteria
- Fungi.

Clinical Manifestations

- Pruritus more acute at night.
- Reddened, edematous tissue, possible ulceration.
- Pain and burning sensation.

Page 349 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Discharge, possibly profuse and purulent.

CANDIDA ALBICANS

- A fungal infection caused by *Candida albicans*. Predisposing factors include:
Steroid therapy
Obesity
Antibiotic therapy
Diabetes mellitus
Oral contraceptives
Frequent douching

Signs and symptoms

- Vaginal discharge is thick and irritating
- White or yellow patchy, cheese like particles adhere to vaginal walls.
- Itching is the most common complaint.
- May also experience burning, soreness, frequency, and dysuria.

Management

- Eradicate the fungus by applying antifungal vaginal cream, or vaginal suppository for 3 or 7 nights as ordered.
- For severe or recurrent cases use systemic antifungal.

TRICHOMONAS VAGINALIS

- A condition produced by a protozoan (pear-shaped and motile) that thrives in an alkaline environment.
- It is sexually transmitted disease.

Signs and symptoms

- Malodorous discharge; may be frothy and yellow-green in color.
- May have pruritus, and spotting.
- May also have vulvar edema, dysuria, and hyperemia secondary to irritation of discharge.
- Destroy infective protozoa by taking metronidazole (orally), usually single dose of 2
- Prevent re infection by treating male.

Page 350 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

- Avoid alcohol during treatment.

CANCER OF THE CERVIX

- Cancer of the cervix is a common gynecologic malignancy.
- Most common between ages 35 and 55.
- **Cause:** Unknown

Predisposing factor

- Early sexual activity, multiple sexual partners, and history of STDs, especially HPV, are major risk factors

Clinical Manifestations

- Early disease is usually asymptomatic.
- Initial symptoms include postcoital bleeding, irregular vaginal bleeding or spotting between periods or after menopause, and malodorous discharge.
- As disease progresses, bleeding becomes more constant and is accompanied by pain that radiates to buttocks and legs.
- Weight loss, anemia, and fever signal advanced disease.

Diagnostic Evaluation

- **Pap smear-routine screening measure.**

Management

- Hysterectomy
- Radiotherapy(for localized early stage)
- Chemotherapy, used for advanced disease; or for metastatic disease.

Complications

- Spread to bladder and rectum; metastasis to lungs, bones, and liver.

Nursing Assessment

- Obtain history of Pap tests, sexual activity, past STDs.
- Obtain history of symptoms.
- Assess understanding of disease and responses, such as guilt, fear, denial, anxiety.

Nursing Diagnoses

Page 351 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Anxiety related to cancer and treatment
- Disturbed Body Image related to surgical treatment

Goal

- Relieving Anxiety

Nursing Intervention

- Assist patient to seek information on stage of cancer, treatment options.

Goal

- Enhancing Body Image

Nursing Intervention

- Provide emotional support during treatment.
- Encourage patient to take pride in appearance by dressing, putting on makeup as able.
- Encourage activity and socialization when patient able.
- Explain the importance of lifelong follow-up, regardless of treatments, to determine the response to treatment and detect spread of cancer.

Expected Outcomes

- **Reports decreased anxiety, increased decision-making ability**
- **Reports continued interest in appearance**

MYOMAS OF THE UTERUS

- Myomas (fibroids) are benign tumors of the uterine myometrium (smooth muscle).
- Develop in women ages 25 to 50.

Cause: unknown.

Clinical Manifestations

- Small myomas do not cause symptoms.
- First indication may be palpable mass.
- Irregular bleeding usually menorrhagia.
- Pain comes from pressure on adjacent organs possible heavy feeling in pelvis.
- Secondary symptoms include fatigue because of anemia, urinary disturbances, and constipation

Page 352 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Diagnostic Evaluation

- **Ultrasound to identify size and location of myomas.**

Management

- Myomectomy may be done for small tumor.
- Hysterectomy for large or numerous tumors.
- Gonadotropin-releasing hormone antagonist (Lupron) therapy to create hypoestrogenic environment and to try to shrink tumors.

Complications

- Infertility
- Habitual abortion

PELVIC INFLAMMATORY DISEASE (PID)

- PID is an infection that may involve the fallopian tubes, ovaries, uterus, or peritoneum.

Cause

- Causative agents include *N. gonorrhoeae*, anaerobes, gram-negative bacteria, and streptococci.
- Cervical infection ascends through the endometrium, into the fallopian tubes, and possibly into the peritoneal cavity.

Predisposing factors:

- Multiple sexual partners
- Use of IUCDs
- Criminal abortion

Clinical Manifestations

- Pelvic pain most common presenting symptoms.
- Fever
- Cervical discharge mucopurulent.
- Cervical motion tenderness.
- Irregular bleeding.
- GI symptoms nausea, vomiting, acute abdomen.

Page 353 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Diagnostic Evaluation

- Culture to identify organisms.
- Laparoscopy provides direct visualization of the fallopian tubes.

Management

- Antibiotics combinations of tetracyclines, penicillins, and cephalosporins, orally or parenterally depending on the patient's condition.
- Clindamycin 900 mg I.V. every 8 hours plus gentamicin 2 mg/kg of body weight I.V. or I.M. as loading dose.
- followed by 1.5 mg/kg every 8 hours as maintenance dosage.
- Ceftriaxone 250 mg I.M. once per day plus doxycycline 100 mg orally twice per day for 14 days.

Complications

- Sepsis.
- Infertility because of adhesions to fallopian tubes and ovaries.
- Ectopic pregnancy caused by inability of fertilized egg to pass stricture.

MALE REPRODUCTIVE DISORDER

PROSTATITIS

- Prostatitis is an inflammation of the prostate gland

Cause

- Bacteria, fungi, mycoplasma
- Microorganisms are usually carried to the prostate from the urethra.

Clinical Manifestations

- Perineal discomfort
- Burning
- urgency
- Frequency, and pain with or after ejaculation.
- Acute bacterial prostatitis may produce sudden fever and chills and perineal, rectal, or low back pain.

Page 354 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Urinary symptoms, such as dysuria, frequency, urgency, and **nocturia** (urination during the night), may occur.

Complications:

- swelling of the prostate gland
- Urinary retention.
- Epididymitis
- Bacteremia
- Pyelonephritis.

Diagnostic Findings

- Urinalysis after prostate examination commonly reveals many white blood cells.

Medical Management

- The goal of therapy for acute bacterial prostatitis is to avoid the complications of abscess formation and septicemia.
- A broadspectrum antibiotic agent is administered for 10 to 14 days.

Nursing Management

- Nursing management includes:
- Administration of prescribed antibiotics and prescribed analgesic agents.
- Sitz baths (to relieve pain and spasm)

Benign prostatic hyperplasia

- In many patients older than 50 years, the prostate gland enlarges
- Extending upward into the bladder and obstructing the outflow of urine. This condition is known as benign prostatic hyperplasia (BPH).

Cause

- Evidence suggests that hormones initiate hyperplasia

Clinical Manifestations

- Examination reveals a prostate gland that is large, and nontender.
- The hypertrophied lobes may obstruct the vesical neck or prostatic urethra, causing incomplete emptying of the bladder and urinary retention.

Page 355 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

- Generalized symptoms may also be noted, including fatigue, anorexia, nausea, vomiting, and epigastric discomfort.
- The obstructive and irritative symptoms includes: increased frequency of urination, nocturia, urgency, hesitancy in starting urination,
- A decrease in the volume and force of the urinary stream, interruption of the urinary stream, dribbling (urine dribbles out after urination)
- A sensation that the bladder has not been completely emptied, acute urinary retention, and recurrent urinary tract infections.

Medical Management

- If the patient is admitted on an emergency basis because he cannot void, he is immediately catheterized.
- Prostatectomy to remove the hyperplastic prostatic tissue is frequently performed.
- Rest
- elevation of the scrotum
- Ice packs to reduce scrotal edema
- Antibiotics, analgesic agents, and anti-inflammatory medications are recommended.

EPIDIDYMITIS

- **Epididymitis** is an infection of the epididymis that usually descends from an infected prostate or urinary tract.
- It may also develop as a complication of gonorrhea.

Cause

- *Chlamydia trachomatis*. The infection passes upward through the urethra and the ejaculatory duct and then along the vas deferens to the epididymis.

Signs and symptoms

- The patient complains of unilateral pain and soreness in the inguinal canal along the course of the vas deferens and then develops pain and swelling in the scrotum and the groin.

Page 356 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- The epididymis becomes swollen and extremely painful; the patient's temperature is elevated.
- The urine may contain pus (pyuria) and bacteria (bacteriuria), and the patient may experience chills and fever.

Medical Management

- If the patient is seen within the first 24 hours after onset of pain, the spermatic cord may be infiltrated with a local anesthetic agent to relieve pain.
- If the epididymitis is from a chlamydial infection, the patient and his sexual partner must be treated with antibiotics.
- The patient is observed for abscess formation as well. If no
- An epididymectomy (excision of the epididymis from the testis) may be performed for patients with recurrent, epididymitis or for those with chronic, painful conditions.

Complication

- infertility

REDUCING ANXIETY

Nursing Intervention

- When appropriate, the patient is encouraged to discuss anxieties and fear associated with the diagnosis, therapy, or prognosis.
- By individualizing teaching efforts, factual information applied to specific needs may offer reassurance.

4.10 Musculoskeletal System disorders

ASSESSMENTS

SUBJECTIVE DATA

- Pain
- Where is the pain located?

Joints, as in osteoarthritis (OA).

Muscles or soft tissue, as in contusions, sprains, or strains.

Page 357 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Bone, as in fractures or tumors.

- Is it sharp, as in a fracture or sprain, or dull, as in a bone tumor?
- Does pain radiate?

To buttocks or legs, as in lower back pain.

To thigh or knee, as in hip fracture.

- What makes the pain increase? What makes it better?
- Limited Range of Motion
- Is stiffness present?
- Is swelling present and limiting mobility?

May be due to fracture.

- May be soft-tissue injury, such as sprain, strain, or contusion.

Associated Symptoms

- Any sensory or motor deficits, such as numbness, or weakness, indicating neurovascular compromise?
- Any weight loss, fever, or malaise, as in bone tumors?

OBJECTIVE DATA

- Data on current system condition and functional abilities are secured through inspection, and palpation.

Skeletal Component

Note deviation from normal structure eg- bony deformities.

Identify abnormal motion.

- Joint Component

Identify swelling that may be due to inflammation or effusion.

- Note deformity associated with contractures or dislocations.
- Estimate range of motion (ROM), actively and passively.
- Muscle Component
- Inspect for size.
- Assess coordination of movement.

Page 358 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Palpate for muscle tone.

Neurovascular Component

- Assess circulatory status of involved extremities by noting skin color and temperature, peripheral pulses, and pain.
- Assess neurologic status of involved extremities by the patient's ability to move distal muscles.
- Test reflexes of extremities.
- Compare all too uninjured/unaffected extremity.

DIAGNOSTIC TESTS

RADIOLOGIC

- Many radiologic tests are helpful in evaluating musculoskeletal problems to rule out fracture or skeletal changes
- And to differentiate soft-tissue injury.

BURSITIS

- Bursitis is a painful inflammation of the bursae.
- Bursae are fluid-filled sacs that prevent friction between joint structures during joint activity.
- The inflammation restricts joint movement.

Clinical Manifestations

- Pain around a joint commonly the knee, elbow, shoulder, and hip.
- Varying degrees of redness, warmth, and swelling may be visible.
- There is point tenderness and limited ROM on examination.
- Management and Nursing Interventions
- Rest and immobilization of affected joint
- ROM exercises
- Surgery indicated when calcified deposits or adhesions have diminished function
- Nonsteroidal anti-inflammatory drugs (NSAIDs) to control the inflammation and pain

OSTEOARTHRITIS

Page 359 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Osteoarthritis, or degenerative joint disease, is a chronic, non inflammatory, slowly progressing disorder that causes deterioration of articular cartilage.
- It affects weight-bearing joints (hips and knees)

Cause

- Cause is unknown, but aging and obesity are contributing factors.
- Previous trauma may cause secondary OA.

Diagnostic Evaluation

- X-rays of affected joints show joint space narrowing, osteophytes, and sclerosis.
- Analysis of synovial fluid differentiates OA from RA.

Management

- Pain management using non-narcotic analgesics, such as acetaminophen; and NSAIDs.
- Weight loss, if necessary, to relieve stress on joints.
- Proper nutrition, sleeps, and stress reduction to improve well-being.

Surgical Intervention

- Surgical intervention is considered when the pain becomes intolerable to patient and mobility is severely compromised.
- Opatientions include osteotomy, and debridement

OSTEOMYELITIS

- Osteomyelitis is a severe pyogenic infection of the bone and surrounding tissues that requires immediate treatment.
- Generally three routes:
- Bloodstream (hematogenous spread)
- Adjacent soft tissue infection (contiguous focus)
- Direct introduction of microorganisms into the bone

Cause

- Bacteria lodge and multiply in bone.
- Staphylococcus aureus is the most common infecting microorganism.
- Clinical Manifestations

Page 360 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Infection of long bones with acute pain and signs of sepsis.
- Localized pain and drainage.

Diagnostic Evaluation

- Aerobic and anaerobic cultures of bone and tissue to identify the organism.
- ESR elevated, WBC and hemoglobin decreased.
- Bone necrosis seen 10 to 14 days on X-rays.

Management

- Acute: full recovery possible with minimal loss of function
- Chronic: develops with inadequate or ineffective course of antibiotics or delayed treatment

Pharmacologic Intervention

Employ quickly after presentation of symptoms to avoid chronicity

Medications depend on organism, but include:

- Penicillins (Pen G).
- Extended-spectrum penicillins (ampicillin, carbenicillin, amoxicillin).
- Tetracyclines.
- Cephalosporins.

Surgical Intervention

- Surgical intervention may be needed to obtain culture and sensitivity of specimen.
- Surgical decompression considered when patient does not improve after 36 to 48 hours of antimicrobial therapy.

Complications

- Non healing wound
- Sepsis
- Immobility
- Amputation
- Nursing Interventions
- Administer opioids for acute pain; non-narcotics for chronic pain.

Page 361 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Administer medications as necessary to establish a consistent blood level.

Septic (Infectious) Arthritis

- Joints can become infected through spread of infection from other parts of the body (hematogenous spread) or directly through trauma or surgical instrumentation.
- Previous trauma to joints

Cause

- *S. aureus* causes most adult joint infections, followed by streptococci and gram-negative organisms.

Risk factors include

- Advanced age, diabetes mellitus, rheumatoid arthritis, and preexisting joint disease or joint replacement.

Clinical Manifestations

- A warm, painful, swollen joint with decreased range of motion.
- Systemic chills, fever, and leukocytosis are present.
- Diagnostic studies include:
 - Aspiration, examination, and culture of the synovial fluid.
 - Computed tomography may disclose damage to the joint lining.

Management

- Broad-spectrum IV antibiotics are started
- The IV antibiotics are continued until symptoms disappear.
- In addition to prescribing antibiotics, the physician may aspirate the joint with a needle to remove excessive joint fluid, exudate, and debris.
- The inflamed joint is supported and immobilized in a functional position by a splint that increases the patient's comfort.
- Analgesics, such as codeine, may be prescribed to control pain.
- After the infection has responded to antibiotic therapy, NSAIDs may be prescribed to limit joint damage.

Musculoskeletal trauma

Page 362 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- The bony skeleton provides the supporting framework for the human body.
- Its 206 bones are subject to many stressors, which may result in fractures.
- Fractures vary in complexity and potential harm to the body.
- Simple fractures occur with no break from the bone to the outside of the body
- Compound fractures have an external wound, thus creating contamination of the fracture.
- Complete fractures occur when bone continuity is completely interrupted
- Partial fractures (incomplete) interrupt only a portion of bone continuity.

Cause

- Traumatic injuries can be intentional (assaults, gunshot wounds, stab wounds)
- Unintentional (falls, motor vehicle crashes).

Assessment

- subjective data
- History of injury, description of symptoms, and associated personal health and family history can give clues to the underlying problem and appropriate care for that problem.
- Any sensory or motor deficits, such as numbness, or weakness, indicating neurovascular compromise?

Physical examination

- In the immediate trauma resuscitation, assessment and treatment are merged.
- Always of first priority is the assessment and management of airway, breathing, and circulation.
- Neurological status becomes part of that initial assessment, as the patient is often in a compromised state of consciousness.
- Monitor the vital signs every 15 minutes or more often until the patient is stabilized.
- The patient may demonstrate a wide range of blood pressures and heart rates, depending on age, degree of blood loss, baseline vital signs, and degree of alcohol intoxication.

Page 363 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

- During the physical examination, handle the patient carefully and be aware that any fractures can be made more serious by the manipulation caused by examination.
- If the cervical spine is injured, movement can lead to lifelong disability.
- Manipulation of broken bones also causes increased pain and blood loss.
- Inspect the patient thoroughly for evidence of fractures, including, open wounds, and changes in color from the rest of the body. Note any swelling or muscle spasms of the limbs.
- Check the range of motion of all joints, and noting any signs of pain from the patient during the examination, but do not move an obviously injured extremity to test for range of motion.
- Complete a neurovascular examination, checking pulses, and response to sharp and dull pain stimuli.

CASTS:

- A cast is an immobilizing device made up of layers of plaster or fiberglass.

Purposes:

- To immobilize and hold bone fragments in reduction.
- To permit early mobilization
- To correct and prevent deformities
- To support and stabilize weak joints

Complications of Casts:

- Pressure of cast on neurovascular and bony structures causes:
- Necrosis
- -pressure sores
- Nerve palsies.

Nursing Measure

- Assess neurovascular status of the extremity with a cast for signs of compromise.
- Pain
- Swelling

Page 364 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Discoloration (pale or Blue)
- Cool skin distal to injury.
- Tingling or numbness.
- Pain on passive extension (muscle stretch).
- Paralysis
- Assess skin integrity of casted extremity. Be alert for:
- Severe initial pain over bony prominences; this is a warning symptoms of pressure sore.
- Pain increases when ulceration occurs.
- Odor
- Drainage on cast.

Nursing Diagnoses

- Ineffective Tissue Perfusion (extremity) related to swelling and constrictive bandage or cast
- Impaired Physical Mobility related to condition and casting
- Risk for Injury related to potential complications

Nursing Interventions

- Maintaining Adequate Tissue Perfusion
- Elevate the extremity on cloth-covered pillow above the level of the heart. Keep the heel off the mattress.
- Avoid resting cast on hard surfaces or sharp edges that can cause denting or flattening of the cast and consequent pressure sores.
- Handle moist cast with palms of hands.
- Turn patient every 2 hours while cast dries.
- Minimizing the Effects of Immobility
- Encourage the patient to move about as normally as possible.
- Encourage compliance with prescribed exercises to avoid muscle atrophy and loss of strength.
- Active ROM for every joint that is not immobilized at regular and frequent intervals.

Page 365 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Isometric exercises for the muscles of the casted extremity. Instruct patient to alternately contract and relax muscles without moving affected part.
- Administer prophylactic anticoagulants as prescribed.
- Encourage deep-breathing exercises and coughing at regular intervals to prevent atelectasis and pneumonia.

AMPUTATION

Amputation is the total or partial surgical removal of an extremity.

Indications

- Inadequate tissue perfusion, such as results with diabetes mellitus or other peripheral vascular diseases
- Severe trauma
- Malignant tumor

Nursing Diagnoses

- Risk for Deficient Fluid Volume related to hemorrhage from disrupted surgical homeostasis
- Ineffective tissue perfusion related to edema and tissue responses to surgery and prosthesis
- Ineffective Coping related to change in body image
- Acute or Chronic Pain related to surgical procedure and phantom sensations
- Impaired Physical Mobility related to amputation, muscle weakness, alteration in body weight distribution

Goal

- Monitoring Fluid Balance

Nursing Interventions

- Monitor patient for systemic symptoms of excessive blood loss like hypotension, tachycardia and decreased level of consciousness.
- Watch for excessive wound drainage.

Page 366 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Keep tourniquet (in view) attached to end of bed to apply to residual limb (stump) if excessive bleeding occurs.
- Reinforce dressing as required, using aseptic technique.
- Monitor intake and output for fluid balance.

Goal

- Maintaining Adequate Tissue Perfusion

Nursing Intervention

- Control edema.
 - Elevate residual limb to promote venous return.
- Maintain pressure dressing.
 - Reapply if necessary, using sterile dressing secured with elastic bandage.

Goal

- Supporting Effective Coping

Nursing Intervention

- Encourage expression of fears and concerns.
- Recognize that modification of body image takes time.
- Encourage participation in rehabilitation planning and self-care.
- Assist patient to adapt to changes in self-care activities.
 - ✓ Upper extremity amputation -encourage independence in one-handed self-care activities using one-handed aids as needed.
 - ✓ Lower extremity amputation-encourage mobility using ambulatory aids as needed.

Goal

- Controlling Pain

Nursing Intervention

Surgical pain

- Administer prescribed medications as needed to control postoperative pain.

- Use nonpharmacological pain management techniques, such as progressive muscle relaxation.
- Phantom sensations (pain)
 - ✓ Anticipate complaint of pain and sensation located in the missing limb.
 - ✓ Reassure patient that phantom limb pain will diminish over time.

Goal

- Promoting Physical Activity
- Nursing intervention
- Encourage frequent repositioning in bed.
- Prevent deformities.
 - ✓ Lower extremity amputations hip flexion contracture (avoid placing residual limb on pillow)
 - ✓ Encourage prone position twice per day.
- Encourage active ROM and muscle-strengthening exercises when prescribed to:
 - ✓ Minimize muscle atrophy.
 - ✓ Increase muscle strength.
 - ✓ Prepare residual limb for prosthesis.
- Promote reestablishment of balance (amputation alters distribution of body weight).
 - ✓ Transfer to chair within 48 hours after surgery.
 - ✓ Supervise ambulation, use of wheelchair, and self-care activities.

CONTUSIONS, STRAINS, AND SPRAINS

A contusion:

- A contusion is an injury to the soft tissue

Cause

- Caused by a blunt force (blow, kick, or fall).
- Clinical Manifestations
- Hemorrhage into injured part (ecchymosis) from rupture of small blood vessels.
- Pain, swelling, and ecchymosis.

Page 368 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

A sprain

- A sprain is an injury to ligamentous structures surrounding a joint

Cause

- Caused by a twist resulting in a decrease in joint stability.

Clinical manifestation

- Pain on passive movement of joint.
- Increasing pain during first few hours due to continued swelling.

A strain

- A strain is a microscopic tearing of the muscle.

Cause

- Caused by excessive force, stretching, or overuse.
- Rapid swelling due to extravasation of blood within tissues.

Clinical manifestation

- Hemorrhage into the muscle.
- Swelling.
- Tenderness.
- May be associated spasm.

Management

- Immobilize in splint, elastic wrap, or compression dressing to support weakened structures and control swelling.
- Apply ice for first 24 hours.
- Analgesics usually include non-steroidal anti-inflammatory drugs.
- Severe sprains may require surgical repair or cast immobilization.

Nursing Interventions and Patient Education

- Elevate the affected part.
- Maintain splint or immobilization as prescribed.
- Apply cold compresses for the first 24 hours (20 to 30 minutes at a time) to produce vasoconstriction, decrease edema, and reduce discomfort.

Page 369 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Apply heat to affected area after 24 hours (20 to 30 minutes at a time) four times per day to promote circulation and absorption.
- Assess neurovascular status of contused extremity every hour to every hour.
- Instruct patient on use of pain medication as prescribed.
- Ensure correct use of crutches or other mobility aid with or without weight bearing, as prescribed.
- Educate on need to rest injured part for about a month to allow for healing.
- Teach patient to avoid excessive exercise of injured part.
- Teach patient to resume activities gradually.

Self-check-4

Directions: Answer all the questions listed below.

Test I Say True or False

- _____ 1. Cataracts can occur as a result of other eye diseases, they mostly develop naturally with age beyond 65 years
- _____ 2. Poor night vision and Sensitivity to light are the most common symptoms of cataract
- _____ 3. Nearly all people who are “color blind” can see colors but have difficulty distinguishing between certain colors.
- _____ 4. Color blindness is an inborn condition caused by a difference in how one or more of the light-sensitive cells found in the retina of the eye respond to certain colors.

Test II Multiple Choice Questions

- _____ 1. Surgical removal of either adrenal glands or infection of the adrenal glands can be the cause of _____
- A. Myocardial infarction
B. Sudden cardiac death
C. Adrenocortical Insufficiency
D. Heart failure
- _____ 2. Surgical removal of parathyroid gland tissue during thyroidectomy or parathyroid dectomy.
- A. Hyperthyroidism
B. Hypothyroidism
C. Hypoparathyroidism
D. hypoparathyroidism

Page 370 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

___3. ___ is a disorder of the posterior lobe of the pituitary gland characterized by a deficiency of antidiuretic hormone (ADH).

A. Hyperthyroidism

C. Diabetes insipidus

B. Hypothyroidism

D. hypoparathyroidism

___4. Type 2 diabetes is commonly detected at routine medical examinations or on admission to hospital with another illness. A. True B. False

___5. Type I diabetes (insulin dependent diabetes) is due to B-cell destruction, usually leading to absolute insulin deficiency). A. True B. False

___6. Gestational diabetes is any degree of glucose intolerance with its onset during pregnancy.

A. True

B. False

___9. Alcohols containing simple sugar should not be drunk by people with diabetes, especially sweet wines and liqueurs

A. True

B. False

Test III Match column A with column B

Match column – A - with the appropriate choose on Column –B-

Column – A-

___1. Dental Plaque

___2. Herpes simplex I

___3. Contact dermatitis

___4. Gingivitis

___5. Gastritis

___6. Appendicitis

___7. Mechanical obstruction

___8. Paralytic

___9. Hepatic Cirrhosis

___10. Hepatitis A Virus

Column – B -

A. Administer corticosteroids

B. Appendectomy

C. Use acyclovir or zovirax

D. Elevated serum transferase levels

E. physical block of intestinal

F. Peritonitis

G. Daily oral hygiene practices

H. inflammation of the gastric mucosa

I. acute viral hepatitis.

J. Applying fluoride to the teeth

Unit five: Identify and manage surgical problems

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

- Operation room techniques
- Wound care
- Pre, intra and post-operative care
- Identify and refer a patient with hernias
- Recognize degree of burn cases and providing care.
- Identify, consult and refer a patient with acute abdomen
- Identify and provide supportive management for a patient with hemorrhoid
- Identify and manage acid-base, fluid and electrolyte imbalance

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

- Describe Operation room theater techniques
- Describe and manage wound care
- Provide Pre, intra and post-operative care
- Identify and refer Hernias
- Identify and manage Burn cases
- Identify, consult, refer acute abdomen
- Provide and manage hemorrhoid and supportive management
- Identify and manage acid-base, fluid and electrolyte imbalance

Page 372 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

5.1 Operation room techniques

Attire, Surgical Scrub, Gowning, and gloving

ESSENTIAL ELEMENTS OF INFECTION PREVENTION

- Hand washing
- Personal protective barriers
- Proper handling and disposal of sharp instruments and item
- Proper handling and processing of instruments and materials
- Aseptic technique
- Environmental cleanliness
- Proper disposal of infectious waste

Operating room Attire

Terms associated with attire, scrubbing, gowning and gloving a surgical procedure are listed below.

- antimicrobial agent
- barrier
- personal protective equipment
- scrub suit
- subungual
- surgical hand scrub

Page 373 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Purpose; the purpose of OR attire is to provide effective barriers that prevent the dissemination of microorganisms to the patient and protect personal from blood and body substances of patients.

Definition

OR attire consists of body covers, such as – trousers, shirts, gowns, head covers, masks and shoe covers, as appropriate

Dress code: - Specific written policies and procedures for proper attire to be worn with in the operating room suit.

The policies include:-

- Dressing rooms are located near the operating suite and are reached from an outer corridor.
- Only freshly laundered, clean attire is worn in the OR suit.
- OR attire should not be worn outside the OR suit
- Impeccable personal hygiene is emphasized.
- Comfortable, supportive shoes should be worn to minimize fatigue and for personal safety.
- A fresh set of OR attire is put on each time the person enters the OR
- Street clothes are never worn in the OR,
- Clothing is changed in the dressing room before entering and on leaving the OR.
- Written policies describe the practice that all persons are required to follow.
- Good health is essential for and person in the OR.

Components of Attire

- Body cover
- Head cover
- Shoe cove
- Mask

Personal Protective Equipment

- Apron
- Gloves

Page 374 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Gown
- Eye wear/goggles
- Face shield

Criteria for operating room attire

Attire should be:-

- An effective barrier to microorganisms. The design & composition should minimize microbial shedding.
- Made of closely woven material void of dangerous electrostatic properties.
- Resistant to blood, aqueous fluids and abrasion to prevent penetration by microorganisms.
- Designed for maximal skin coverage
- Hypoallergenic, cool, and comfortable
- Made of a pliable material to permit freedom of movement.
- Able to transmit heat and water vapor to protect the wearer.
- Colored to reduce glare under lights.
- Easy to don and remove.

Surgical Scrub

DEFINITION OF TERMS

- Antimicrobial agent. Antiseptic soap or cleanser, used for cleaning the skin of patients and caregivers that has a fast-acting, broad-spectrum action to reduce the number of microorganisms before a surgical procedure.
- Barrier:- physical or mechanical obstacle between a person and a hazardous substance or microorganism
- Personal protective equipment:- equipment or cloth worn to prevent airborne droplet, or contact-based transmission of potentially hazardous substances or microorganisms.
- Scrub suit:- attire intended for wear in the OR
- Subungual:- under the fingernails

Page 375 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Surgical hand scrub: - process by which the hands and arms of the team are rendered clean by mechanical and chemical action before a surgical procedure.
 - ✓ The surgical scrub is the process of removing as many microorganisms as possible from the hands and arms by mechanical washing and chemical antiseptics before participating in a surgical procedure.
 - ✓ The surgical scrub is done just before gowning & gloving for each surgical procedure. Despite the mechanical action and chemical antimicrobial component of the scrub process, skin is never rendered sterile.

Microbiology of the skin

Skin harbors two types of microorganisms:

1. Transient organisms acquired by direct contact, usually loosely attached to the skin surface water.
2. Resident organisms found below the skin surface in hair follicles, and in sebaceous and sweat glands. They are more adherent and; more resistant to removal.

In freeing the skin of as many organisms as possible, two processes are used.

1. Mechanical the process removes soil and transient organisms with friction.
2. Chemical this process reduces resident flora and inactivates microorganisms with an antimicrobial or anti-septic agent.

Purpose of surgical scrub

To remove soil, debris, natural skin oils, hand lotion and transient microorganisms from the hands and forearms of sterile team members.

Equipment

- Soft brush or disposable sponges
- Soap or detergent

Methods of scrubbing

There are two methods of scrub procedure

1. A numbered stroke method
2. The timed scrub method

Page 376 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

In cases of a numbered stroke method, a certain number of brush strokes are designated for each finger. Palm, back of hand, and arm.

The alternative method is the timed scrub, and each scrub should in available at each scrub.

Consisting of the following:-

1. Locate scrub equipment (brushes, soaps, nail cleaners) which are available at each scrub station.
2. Remove jewelry (watch and rings)
3. Wash hands and arms with soap & H₂O
4. Clean sub ungula areas with a nail file
5. Start timing scrub each side of each finger, between the fingers, and the back and front of the hand for 2 minutes.
6. Proceed to scrub the arms, keeping the hand higher than the arm at all times. This prevents bacteria laden soap and water from contaminating the hand.
7. Wash each side of the arm to 3 inches above the elbow for 1 minute.
8. Repeat the process on the other hand and arm, keeping hands above elbows at all times. If at any time the hands touch anything except the brush and or soap, the scrub must be lengthened by one minute for the area that has been contaminated.
9. Rinse hands and arms by passing them through the water in one direction only, from fingertips to elbow. Do not move the arm back and forth through the water. Proceed to the operating room suite holding hands above elbow.

Drying the hands and arms

Procedure

1. Pick up a sterile towel from the table, being careful not to drip water on the gown beneath it.
2. Use one end of the towel only to dry one hand. Use a blotting motion as you dry.
3. Rotate the arm as you proceed to dry it, working from wrist to elbow. Do not allow the towel to contact the scrub suite.

Page 377 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

4. Once the arm is dried, bring the dry hand to the opposite end of the towel and begin drying the other hand.
5. Dry the hand and arm using the blotting rotating motion.
6. Proceed to the elbow. Discard the towel into its proper place.

Mask

- Masks are worn at all times in the OR for minimizing air borne contamination.
- Droplets containing microorganisms from the pharynx and nasopharynx must be tightly fitting and should cover the nose and mouth completely. At the same time it should not interfere with breathing, speech or vision, and it must be compact and comfortable. Effective disposable masks are available that have a high filtration efficiency of greater than 95%.
- Masks are changed at a minimum between patients and are not to be worn outside the surgery department.
- Because the mask loses much of its effectiveness when it is used for surgical procedures.
- The mask is either on or off it must not be allowed to hang around the neck.
- Mask strings are tied snugly the top strings are tied at the back of the head, in addition, bottom strings are tied at the back of neck.

Shoes

- Shoes should be comfortable. And supportive
- Shoe covers establish an electrical ground for the wearer. Shoe covers are worn one time only and are removed on leaving the restricted area.

Gowning and gloving

The sterile gown is put on immediately after the surgical scrub.

The sterile gloves are donned immediately after gowning.

Purpose

To exclude skin as a possible contaminant and to create a barrier between the sterile and non-sterile area.

General Considerations

Page 378 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

1. The scrub person gowns and gloves himself/herself and then may gown and glove the surgeon and his assistants.
2. Gown packages are preferably are opened on a separate table from other packages
3. Avoid splashing water on scrub attire during the surgical scrub because moisture may contaminate the sterile gown.
4. The circulator will assist by pulling the gown up over the shoulders and tying it.

Gloving

Sterile gloves may be put on in different ways.

1. by the closed gloving technique or
2. by the open gloving technique

Closed technique

1. Lay the glove palm down over the cuff of the gown. The fingers of the glove face toward you.
2. Working through the gown sleeve, grasp the cuff of the glove and bring it over the open cuff of the sleeve.
3. Unroll the glove cuff so it covers the sleeve cuff.
4. Proceed with the opposite hand, using the same technique
5. Never allow the bare hand to contact the gown cuff edge or outside glove.

Open technique

1. Pick up the glove by its inside cuff with one hand. Do not touch the glove wrapper with the bare hand.
2. Slide the glove onto the opposite hand. Leave the cuff down
3. Using the practically gloved hand, slide the fingers into the outer side of the opposite.
4. Slide the hand into the glove and unroll the cuff. Do not touch the bare arm as the cuff is unrolled.
5. With the gloved hand slide the fingers under the outside edge of the opposite cuff and unroll it gently, using the same technique.

Removing gloves aseptically

Page 379 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

The gloves should be removed so that the bare skin is not exposed to the outside of the soiled gloves.

Technique

1. Grasp the cuff of the left glove with the gloved fingers of the right hand and pull it inside out.
2. Slip the ungloved fingers of the left hand under the cuff of the right glove and slip it inside out.
3. Discard the gloves in an appropriate receptacle.
4. Wash hands.

Health Hazards

- The presence of occupational hazards in the OR is not new concepts, but the characteristics of these hazards are changing. Internal monitoring of the OR includes the analysis of swipe samples for infectious and toxic agents.
- With the spread of the HIV, OR attire has changed drastically. For example, double gloving is routine now a days.

Distribution of Sterile Goods

Sterile goods are packaged so as to allow personnel to unwrap the item without contaminating it.

Methods of distribution

There are three popular methods:-

1. Large linen packs
 - Place in the center of the back table
 - pull layers towards the person opening the pack so that the hand and arms do not cross over
 - Handle only the edge of the linen
 - Follow the same procedure for the final fold.
2. Small packages are opened by grasping the corners of the wrapper and bringing them back over the hand.

Page 380 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

3. A peel-back package (demonstration) solution is poured carefully so as to avoid splashing.

Terminal Decontamination Following Surgery

Following a surgical case, after the patient has left the OR, the nurse gathers all of the instruments (including soiled and not used) and terminally decontaminate in the washer.

Disposable items in the trash

Large equipment is wiped with a disinfectant and placed usual storage

The floors are cleaned with disinfectant with disinfectant

The stationary equipment/operating table, electrosurgical power unit etc./ are all wiped or clean with disinfectant.

Any visible soil is washed with disinfectant

Sterilization and Disinfection of Equipment

Procedures for sterilizing and disinfecting equipment and supplies are based largely on principles of microbiology. Certain of those, which affect the choice of sterilization and disinfections procedures, will be.

1. Nature of organisms present
2. Number of organisms present
3. Type of equipment
4. Intended use of equipment
5. Time
6. Available means for sterilization and disinfection.

5.2 Pre, intra and post-operative care

Preoperative Assessment

Preoperative Psychosocial Assessment

Any surgical procedure is preceded by same type of emotional reaction in a patient whether it is obvious or hidden, normal or abnormal. For example, Preoperative anxiety. It is known that a mind that or not at peace directly influences the functioning of the body. Therefore, it is imperative to identify the anxieties that the patient is experiencing.

Page 381 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

An important part of the assessment is to determine the role of the patients' family or persons who are signification to him/her

A preoperative patient may experience a number of fears by raking a careful health history; the nurse elicits patient concerns,

- Fear of the unknown (the most troubling)
- Fear of destruction of body image
- Fear of separation from a beloved one.
- Fear of financial problems.
- Fear of family responsibilities
- Fear of poor prognosis and
- Fear of anesthesia and many else

The main source of anxieties is lack of information or not being told everything about his/her diagnosis or illness. So telling everything about his/her Dx. or illness is important part of nursing intervention to give relief from anxieties.

The significance of spiritual therapy must not be forgotten

General physical Assessment

Before treatment/ surgery is initiated a health history is obtained & a physical examination is performed during which vital signs are noted & a data base ID is established for future comparison. Many diagnostic tests may be performed, such as blood analysis X-ray studies endoscopies, tissue biopsies, stool & urine studies. In preparing the patient for these testes, the nurse is in a position to help the patient understand the need for the diagnostic studies.

Informed Consent

- To attain the right to operate it is necessary for the surgeon to obtain a voluntary and informed consent from the patient.
- The nurse's responsibility is to ensure than informed consent has been obtained voluntarily from and informed person.
- Informed Consent is necessary when;

Page 382 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- ✓ The procedure is invasive
- ✓ Anesthesia is used
- ✓ A procedure is performed that involves radiation

Criteria for Valid informed Consent

- Valid consent must be freely given without that coercion.
- Individuals who are mentally retarded, mentally ill, or comatose are not autonomous and cannot give or withhold consent
- Consent form should be in written form and it should contain the following
 - ✓ Explanation of procedure and its risks
 - ✓ Description/explanation of benefits
 - ✓ An offer to answer questions about procedure
 - ✓ Instructions that the patient may withdraw consent.
- Information must be written and delivered in language understandable to the patient

Preoperative Patient Education

- It should include the followings:-
 - ✓ Deep breathing (diaphragmatic breathing)
 - ✓ Coughing
 - ✓ Relaxation skills
 - ✓ Turning and active body movement
 - ✓ About pain control and medications
 - ✓ Cognitive control for relieving tension, anxiety and achieving relaxation include the following
 - Imagery-encourages concentrating on good things
 - Distraction
 - Optimistic self-reaction ('I know all will go well')

Preoperative Nursing Interventions

Routine nursing interventions include altering nutrition and fluid intake, skin preparation of surgical site, administration of preoperative medication, and completion of the preoperative

Page 383 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

checklist, careful attention to psychological and physical interventions prepares the patient to be optimistic for the intraoperative phase.

Nutrition and Fluid

When the operation is scheduled for the morning, the meal the preceding evening may be an ordinary light diet.

In dehydrated patients, and especially in older once, fluids may be administered are unable to take fluids by mouth. If the operation is scheduled to take place offer noon and does not involve any part of the gastro initial tract, a soft breakfast may be prescribed. Most often oral intake of food or water is withheld 8 to 10 hours before the operation.

The purpose of withholding food before surgery is to prevent **aspiration**.

Intestinal Preparation

A warm cleansing enema or laxatives may be prescribed the evening before an operation. This is to prevent defection during anesthesia or prevent accidental trauma to the intestine during abdominal surgery. In addition, antibiotics may be prescribed to reduce intestinal flora.

Preoperative Skin Preparation

The goal of preoperative skin preparation is to decrease bacterial sources without injuring the skin.

Before surgery, the patient should take a warm, relaxing bath or shower, using a soap containing a detergent germicide. It is preferred that the skin at and around the operative site not be shaved. During shaving, the skin may be injured by the razor and became a portal of for bacteria.

Preparation of the surgical site

I. Skin preparation

- Because the skin cannot be sterilized, it is shaved and washed with an antiseptic agent.

This process is called the skin preparation

- The skin harbors two types of microorganisms (resident and transient flora, or bacteria).

Page 384 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

The shave Preparation

Hair readily supports the growth of microorganisms and there of the skin at and around the incision site is shaved prior to surgery.

The Scrub Preparation

- Done usually by nurses
- Done just prior to operation after patient. is an etherized and positioned
- Sterile supplies needed for the scrub prep include towels, antiseptic soap, gauze sponges, cotton tipped applicators and gloves

Procedures for Particular areas

1. Flat surfaces abdomen
 - follow the prep guidelines
 - If colostomy is present place a soapy sponge over it
 - prepare the colostomy last
2. Elevated limb
 - begin the prep at elevated point rather the incision site
3. Vaginal
 - begin a few centimeters from the vulva
 - extend the prep out wards to include the thighs and lower abdomen
 - sponges sticks are used to prep the vagina itself
 - to complete the prep wash the vulva and anus and passing the soapy sponge
4. Anus
 - Is considered a contaminated area
 - prep the surrounding area first and the anus itself last
5. breast for biopsy
 - do it very gently
 - prevent spreading of cancer cell
6. Eye

Page 385 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- use soft cotton balls
- Irrigate from the inner to the outer cantus
- the ear on the affected side should be plugged with cotton

7. Ear

- Clean folds with cotton tipped applicators
- prevent pooling of solution in the ear canal

8. Face

- has several unclean areas (the mouth, nose, and hairline)
- Difficult to avoid contaminating the prep when usual technique is employed.
- Prep from the center out wards (from hair line)
- Return to the incision site using sponges and prep that area last
- If the hair is long braid, cap of held back with clips prior to the prep.

Immediate preoperative nursing interventions

- The patient. is dressed in a hospital gown that is left untied and open in the back.
- If the patient. has long hair, it may be braided; hairpins are removed, and the hair is completely covered with a disposable paper cap.
- The mouth is inspected and dentures or plates and chewing gum are removed.
- When the GIT is the surgical site, a small-prepackaged enema may be prescribed and administered.
- All patients should void immediately before going to the operating room.

Pre-Anesthetic Medication

- A complete medication History on every patient scheduled for surgery is imperative because of possible problem of drug interaction
- The History should include all the medication the patient has been taking or has taken within the past two months
- Note should be made of medication hypersensitivity for which medications were prescribed

Page 386 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- As with other management modalities, medication is prescribed on an individual basis to meet the needs of the particular patient

For Example,

- Barbiturates:- For sedation and hypnotic (phenobarbital and diazepam respectively)
- Opiates:- Medications such as morphine may be prescribed before the operation to reduce and to produce analgesia in patients who have pain before the operation
- Anticholinergics:- Such as atropine may be prescribed to reduce respiratory tract secretions
- Prophylactic antibiotics:- to prevent post operative infection
- Because pre- anesthetic medications should be given from 45 to 75 minutes before anesthesia is begun, it is most important that the nurse administer this medication on the prescribed time other wise, its effect will have worn off, or it will not have begun to act when anesthesia is started.

Preoperative Record

- The completed preoperative check list chart accompanies the patient to the operating room
- The informed consent form is also attached in the chart

Transportation to the Pre-Surgical Site

- The patient is transferred to the pre surgical suite in a bed or on stretcher about 30-60 min before the anesthetic is to be given
- The nurse who has cared for the patient. up to this time accompanies him to the OR. It is important that someone be with the preoperative patient. at all the times
- The patient should not hear undesirable sounds or conversations he might be misinterpreted or exaggerated.

Operating Room Team

When a patient arrives in the OR, essentially three different groups of personnel are preparing for his/her care

Page 387 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

1. The anesthesiologist/nurse anesthetist/
2. The surgeon and assistants
3. The intraoperative nurses. Of course, there is OR the chains and other auxiliary workers (such as janitors)

The OR team is subdivided according to the functions of its members;-

1. The **Sterile team** which consists of
 - a) Surgeon
 - b) Assistants to the surgeon
 - c) Scrub nurse
2. The **unsterile team** which is consists of
 - a) Anesthesiologist
 - b) Circulatory nurse
 - c) Auxiliary workers

Responsibilities of each member

Responsibilities of the circulating nurse

Responsible for maintaining a neat, quiet, well-organized or and must be able to anticipate and meet the needs of the other team members such as; the scrub nurse, the anesthesia provider, the surgeon, and above all the patient.

Some of the activities of the circulating nurse include the following:-

- Observe the technique at all times to see that it is maintained properly
- Keep the scrub nurse with supplies e.g. suture materials etc
- open sterile supplies before and during the case
- Help to position the patient. on the surgery table
- Perform the scrub prep of the patient.
- Assist the anesthetist when required
- Take part in sponge and instrument counts and their documentation
- Tie the gowns of the scrubbed personnel
- Adjust the surgical light; attach the suction apparatus

Page 388 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Wipe the scrubbed personnel brows as needed
- Assist in transporting the patient
- Document and preserve any specimens received during surgery etc

Form the responsibilities listed it is essential that the circulating nurse must possess ability to:-

- Organize activities and direct personnel
- Anticipate needs
- Differentiate situations that demand immediate attention
- Maintain a quite, neat and well equipped unit
- Understand thoroughly the principles of asepsis

Responsibilities of the scrub nurse

- Assist the surgeon during surgery by passing instruments and other equipment in a prescribed manner
- Maintain an orderly organized surgical field
- Keep the instrument table neat so that supplies can be handled quickly and efficiently
- Anticipate and meet the needs of the surgeon by watching the progress of the surgery and knowing of the various steps of the procedure
- Passes instruments and other supplies in an acceptable manner so that the surgeon does not have to turn away from the wound site to receive the instrument
- Takes part in sponge, needle and instrument counts, as needed
- Properly identifies and preserves specimens etc

Qualities of the OR Nurse

The OR Nurse should be:-

- a) Stamina be in a good physical and mental conditions (should have endurance)
- b) Emotionally stable
- c) Respect patients and team members
- d) Stable in health conditions
- e) Good humor doing things pleasantly/feeling cheerful/
- f) Team spirit work towards a common goal /undivided attention to the patient

Page 389 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

2. Intra-Operative phase nursing care

- Begin when the patient is admitted/ transferred to surgery department and end when he is admitted to recovery room/area.
- Throughout this continuum, priority is given to the patient, his safety, his understanding of the care he is receiving and the biophysical and psychosocial needs he is experiencing.

Receiving the patient

- When we receive the patient;
 - ✓ Be polite
 - ✓ Help him/her by all means you can
 - ✓ Reassure/psychological support
 - ✓ Check wither all preoperative procedures has been done

Preliminary Preparation

- Check out and be sure whether operating suite equipment are in place or not
- Sterile team members wash (scrub) their hands and arms, put on(don) a sterile gown and gloves, and enter to the sterile filed, the sterile field is the area of the OR that immediately surrounds and is specially prepared for the patient
- Toe establish a sterile field, all items needed for the surgical procedure are sterilized
- After this process, the scrubbed and sterile team members function with in this limited area handle nay sterile items
- Unsterile team member, on the other hand do not enter to the sterile field; they function outside around it. Following the principles of aseptic technique, they keep the sterile team supplied and provide direct patient care

Patient Position of the Operating Table

The poison in which the patient is placed on the operating table depends on the operation to be performed as well as on physical condition of the patient.

- The proper position of the surgical patient results in

Page 390 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- ✓ Maximum safety for the patient.
- ✓ Allows adequate exposure of the surgical site
- It also ensures that anesthesiologist/anesthesia has adequate access to the patient's head in order to administer anesthesia
- Since all members of the surgical team may participate in positioning of the patient on the table, all should be familiar with possible risks in order to facilitate a safe outline
- The patient is positioned after induction (when a general aesthetic is administered)

Factor to consider includes the following

- The patient should be in as comfortable a position as possible whether asleep or awake.
- The operative area must be adequately exposed
- The vascular supply should not be obstructed by an awkward position or undue pressure on a part
- There should be no interference with the patient's respiration
- Nerves must be protected from undue pressure
- The patient needs gentle restrain before induction, in case of excitement.

Types of Position

1. Dorsal recumbent position / supine/

- The usual position for surgery is flat on the back one arm is at the side of the table with the hand placed palm down; the other is carefully positioned on an arm board for IV infusion. It is used for most abdominal operation

2. Trendelenburg position

- Used from operations on the lower abdomen and pelvis to have good exposure by displacing the intestines in the upper abdomen. In this, position the head and body are lowed and the knees are flexed

3. Lithotomy position

- The patient is lying on his back with the legs and thighs flexed at right angles. The position is maintained by placing the feet in stirrups
- Nearly all perineal, rectal, and vaginal operations require this positions

Page 391 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

4. Prone position (on abdomen)

5. Fowler's position

- The patient's trunk is raised to an angle of 80-90° (e.g. patients with abdominal drainage)
- The head of the bed must be raised slowly to reduce the feeling of light headiness

Draping Materials and their Applications

- Drapes are pieces of cloth used to cover areas in order to provide sterile field, protective barrier against contamination.

Draping procedure

- During draping of a table or patient, the sterile drape is held well above the surface to be covered and is positioned from front to bank
- Only the top of the patient or table that is draped is considered sterile; drapes hangings over the edge are not regarded as sterile
- Sterile drapes are kept in position by the use of clips or adherent materials drapes are not moved during the operation
- provide a wide cuff for hand
- Drapes are nearly always unfolded at the field to avoid moving the around

Assisting in Administration of Anesthesia

An anesthesiologist/anesthetist is a qualified nurse, dentist, and physician. Most anesthetists' are nurses. Anesthetics are agents used in anesthesia which are used to desensitize the body (For Absence of sensation)

Anesthesia is a state or narcosis analgesia relaxation, and reflex loss

- Basically anesthetic are divided into two classes according to whether they

1. In the whole body (general anesthesia)

2. In parts of the body (local, regional, epidural, or spinal anesthesia)

General Anesthesia (GA)

- Most commonly achieved by inhalation or by intravenous techniques

Page 392 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

- Volatile liquid anesthetics produce anesthesia when their vapors are inhaled such as halothane. Ether, Trilene, Isoflurane
- Gas anesthetics are administered by inhalation and always combined with oxygen such as nitrous oxide and Ether
- The intake and elimination of the agent is in large measure affected by pulmonary ventilation
- The substances, when inhaled, enter the blood through the pulmonary capillaries and, when in sufficient concentration, act on the cerebral centers to produce loss of consciousness and sensation
- When administration of the anesthetic is discontinued, the vapor or gas is eliminated by way of the lungs

Methods of Administration

- Liquid anesthetics may be administered by mixing the vapors with oxygen or nitrous oxide oxygen and then having the patient inhale the mixture. The vapor is conducted to the patient via a tube and a mask.

Stages of General Anesthesia

- Anesthesia consists of four stages, each of which presents a definite group of signs and symptoms.

Stage I. Beginning Anesthesia

- He/She may have warmth, dizziness, and a feeling of detachment
- Experiences a ringing, roaring or buzzing in the ears

Stage II. Excitement

- Shows struggling, shouting, talking, singing, laughing or even crying.
- The pupils become dilated but contract if exposed to light the pulse rate rapid and respirations irregular

Stage III. Surgical Anesthesia

- Reached by continued administration of the vapor or gas

- The patient is unconscious, lying quietly on the table. The pupils are small but will contract on exposure to light. Respirations are regular: pulse has a normal rate and volume

Stage IV. Over dosage

- This stage is reached when too much anesthesia has been administered
- Respirations become shallow, the pulse weak and thereby; the pupils become widely dilated and no longer contract when exposed to light
- Cyanosis develops and unless prompt action is taken death follows rapidly
- If this stage should develop the anesthetic is discontinued immediately, and respiratory and circulatory supports are necessary to prevent death
- Using smooth administration of an anesthetic there is, of course, no sharp division between the first three stage and there is no stage IV

Intravenous Barbiturate Anesthesia

- A short acting barbiturate, thiopental sodium (Pentothal), is the anesthetic most commonly used for this purpose. This substance leads to unconsciousness within 30 seconds
- Ketamine it produces a peculiar anesthetic, state called 'dissociative anesthesia'. Here the patient appears to be awake but is unaware of his surroundings. It is a very strong pain killer and is used for very painful procedures. It can cause bad dreams

Advantages

- The onset is pleasant; there is none of the buzzing, roaring or dizziness known to an inhalation anesthetic.
- The duration of action is brief
- Non explosive
- Little nausea or vomiting

Disadvantages

- Powerful depressant of breathing.
- It needs highly skilled anesthesiologist.

Page 394 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Regional Anesthesia (RA)

- Regional anesthesia is a form of local anesthesia in which an anesthetic agent is injected around nerves is anesthetized
- It means loss of sensation in specific body region
- The effect depends on the type of nerves involved
- The patient. experiences no pain in the area of operation and remains awake b/se the local anesthetic does not affect the brain function

Examples of Regional Anesthesia

Spinal Anesthesia

- It is a type of extensive conduction nerve block that occurs by introducing a local anesthetic into the subarachnoid space at the lumbar level (usually L-2)
- It produces anesthesia of the lower extremities, perineum an lower abdomen
- For the lumbar puncture procedure, the patient lies on his side in a knee-chest position

Conduction /nerve/ Blocks

Such as:-

- Epidural block
- Brachial plexus block to the arm
- Paravertebral block
- Trans sacral block perineum

Local infiltration Anesthesia

- In this method the local anesthetic drug is injected at the site of operation and no attempt is made to block any nerve e.g. Lignocaine

Advantages of local anesthesia are as follows

- It is simple economic and non-explosive
- The amount of equipment is minimal
- Postoperative recovery is shortened
- Undesirable effect of general anesthesia are avoided

Page 395 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

- It is ideal of short and superficial operations

Contra-indications

- Local anesthesia is the anesthesia of choice in any operation in which it can be used. However, it is Contraindicated for operations on hilly nervous, apprehensive patients, because surgery with local anesthesia may increase anxiety

Post Anesthesia Recovery Room

The post anesthesia recovery room is a unit usually located adjacent to the OR. Patients who are still under anesthesia or recovering from it are placed in this unit for easy access to:-

1. Nurses of RR
2. Anesthesiologists
3. Surgeons
4. Monitors and special equipment

3. Postoperative phase (POP)

- The postoperative phase, the third and last phase of perioperative nursing care, centered on the recovery of the patient following surgery. Critical nursing assessment and prompt intervention promote the patient's return to optimal function and decrease the occurrence postoperative complications the delay recovery. The nursing process is directed towards the reestablishment of the patient's physiologic equilibrium, alleviation of pain, and prevention of complication.
- Nursing assessment sand intervention should be focus on POP complications that can prolong recovery and adversely affect the surgical outcome; shock, hemorrhage, deep vein thrombosis, pulmonary embolism and respiratory, urinary, intestinal dysfunction psychological disturbances
- Careful assessment and immediate interventions assist the patient in returning to optimal function quickly, safely, and as comfortably as possible.
- Nursing management instructions the postoperative phase include the following
 1. Patient case in the PAR
 2. Wound care and wound complications and

Page 396 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

3. Other postoperative complications

➔ Nursing management of the patient in the PARR focuses on

- Adequate respiratory exchange,
- Stabilization of vital signs
- Observation of the incision site and
- Comfort

Case Classification

Surgical cases are classified according to the amount of risk of postoperative infection. The risk depends on the amount and source of bacteria present in the surgical wound.

1. Clean case

- No break in aseptic technique has occurred
- The wound is not inflamed and
- The respiratory, digestive, or genitourinary tract is not entered

2. Clean contaminated case

- a minor break in aseptic technique has occurred
- include procedures of the GI, RT, GUT
- patient must have had bowel prep

3. Contaminated case

- Major break in aseptic technique has occurred
- The has been extensive spillage from the GI-trct and
- The patient has not had bowel prep
- A case involved a fresh traumatic wound

4. Infected case

- There is known infection or
- The patient. Has a contagious disease

Wound healing is promoted in the Post Operative phase by meticulous wound care, aseptic dressing change, and attention to factors that influence wounds healing and skin integrity Physiology of wound healing;

Cellular processes that contribute to the restoration of a wound are,

Cell regeneration

Cell proliferation and

Collagen production

The response of tissue o injury goes three phases this are;

Inflammatory /lag /phase

Proliferation fibroblastic / phase and

- The transfer from the OR to the RR involves special consideration of the patient's incision site, vascular changes, and exposure
- Serious arterial hypotension may occur when a patient is moved from one position to another, such as from a lithotomy to a horizontal position, from a prone to a supine position, or from prone to a supine position. Even moving the anesthetize patient to the stretcher can precipitate this problem. Thus, the patient must be moved solely and carefully.
- Transfer of the postoperative patient from the OR to the RR is the responsibility of the anesthesiologist, with a member of the surgical team.

Immediate Postoperative Assessment

- The recovery room nurse who receives the patient reviews the following with the anesthesiologist;-
1. Medical diagnosis and type of surgery performed
 2. Patient's age and general condition

Page 398 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Airway patency
- Vital signs including Blood pressure

3. Anesthetic and other medications used

4. Any problems that occurred in the OR that might influence postoperative care

(E.g. Extensive hemorrhage, shock, cardiac arrest)

5. Fluid administered, blood loss and replacement

6. Any tubing drains, catheters

7. Note from the OR team members

Nursing Interventions

The primary objective is to maintain pulmonary ventilation and thus to prevent

- Hypoxemia (reduced O₂ in bloodk)
- Hypercapnia (excess CO₂ in blood) which are occur as a result of airway obstruction and reduced ventilation (Hypoventilation)
- Shock can be avoided largely by the timely administration of IV fluids bloods and medications.

Post-Anesthesia RR Scoring Sheet (0-2)

Area of Assessment includes:

- Respiration
- Circulation
- Consciousness level
- Color
- Muscle activity

Required for discharge from RR 7-8 points out of 10 points

Post- anesthesia RR criteria and Scoring Guide

Page 399 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

Usually the following criteria are used to determine the patient's readiness for discharge from the PARR

- Uncompromised pulmonary function
- Stable V/S including blood pressure
- Orientation to place event time person
- Nausea and vomiting under control
- Patient's score greater than 7 points.

Wound healing is promoted in the postoperative phase by intensive wound care, aseptic dressing change and attention to factors that influence wound healing and skin integrity

- Nursing assessment and intervention focus on postoperative complications that prolong recovery and adversely affect the surgical outcome shock; hemorrhage deep vein thrombosis; pulmonary embolism

5.3 A patient with hernias

A hernia happens when an internal organ pushes through a weak spot in your muscle or tissue. There are several types of hernia that you can experience including, inguinal hernias, femoral hernias, umbilical hernias and hiatal hernias. If you have a hernia, it's important to treat it quickly.

A hernia occurs when an internal organ or other body part protrudes through the wall of muscle or tissue that normally contains it. Most hernias occur within the abdominal cavity, between the chest and the hips.

Page 400 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

Types Of Hernia

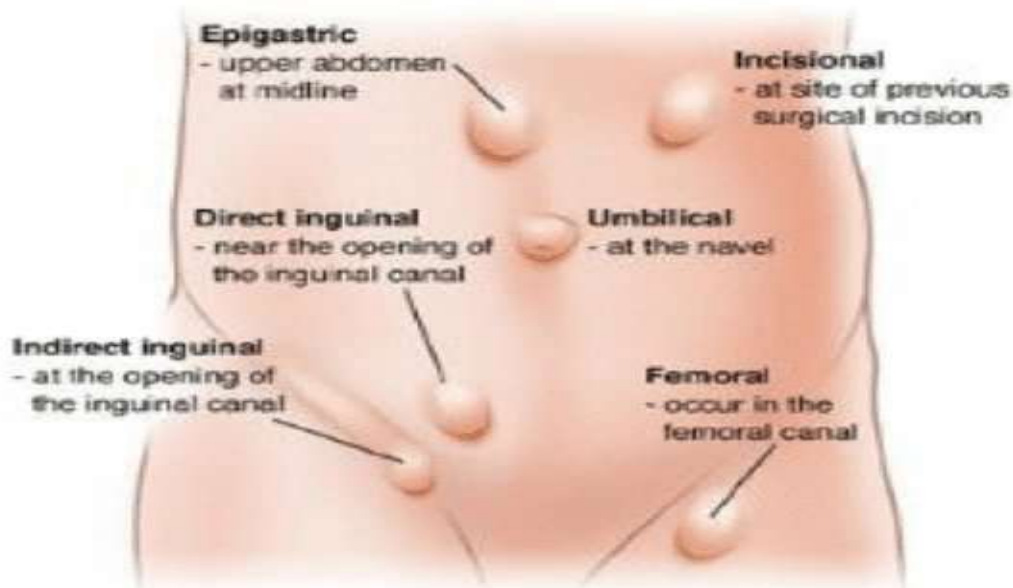


Figure 5.3 Different types of hernias

The most common forms of hernia are:

Inguinal hernia: In men, the inguinal canal is a passageway for the spermatic cord and blood vessels leading to the testicles. In women, the inguinal canal contains the round ligament that gives support for the womb. In an inguinal hernia, fatty tissue or a part of the intestine pokes into the groin at the top of the inner thigh. This is the most common type of hernia, and affects men more often than women.

Femoral hernia: Fatty tissue or part of the intestine protrudes into the groin at the top of the inner thigh. Femoral hernias are much less common than inguinal hernias and mainly affect older women.

Umbilical hernia: Fatty tissue or part of the intestine pushes through the abdomen near the navel (belly button).

Hiatal (hiatus) hernia: Part of the stomach pushes up into the chest cavity through an opening in the diaphragm (the horizontal sheet of muscle that separates the chest from the abdomen).

Page 401 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

Other types of hernias include:

Incisional hernia: Tissue protrudes through the site of an abdominal scar from a remote abdominal or pelvic operation.

Epigastric hernia: Fatty tissue protrudes through the abdominal area between the navel and lower part of the sternum (breastbone).

Spigelian hernia: The intestine pushes through the abdomen at the side of the abdominal muscle, below the navel.

Diaphragmatic hernia: Organs in the abdomen move into the chest through an opening in the diaphragm.

How common are hernias? Of all hernias that occur:

75 to 80% are inguinal or femoral.

2% are incisional or ventral.

3 to 10% are umbilical, affecting 10 to 20% of newborns; most close by themselves by 5 years of age.

1 to 3% are other types.

SYMPTOMS AND CAUSES

Causes of hernia

Inguinal and femoral hernias are due to weakened muscles that may have been present since birth, or are associated with aging and repeated strains on the abdominal and groin areas. Such strain may come from physical exertion, obesity, pregnancy, frequent coughing, or straining on the toilet due to constipation.

Adults may get an umbilical hernia by straining the abdominal area, being overweight, having a long-lasting heavy cough or after giving birth.

The cause of hiatal hernias is not fully understood, but a weakening of the diaphragm with age or pressure on the abdomen could play a part.

Symptoms

A hernia in the abdomen or groin can produce a noticeable lump or bulge that can be pushed back in, or that can disappear when lying down. Laughing, crying, coughing, straining during a bowel

Page 402 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

movement, or physical activity may make the lump reappear after it has been pushed in. More symptoms of a hernia include:

Swelling or bulge in the groin or scrotum (the pouch that contains the testicles).

Increased pain at the site of the bulge.

Pain while lifting.

Increase in the bulge size over time.

A dull aching sensation.

A sense of feeling full or signs of bowel obstruction.

In the case of hiatal hernias there are no bulges on the outside of the body. Instead, symptoms may include heartburn, indigestion, difficulty swallowing, frequent regurgitation (bringing food back up) and chest pain.

DIAGNOSIS AND TESTS

It is usually possible to see or feel a bulge in the area where a hernia has occurred by physical exam. As part of a male's typical physical exam for inguinal hernias, the doctor feels the area around the testicles and groin while the patient is asked to cough. In some cases, soft-tissue imaging like a CT scan will accurately diagnose the condition.

MANAGEMENT AND TREATMENT

Treatment

Hernias usually do not get better on their own, and surgery may be the only way to repair them. However, your doctor will recommend the best therapy to address your hernia, and may refer you to a surgeon. If the surgeon thinks it is necessary to repair your hernia, then the surgeon will tailor the method of repair that best meets your needs.

In the case of an umbilical hernia in a child, surgery may be recommended if the hernia is large or if it has not healed by the age of 4 to 5 years old. By this age, a child can usually avoid surgical complications.

If an adult has an umbilical hernia, surgery is usually recommended because the condition will not likely improve on its own and the risk of complications is higher.

One of three types of hernia surgery can be performed:

Page 403 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Open surgery, in which a cut is made into the body at the location of the hernia. The protruding tissue is set back in place and the weakened muscle wall is stitched back together. Sometimes a type of mesh is implanted in the area to provide extra support.

Laparoscopic surgery involves the same type of repairs. However, instead of a cut to the outside of the abdomen or groin, tiny incisions are made to allow for the insertion of surgical tools to complete the procedure.

Complications of an untreated inguinal or femoral hernia may include:

Obstruction (incarceration): Part of the intestine becomes stuck in the inguinal canal, causing nausea, vomiting, stomach pain, and a painful lump in the groin.

Strangulation: Part of the intestine is trapped in a way that cuts off its blood supply. In such cases, emergency surgery (within hours of occurring) is necessary to prevent tissue death.

PREVENTION

Maintain ideal body weight by eating a healthy diet and exercising.

Eat enough fruits, vegetables and whole grains to avoid constipation.

Use correct form when lifting weights or heavy objects. Avoid lifting anything that is beyond your ability.

See a healthcare provider when you are ill with persistent coughs or sneezing.

Don't smoke, as the habit can lead to coughing that triggers a hernia.

5.4 Degree of burn cases and care

Burns: It is an injury to body tissue caused by heat, chemicals or radiation.

Types of burn

Dry burn – burn caused by flames, lighted cigarettes and hot electric equipment

Scalds - Burns caused by wet heat such as steam, hot H_2O , or fat produced scalds

Cold burn - burn due to contact with substances such as liquid oxygen & liquid nitrogen

Chemical burns - Caused by acid or alkalis chemicals

Electric burn - Eclectic current and lightning generate heat and can cause burn.

Radiation burn - Sun rays and light reflected from bright surface.

Classification of Burn- Classified according to the area and depth of the injury

Page 404 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Superficial burn / 1st degree burn/ - Involves only the outer layer of the skin

Sign and symptom- Redness, swelling & tenderness

Treatment - Immerse in cold H₂O

Remove any rings watches and coverings from the injured site

Dress with clean dressing

Intermediate burn / 2nd degree burn/ - involves the formation of blister

Sign and symptom - Swollen & red. It can be infected

First aid measure - Lay the causality down and check ABC

- Protect the burn area form contact
- Remove any ring watch etc
- Don not removes any thing that is sticking to a burn
- Cover the area with sterile dressing
- Do not apply any ointment/ lotion
- Do not break blisters

Deep burn / 3rd degree burn/ -Involves all layers of the skin

Sign and symptom- The skin appears pale, waxy or charred

- Relatively pain free b/s damaged nerves
- Deep burn always require medical attention

First aid measure- Lay the causality down and checks ABC

- Protect the burn area form contact
- Remove any ring watch etc
- Don not removes any thing that is sticking to a burn
- Cover the area with sterile dressing
- Do not apply any ointment/ lotion
- Do not break blisters
- Rinse irrigate chemical burn with clean water

Bandages: - are strips of woven material used to hold a wound dressing or splint in place.

It helps to immobilize, support and protect an injured part of the body.

Page 405 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

Types of bandages

1. Elastic bandage
2. Gauze bandages
3. Triangular bandages (for scalp, foot or any large areas and for sling)
4. Adhesive strip bandages (for small wounds following through cleaning)

General principles of application of bandages

- A bandage should be not too loose or too tight
- Ensure that circulation is not interfered
- Leave the victim finger tips and toes exposed
- Watch for swelling, change of color and coldness of the tips of fingers or toes indicating interference with circulation
- Loosen bandages immediately if the victim complains of numbness or tingling sensation

Methods of applying bandages

Arm sling

- Prepare a triangular bandage
- Place one end of the bandage over the injured shoulder and let the other end hang down in front of the chest parallel to the side of the body
- Carry the point behind the elbow of the injured arm
- Carry the second end of the bandage up over the shoulder and the two ends together of the side of the neck not over the spine
- Bring the point of the sling and tie it
- Make sure the ends of the fingers extend just beyond the base so that you can observe whether or not the circulation is cut off
- In all cases of fore arm or hand injury adjust the sling so that the hand is elevated 10 or 12 cm above the level of the elbow.

5.5 A patient with acute abdomen

Acute abdomen is defined as a sudden onset of severe abdominal pain developing over a short time period. It has a large number of possible causes and so a structured approach is required.

Page 406 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

The initial assessment should attempt to determine if the patient has an acute surgical problem that requires immediate and prompt surgical intervention, or urgent medical therapy.

The first decision when you first see any patient is “Are they critically unwell?”. A 10-second assessment of their clinical state can be made by a general look (the “end-of-bed-o-gram”) and their observations.

If they are critically unwell, start initial management steps promptly, and call for help early before going into the detail with their history and examination.

Presentations Requiring Urgent Intervention

Bleeding

The most serious cause of intra-abdominal bleeding is often the ruptured abdominal aortic aneurysm, which requires swift referral to the vascular team and immediate surgical intervention.

Other common causes usually involve a slower rate of bleeding, but with urgent surgery still required, include ruptured ectopic pregnancy, bleeding gastric ulcer, and trauma.

These patients will typically go into hypovolemic shock. Clinical features include tachycardia and hypotension, pale and clammy on inspection, and cool to touch.

Perforated Viscus

Peritonitis is the inflammation of the peritoneum, and a generalised peritonitis is most commonly caused by perforation of an abdominal viscus.

The causes of perforation are broad but include peptic ulceration, small or large bowel obstruction, diverticular disease, and inflammatory bowel disease.

Patients with a generalised peritonitis present will often lay completely still (not to move their abdomen) and look unwell; this is especially important when compared to a renal colic, whereby patients are constantly moving and cannot get comfortable.

On examination, they will show signs of:

Tachycardia and potential hypotension

A completely rigid abdomen with percussion tenderness

Page 407 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Involuntary guarding – the patient involuntarily tenses their abdominal muscles when you palpate the abdomen

Reduced or absent bowel sounds, suggesting the presence of a paralytic ileus

Ischaemic Bowel

Any patient who has severe pain out of proportion to the clinical signs has ischaemic bowel until proven otherwise. They are often acidaemic with a raised lactate and physiologically compromised.

Patients will often complain of a diffuse and constant pain, however the examination can often otherwise be unremarkable. Definitive diagnosis is via a CT scan with IV contrast, with early surgical involvement.

Presentations That Are Less Acute

Colic

Colic is an abdominal pain that crescendos to become very severe and then goes away completely. The most common types of colic are seen in biliary colic, ureteric colic, and bowel obstruction.

Peritonism

Peritonism (not peritonitis) refers to the localised inflammation of the peritoneum, usually due to inflammation of a viscus that then irritates the visceral (and subsequently, parietal) peritoneum.

This leads to patients stating that their abdominal pain starts in one place (irritation of the visceral peritoneum) before localising to another area* (irritation of the parietal peritoneum) or becoming generalised.

The classic example of this is acute appendicitis, with the pain migrating from the umbilical region to the right iliac fossa

Differential Diagnosis

The location of abdominal pain is one useful feature that helps narrow the differential. These can be classified based upon quadrant or region affected.

Page 408 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

It must be remembered to always consider extra-abdominal organs as the cause for abdominal pain, including cardiac, respiratory, and gynaecological or testicular conditions.

Importantly, there are non-general surgical causes of abdominal pain that must not be missed, including testicular torsion, ruptured ectopic pregnancy, diabetic ketoacidosis, and myocardial infarction

Investigations

Laboratory Tests

The investigations in all cases of the acute abdomen share the same generic outline:

Urine dipstick – for signs of infection or haematuria \pm MC&S. Include a pregnancy test for all women of reproductive age

Arterial Blood Gas – useful in bleeding or septic patients, especially for the pH, pO₂, pCO₂, and lactate for signs of tissue hypo perfusion, as well as a rapid hemoglobin level

Routine bloods – FBC, U&Es, LFTs, CRP, amylase*

Do not forget a group & save (G&S) if the patient is likely to need surgery soon

Blood cultures – if considering infection as a potential diagnosis

*Any amylase 3x greater than the upper limit is diagnostic of pancreatitis. Any raised value lower than this may also be due to another pathology, such as perforated bowel, ectopic pregnancy, or diabetic ketoacidosis (DKA)

Imaging

Following assessment, initial imaging may help to further help focus the diagnosis if still unclear:

Ultrasound

Kidneys, ureters, and bladder ('KUB') – can check for hydronephrosis and cortico-medullary differentiation

Biliary tree and liver – can check for the presence of gallstones, gallbladder thickening, or duct dilatation

Transvaginal – for suspected tubo-ovarian pathology

CT imaging of the abdomen, often best discussed with a senior depending on the suspected underlying diagnosis if required

Page 409 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

In the emergency setting, every patient with abdominal pain should also have an electrocardiogram to exclude cardiac pathology, as referred pain

Management

The definitive management of acute abdomen depends largely on the cause. However, a good initial management plan includes core points, regardless of the underlying aetiology.

These include intravenous access, nil-by-mouth (NBM) status set, analgesia +/- antiemetics, initial imaging (as discussed above), VTE prophylaxis, urine dip, bloods (as discussed above). If the patient is unwell, consider a urinary catheter and/or nasogastric tube if necessary, and start intravenous fluids and monitor fluid balance.

5.6 Management for a patient with hemorrhoid

Hemorrhoids, or piles are swollen veins inside the rectum or outside the anus can cause pain, anal itching and rectal bleeding. Symptoms often improve with at-home treatments but on occasion people need medical procedures.

Eating more fiber can help prevent hemorrhoids. Hemorrhoids, or piles, are a common problem.

Hemorrhoids are swollen, enlarged veins that form inside and outside the anus and rectum. They can be painful, uncomfortable and cause rectal bleeding. Hemorrhoids are also called piles. We're all born with hemorrhoids, but at baseline, they don't bother us. It's only when they become swollen and enlarged that they produce irritating symptoms.

Anyone can get symptomatic hemorrhoids, even teenagers. (Because hemorrhoids take a while to develop, they're uncommon in children.) You may be more at risk if you:

Have overweight/obesity.

Are pregnant.

Eat a low-fiber diet.

Have chronic constipation or diarrhea.

Regularly lift heavy objects.

Spend a lot of time sitting on the toilet.

Strain while having bowel movements.

Page 410 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Hemorrhoids can happen inside or outside the rectum. The type depends on where the swollen vein develops. Types include:

External: Swollen veins form underneath the skin around the anus. Your anus is the canal where poop comes out. External hemorrhoids can be itchy and painful. Occasionally, they bleed. Sometimes they fill with blood that can clot. This is not dangerous, but can result in pain and swelling.

Internal: Swollen veins form inside the rectum. Your rectum is the part of the digestive system that connects the colon (large intestine) to the anus. Internal hemorrhoids may bleed, but they usually aren't painful.

Prolapsed: Both internal and external hemorrhoids can prolapse, meaning they stretch and bulge outside of the anus. These hemorrhoids may bleed or cause pain.

SYMPTOMS AND CAUSES

Straining puts pressure on veins in the anus or rectum, causing hemorrhoids. You might think of them as varicose veins that affect your bottom.

Any sort of straining that increases pressure on your belly or lower extremities can cause anal and rectal veins to become swollen and inflamed. Hemorrhoids may develop due to:

Pelvic pressure from weight gain, especially during pregnancy.

Pushing hard to have a bowel movement (poop) because of constipation.

Straining to lift heavy objects or weightlifting.

Internal hemorrhoids rarely cause pain (and typically can't be felt) unless they prolapse. Many people with internal hemorrhoids don't know they have them because they don't have symptoms.

If you have symptoms of internal hemorrhoids, you might see blood on toilet paper, in stool or the toilet bowl. These are signs of rectal bleeding.

Signs of external hemorrhoids include:

Itchy anus.

Hard lumps near the anus that feel sore or tender.

Pain or ache in the anus, especially when you sit.

Page 411 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Rectal bleeding.

Prolapsed hemorrhoids can be painful and uncomfortable. You may be able to feel them bulging outside the anus and gently push them back inside.

Different gastrointestinal disorders can cause rectal bleeding and other symptoms similar to hemorrhoids. Some of these disorders are life-threatening. For this reason, it's important to let your healthcare provider know when you're having symptoms.

Bowel diseases that can cause bleeding include:

Colon cancer.

Crohn's disease.

Ulcerative colitis.

DIAGNOSIS AND TESTS

Your healthcare provider diagnoses hemorrhoids based on symptoms and a physical exam. You may also have:

Digital rectal exam: Your provider inserts a gloved, lubricated finger into the rectum to feel for swollen veins.

Anoscopy: Your provider uses an anoscope (lighted tube) to view the lining of the anus and rectum.

Sigmoidoscopy: Your provider uses a sigmoidoscope (lighted tube with a camera) to view inside the lower (sigmoid) part of the colon and rectum. Procedure types include flexible sigmoidoscopy and rigid sigmoidoscopy (proctoscopy).

These tests may be uncomfortable but aren't painful. They typically take place in a doctor's office or outpatient center without anesthesia. You go home the same day.

Your provider may perform a colonoscopy to confirm findings from other tests or check for signs of colon cancer. This outpatient procedure requires anesthesia.

MANAGEMENT AND TREATMENT

Hemorrhoids can be uncomfortable and painful, but they don't tend to cause serious problems.

Rarely, people with hemorrhoids develop:

Anemia.

Page 412 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Blood clots in external hemorrhoids.

Infection.

Skin tags (flap of tissue that hangs off skin).

Strangulated hemorrhoids (muscles in the anus cut off blood flow to a prolapsed internal hemorrhoid).

Treatment for hemorrhoids

You should see your healthcare provider if symptoms get worse or interfere with your daily life or sleep. Also seek help if signs don't improve after a week of at-home treatments. Your provider may treat hemorrhoids with:

Rubber band ligation: A small rubber band placed around the base of a hemorrhoid cuts off blood supply to the vein.

Electrocoagulation: An electric current stops blood flow to a hemorrhoid.

Infrared coagulation: A small probe inserted into the rectum transmits heat to get rid of the hemorrhoid.

Sclerotherapy: A chemical injected into the swollen vein destroys hemorrhoid tissue.

Surgical treatments include:

Hemorrhoidectomy: Surgery removes large external hemorrhoids or prolapsed internal ones.

Hemorrhoid stapling: A stapling instrument removes an internal hemorrhoid. Or it pulls a prolapsed internal hemorrhoid back inside the anus and holds it there.

PREVENTION

Hemorrhoids are common as we get older. These steps can help prevent hard stools and constipation that can lead to hemorrhoids:

Don't sit too long or push too hard on the toilet.

Go the toilet when the urge hits don't delay bowel movements.

Drink plenty of water throughout the day.

Eat more high-fiber foods (fresh fruits, vegetables and whole grains) or take supplements.

Generally, women should aim for 25 grams of fiber per day, while men should get 35 grams of fiber.

Page 413 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Stay physically active. Being on the move keeps bowels moving.

Take laxatives or use enemas only as recommended by your healthcare provider. Too many laxatives or enemas can make it hard for your body to regulate how you defecate.

5.7 Acid-base, fluid and electrolyte imbalance

I. FLUIDS AND ELECTROLYTES

A. General Overview

1. Body water compartments

- Total body water (TBW): About 60% of body weight for males; about 55% of body weight for females; lower percentage for those who are obese and elderly (0.5 L/kg for males; 0.45 L/kg for females)
- About 60% of TBW is intracellular.
- About 40% of TBW is extracellular water (about volume)

2. Estimating daily fluid requirements

- 30–35 mL/kg (overestimates large person, underestimates small person)
- 100 mL/kg for the first 10 kg, 50 mL/kg for the
- Increased insensible losses with fever (around 10%–15% for every degree Celsius greater than 37°C)

Table 5.7 Effect of Body Temperature on Insensible Fluid Losses

Rectal Temperature (°C)	No. of Patients	Mean Fluid Loss (mL/m ² /day)
36.7–37.7	205	552
37.8–38.2	160	600
38.3–38.8	48	768
38.9–40	14	840

Regulation of effective circulating volume

- Kidney – Renin-angiotensin-aldosterone system
- Extra-renal (carotid sinus, atrium) – Sympathetic nervous system (epinephrine and norepinephrine)

and atrial natriuretic peptide

Table 5.8. Hemodynamic Assessment

Ejection Fraction	Adjusted End-Diastolic Volume Index for Normal Subjects	Adjusted End-Diastolic Volume Index for Critically Ill Patients
20	200	240
30	150	180
35	125	150
40	100	120
50	50	60

5. Regulation of plasma osmolality

- a. Vasopressin release
 - b. Thirst
 - c. Osmoreceptor sensitivity
- B. Water and Sodium Disorders

1. Dehydration: As evidenced by decreased urine output (unless patient has glycosuria or diuretic therapy), increased serum urea nitrogen/serum creatinine, net fluid balance “from nursing records), poor skin turgor, hypotension, “contraction alkalosis.” Increased losses
 - a. Fever
 - b. GI fluids
2. Volume excess: As evidenced by the presence of peripheral/sacral/pulmonary edema, anasarca, congestive heart failure, acute kidney injury (AKI)
 - a. Excessive fluid intake
 - b. Impaired ability to excrete excess water and sodium (e.g., heart failure, cirrhosis with ascites, renal failure)



3. Hyponatremia

a. Classic evaluation

- i. Exclude hyperglycemia, mannitol, and glycine for unmeasured osmoles (hypertonic hyponatremia).
- ii. Exclude factitious/pseudo-hypoglycemia (isotonic hyponatremia).
- iii. Evaluate ECF volume (increased, normal, decreased)
- iv. Consider use of urine sodium and osmolality, if necessary.
- v. Consider patient conditions/diagnoses.

b. European Society of Endocrinology guidelines

- i. Exclude hyperglycemia and other causes of non-hypotonic hyponatremia.
- ii. Evaluate urine sodium and osmolality.
- iii. Assess ECF and arterial blood volume, diuretics, presence of kidney disease

c. Treatment of hyponatremia

- i. Acute or severe symptoms? – Immediate treatment with hypertonic saline
- ii. ECF expanded – Fluid and sodium restriction
- iii. ECF reduced and low urine sodium – Give sodium, reduce diuretic therapy.
- iv. ECF normal – Consider syndrome of inappropriate antidiuresis or secondary adrenal insufficiency – Fluid restriction first; consider use of 0.9% sodium chloride solution with or without diuretic therapy

4. Hypernatremia

- a. Excessive sodium intake (hypertonic saline, 0.9% sodium chloride solution, lactated Ringer solution)
- b. Dehydration

A. C. Disorders of Potassium Homeostasis

I. Potassium homeostasis overview

- a. 98% intracellular
- b. Total body stores: 35–50 mEq/kg in normal healthy, undernourished
- c. Normal serum concentration: 3.5–5.2 mEq/L

Page 416 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- d. Serum concentration can be influenced by change serum potassium will decrease by around 0.6 mEq/L [range 0.4–1.3 mEq/L])

Self-check-5

Directions: Answer all the questions listed below

1. The nurse is caring for a client postoperatively who develops sinus tachycardia. Which of the following interventions should the nurse perform?
 - A. Apply warmed blankets
 - B. Administer atropine sulfate
 - C. Position the client in a left lateral position
 - D. Manage the client's anxiety
2. A client is experiencing confusion in the immediate postoperative period. Which of the following assessments is essential to determine the reason for the confusion?
 - A. Level of consciousness
 - B. Airway status
 - C. Cardiac rhythm
 - D. Level of anxiety
3. Which laboratory result would require immediate intervention by the nurse for the client scheduled for surgery?
 - A. Bleeding time 2 minutes.
 - B. Potassium 2.4 mEq/L.
 - C. Calcium 9.2 mg/dL.
 - D. Hemoglobin 15 g/dL.

Unit six: Identify & manage common communicable & non-communicable diseases

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

- Common bacterial diseases
- Common viral infections
- Common fungal infections
- Common protozoal infections
- Common parasitic infestations
- Common non- communicable disease
- Developmental and acquired spinal health problems
- Explain Prevention methods of spinal problems

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

- Diagnose and manage common bacterial diseases
- Identify and manage common viral infections
- Diagnose and provide treatment for common fungal infections
- Identify and manage common protozoal infections
- Diagnose and manage Common parasitic infestations
- Diagnose and manage common non- communicable disease
- Identify developmental and acquired spinal health problems
- Explain Prevention methods of spinal problems

6.1 Common bacterial diseases

INTRODUCTION

Page 419 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

The organisms causing the diseases in the air-borne group enter the body via the respiratory tract.

When a patient or carrier of pathogens talks, coughs, laughs, or sneezes, he/she discharges fluid droplets. The smallest of these remain up in the air for some time and may be inhaled by a new host. Droplets with a size of 1-5 microns are quite easily drawn in to the lungs and retained there. Droplets that are bigger in size will not remain air borne for long but will fall to the ground.

Here, however, they dry and mix with dust.

When they contain pathogens that are able to survive drying, these may become air-borne again by wind or something stirring up the dust, and they can then be inhaled. Air-borne diseases, obviously, will spread more easily when there is overcrowding, as in overcrowded class rooms, public transport, canteens, dance halls, and cinemas.

Good ventilation can do much to counteract the effects of overcrowding.

Air-borne diseases are mostly acquired through the respiratory tract. Here are some common bacterial diseases in our country Ethiopia.

6.1.1 Tuberculosis (TB)

TB is the most frequent life-threatening OI and a leading cause of death in HIV infected people. TB increases HIV replication through immune activation, thus high viral load and rapid progression of HIV disease.

Is a chronic and infectious mycobacterial disease important as a major cause of illness and death in many parts of the world. On the other hand, HIV increases susceptibility to M. tuberculosis infection (20-37 times greater lifetime risk than HIV negative), progression to TB disease and the incidence and prevalence of TB.

Infectious agent

Mycobacterium tuberculosis- human tubercle bacilli (commonest cause) Mycobacterium bovis- cattle and man infection

Mycobacterium avium- infection in birds and man.

Diagnosis of TB

Page 420 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
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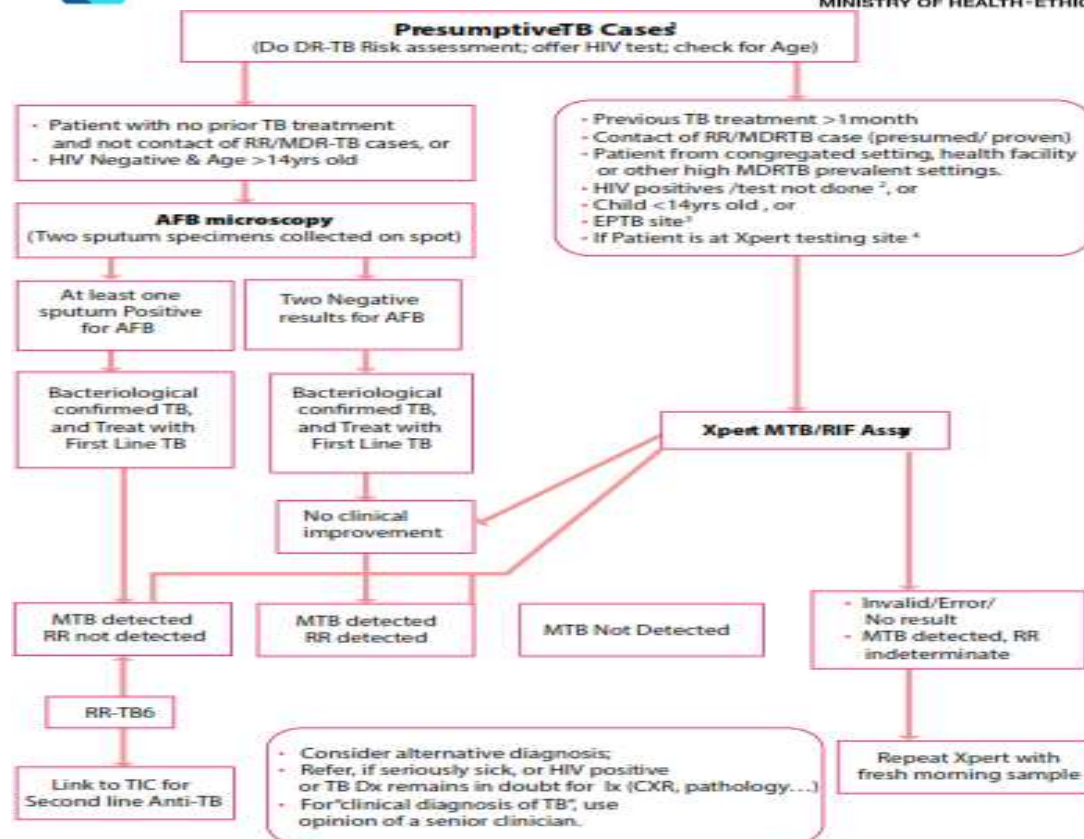


Figure 3.1 Algorithm for the diagnosis of Pulmonary & extrapulmonary TB

Mode of transmission

Through aerosolized droplets mainly from persons with active ulcerative lesion of lung expelled during talking, sneezing, singing, or coughing directly.

Untreated pulmonary tuberculosis positive (PTB+) cases are the source of infection. Most important is the length of time of contact an individual shares volume of air with an infectious case.

That is intimate, prolonged or frequent contact is required.

Transmission through contaminated fomites (clothes, personal articles) is rare.

Ingestion of unpasteurized milk transmits bovine tuberculosis. Overcrowding and poor housing conditions favor the disease transmission.

Incubation period

4-12 weeks Period of communicability- as far as the bacilli is present in the sputum

Page 421 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

Susceptibility and resistance

Under 3 years old children, adolescents, young adults, the very old and the immuno suppressed are susceptible.

Treatment of TB

Two antibiotics (isoniazid and rifampicin) for the first 2 months and

Two additional antibiotics (pyrazinamide and ethambutol) for the first last 4 months of the 6-month treatment period.

6.1.2 Tetanus

Tetanus is a vaccine-preventable disease that is caused by a potent neurotoxin produced by the spore-forming bacterium *Clostridium tetani*.

The spores of *C. tetani* are present in the environment and can contaminate wounds, minor abrasions, and, in neonatal tetanus, the umbilical stump. In anaerobic conditions, the spores of *C. tetani* produce vegetative bacteria, which express the tetanus toxin and cause the disease.

Tetanus toxin is highly neurotoxic. It inhibits inhibitory neurotransmission. This loss of inhibition (disinhibition) results in increased muscle tone, painful spasms, and widespread autonomic instability.

In the majority of cases, tetanus arises from minor skin cuts or abrasions. In significant number of patients no obvious entry site is seen.

Tetanus can present in one of four clinical patterns:

- Generalized
- Local
- Cephalic
- Neonatal

The incubation period = the time from presumed infection (injury) to the first symptom.

The period of onset = the time between the first symptom and first spasm.

Incubation period of less than 7 days and a period of onset of 48 hr considered to indicate poor prognosis. However, the time from first symptom to hospitalization and the presence of spasms at presentation have greater prognostic significance

Page 422 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Prognosis also depends on the severity.

Clinical Features

Generalized tetanus

- Trismus (lockjaw)
- Spasms: very painful spasms
 - ✓ Triggered by noises or other sensory, contact or light.
 - ✓ Stiff neck, opisthotonus, risus sardonius (ironic smile), a board-like rigid abdomen.
 - ✓ Periods of apnea or upper airway obstruction
 - ✓ Dysphagia
- Autonomic over activity: restlessness, profuse sweating, and tachycardia, cardiac arrhythmias, labile hypertension or hypotension, and fever are often present.

Local tetanus: Rarely, tetanus presents with tonic and spastic muscle contractions in one extremity or body region.

Cephalic tetanus: Patients with injuries to the head or neck may present with cephalic tetanus, involving initially only cranial nerves.

Investigations and diagnosis

- The diagnosis of tetanus is clinical based on the typical findings
- **Severity Scoring:** There is several severity scores used but the Ablett classification has been used most commonly.

Table 6.1 Ablett classification of severity of Tetanus

Grading	Clinical features
I- Mild	Mild to moderate trismus; general spasticity; no respiratory embarrassment; no spasm; little or no dysphagia
II- Moderate	Moderate trismus; well-marked rigidity; mild to moderate but short spasms; moderate respiratory embarrassment with RR greater than 30; mild dysphagia
III-Severe	Severe trismus; generalized spasticity; reflex prolonged spasms; increased RR greater than 40; apnoeic spells; severe dysphagia; tachycardia greater than 120.

IV-Very Severe	Grade III and violent autonomic disturbances involving the cardiovascular system. Severe hypertension and tachycardia alternating with relative hypotension and bradycardia, either of which may be persistent.
Ablett JLL. Ellis M, ed. Symposium on Tetanus in Great Britain. 1967;1-10.	

Table 6.1.1 Treatment for tetanus

Drug name	Dose	Comment
Control of spasm		
Diazepam	10 mg I.V. should be given every 4 hourly, the dose being titrated depending on the response.	Be cautious with respiratory depression at high dose, if not mechanically ventilated.
Neuromuscular blockade		
Suxamethonium	20-100mg I.V.	May be employed in patients with severe laryngeal spasm.
Control of autonomic dysfunction		
Magnesium sulphate	Load 40mg/kg IV over 30 min, then IV infusion of 2g/h for > 45kg & 1.5g/h for ≤45kg	well-studied in reducing autonomic instabilities; help to reduce spasms
Labetolol	0.25-1.0mg/min IV infusion	Alpha and beta blocker, avoid beta blockers alone
Morphine	0.5-1.0mg/kg per hour	
Halting toxin production and neutralizing circulating toxins		

Wound debridement to eradicate spores and necrotic tissue	Initially and as necessary	Halt bacteria germination and related toxin production
Human Tetanus immunoglobulin (HTG)	500 IU I.M. single dose	Start immediately. Help to neutralize unbound

6.1.3 Community Acquired Pneumonia (CAP)

Pneumonia refers to acute inflammation of the distal lung-terminal airways, alveolar spaces, and interstitium.

The clinical presentation and the etiology vary greatly depending on the age of the patient, the infecting organism, the site/s the infection has involved, immune status of the patient and the place of acquisition of infection.

Etiology of CAP

Streptococcus pneumoniae is the most common etiology.

Others: *Mycoplasma*, *Chlamydia*, *H. influenza*, *M. catarrhalis*, *Legionella* (especially in elderly, smokers), viral (especially in young), *Klebsiella* & other gram negative bacteria (mainly in alcoholics & during aspiration), *S. aureus* (especially post-viral infection)

Clinical features

Although signs, symptoms & imaging do not reliably distinguish between —typical and atypical pneumonia, the following can give clues.

Typical (*S. pneumoniae*, *H. influenza*)

Acute onset of fever, cough with purulent sputum, dyspnea

Consolidation on CXR.

Atypical (*Mycoplasma*, *Chlamydia*, *Legionella*, viral)

More insidious onset of dry cough

Extra pulmonary symptoms may be present (nausea/vomiting, diarrhea, headache, myalgia,

Page 425 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

sore throat)

Patchy interstitial infiltrates on CXR

Elevated transaminases & low serum sodium with *Legionella*.

Identifying site of care

Although it can't completely replace clinical judgement, clinicians need to use prognostic criteria to decide at the setting of treatment pneumonia (inpatient versus outpatient).

The CURB-65 is relatively easy to use criteria for this purpose.

Table 6.1.3 CURB-65 criteria for deciding the setting of treatment in CAP

C	Confusion* (1 point)
U	Urea >20 mg/dL (7 mmol/L)** (1 point)
R	Respiratory rate ≥30 breaths per minute (1 point)
B	Low systolic (<90 mmHg) or diastolic (≤60 mmHg) Blood pressure (1 point)
65	Age ≥65 years (1 point)
* Defined as an Abbreviated Mental Test Score ≤8 or new disorientation to person, place, or	

CURB-65 score	Site of management
0	Outpatient treatment, PO antibiotic
1-2 point	Inpatient management, with IV antibiotics, in a general ward. Those with a score of 1, due age ≥ 65 can be managed as an outpatient.
3 to 5 points	Inpatient management with IV antibiotics; evaluate for ICU admission.

Table 6.1.4 Empiric antibiotic recommendations for outpatients' management of CAP

CAP categories	Etiology	First line	Second line
CAP: outpatient No-comorbidities AND No risk factors*	S.pneumoniae H.influenzae Atypicals	Amoxicillin X 5- 7 days	Doxycycline OR Clarithromycin/Azithromycin
CAP: outpatient With comorbidities	Above + beta-lactamase-producing organisms catarrhalis	<u>Combination therapy</u> Amoxicillin-clavulanate AND Clarithromycin/Azithromycin X 5-7 days	<u>Combination therapy</u> Cefuroxime or Cefpodoxime AND Clarithromycin/Azithromycin
CAP for hospitalized patients	Gram positive and negative and atypical microorganisms	Ceftriaxone OR cefotaxime IV + Clarithromycin or Azithromycin for 5 to 7 days	Amoxicillin-clavulanate + azithromycin or Clarithromycin
*Risk factors = risk factors for MRSA or <i>P. aeruginosa</i> infections (see the text above)			

6.1.4 Cholera

Cholera is an acute diarrheal disease that can cause severe dehydration and death in a few hours. It is caused by *Vibrio cholera* and often occurs as epidemics under conditions of poor hygiene.

Clinical features

Sudden onset of explosive diarrhea is the hallmark of the disease.

The diarrhea is classically voluminous, non-offensive, and somewhat looks gray or rice water.

Fever is absent.

Investigations and diagnosis

- It is often diagnosed based on clinical grounds.
- If possible stool culture.

Treatment Objectives

- Correction of fluid and electrolyte deficits
- Replacement of ongoing fluid losses
- Decrease duration of diarrhea

Prevention

- The promotion of adequate hygienic conditions in the community is important to prevent an outbreak and spread of the disease.
- If cholera outbreak is suspected, the responsible health authorities should be notified. Appropriate epidemic investigation and confirmation is needed.
- Patients should be treated in isolated area with infection prevention strategies in place, trained manpower and —cholera-beds‘

Page 428 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

6.1.5 Dysentery

Dysentery is a blood diarrheal stool.

Dysentery can be an acute or persistent diarrhea and it can also be associated with dehydration.

Investigations

Diagnosis is generally based on clinical profile.

Stool examination or stool culture may be indicated in children with dysentery or persistent diarrhea but is not commonly needed for acute watery diarrhea.

Treatment

Objectives

- Prevent dehydration,
- Treat dehydration, when dehydration is present;
- Prevent nutritional damage, by feeding during and after diarrhea; and
- Reduce the duration and severity of diarrhea, and the occurrence of future episodes, by giving supplemental zinc.

Plan A

Give fluid and food to treat diarrhea at home.

If the child is being breastfed, advise the mother to breastfeed frequently and for longer at each feed.

If the child is exclusively breastfed, give ORS solution or clean water in addition to breast milk.

After the diarrhea stops exclusive breastfeeding should be resumed, if appropriate to the child's age

In non-exclusively breastfed children, give one or more of the following:

- ✓ ORS solution
- ✓ Food-based fluids (such as soup, rice water and yoghurt drinks)
- ✓ Clean water

Dangerous fluids not to be given

- ✓ Drinks sweetened with sugar

Page 429 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- ✓ Commercial carbonated beverages
- ✓ Commercial fruit juices
- ✓ Sweetened tea
- ✓ Fluids with stimulant, diuretic or purgatives effects (e.g., coffee)
- ✓ Some medicinal

6.2 Common viral infections

Common cold (Viral rhinitis)

Also known as Upper Respiratory Tract Infection is a common acute illness

Symptoms are self-limiting often lasting up to 10 days

Transmission occurs through droplets

Symptoms

Fever usually low grade

Nasal congestion, Rhinorrhea,

Sore throat, cough, general malaise

Investigation and Diagnosis

The diagnosis of common cold should be made clinically yet it is important to distinguish it from other illnesses with similar symptoms.

Treatment

Goals

Reduction of symptom duration and severity

Non pharmacologic

Bed Rest

Adequate Hydration

Steam

Pharmacologic

Symptomatic Treatment: Paracetamol or NSAID

Topical decongestants

Oral Antihistamines

Page 430 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

N.B: Avoid usage of antibiotics for patients with common cold.

Varicella (Chicken Pox)

The varicella virus causes two distinct syndromes in humans:

A primary illness called chicken pox, which most often occurs in children and is relatively benign, and

A second distinct syndrome called herpes zoster, which occurs in older adults or immunocompromised hosts and is due to reactivation of the dormant virus in the nerves.

Clinical features of chicken pox

Prodrome of fever, malaise, nausea, —flu-like illness. 2–5 days later a generalized, itchy rash appears.

Crops of papules-vesicles, then crusted lesions appear all over, sparing the palms and soles.

Lesions co-exist in different stages of progression, i.e. new papules appear when older lesions are already crusted. Intense itching occurs.

Complications are more often if HIV acquire as adults, and particularly in pregnant.

Complications may include pneumonia, encephalitis, hepatitis or haemorrhagic syndromes.

Varicella complications acquired before 28 weeks' gestation, will cause congenital abnormalities in the child (also called congenital varicella syndrome).

If acquired around the time of birth, it can cause neonatal varicella, which carries a high rate of pneumonia and other complications.

Treatment

Objectives

Prevent complications

Pharmacologic

In adults including pregnant women:

Oral acyclovir, 800mg 5 times daily for 7 days.

In immunocompromised adults or those with disseminated disease:

IV acyclovir 10mg/kg 3 times daily for 7 days; OR high-dose oral acyclovir, if no IV available.

Page 431 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Start treatment as early as possible ideally in less than 24 hours after symptom onset.

For oral treatment, the value of starting after 24 hours is not well established

N.B. The rash can be pruritic and this can be treated with appropriate anti-histamines.

Hepatitis

Hepatitis B virus (HBV) is a double-stranded hepatotropic DNA virus.

HBV infection is a global health problem. It is estimated that about 650,000 people die annually worldwide from the consequences HBV infection.

The prevalence of HBV is highest in sub-Saharan Africa and East Asia.

Though there is no a nationwide epidemiology study, several studies indicate that Ethiopia has a high burden of HBV infection.

Transmission

HBV is transmitted by percutaneous or mucosal exposure to infected blood or body fluids (saliva, menstrual, vaginal, and seminal fluids).

Mother to child (perinatal) transmission is an important route of transmission.

Transmission within a household, particularly to children is also an important contributor.

Sexual transmission may occur in those with multiple sex partners.

The risk of developing chronic infection is 90% following perinatal infection (up to 6 months of age) but decreases to 20–60% between the ages of 6 months and 5 years. Infection in adulthood leads to chronic hepatitis in less than 5% of cases.

HBV infection causes a number of clinical problems: acute hepatitis, chronic hepatitis, liver cirrhosis, hepatocellular carcinoma, and extrahepatic features (e.g., glomerulonephritis, vasculitis). Liver cirrhosis and hepatocellular carcinoma are the two major causes of death in patients with chronic HBV infection

Chronic HBV infection is a dynamic process due to viral replication and the host immune response. Taking viral replication status (HBeAg status), HBV DNA level (viral load), alanine aminotransferase (ALT) values and status of liver inflammation, HBV infection is divided into five phases.

Page 432 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Having evidence of HBV infection does not necessarily indicate liver injury (hepatitis) or the consequences of liver injury (liver cirrhosis and hepatocellular carcinoma). A positive HBV surface antigen (HBsAg) is the hall mark of HBV infection while HBV antigen (HBeAg) indicates high viral replication.

The presence of liver injury (hepatitis) is confirmed by a rise in transaminases (mainly ALT) or imaging/clinical evidence of liver fibrosis and cirrhosis.

Clinical features

Acute infection

- Largely asymptomatic
- Some patients may have features of acute hepatitis: jaundice, nausea, vomiting, fatigue, right upper quadrant pain.
- Rarely patients may progress to acute liver failure: encephalopathy, ascites, bleeding diathesis

Chronic infection

- Largely asymptomatic
- Some patients may have non-specific symptoms which can be intermittent or persistent: fatigue/lack of energy, poor appetite

Decompensated Liver Cirrhosis

- Nonspecific symptoms: fatigue, weight loss, poor appetite
- Jaundice
- Ascites
- Variceal bleeding
- Encephalopathy (mild to severe)
- Bleeding

Hepatocellular Carcinoma

- Weight loss
- Hard irregular liver mass

Treatment

Page 433 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Objectives of treatment

The main objectives of HBV treatment

- Reduce progression to cirrhosis, hepatocellular carcinoma and associated mortality
- Improve liver fibrosis
- Preventing acute or subacute liver failure in acute HBV infection
- Controlling extrahepatic manifestations.
- Prevention of HBV reactivation.
- Prevention of mother to child transmission.

Intermediate objectives of treatment

- Suppression of HBV DNA levels
- Induction of HBeAg loss, with or without anti-HBe seroconversion
- Biochemical response = ALT normalization
- HBsAg loss: optimal goal but rarely achievable

Pharmacological treatments

First line

- Tenofovir (Tenofovir disoproxil fumarate) (TDF) 300mg, PO, once daily Avoid in patients with GFR <60ml/min OR
- Entecavir 0.5mg, PO, once daily. For patients with decompensated cirrhosis or those with previous exposure to Lamuvidine the dose should be increased to 1mg, daily.
- Entecavir is preferred over Tenofovir in patient's age > 60, chronic kidney disease, osteoporosis or steroid use.

6.3 Common fungal infections

Fungal Infections of the Skin

Candidiasis (Mucocutaneous Candidiasis)

- Candidiasis is an infection caused by the yeast like fungus Candida Albicans. Infection by this fungus may cause different types of lesions on the skin, nail, mucous membrane and viscera.

Page 434 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

- The areas where warmth, and maceration of the skin permit the organism to thrive, are frequently affected. These are the perianal and inguinal folds, the interdigital areas and the axillae.
- It may be a normal inhabitant at various sites until there is some change in the state of the area, and then it becomes a pathogen.
- Abnormal moisture also promotes its growth, as in moist lip corner.
- Clinical features and investigations depend on each specific site.

Balanoposthitis

Balanoposthitis refers to candida infection of the penis.

Clinical features

Small papules or fragile papulopustules on the glans or in the coronal sulcus

Investigations

Microscopic examination after KOH preparation

Treatment

Objectives

Eradicate infection

Non pharmacologic

Manage predisposing factors like maceration and underlying diseases like diabetes and immunosuppression.

Pharmacologic

First line

Clotrimazole, thin film of 1% cream applied to the lesion BID for about 2-3 weeks

Alternative

- Miconazole, thin film of 2% cream applied to the lesion bid for about 2-3 weeks.
- Candidal Intertrigo
- Usually involves the great folds of the body (groin, inframammary, axillae, scrotum, perianal areas). It also affects the area between the fingers and toes.
- Clinical features

Page 435 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- Red, oozing band with a whitish macerated center and a scaly border at the affected fold.
- Isolated, flaccid, satellite, vesiculo-pustules which, when they break, show collar of scale at
- The periphery.

Investigations

Microscopic examination after KOH preparation

Treatment

Eradicate infection

In those suffering from diabetes mellitus, treatment consists of bringing the diabetes under control.

Candidal Intertrigo

Usually involves the great folds of the body (groin, inframammary, axillae, scrotum, perianal areas). It also affects the area between the fingers and toes.

Clinical features

- Red, oozing band with a whitish macerated center and a scaly border at the affected fold.
- Isolated, flaccid, satellite, vesiculo-pustules which, when they break, show collar of scale at the periphery.

Investigations

Microscopic examination after KOH preparation

Treatment

Objectives

- Eradicate infection
- In those suffering from diabetes mellitus, treatment consists of bringing the diabetes under control.

Non pharmacologic

Avoidance of chronic exposure to moisture.

Pharmacologic

Topical application of, Clotrimazole, Miconazole

Oral candidiasis (thrush)

Page 436 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

Oral thrush are thick white plaques that adhere to the oral mucosa with moist, reddish, and macerated base.

It can be a sign of immunosuppression and dry mouth can be the predisposing factor, because saliva inhibits growth of candida.

Clinical features

Pseudomembranous form- The most common form characterized by white plaques on the buccal mucosa, palate, tongue or oropharynx.

Atrophic form- Commonly found under dentures and characterized by erythema without plaques.

Investigations

Microscopic examinations of KOH preparations of the scrapings of the white patches or erosive areas of the mucosa.

Treatment

Objective

Eradicate Infection

Non-pharmacologic

Manage predisposing factors like maceration and underlying diseases like diabetes and immunosuppression.

Pharmacologic

Topical application of Clotrimazole or Miconazole or Nystatin for 15 days

OR

Systemic treatment with loading dose of Fluconazole 200mg PO and maintenance dose of 100/200mg PO/day for 7-14 days OR Itraconazole 200mg PO/day for 05-10 days

6.4 common parasitic infections

Malaria

Malaria is a parasitic infection caused by plasmodium species known to affect humans.

Page 437 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

The commonest causes of malaria in Ethiopia are *Plasmodium falciparum* and *Plasmodium vivax*.

P. falciparum causes virtually all the severe forms of malaria.

Malaria is a major public health problem in Ethiopia and has been consistently reported as one of the leading causes of morbidity and mortality.

Prompt diagnosis and treatment is essential in order to prevent complications and death.

Clinical feature of uncomplicated malaria

- Fever, chills, rigors, sweating
- Headache, generalized body and joint pain (myalgia and arthralgia)
- Nausea and/or vomiting, loss of appetite, abdominal pain (especially in children)
- Irritability and refusal to feed (in infants), flu-like symptoms,
- Fever, usually above 38°C
- hepatosplenomegaly
- Pallor

Investigations and diagnosis

Investigations

- Microscopy-thick and thin blood films for malaria parasites
- Rapid diagnostic tests (RDT)-if microscopy is unavailable
- CBC

Diagnosis

- The diagnosis of malaria can be confirmed when malaria parasites are demonstrated in the blood films (thick or thin) or with Rapid Diagnostic Test (RDT).
- Blood film is also helpful to estimate the degree of parasitemia, which is very useful not only to predict severity but gauge response to treatment.
- If neither microscopy nor rapid tests are available, diagnosis should be made on the basis of clinical presentation.
- Clinical diagnosis of malaria is made in a patient who has fever or history of fever in the past 48 hours and lives in malaria-endemic areas or has a history of travel within the last 30 days to malaria-endemic areas.

Page 438 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	---	--	--

- All patients with malaria should be asked for history of malaria treatment in the past 28 days.

Treatment

Objectives

- Decrease individuals morbidity
- Prevent uncomplicated malaria from progressing to severe form
- Improve societal productivity
- Prevent death from malaria complication
- Prevent the development and transmission of drug resistance
- Decrease malaria transmission to others

Pharmacological treatment

P.vivax Chloroquine for 3 days + primaquine (PQ) for 14 days

Artemether-lumefantrine/oral quinine + PQ for 14 days

Uncomplicated P.falciparum Artemether-lumefantrine for 3 days + single dose PQ Other ACTs (3 days)

if available or oral quinine + single dose PQ 354 Uncomplicated mixed infections Artemether-lumefantrine for 3 days + PQ for 14 days Other ACTs if available or oral quinine (7 days) + PQ for 14 days

Intestinal Helminthic Infestations

These are infestation caused by intestinal worms (nematodes and cestodes), which are commonly associated with poor personal and environmental hygiene.

Although they may not be fatal, they contribute to malnutrition and diminished work capacity.

Clinical features

Include abdominal cramps, nausea, bloating, anorexia

Anemia

Perianal itching

Passage of adult worms

Investigations

Page 439 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

Mainly by direct stool microscopy: A single stool microscopy may not be diagnostic.

A repeated stool microscopy may be needed.

Treatment

Reduce symptoms

Break the cycle of transmission

Table 6.5 Treatment of common intestinal helminthic parasitic infestations

Name of infestation Etiology Mode of transmission	Treatment	Remark
Ascariasis <i>Ascaris lambricoids</i>	First line-options Albendazole , 400mg P.O. as a single dose, for children: 1 – 2 years, 200mg as a single dose.	Presence of migrating larvae in the lungs can provoke pneumonia

Ingestion of the larvae of the parasite together with food	Mebendazole , 100mg P.O.BID for 3 days or 500mg, once Alternative (pregnant women) Pyrantel pamoate , 700mg P.O. as a single dose	
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<p>Enterobiasis</p> <p><i>Enterobius Vermicularis</i></p> <p>Ingestion of the eggs of the parasite together with food</p>	<p>First line-options</p> <p>Mebendazole, 100mg P.O. BID for 3 days, repeat in two weeks OR Albendazole, 400mg P.O. as a single dose, repeat in two weeks,</p> <p>Alternative</p> <p>Piperazine, 4g in a single dose.</p> <ul style="list-style-type: none"> Simultaneous treatment of the entire household is warranted due to high transmission possibilities 	<p>Common in children</p> <p>and auto infection may occur</p>
<p>Hookworm infestation</p> <p><i>Necator americanus</i> or <i>Ancylostoma duodenale</i></p> <p>Penetration of the larvae of the parasite through skin</p>	<p>First line-options</p> <p>Albendazole, 400mg P.O. as a single dose (preferred) OR Mebendazole, 100mg P.O. BID for 3 days or 500mg stat</p> <p>Alternatives:</p> <p>Pyrantel pamoate, 700mg P.O. as a single dose</p>	
<p>Strongyloidiasis</p> <p><i>Strongyloides stercoraries</i></p> <p>Penetration of the larvae of the parasite</p>	<p>First line</p> <p>Ivermectin, 200mcg/kg daily for 2 days. For disseminated strongyloidiasis, treatment with ivermectin should be extended for at least 5–7 days or until the parasites are eradicated.</p> <p>Alternatives-options</p>	<p>Larvae migrate to the lungs where they cause tissue destruction and bleeding.</p> <p>Treat concomitant anemia if any</p>



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MINISTRY OF HEALTH-ETHIOPIA

Page 442 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

Self-check-6

Directions: Answer all the questions listed below

1. Diseases caused due to the inflammation of the vermiform appendix of the digestive system is known as _____.

- (a) Appendectomy
- (b) Appendicitis
- (c) Intestinal cancer
- (d) Amoebic dysentery

2. Which of the following is a set of bacterial diseases?

- (a) Malaria, poliomyelitis, mumps
- (b) Mumps, cholera, typhoid
- (c) Plague, Leprosy, Diphtheria
- (d) Measles, Tuberculosis, Tetanus

3. In Ayurveda, the _____ disease is called as Vishuchika ?

- (a) Chickenpox
- (b) Smallpox
- (c) Cholera
- (d) Diphtheria

4. Vibrio cholerae is a motile bacteria, which belong to the group of _____.

- (a) Lophotrichous
- (b) Peritrichous
- (c) Monotrichous
- (d) Amphitrichous

5. 'Syphilis', a sexually transmitted disease is caused by _____.

- (a) Vibrio
- (b) Leptospira
- (c) Treponema pallidum
- (d) Pasteurella

Page 443 of 446	Author/Copyright Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I August, 2022
-----------------	--	--	--

6. Which of the following is the symptom of Diphtheria?

- (a) Bleeding gum
- (b) Hydrophobia
- (c) Suffocation
- (d) Excessive watering

7. Widal test is used for the susceptibility of _____.

- (a) Typhoid
- (b) Cholera
- (c) Malaria
- (d) Cholera

Page 444 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
			August, 2022

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Page 445 of 446	<u>Author/Copyright</u> Ministry of Labor and Skills	Common Medical and Surgical Care in Maternal Health	Training module Version -I
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