Prenatal Midwifery

NSG 313

University of Ibadan Distance Learning Centre
Open and Distance Learning Course Series Development

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Vice-Chancellor's Message

The Distance Learning Centre is building on a solid tradition of over two decades of service in the provision of External Studies Programme and now Distance Learning Education in Nigeria and beyond. The Distance Learning mode to which we are committed is providing access to many deserving Nigerians in having access to higher education especially those who by the nature of their engagement do not have the luxury of full time education. Recently, it is contributing in no small measure to providing places for teeming Nigerian youths who for one reason or the other could not get admission into the conventional universities.

These course materials have been written by writers specially trained in ODL course delivery. The writers have made great efforts to provide up to date information, knowledge and skills in the different disciplines and ensure that the materials are user-friendly.

In addition to provision of course materials in print and e-format, a lot of Information Technology input has also gone into the deployment of course materials. Most of them can be downloaded from the DLC website and are available in audio format which you can also download into your mobile phones, IPod, MP3 among other devices to allow you listen to the audio study sessions. Some of the study session materials have been scripted and are being broadcast on the university's Diamond Radio FM 101.1, while others have been delivered and captured in audio-visual format in a classroom environment for use by our students. Detailed information on availability and access is available on the website. We will continue in our efforts to provide and review course materials for our courses.

However, for you to take advantage of these formats, you will need to improve on your I.T. skills and develop requisite distance learning Culture. It is well known that, for efficient and effective provision of Distance learning education, availability of appropriate and relevant course materials is a *sine qua non*. So also, is the availability of multiple plat form for the convenience of our students. It is in fulfilment of this, that series of course materials are being written to enable our students study at their own pace and convenience.

It is our hope that you will put these course materials to the best use.

Prof. Abel Idowu Olayinka
Vice-Chancellor

Foreword

As part of its vision of providing education for "Liberty and Development" for Nigerians and the International Community, the University of Ibadan, Distance Learning Centre has recently embarked on a vigorous repositioning agenda which aimed at embracing a holistic and all encompassing approach to the delivery of its Open Distance Learning (ODL) programmes. Thus we are committed to global best practices in distance learning provision. Apart from providing an efficient administrative and academic support for our students, we are committed to providing educational resource materials for the use of our students. We are convinced that, without an up-to-date, learner-friendly and distance learning compliant course materials, there cannot be any basis to lay claim to being a provider of distance learning education. Indeed, availability of appropriate course materials in multiple formats is the hub of any distance learning provision worldwide.

In view of the above, we are vigorously pursuing as a matter of priority, the provision of credible, learner-friendly and interactive course materials for all our courses. We commissioned the authoring of, and review of course materials to teams of experts and their outputs were subjected to rigorous peer review to ensure standard. The approach not only emphasizes cognitive knowledge, but also skills and humane values which are at the core of education, even in an ICT age.

The development of the materials which is on-going also had input from experienced editors and illustrators who have ensured that they are accurate, current and learner-friendly. They are specially written with distance learners in mind. This is very important because, distance learning involves non-residential students who can often feel isolated from the community of learners.

It is important to note that, for a distance learner to excel there is the need to source and read relevant materials apart from this course material. Therefore, adequate supplementary reading materials as well as other information sources are suggested in the course materials.

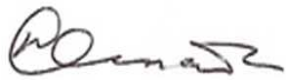
Apart from the responsibility for you to read this course material with others, you are also advised to seek assistance from your course facilitators especially academic advisors during your study even before the interactive session which is by design for revision. Your academic advisors will assist you using convenient technology including Google Hang Out, You Tube, Talk Fusion, etc. but you have to take advantage of these. It is also going to be of immense advantage if you complete assignments as at when due so as to have necessary feedbacks as a guide.

The implication of the above is that, a distance learner has a responsibility to develop requisite distance learning culture which includes diligent and disciplined self-study, seeking available administrative and academic support and acquisition of basic information technology skills. This is why you are encouraged to develop your computer skills by availing yourself the opportunity of training that the Centre's provide and put these into use.

In conclusion, it is envisaged that the course materials would also be useful for the regular students of tertiary institutions in Nigeria who are faced with a dearth of high quality textbooks. We are therefore, delighted to present these titles to both our distance learning students and the university's regular students. We are confident that the materials will be an invaluable resource to all.

We would like to thank all our authors, reviewers and production staff for the high quality of work.

Best wishes.



Professor Bayo Okunade
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COURSE INFORMATION
Course Code and Course Name: NSG 313 PRENATAL MIDWIFERY.
Credit Points: 3 units
Year: 300level

About the course: This course introduces the student to prenatal midwifery 1 which involves the anatomy and physiology of the genito-urinary organs.

Lecturer Information
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Consultation: Through SMS and Email

Introduction to the Course

You are welcome to NSG 313. This is an online course that runs in the Distance Learning Mode. It is a compulsory course open to all nursing students and it is a three (3) unit course that has 45 hours of interaction among teachers and learners for the period of the course. The course focuses on the normal anatomy and physiology of reproductive organs and the male reproductive organs and the urinary tract.

Aim

The course will enable the learners to, know the science of the normal structure and the function of the female reproductive organs and urinary system and the male reproductive system. Knowledge of the anatomy will enable students to recognize any deviation from normal, enhance the understanding of the labour process and the physiology of formation and excretion of urine and make the students to assist the nursing and medical staff intelligently.

Study Session 1: Female Pelvis

Expected Duration: One week of 2 contact hours

Introduction

In this study session we will be discussing the female pelvis. The woman's body is adopted by its shape and functions for unique feminine roles for example child bearing. It is important to be familiar with the anatomical features of the woman to understand the process of reproduction.

Learning Outcomes for Study Session 1

At the end of this study session, you should be able to:

1.1 Highlight the anatomy and various types of pelvis
1.2 Explain the four types of pelvis and its features
1.3 Differentiate the normal pelvis from abnormal.

The Anatomy of the Pelvis

Below the anatomy of the pelvis and its various types will be explained:

Innominate Bone

Innominate bones are also referred Pelvic bones

There are four pelvic bones:

- Two innominate ('nameless') or hip bones
- One sacrum
- One coccyx

Innominate bones

Each innominate bone is composed of three parts namely:

- The ilium
- The ischium
- The pubic bone

The ilium is the large flared-out part. When the hand is placed on hip it rests on the iliac crest which is the upper border. At the front of the iliac crest is the anterior superior iliac spine. Below it is the anterior inferior iliac spine. At the end of the iliac crest is the posterior superior and the posterior inferior iliac spines. The concave anterior surface of the ilium is the iliac fossa.

The ischium is the thick lower part. It has a large prominence known as the Iscial tuberiosity on which the body rests when sitting. Behind and a little above the tuberosity

is an inward projection, the ischial spine. In labour the station of the foetal head is estimated in relation to the ischial spines.

The pubic bone forms the anterior part. It has a body and two projections, the superior ramus and the inferior ramus. The two pubic bones meet at the symphysis pubis and the two inferior rami form the pubic arch. The space enclosed by the body of the pubic bone, the rami and the ischium is called the obturator foramen. The innominate bone contains the acetabulum. On the lower border of the innominate bone are two curves, the greater sciatic notch, and the lesser sciatic notch

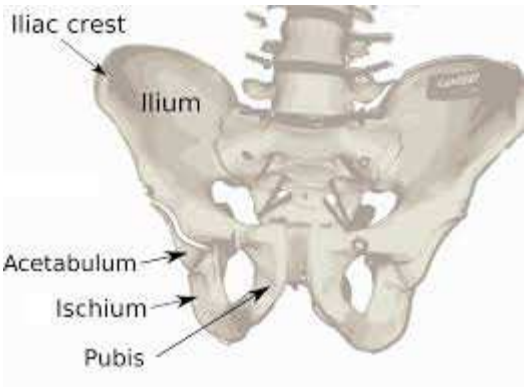

Figure 1.1: *Image to show Illium, Ishium, and Pubic bone*

In-text Question

The innominate bone is composed of three parts. Mention them

In-text Answer

Ileum, Ischium, Pubic bone

The sacrum is a wedge-shaped bone consisting of five vertebrate. The upper border of the first sacral vertebra is known as the sacral promontory. The anterior surface of the sacrum is concave and is referred to as the hollow of the sacrum. Laterally the sacrum extends into a wing or ala. Four pairs of holes of foramina pierce the sacrum and, through these, nerves from the cauda equine emerge to supply the pelvic organs.

The coccyx is a vestigial tail. It consists of four fused vertebrae, forming a small triangular bone.

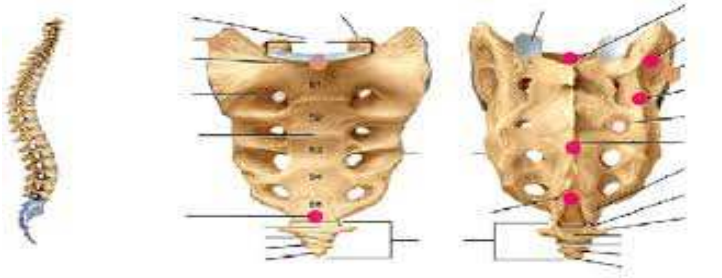

Figure 1.2: *Sacrum and Coccyx*

1.1.1 The Pelvic Joints

There are four pelvic joints:

- One symphysis pubis
- Two sacroiliac joints
- One sacrococcygeal joints

The Symphysis Pubis is formed at the junction of the two pubis bones which are united by a pad of cartilage.

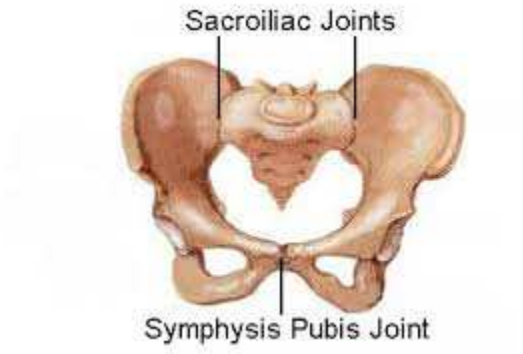

Figure 1.3: *Symphysis Pubis*

The Sacroiliac Joints are the strongest joints in the body. They join the sacrum to the ilium and this connects the spine to the pelvis.

The Sacrococcygeal Joint is formed where the base of the coccyx articulates with the tip of the sacrum. During pregnancy endocrine activity causes the ligaments to soften, which allows the joints to give. This may provide more room for the foetal head as it passes through the pelvis. The symphysis pubis may separate slightly in later pregnancy. If it widens appreciably, the degree of movement permitted may give rise to pain on walking. The sacrococcygeal joint permits the coccyx to be deflected backwards during the birth of the head.

In-text Question

Endocrine activity causes one of the following to soften during pregnancy.

a. Tissue
b. Tendon
c. Ligaments
d. Fibres

In-text Answer

Answer: ligaments

1.1.3 Pelvic Ligaments

Each of the pelvic joints is held together by ligaments:

- Interpubic ligaments as the symphysis pubis
- Sacroiliac ligaments
- Sacrococcygeal ligaments
- Sacrotuberous ligament

- Sacrospinous ligament

The sacrotuberous ligament runs from the sacrum to the ischial tuberosity and the sacrospinous ligament from the sacrum to the ischial spine. These two ligaments cross the sciatic notch and form the posterior wall of the pelvic outlet.

1.1.4 The True Pelvis

The true pelvis is the bony canal through which the foetus must pass during birth. It has a brim, a cavity and an outlet.

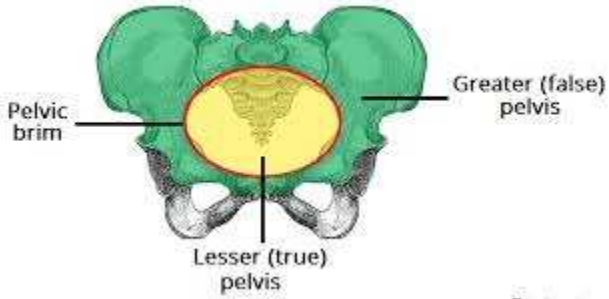

Figure 1.4: *The true pelvis and Pelvis brim*

The Pelvic Brim: is round except where the sacral promontory projects into it. The promontory and wings of the sacrum form its posterior border, the iliac bones its lateral borders and the pubic bones its anterior border. The landmarks on the pelvic brim are:

1. Sacral promontory
2. Sacral ala or wing
3. Sacroiliac joint
4. Iliopectineal line which is the edge formed at the inward aspects of the ilium
5. Iliopectineal eminence which is a roughened area formed where the superior ramus of the pubic bone meets the ilium
6. Superior ramus of the pubic bone
7. Upper inner border of the body of the pubic bone
8. Upper inner border of the symphysis pubis

Diameters of the brim: Three diameters are measured:

The Anteroposterior diameter: is a line from the sacral promontory to the upper border of the symphysis pubis. At the uppermost point of the symphysis pubis it is called the anatomical conjugate and measures 12cm; when it is taken to the posterior border of the upper surface, which is about 1.25cm lower, it is called the obstetrical conjugate and measures 11cm. The term true conjugate maybe be used to refer to either of these measurements.

The Diagonal diameter is also measured anteroposteriorly from the lower border of the symphysis to the sacral promontory. It measures 12-13cm.

The Oblique diameter is a line from one sacroiliac joint to the iliopectineal eminence on the opposite side of the pelvis and measures 12cm.

The Transverse diameter: is a line between the points furthest apart on the iliopectineal lines and measures 13cm. Another dimension, the sacrocotyloid, passes from the sacral promontory to the iliopectineal eminence on each side and measures 9-7.5cm. Its importance is concerned with posterior positions of the occiput when the parietal eminences of the foetal head may become caught.

In-text Question
What are the two ligaments that cross the sciatic notch to form the posterior wall of the pelvic outlet?

In-text Answer
The sacrotuberous and sacrospinous ligaments

The Pelvic Cavity: The cavity extends from the brim to the outlet below. The anterior wall is formed by the pubic bones and symphysis pubis and its depth is 4cm. The posterior wall is formed by the curve of the sacrum which is 12cm in length. Its lateral walls are the sides of the pelvis which are mainly covered by the obturator internus muscle. The cavity is circular in shape its diameter are all considered to be 12cm.

The Pelvic Outlet
Two outlets are described: the anatomical and the obstetrical. The anatomical outlet is formed by the lower borders of each of the bones together with the sacrotuberous ligament. The obstetrical outlet is of greater practical significance because it includes the narrow pelvic strait through which the foetus must pass.
The Anteroposterior diameter is a line from the lower border of the symphysis pubis to the sacrococcygeal joint. It measures 13cm.
The Oblique diameter is between the obturator foramen and the sacrospinous ligament. The measurement is 12cm.
The Transverse diameter is a line between the two ischial spines and measures 10-11cm. It is the narrowest diameter in the pelvis.

In-text Question
Mention four landmarks on the pelvic brim starting posteriorly?

In-text Answer
Sacral promontory, sacral ala or wing, Sacroiliac joint, Iliopectineal line

1.1.5 The false pelvis
This is the part of the pelvis situated above the pelvic brim. It is formed by the upper flared-out portions of the iliac bones and protects the abdominal organs, but is of no significance in obstetrics.
The false pelvis is the part situated above the pelvic brim. It is of no significance in obstetrics.

1.2 Types of Pelvis and Functions of Pelvis

Four Types of Pelvis

1. The Gynaecoid Pelvis

This is the ideal pelvis for childbearing. Its main features are the rounded brim, the generous fore pelvis, straight side walls, a shallow cavity with broad, well-curved sacrum, blunt ischial spines, a wide sciatic notch and a pubic arch of 90 degrees. It is found in women of average build and height.

The Justo Minor PelvisIs like a gynaecoid pelvis in miniature. All diameters are reduced but are in proportion. It is normally found in women of small stature, less than 1.5 m in height, with small hands and feet, but is occasionally found in women of normal stature. The outcome of labour in this situation depends on the foetus. If the foetal size is consistent with the size of the maternal pelvis, normal labour and delivery will take place

Table 1: Features of the four types of Pelvis

Features	Gynaecoid	Android	Anthropoid	Platypelloid
Brim	Rounded	Heart-shaped	Long oval	Kidney-shaped
Fore pelvis	Generous	Narrow	Narrowed	Wide
Side walls	Straight	Convergent	Divergent	Divergent
Ischial spines	Blunt	Prominent	Blunt	Blunt
Sciatic notch	Rounded	Narrow	Wide	Wide
Sub pubic angle	90^0	$< 90^\circ$	$>90^\circ$	$>90^\circ$
Incidence	$50^0/_0$	$20^0/_0$	$25^0/_0$	$5^0/_0$

2. **The Android Pelvis**: This is so called because it resembles the male pelvis. Its brim is heart-shaped with a narrow fore pelvis, and has a transverse diameter which is towards the back. The side walls converge, making it a funnel shape with a deep cavity and a straight sacrum. The ischial spines are prominent and the sciatic notch is narrow.

The angle of the pubic arch is less than 90 degrees. It is found in short and heavily built women. Android pelvis predisposes to an occipitoposterior position of the foetal head.

3. **The Anthropoid Pelvis**

This has a long, oval brim in which the anteroposterior diameter is longer than the transverse. The side walls diverge and the sacrum is long and deeply concave. The ischial spines are not prominent and the sciatic notch is very wide, as is the women with this type of pelvis tend to be tall, with narrow shoulders. Labour does not usually present any difficulties.

4. **The Platypelloid Pelvis**

This flat pelvis has a kidney-shaped brim in which the anteroposterior diameter is reduced and the sacrum is flat and the cavity shallow. The ischial spines are blunt, and the sciatic notch and the sub-pubic angle are both wide.

1.2.1 Pelvic Variations

High Assimilation Pelvis: This occurs when the 5th lumbar vertebra is fused to the sacrum and the angle of inclination of the pelvic brim is increased. Engagement of the head is difficult but, once achieved, labour progresses normally.

Deformed Pelvis: Deformation of the pelvis may result from a development anomaly, dietary deficiency, injury or disease.

The features of the female pelvis enhances the process of childbirth, provided the foetus size is normal.

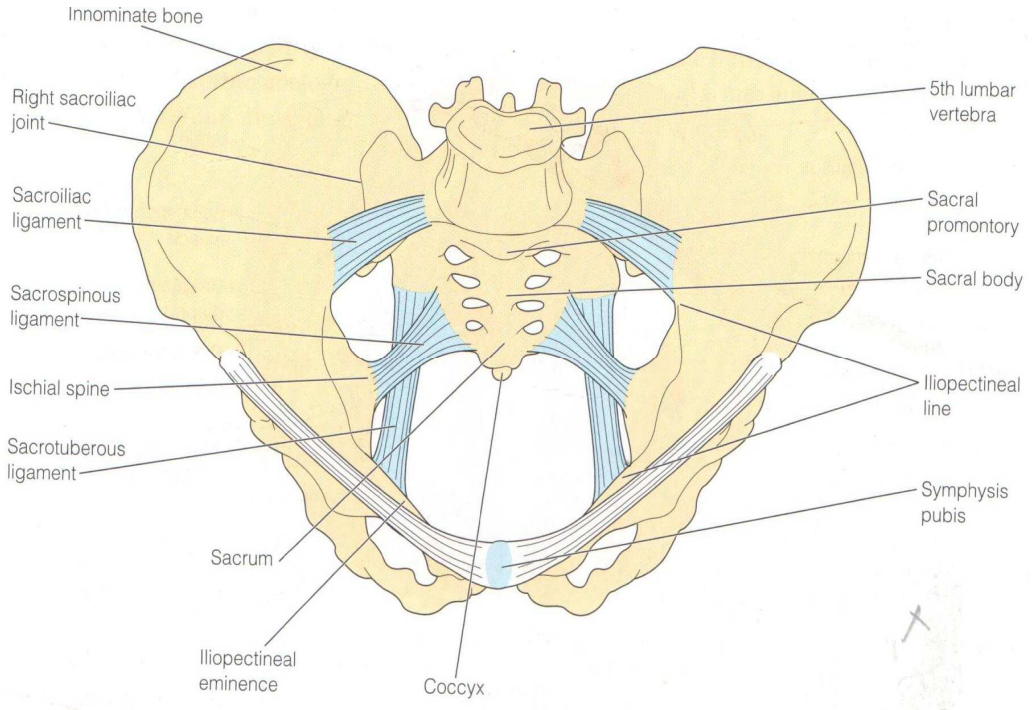

Figure 1.5:*The Female Pelvis(London, Ladering, Ball and Bindler, 2003).*

Functions of the female pelvis are:

Primary function is to allow the movement of the body especially walking and running

- It permits the individual to sit and kneel.
- Transmits the weight of the trunk to the legs acting as a bridge between the femurs and also takes the weight of the sitting body unto the ischial tuberosities
- Protects the pelvic organs and abnormal organs
- The female pelvis is adopted for child bearing

Summary **of Study Session 1**

In this study session 1 you have learnt that:

The features of the female pelvis facilitate the process of childbirth if the foetal size is normal

The pelvic bones, joints, ligaments and normal shape facilitate the labour process.

Self -Assessment Questions (SAQS) for Study Session 1

Now that you have completed study session, you will need to assess yourself to see if you have achieved the learning objectives. Try to answer the questions below. Compare your answers to the correct answers at the end of the study session

SAQ1 (Test learning outcome 1.1)

How can we correctly describe the functions of the pelvis?

SAQ1.2 (Test learning outcome 1.2)

In a tabular form, highlight all the types of pelvis and their features.

References:

Cooper,M.,& Fraser, D. (2009) *MylesTextbook for Midwives*.15th Edition Churchill Livingstone.

London M. Z., Ladering, P. W., Ball, J. W.,& Bindler, R.C (2003).*Maternal and Child nursing care* (2nd Ed). New Jersey: Pearson Education.

Answers to Self- Assessment Questions

SAQ1.1

Functions of the Pelvis
Primary function is to allow the movement of the body especially walking and running
It permits the individual to sit and kneel
Transmits the weight of the trunk to the legs acting as a bridge between the femurs and also takes the weight of the sitting body unto the ischial tuberosities
Protects the pelvic organs and abnormal organs
The female pelvis is adopted for child bearing

SAQ1.2

Table 1: Features of the four types of Pelvis (Cooper & Fraser,2009)

Features	Gynaecoid	Android	Anthropoid	Platypelloid
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Sciatic notch	Rounded	Narrow	Wide	Wide
Sub public angle	90^0	$< 90^\circ$	$>90^\circ$	$>90^\circ$
Incidence	$50^0/_0$	$20^0/_0$	$25^0/_0$	$5^0/_0$

Study Session 2: The Pelvic Floor/Vulva and Vagina

Expected Duration: 1 week of 2 contact hour

Introduction

In this study session, we shall be discussing the pelvic floors, the muscle, and the perineal body and also the vulva and vagina. The pelvic floor is formed by soft tissues; the most important is the strong diaphragm of muscles through which the urethra, the vagina and anal canal passes through.

The vulva is the term applied to the external female genital organs and the vagina is a passage that allows the escape of menstrual flow, receives the penis and sperm during sex and provide an exit for the foetus during delivery.

Learning Outcomes for Study Session 2

At the end of this lecture, you should be able to:

2.1 Explain the functions of the pelvic floor and describe the muscle layer.
2.2 Describe the perineal body
2.3 Highlight the structure of the vulva.
2.4 Describe the function and structure of the vagina and the organs in association with the vagina

2.1 Functions of the Pelvic Floor

The pelvic floor or pelvic diaphragm is composed of muscle fibres of the levator ani, the coccygeus muscle, and associated connective tissue which span the area underneath the pelvis.

The functions of the pelvic floor include:

- Supports the weight of the abdominal and pelvic organs
- Its muscle are responsible for voluntary control of micturition and defecation and also play vital part in sexual intercourse
- It influences the passive movement of the foetus through the birth canal and facilitates its exit from the pelvis during labour.

The Muscle Layers: This consists of superficial and deep muscle layers. The superficial muscle is composed of five muscles

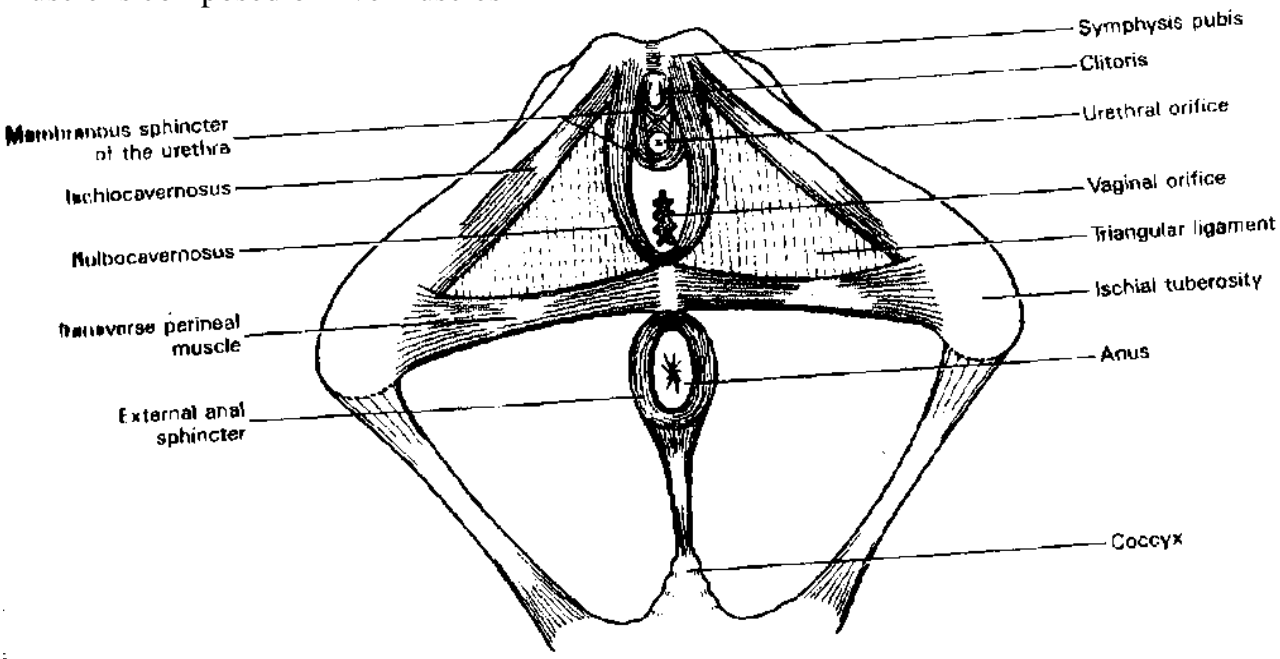


Figure 2.1:*Superficial Pelvic Floor Muscles (Cooper & Fraser,2009)****Source:*** *UNIBADAN DLC*

The external anal sphincter encircles the anus and is attached behind the few fibres to the coccyx

- *The transverse perineal muscles* pass from the ischial tuberosity to the centre of the perineum
- *The bulbocavernosus muscles* pass from perineum forwards around the vagina to the corpora cavernosa of the clitoris
- *The ischiocavernosus muscles* pass from the ischial tuberosity along the pubic arch to the corpora canernosa
- *The membranous sphincter of the urethra* is composed of muscle fibres passing above and below the urethra and attached to the pubic bones. It is not a trues sphincter since it is not circular, but it acts to close the urethra

The Deep Layers: Is composed of three pairs of muscles which together are known as the levator ani muscles. They are so called because they lift or elevate the anus. Each levator ani muscles (left and right) consist of the following:

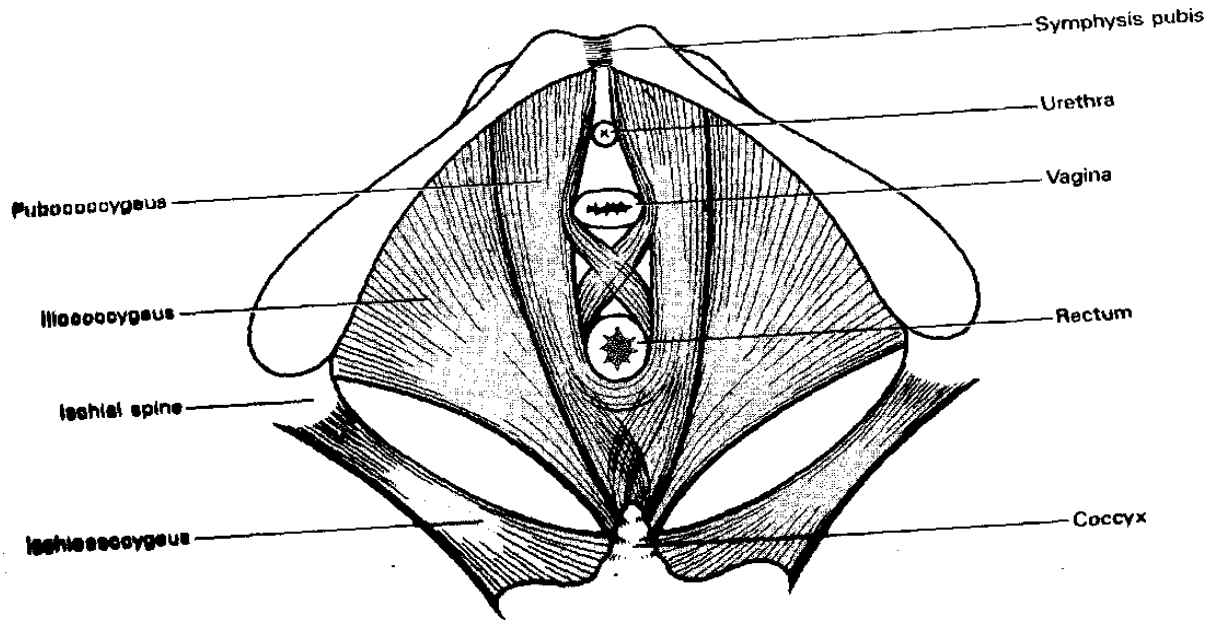


Figure 2.2: *Deep pelvic Floor Muscles(Cooper & Fraser,2009)*

The pubococcygeus muscle passes from the pubis to the coccyx, with a few fibres crossing over the perineal body to from its deepest part
The iliococcyheus muscle passes from the fascia covering the obturator internus muscle to the coccyx
The ischiococcygeus muscle passes from the ischial spine to the coccyx.
Between the muscle layers, and also above and below them, there are layers of pelvic fascia. This is loose areolar tissue. The tissue that fills up the triangular space between the bulbocavernosus, the ischiocavernosus and the transverse perineal muscles is known as the *triangular ligament*

In-text question
What is the importance of the pelvic floor?

In-text Answer
The pelvic floor supports the weight of abdominal organ
Responsible for voluntary control of micturation and defecation
Play and important part in sexual intercourse
Enhances the passive movement of the feotus through the birth canal and its exit from the pelvis

2.1.1 The Perineal Body

This is a pyramid of muscle and fibrous tissue situated between the vagina and the rectum. It is made up from fibres of muscles described above. The apex, which is the deepest, is formed from the fibres of pubococcygeus muscle which cross over at this point; the base is formed from the transverse perineal muscles which meet in the front and the external anal sphincter behind. The perineal body measures 4cm in each direction.

Activity 2.1

Time allowed: 15minutes

Describe the structure and functions of the perineal body. How is it similar to those of the pelvic floor?

2.2 The Structures of the Vulva

The Vulva: This term applies to the external female genital organs (Fig.3.1). It consists of the following structures:

The mons pubis or mons veneris (‘mount of Venus): is a pad of fat lying over the symphysispubis. It is covered with pubic hair from the time of puberty.

The labia majora (greater lips):are two folds of fat and areolar tissue, covered with skin and pubic hair on the outer surface. They arise in the mons veneris and merge into the perineum behind.

The labia minora (lesser lips):are two thin folds skins lying between the labia majora. Anteriorly they divide to enclose the clitoris; posteriorly they fuse, forming the fourchette.

The clitoris:is a small rudimentary organ corresponding to the male penis. It is extremely sensitive and highly vascular and plays a part in the orgasm of sexual intercourse.

The vestibule: is the area enclosed by the labia minora in which are situated the opening of the urethra and the vagina.

The urethral orifice:lies 2.5 cm posterior to the clitoris. On either side lie the openings of Skene’s ducts.

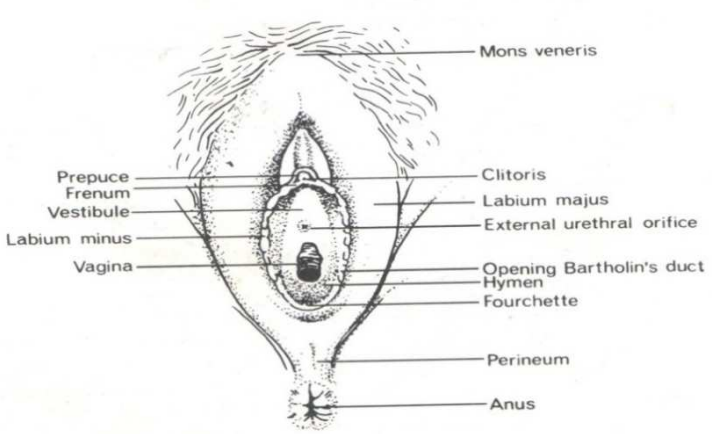


***Figure 2.3**: The External Genitalia (Cooper and Fraiser, 2009)*

The vaginal orifice: is also known as the introitus of the vagina and occupies the posterior two-thirds of the vestibule. The orifice is partially closed by the hymen, a thin membrane which tears during the sexual intercourse or during the birth of the first child.
Bartholin's glands: are two small glands which open on either side of the vagina orifice and lie on the posterior part of the labia majora. They secrete mucus which lubricates the vaginal opening.
Blood Supply: This comes from the internal and external pudendal arteries. The blood drains through corresponding veins.
Lymphatic drainage: This is mainly via the inguinal glands.
Nerve Supply: This is derived from branches of the pudendal.

Activity 2.2
Time allowed: 15minutes

Draw the diagram of the vulva and vagina and relate them to their functions.

2.3 The Function and Structure of the Vagina

Functions:
The vagina is a passage, which does the following:

- Allows the escape of the menstrual flow
- Receives the penis and the ejected sperm during sexual intercourse
- Provides an exit for the foetus during delivery

Position: It is a canal running from the vestibule to the cervix, passing upwards and backwards to the pelvis.
Relations: Knowledge of the relation of the vagina is essential for the accurate examination of the pregnant woman and her safe delivery.

- **Anterior**: In front are the bladder and the urethra.
- **Posterior**: Behind, the pouch of Douglas, the rectum and the perineal body.
- **Lateral**: Besides the upper two-thirds are the pelvic fascia and the ureters which pass beside the cervix, while beside the lower third are the muscles of the pelvic floor.
- **Superior**: Above the vagina lies the uterus.
- **Inferior**: Below the vagina lie the external genitalia.

Structure: The posterior wall is 10cm long while the anterior wall is only 5.5cm in length because the cervix projects at a right angle into its upper part. The upper end of the vagina is known as the vault. Where the cervix projects into it, the vault forms the circular recess which is described as the four arches or fornices.
The posterior fornix is the largest of these because the vagina is attached to the uterus at a higher level behind than in front. The anterior fornix lies in front of the cervix and the lateral fornices lies at either side. The vaginal walls are thrown into small folds that are known as reggae. These allow the vaginal wall to stretch during intercourse and childbirth.

Layers: The lining is made of squamous epithelium. Beneath the epithelium lies a layer of vascular connective tissue. The muscle layer consists of circular and longitudinal fibres.
Pelvic fascia surrounds the vagina, forming a layer of connective tissues.

Contents of the Vagina
The vagina is, moistened by mucus from the cervix and a transudate from the blood vessels of the vaginal wall. The vaginal fluid is strongly acid (pH 4.5) due to the presence of lactic acid formed by Doderlein's bacilli. The acid deters the growth of pathogenic bacteria.

Blood supply: From branches of the internal iliac artery the vaginal artery and a branch of the uterine artery, the blood drains through corresponding veins.
Lymphatic drainage: This is via the inguinal, the internal iliac and the sacral glands.
Nerve supply: This is derived from the Lee Frankenhauser plexus.

In-text question
Differentiate between vulva and vagina

In-text Answer
The term vulva applies to the female genital parts that lies outside the body while the vaginal is a passage which allows the escape of the menstrual flow, receives the penis and ejaculated sperm during sexual intercourse and provide an exit for the foetus during delivery.

Summary of Study Session 2
In study session you have learnt that:
1. The pelvic floors supports the whole weight of the abdominal and pelvic organs and it consists of deep and superficial muscle layers.
2. The perineal body is made up of the deep and superficial layers of muscles and if muscles measures 4cm in each direction.
3. The vulva refers to the external female genital organs and consists of eight structures.
4. The vagina is a passage for escape of menstruation and an exit for the foetus during labour

Self-Assessment Questions (SAQS) for Study Session 2
Now that you have completed this study session, you will need to assess yourself if you have achieved the learning outcomes. Try to answer the question below. Compare your answer to the correct one at the end of the study session

SAQ 2.1
List the functions of the pelvic floor and describe the muscle layers.

SAQ2.2
Enumerate the structures of the vulva.

SAQ2.3
Describe the functions and structure and content of the vagina.

Answer to Self-Assessment Questions
Functions of the pelvic floor:

- Supports the weight of the abdominal and pelvic organs
- Its muscles are responsible for voluntary control of micturition and defecation and also play vital part in sexual intercourse
- It influences the passive movement of the foetus through the birth canal and facilitate its exit from the pelvis during labour.

SAQ2.2

Structures of the vulva:

This term applies to the external female genital organs. It consists of the following structures:

- The mons pubis or mons veneris
- The labia majora
- The labia minora
- The clitoris
- The vestibule
- The urethral orifice
- The vaginal orifice
- Bartholin's glands

The Vulva Blood Supply

Lymphatic drainage: This is mainly via the inguinal glands.

Nerve Supply: This is derived from branches of the pudendal.

SAQ 2.3

SAQ2 Functions, Structure and Content of the vagina:

Functions:

1. The vagina is a passage, which allows the escape of the menstrual flow.
2. Receives the penis and the ejected sperm during sexual intercourse.
3. Provides an exit for the foetus during delivery.

Structure: The posterior wall is 10cm long

The anterior wall is only 5.5cm

The upper end of the vagina is known as the vault.

The vault forms the circular recess which is described as the four arches or fornices.

The vaginal wall are thrown into small folds that are known as reggae

Layers: The lining is made of squamous epithelium. Beneath the epithelium lies a layer of vascular connective tissue. The muscle layer consists of circular and longitudinal fibres.Pelvic fascia surrounds the vagina, forming a layer of connective tissues.

Reference:

Cooper, M; Fraiser, D (2009); *MylesTextbook for Midwives,* 15th Ed. Churchill Livingstone

Study Session 3: The Uterus, Fallopian Tubes and Ovaries

Expected Duration: 1 week of 2 contact hours

Introduction

The uterus is a female reproductive organ which shelters the foetus during pregnancy.
"The Ovaries" are the female reproductive organs that contain the ova. The ovaries are the female pelvic reproductive organs that house the ova and are responsible for the production of sex hormones.
They are paired organs located on either side of the uterus within the broad ligament below the uterine (fallopian) tubes. The ovaries are responsible for housing and releasing ova, or eggs, necessary for reproduction.
In this study session, you will learn about the uterus, fallopian tubes and ovaries.

Learning Outcomes for Study Session 3

At the end of this study session, you should be able to:
3.1 Describe the position, organs in relationship with the uterus, the ligaments that support the uterus and the structure.
3.2 Explain the functions, organs in relations with, and the structure of the uterus tubes.
3.3 Explain the position and function of the ovaries.
3.4 Discuss the female cycle, the blood and nerve supplied and the hymphetic drainage

3.1 The Uterus

Functions:
The uterus shelters the foetus during pregnancy. It prepares for this possibility each month and it expels the uterine contents following pregnancy.
Position:
It is situated in the cavity of the true pelvis, behind the bladder and in front of the rectum. It leans forward, which is known as *anteversion*; it bends forward on itself, which is known as *anteflexion.*
Organs in Relation:
Anteriorly: The uterovesical pouch and the bladder.
Posteriorly: The rectouterine pouch of Douglas and the rectum.
Laterally: The broad ligaments, the uterine tubes and the ovaries.
Superiorly: The intestines.
Inferiorly: The vagina.

Support: The uterus is supported by the pelvic floor and maintained in position by several ligaments. The most important are:

- The transverse cervical ligaments as or the cardinal ligaments or Mackenrodt's ligaments
- The uterosacral ligaments
- The pubocervical ligaments
- The broad ligaments
- The round ligaments
- The ovarian ligaments

In-text question

What isthesupport of the uterus?

In-text Answer

The pelvic floor supports the uterus and it is maintained in position by several ligament for example the *cardinal* and *broad ligament*

Structure:

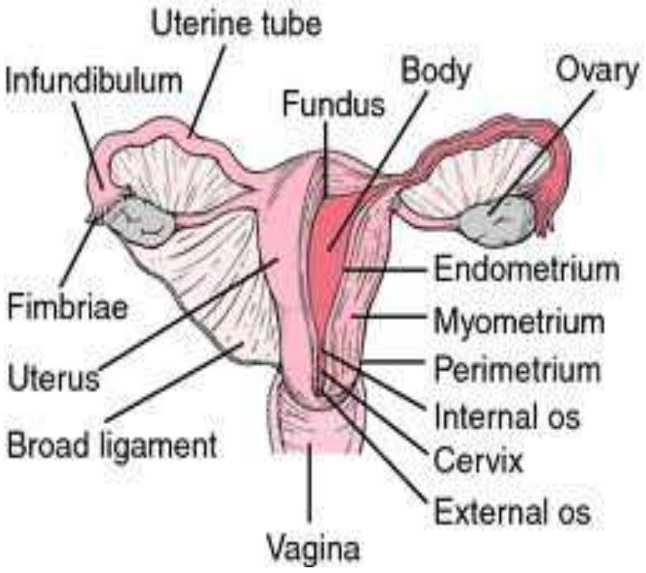


Figure 3.1: The Uterus and Fallopian Tube

The non-pregnant uterus is a hollow, muscular, pear-shaped organ situated in the true pelvis. It is 5.5cm long, 5cm wide and 2.5cm in depth, each wall being 1.25cm thick. The cervix forms the lower third of the uterus and measures 2.5cm in each direction.

The uterus consists of the following parts:

The body or corpus: makes up the upper two-thirds of the uterus.

The fundus: is the domed upper wall between the insertions of the uterine tubes.

The cornua: are the upper outer angles of the uterus where the uterine tubes join.

The cavity: is a potential space between the anterior and posterior walls. It is triangular in shape, the base of the triangle being uppermost.
The isthmus: is a narrow area between the cavity and the cervix, which is 7mm long. It enlarges during pregnancy to form the lower uterine segment.
The cervix or neck: protrudes into the vagina. The upper half, being above the vagina, is known as the supravaginal portion while the lower half is the infravaginal portion.
The internal os: is the narrow opening between the isthmus and the cervix.
The external os:is a small round opening at the lower end of the cervix.The cervical canal lies between these two ora and is a continuation of the uterine cavity. This canal is shaped like a spindle, narrow at each end and wider in the middle.
Layers: The uterus has three layers, of which the middle muscle layer is by far the thickest.

Perimetrium: The outer layer of peritoneum. It is a double serous membrane, an extension of the peritoneum.
Myometrium: or muscle coat is thick in the upper part of the uterus and is sparser in the isthmus and cervix. It is the middle and muscular lager consisting of Longitudinal, Oblique and Circular muscles. The outer layer is formed in longitudinal fibres. Oblique muscles are arranged in criss-cross fashion to enhance control of haemorrhage. Its fibres run in all directions and interlace to surround the blood vessels and lymphatics which pass to and from the endometrium. Circular muscles allow cervical dilatation as longitudinal muscles are pulled up during uterine contractions and retractions of muscles. In the cervix the muscles fibres are embedded in collagen fibres which enable it to stretch in labour.

The endometrium: forms a lining of ciliated epithelium on a base of connective tissue or stroma.In the uterine cavity this endometrium is constantly changing in thickness throughout the menstrual cycle. The epithelial cells are cubical in shape and dip down to form glands which secrete alkaline mucus.

In-text Question
Differentiate between the internal os and external os?

In-text Answer
The internal os (mouth) is the narrow opening between the isthmus and the cervix.

1. The external os is a small round opening at the lower end of the cervix.
2. The cervical endometrium is thinner than that of the body and is folded into a pattern known as the arbor vitae (tree of life). This is thought to assist the passage of the sperm. The point where the epithelium changes, at the external os, is termed the squamocolumnar junction.
3. The myometrium**:** or muscle coat, is thick in the upper part of the uterus and is sparser in the isthmus and cervix. Its fibres run in all directions and interlace to surround the blood vessels and lymphatics which pass to and from the

endometrium. The outer layer is formed in longitudinal fibres. In the cervix the muscles fibres are embedded in collagen fibres which enable it to stretch in labour.

4. The perimetrium: is a double serous membrane, an extension of the peritoneum.
5. Blood Supply: The uterine artery is a branch of the internal iliac artery. It sends a small branch to the upper vagina, and then runs upwards in a twisted fashion to meet the ovarian artery. The ovarian artery supplies the ovary and uterine tube. The blood drains through corresponding veins.
6. Lymphatic Drainage: Lymph is drained from the uterine body to the internal iliac glands and also from the cervical area pelvic lymph glands.
7. Nerve Supply:From the autonomic nervous system, sympathetic and para-sympathetic.

3.2 The Uterine Tubes

Functions:

1. The uterine tube propels the ovum towards the uterus, receives the spermatozoa as they travel upwards and provides a site for fertilization.
2. It supplies the fertilized ovum with nutrition during its continued journey to the uterus.

Position: The uterine tubes extend laterally form the cornua of the uterus towardsthe side walls the side walls of the pelvis. They arch over the ovaries, the fringed ends hovering near the ovaries in order to receive the ovum.

Relations:

Anteriorly, posteriorly and superiorly: the peritoneal cavity and the intestines.
Laterally: The side walls of the pelvis
Inferiorly: The broad ligaments and ovaries lie below the tubes.
Medially: The uterus lies between the two uterine tubes.
Supports**:**The uterine tubes are held in place by their attachment to the uterus.

Activity 3.1

Time allowed: 15minutes

Describe the organs in relation to the uterus and parts of the uterus.

Each uterine tube is 10cm long and consists of four portions presented in the figure below:

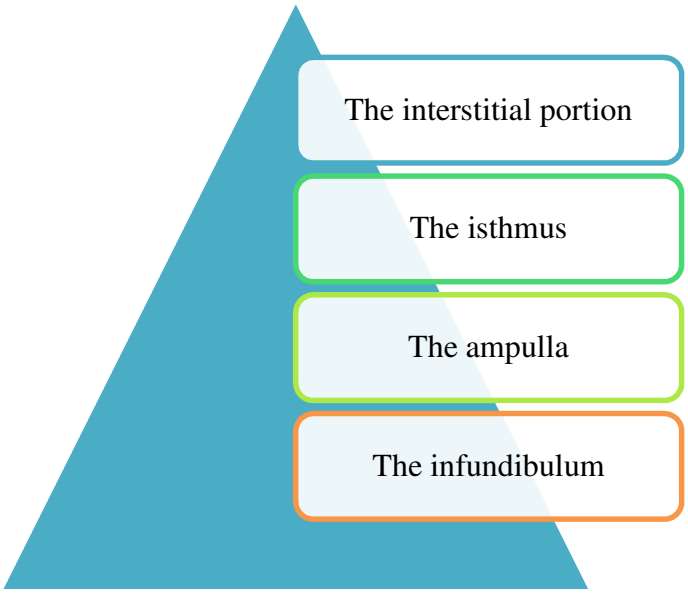


Figure 3.2: *Four portions of the Uterine*

Structure: Each tube is 10cm long. The lumen of the tube provides an open pathway from the outside to the peritoneal cavity. The uterine has four portions:

- **The interstitial portion:** is a 1.25cm long lie within the wall of the uterus. Its lumen is 1mm wide.
- **The isthmus:** is another narrow part which extends for 2.5cm from the uterus.
- **The ampulla:** is the wider portion where fertilization usually occurs. It is 5 cm long.
- **The infundibulum:** is the funnel-shaped fringed end which is composed of many processes known as fimbriae.

Layers:

1. **The lining:** is a mucous membrane of ciliated cubical epithelium which is thrown into folds known as plicae. These folds slow the ovum down on its way to the uterus. Beneath thelining is a layer of vascular connective tissue.
2. **The muscle coat:** This consists of two layers, an inner circular layer and an outer longitudinal layer, both of smooth muscle. The peristaltic movement of the uterine tube is due to the action of these muscles. The tube is covered with peritoneum.
3. **Blood Supply:** This is from the uterine and ovarian arteries returning by the corresponding veins.
4. **Lymphatic Drainage:** This is to the lumbar glands.
5. **Nerve Supply:** This is from the ovarian plexus.

In-text Question
What are the functions of uterine tube?

In-text Answer
The uterine tube propels the ovum towards the uterus, receives the spermatozoa as they travel upwards and provides a site for fertilization.
It supplies the fertilized ovum with nutrition during its continued journey to the uterus.

3.3 The Position of the Ovaries

The ovaries are paired organ located at either side of the uterus within the broad ligament below the fallopian tubes. The ovary is within the evasions fossa.

Functions:
The ovaries are responsible for housing and releasing ova or female eggs necessary for reproduction.

Gross Structure of the Ovary:
The ovaries are small oval-shaped, and grayish in colour, with an uneven surface. The size of an ovary depends on a woman's age and hormonal status. They are approximately 3-5cm in length during childbearing years and become much smaller and the atrophic once menopause occurs. The ovaries are covered by a modified peritoneum.

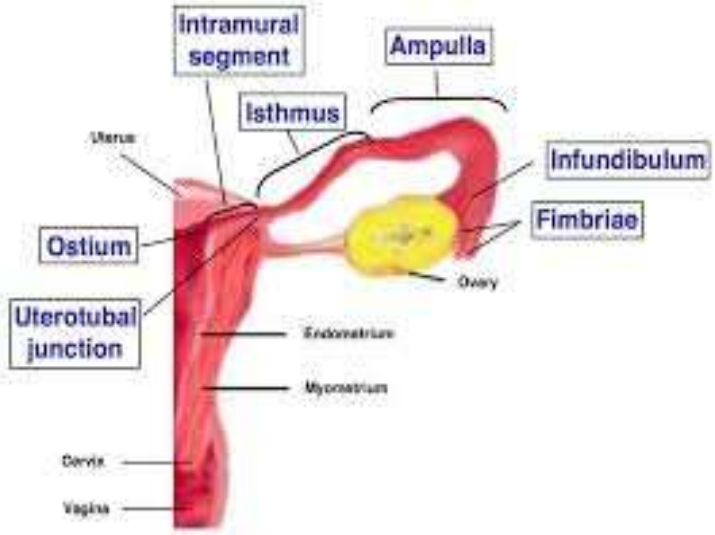


Figure 5.1: *The Gross Structure of the Ovary*

Microscopic Structure: A cross-section of the ovary reveals many cystic structures that vary in size. These structures represent ovarian follicle at various stages of development and degeneration.
Ovarian Ligament: Several Paired Ligaments Support the Ovaries namely:

- The Ovaries Ligament: Connects the uterus and ovary.

- The Posterior Portion of the Broad Ligament: The mesovarium, which supports the ovary and houses its arterial and venous supply.
- The Suspensory Ligament of the Ovary: (infundibular pelvic ligament) attaches the ovaries to the pelvic sidewall. This larger structure also contains the ovarian artery and vein, as well as nerve supply to the ovary.

In-text Question

State one function of the ovaries

In-text Answer

The ovaries are responsible for housing and releasing ova or female eggs necessary for reproduction.

3.4 The Female Circle

Each month, the ovaries go through a series of stages, depending on stimulation by the anterior pituitary hormones the follicle stimulating hormone (FSH) and the luteinizing hormone (LH). A typical female cycle lasts 28 days; however, this can range from 21-35days.

The ovarian cycle has 2 distinct phases: The follicular phase (days 1-14) and the luteal phase (days 14-28). The follicular phase is characterized by follicle development and growth, the goal being that one follicle matures and releases an egg at the time of ovulation, around day 14 of the female cycle.

The remaining immature follicles go through stages of degeneration up until day 28, when the cycle repeats itself. The egg that is released is picked up by the fimbriae of the uterine tube, and the egg is transported toward the uterus. If fertilization does not occur, the egg degenerates, and menstruation occurs.

In-text Question

Explain the follicular phase?

In-text Answer

It is characterised by follicle development and growth, the goal being that one follicle matures and releases an egg at the time of ovulation around 14 day of the female cycle.

Blood Supply and Venues Drainage:

Blood supply to the ovary from the ovarian artery**:** Both the right and left arteries originate directly from the descending aorta. *The ovarian artery and vein enter and exit the ovary at the hilium.* The left ovarian vein drains into the left renal vein, and the right ovarian vein empties directly into the inferior venacava

Nerve Supply: Nerve supply to the ovaries runs with the vasculature through the suspensory ligament of the ovary, entering the ovary at the hilum. Supply is through the ovarian, hypo gastric and aortic plexuses.

Lymph Drainage of the ovary is primary to the lateral aortic nodes; however, the iliac nodes are also involved.

Activity 3.2
Time allowed: 15mins

Describe the gross and microscopic structure of the ovary.

Summary of Study Session 3

In this study session, you learnt that:

1. The uterus is the female reproductive organ that shelters the foetus during pregnancy. It is supported by ligaments and lined three layers of tissues.
2. The uterine or fallopian tubes propel the ovum towards the uterus. The tube has four portions, the interstitial portion, isthmus, the ampulla and the infundibulum.
3. The ovaries are the female reproductive organs that contain the ova which is necessary for reproduction.
4. The ovarian cycle has 2 distinct phase, the follicular phase and the luteal phase.

Self- Assessment Questions (SAQS) For Study Session 3

Now that you have completed this study session, you will need to assess yourself to see if you have achieved the learning objectives. Try to answer the questions below. Compare your answer to the correct answer at the end of the study.

SAQ 3.1

How can we correctly describe the layers of the uterus? Highlight the blood supply, lymphatic drainage and nerve supply.

SAQ 3.2

Describe the structure of the uterine tubes.

SAQ 3.3

Describe the gross and microscopic structure of the ovary.

SAQ 3.4

How can you correctly discuss the female cycle?

Reference:

Cooper, M. & Fraiser, D. (2009)*MylesTextbook for Midwives,* 15th Ed. ChurchillLivingstone

Miranda, A.V. (2013).The ovaries.http:// emedicine. Medscape.com/article/1949171overview

Answers to the Self -Assessment Questions

SAQ 3.1

Layers of the Uterus:

The lining is a mucous membrane of *ciliated cubical epithelium* which is thrown into folds known as plicae. Beneath the lining is a layer of *vascular connective tissue.*

The muscle coat consists of two layers, an inner circular layer and an outer longitudinal layer, both of smooth muscle.

The tube is covered with *peritoneum.*

Blood Supply: This is from the uterine and ovarian arteries returning by the corresponding veins.
Lymphatic Drainage: This is to the lumbar glands.
Nerve Supply: This is from ovarian plexus.

SAQ 3.2

Structure of the uterine tubes:
Each tube is 10cm long. The lumen of the tube provides an open pathway from the outside to the peritoneal cavity. The uterine has four portions.
The interstitial portion is 1.25cm long lies within the wall of the uterus. Its lumen is 1mm wide.
The isthmus is another narrow part which extends for 2.5cm from the uterus.
The ampulla is the wider portion where fertilisation usually occurs. It is 5 cm long.
The infundibulum is the funnel-shaped fringed end which is composed of many processes known as fimbriae.

SAQ 3.3

Gross and microscopic structure of the ovary
The ovaries are small oval-shaped, and grayish in colour, with an uneven surface. The size of an ovary depends on a woman's age and hormonal status. They are approximately 3-5cm in length during childbearing years and become much smaller and the atrophic once menopause occurs. The ovaries are covered by a modified peritoneum.
Microscopic Structure: A cross-section of the ovary reveals many cystic structures that vary in size. These structures represent ovarian follicle at various stages of development and degeneration.

SAQ 3.4

Two distinct phases of ovarian cycle:

- The follicular phase (days 1-14)
- The luteal phase(days 14-28)

The Femal
Each month, the ovaries go through a series of stages, depending on stimulation by the anterior pituitary hormones the follicle stimulating hormone (FSH) and the luteinizing hormone (LH). A typical female cycle lasts 28 days; however, this can range from 21-35days.
The ovarian cycle has 2 distinct phases namely:
The follicular phase (days 1-14)
And the luteal phase (days 14-28).
The follicular phase is characterized by follicle development and growth, the goal being that one follicle matures and releases an egg at the time of ovulation, around day 14 of the female cycle. The remaining immature follicles go through stages of degeneration up until day 28, when the cycle repeats itself. The egg that is released is picked up by the

fimbriae of the uterine tube, and the egg is transported toward the uterus. If fertilization does not occur, the egg degenerates, and menstruation occurs.

Study Session 4: The Breast

Expected Duration: 1 week of 2 contact hours

Introduction

The breasts are compound secreting glands, composed of the glandular tissues which produce milk after delivery. The breast is the tissue overlying the chest (pectoral) muscles. Women's breasts are made of specialized tissue that produces milk (glandular tissue) as well as fatty tissue. The amount of fat determines the size of the breast.
Connective tissue and ligaments provide support to the breast and give it its shape. Nerves provide sensation to the breast. The breast also contains blood vessels, lymph vessels, and lymph nodes.
In this study session, you will learn about the structure and function of breasts.

Learning Outcomes for Study Session 6

At the end of this study session, you should be able to:
6.1 Describe the structure and function of the female breast

4.1 Anatomy and physiology of the female breast

The breasts are composed secreting glands, composed mainly of glandular tissue which is arranged in lobes, approximately 20 in number. Each lobe is divided into lobules that consist of alveoli and ducts. The alveoli contain acini cells which produce milk and are surrounded by myoepithelial cells.

Small lactiferous ducts, carrying milk from the alveoli, unite to form larger ducts; one large duct leaves each lobes and widens to form a lactiferous sinus or ampulla which acts as a temporary reservoir for milk. A lactiferous tubule from each sinus emerges on the surface of the nipple.

The nipple, composed of erectile tissue, is covered with epithelium and contains plain muscle fibres which have a sphincter-like action in controlling the flow of milk. Is an area of pigmented skin called the areola which contains Montgomery's glands. These

produce a sebum-like substance which acts as a lubricant pregnancy and throughout breast feeding.

Blood Supply: From the internal and external mammary arteries and branches from the intercostal arteries.

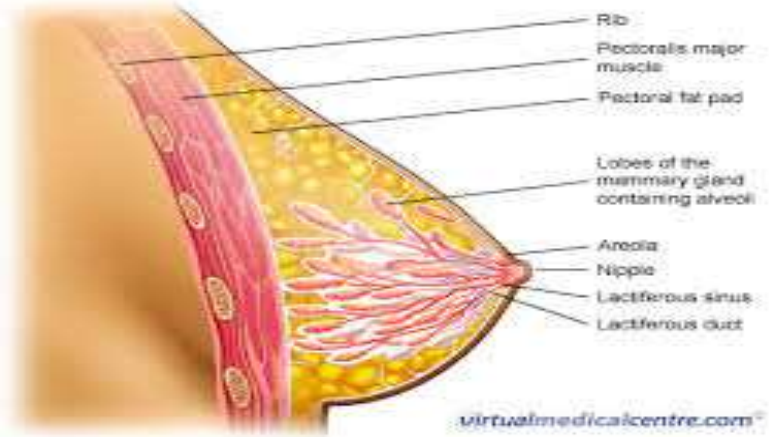


Figure 4.1: *Structure of the breast*

Venous Drainage: The veins are arranged in a circular fashion around the nipple.
Lymphatic Drainage: Lymph drains freely between the two breasts and into lymph nodes in the axillae and the mediastinum.

In-text Question
Which cells produce milk in the female breast?

In-text Answer
Acini cells

Activity 4.1
Time allowed: 15 minutes

With the aid of a well-labelled diagram explain the structure and functions of the breast.

Summary of Study Session 4
In this study session, you have learnt that:
The breast consists of lobes, which is divided into lobules that consist of alveoli and ducts and cells that produce milk.

Self-Assessment Question (SAQ) for Study Session 4
Now that you have completed study session 4, you will need to assess yourself to see if you have achieved the learning objectives. Try to answer the question below. Compare your answer to the correct answer at the end of the study session

SAQ4.1

How can you correctly describe the anatomy of the female breast?

Answer to SAQ

Anatomy of the female breast

The breasts are composed secreting glands, composed mainly of glandular tissue which is arranged in lobes, approximately 20 in number. Each lobe is divided into lobules that consist of alveoli and ducts. The alveoli contain acini cells which produce milk and are surrounded by myoepithelial cells.

Small lactiferous ducts, carrying milk from the alveoli, unite to form larger ducts; one large duct leaves each lobes and widens to form a lactiferous sinus or ampulla which acts as a temporary reservoir for milk. A lactiferous tubule from each sinus emerges on the surface of the nipple.

The nipple, composed of erectile tissue, is covered with epithelium and contains plain muscle fibres which have a sphincter-like action in controlling the flow of milk. Is an area of pigmented skin called the areola which contains Montgomery's glands. These produce are sebum-like which acts as a lubricant pregnancy and throughout breast feeding.

Blood Supply: From the internal and external mammary arteries and branches from the intercostal arteries.

Venous Drainage: The veins are arranged in a circular fashion around the nipple.

Lymphatic Drainage: Lymph drains freely between the two breasts and into lymph nodes in the axilla and the mediastinum.

Reference:

Cooper, M; Fraser, D; Myles, M (2009).*Textbook for Midwives*. 15th Ed. Churchill and Livingstone

Study session 5: The Male Reproductive System

Expected Duration: 1 week of 2 contact hour

Introduction

People in your environment are categorized into male and female in most cases and each need the other in order to bear children which is called reproduction. The interesting aspect of this reproduction is the system in which different organs operate to make this process possible. The male reproductive organ is different from the female reproductive organ hence you will study both in the course but in different study session.

In this study session therefore, you will be learning about the reproductive anatomy (structure) of the male, the formation of the sperm cell and it's partway and also you will study the accessory glands and other secondary sex organs of the male.

Learning objectives for Study Session 5

At the end of this lecture, you will be able to:

5.1 Describe the External Genitalia and Anatomy of the Testes, Scrotum, and Penis.

5.2 Draw and label the Accessory Glands and other Secondary Sex Organs of the Male.

5.3 Identify the Pathway of Sperm Cell From its Formation to Ejaculation.

5.1 The External Genitalia and the Anatomy of the Testes

Unlike the female reproductive system, most of the male reproductive system is located outside of the body.

The external genitalia occupy the perineum a diamond-shaped religion marked by the public symphysis, ischialtuberosities, and coccyx. Each testis is oval, about 4cm long, 2.5cm in diameter, and weighs 10 to 14g. Its anterior and lateral surface is covered by the tunica vaginalis. The testis has white fibrous capsule called tunica albuginea. Connective tissue septa divide the organ into wedge-shaped lobules.

Each lobule contains **somniferous tubules** in which the sperm are produced. A seminiferous tubule has a narrow lumen lined by a germinal epithelium. The epithelium consists of several layers of *germ cells* in the process of becoming sperm and a much smaller number of *sustentacular (Sertoli)* cells and promotes their development.

In Text Question

Where is the sperm produced?

In Text Answer
Somniferous tubules

Tight junctions between adjacent sustentacular cells form a *blood-testis* barrier (BTB), which prevents proteins and other large molecules in the blood and intercellular fluid from getting into the germ cells. Between the seminiferous tubules are clusters of *interstitial (leydig) cells*, the source of testosterone. The testes also secrete small amounts of estrogen.

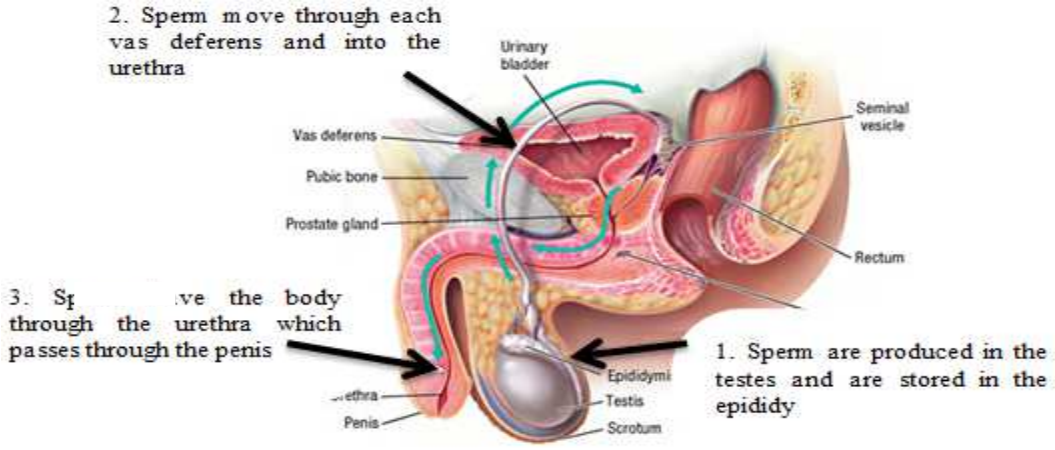


Figure: Shows the partway of the sperm

Function of the Male reproductive organ.
The function of the male reproductive system is to perform the following function:

1. To produce, maintain and transport sperm (male reproductive cells).
2. To serve as protective fluid (semen)
3. To discharge sperm within the female reproductive tract during sex
4. To produce and secrete male sex hormone responsible for maintaining the mail productive system.

5.1.1 Structure of the Scrotum

The testes are contained in a pendulous sac, the scrotum. The left testis is usually suspended lower than the right so the two are not compressed against each other between the thighs. **See figure below** the skin of the scrotum has spare hair, sebaceous glands, rich sensory innervations, and somewhat darker pigmentation than skin elsewhere.

The scrotum is divided into right and left compartments by an internal mediums septum, which protects each testis from infections of the other one. The location of the septum is externally marked by a seam called the perineal raphe.

In Text Question
What is BTB?

In Text Answer
Blood-Testes-Barrier

The **spermatic cord** passes up the back of the scrotum, then anterior to the pubis, and through the inguinal ring into the inguinal canal. It contains a sperm duct called the ductus deferens and other structures that descended with the testis as it passed through the inguinal canal- the aforementioned blood and lymphatic vessels, testicular nerves, and so forth.

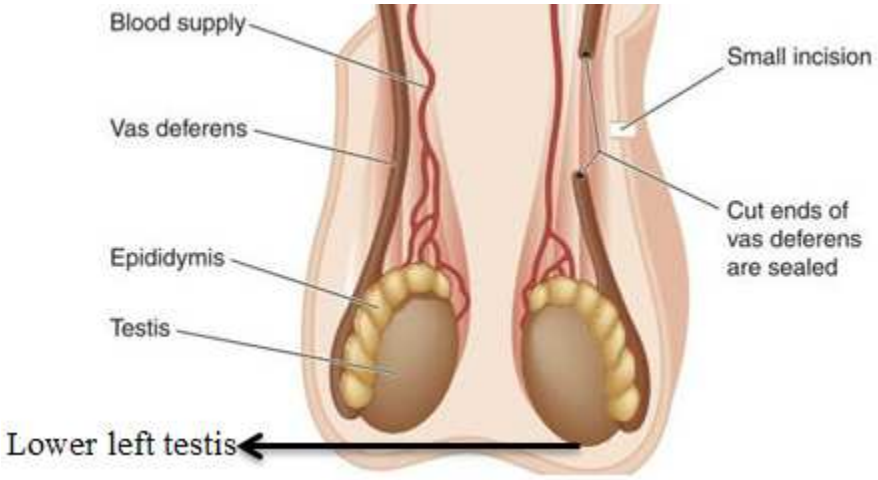


Figure: Showing the Testis located at different levels

The scrotum has three mechanisms for regulating the temperature of the testes:

- Dartos Muscle
- Cremaster Muscle
- Pampiniform plexus

Dartos muscle (tunica dartos). When it is cold, the dartos contracts and draws the testes closer to the body to keep them warm; when it is warm, the dartos relaxes and the testes are suspended farther from the body.

Cremaster muscle, reflexively contracts when it is cold and relaxes when it is warm, elevating or lowering the testes as needed.

Pampiniformplexus is an extensive network of veins from the testis; these veins converge to form the testicular vein. Without the pampinniform plexus, warm arterial blood would heat the testis and inhibit spermatogenesis. The pampiniform plexus, however, prevents this by acting as a countercurrent heat exchanger.

In-text question

Name the erectile tissues of the penis

In Text Answer

corpusspongiosum-
corpora cavernosa.
tunicaalbuginea

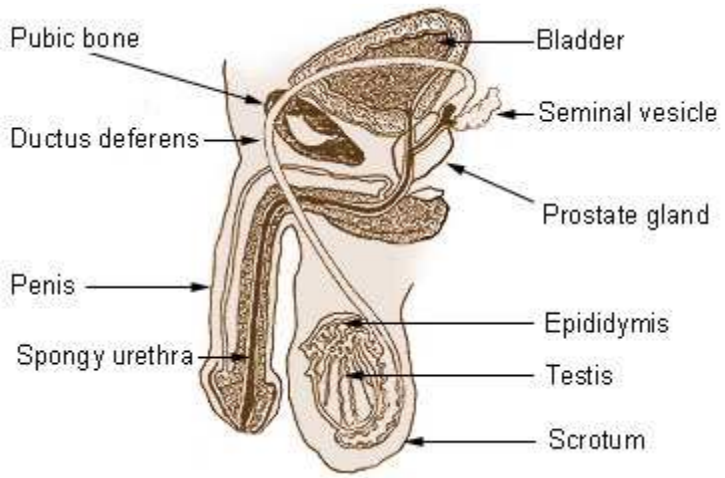


Fig 5.1: The Male Reproductive System *(http://www.innerbody.com)*

Function of the Scrotum

The scrotum performs certain functions which can be categorized mainly into two. They are:

a. Control of temperature to protect sperm
b. Protect Testes and Guarantee Maturing of Sperm before Discharge

Control Temperature to Protect Sperm

Biologists believe that the primary function of the scrotum is to maintain the desired temperature for the sperms. They should consistently be at a temperature that is slightly cooler than the rest of the body. The ideal scrotum temperature in humans is around 35 to 36 degrees Celsius (which is 95 to 96.8 degrees Fahrenheit).

When this temperature is compared to the normal body temperature, 37 degrees Celsius (which is 96.6 degrees Fahrenheit), the slight decrease becomes obvious. This temperature is necessary because any higher temperature will cause the sperm count to go down.

The scrotum is able to control the temperature by changing the distance between the testicles and the abdomen. When the room temperature is warm, the scrotum moves the testes farther from the abdomen. This increases the amount of surface area that is exposed and therefore helps any excess heat dissipate faster.

When the temperature is cold, the scrotum will move the testicles closer to a person's abdomen. Movements in either direction are controlled by the relaxation and contraction of the cremaster muscle within the abdomen as well as the dartos fascia within the scrotum.

Protect Testes and Guarantee Maturing of Sperm before Discharge

Another function of the scrotum is to help protect the testes. This in turn makes sure that the sperm within will have sufficient time to mature before they are discharged. Some

biologists have pointed out that if the testes were found in the abdominal cavity instead of their actual location, they would experience regular changes in terms of pressure within the abdomen. These changes in pressure would be due to the abdominal muscles contracting and relaxing. The problem is that if this were to occur, the testes would empty much faster so the sperm would not have enough time to fully mature

5.1.2 Anatomy of the Penis

The ***penis*** serves to deposit semen in the vagina. Half of it is an internal **root** and half is the externally visible***shaft***. The external portion is about 8 to 10cm long and 3cm in diameter when flaccid (nonerect); the typical dimensions of an erect penis are 13 to 16cm long and 4cm in diameter. Distally, the penis ends in a swollen head called the ***glans*****,** which has the external urinary meatus at its tips the proximal margin of the ***corona***.

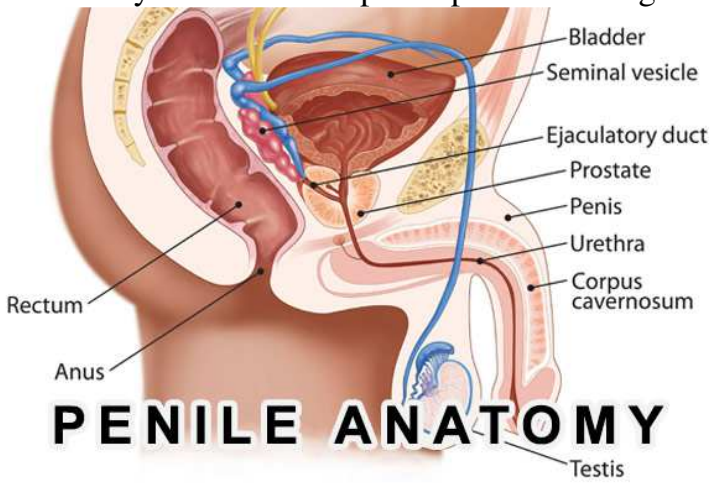


Figure: Anatomy of the Penis

The penis consists mainly of the cylindrical bodies called ***erectile tissues*****,** which fills with blood during sexual arousal and account for its enlargement and erection. A single erectile body, the ***corpus spongiosum*****,** passes along the ventral side of the penis and encloses the penile urethra. It dilates at the distal end to fill the entire glans. On the dorsal side of the penis there is pair of ***corpora cavernosa.*** Each is ensheathed in a fibrous ***tunica albuginea*****,** and they are separated from each other by a***medium septum*****.**

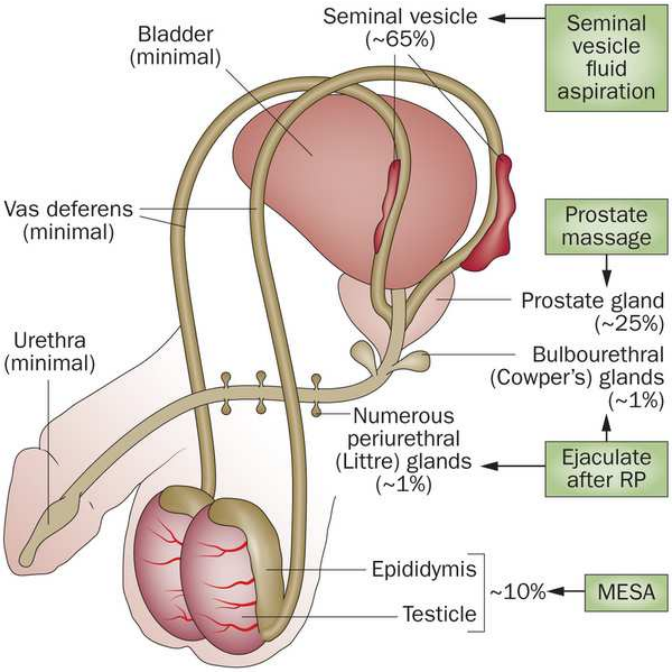
All three erectile tissues contain numerous tiny blood sinuses called ***lacunae.*** The partitions between lacunae, called***trabeculae*****,** are composed of fibroconnective tissue and smooth ***trabecular muscle.*** In flaccid penis, tonus of the trabecular muscle collapses the lacunae, which appear as tiny slits in the tissue.

At the body surface, the penis turns 90^{o} and continues inward as the root. The corpus spongiosum terminates internally as a dilated bulb. The corporacavernosa diverge like the arms of a Y. Each arm, called a crus (cruss; plural, crura), and attaches the penis to the public arch (ischiopublic ramus) and perineal membrane.

5.2 The Accessory Glands of the Male Reproductive Organs

There are three sets of ***accessory glands*** in the male reproductive system they are:

- ✓ The seminal vesicles
- ✓ Prostate gland
- ✓ Bulbourethral gland.



5.2.1 The Seminal vesicles

The seminal vesicles are a pair of glands posterior to the urinary bladder. A seminal vesicle is about 5cm long. The secretory portion is a very convoluted duct with numerous branches that form a complex labyrinth. The duct empties into the ampulla of the ductus deferens. The secretion of the seminal vesicles constitutes about 60 per cent of the semen.

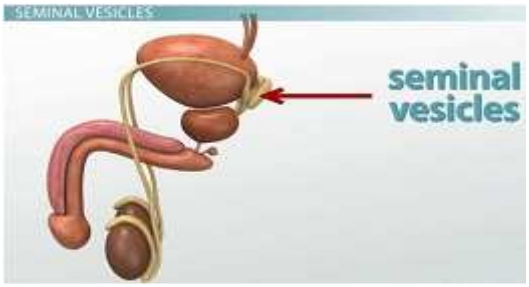


Figure: *Seminal vesicles*

The seminal vesicles produce a sugar-rich fluid (fructose) that provides sperm with a source of energy to help them move. The fluid of the seminal vesicles makes up most of the volume of a man's ejaculatory fluid, or ejaculate.

5.2.2 Prostate

The prostate surrounds the urethra immediately inferior to the urinary bladder. It measures about 2 by 4 by 3cm and is an aggregate of 30 to 50 tubuloacinar glands enclosed in a single fibrous capsule. These glands empty through about 20 pores in the urethra wall. The stoma of the prostate consists of connective tissue and smooth muscle, like that of the seminal vesicles. The thin milky secretion of the prostate contributes about 30 percent of the semen.

Figure: *Showing the prostate gland*

5.2.3 Bulbourethral (Cowper) Glands

They are brownish, spherical glands about 1cm in diameter. During sexual arousal, they produce a clear slippery fluid that lubricates the head of the penis in preparation for intercourse. Perhaps more importantly, though, it neutralizes the acidity of residual urine in the urethra, which would be harmful to the sperm.

Figure: *The Bulbourethral gland*

In Text Question

I surround the urethra immediately inferior to the urinary bladder. I measures about 2 by 4 by 3cm and is an aggregate of 30 to 50 tubuloacinar glands enclosed in a single fibrous capsule, what am I?

In Text Answer

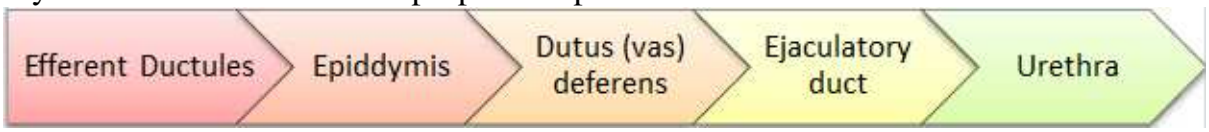
Prostate gland

5.3 Describe the pathway of sperm cell from its formation to ejaculation.

The testes are where sperm are manufactured in the scrotum. The epididymis is a tortuously coiled structure topping the testis, and it receives immature sperm from the

testis and stores it several days. When ejaculation occurs, sperm is forcefully expelled from the tail of the epididymis into the deferent duct. Sperm then travels through the deferent duct through up the spermatic cord into the pelvic cavity, over the ureter to the prostate behind the bladder.

Here, the vas deferens joins with the seminal vesicle to form the ejaculatory duct, which passes through the prostate and empties into the urethra. When ejaculation occurs, rhythmic muscle movements propel the sperm forward



Summary:
In this study session, you have learnt that

1. Thetestes contain seminiferous tubules in which sperm are produced.
2. The scrotum regulates the temperature of the testes through the dartos muscle (tumicadartos) cremaster muscle and the pampiniform plexus.
3. The penis consists of three erectile tissues, which are spongy and contains lacunae.
4. There are three sets of accessory glands namely the seminal vesicles, prostate and bulbourethra glands.
5. After leaving the testes the sperm travels through a series of spermatic ducts to reach the urethra.

Self-Assessment Question (SAQs) for Module 7

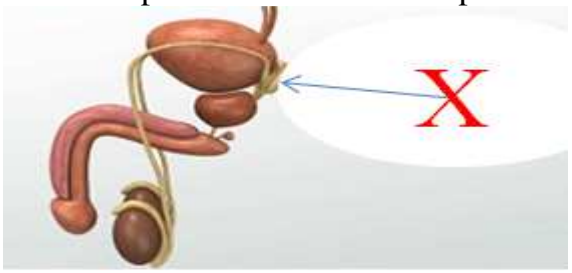
Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering these questions. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 5.1(Test learning outcome 5.1)

Function of the male reproductive system.

SAQ 5.2(Test learning outcome 5.2)

Label the point marked X and explain its function.



SAQ 5.3(Test learning outcome 5.3)

Describe the pathway of a sperm cell from formation to ejaculation using a simple diagram

Notes on the Self-Assessment Questions (SAQs) for Study Session 1

SAQ 5.1:

The function of the male reproductive system is to perform the following function:

1. To produce, maintain and transport sperm (male reproductive cells).
2. To serve as protective fluid (semen)
3. To discharge sperm within the female reproductive tract during sex
4. To produce and secrete male sex hormone responsible for maintaining the mail productive system

SAQ 5.2

The seminal vesicles produce a sugar-rich fluid (fructose) that provides sperm with a source of energy to help them move. The fluid of the seminal vesicles makes up most of the volume of a man's ejaculatory fluid, or ejaculate.

SAQ 5.3

The Pathway taken by Sperm Cell from Formation to Ejaculation: After leaving the testis, the sperm travel through a series of spermatic ducts to reach the urethra.

REFERENCES

Cooper, M., Frazer, D., Myles, M. 2009.Textbook for Midwives.15th Ed.Churchill and Livingstone.

http://www.innerbody.com/image/urinov.html

http://www.l'e ac uk/pa/tecachva/anatomy/case4/frmst4./html

Study Session6: Urinary Tract

Expected Duration: 1 week of 2 contact hour

Introduction

The urinary system is made up of three components which are listed from upper part of the body to the lower part; Kidney, Ureter, Bladder and the Urethra. All these four components are linked together by a tract. Hence you will be learning about the urinary tract.

The urinary tract begins at the two kidneys, which is linked up to the blood supply by the renal arteries and veins. It continues as a passage for urine in the two urethras, the bladder and the urethra. Therefore, in this study session you will learn how to locate the positions of all the components of the urinary system and their functions.

Learning Outcomes for Study Session 6:

When you have studied this lecture, you will be able to:

8.1 Locate and describe the position, support, appearance, and microscopic structure of the kidneys.
8.2 Explain the functions of the kidneys.
8.3 Highlight the structure and functions of the ureter,
8.4 Draw the bladder and list its functions.
8.5 Identify the parts urethra and its functions.

6.1 Position, Support, and Appearance

The kidneys are a pair of bean-shaped organs found along the posterior wall of the abdominal cavity. The left kidney is located slightly higher than the right kidney because the right side of the liver is much larger than the left side. The kidneys are located posterior (next) to the peritoneum and touch the muscles of the back.

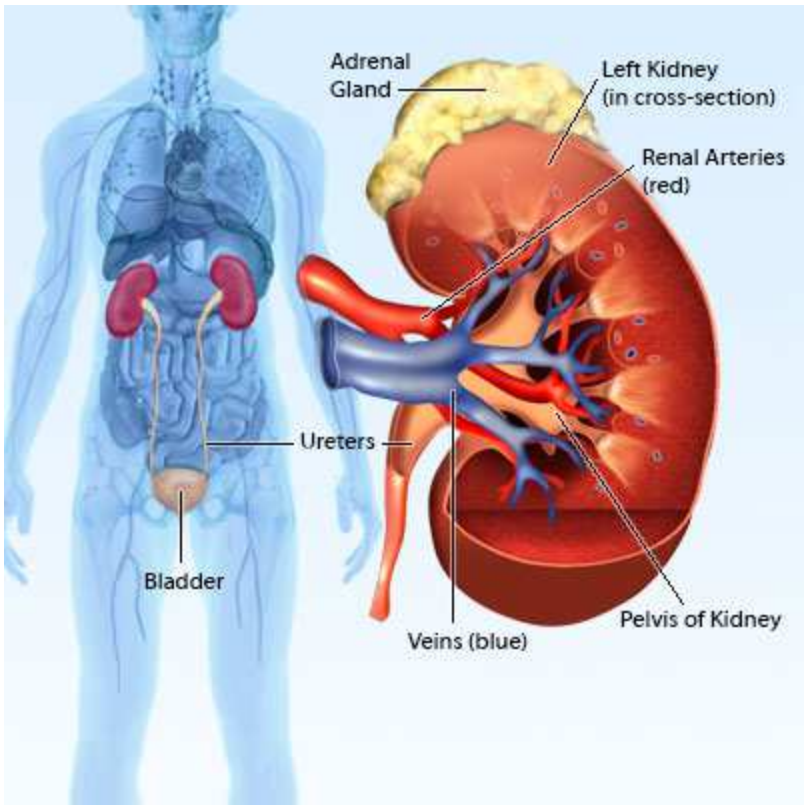


Figure 6.1: Showing the position of the Kidney and a cross section of it.
Source: http://www.medicinenet.com/kidney_pain/article.htm

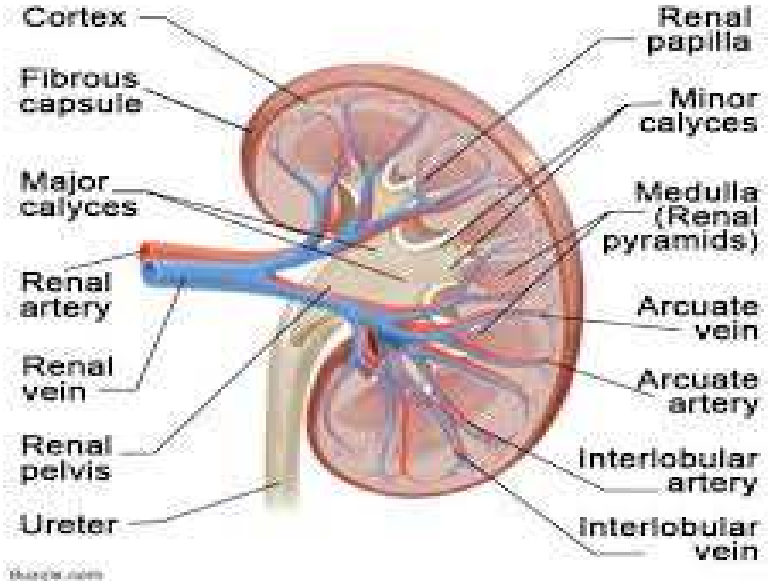


Fig 6.1:The Cross-section of the Kidney

A layer of adipose that holds them in place and protects them from physical damage surrounds the kidney. The kidneys filter excess ions, and chemicals from the blood to form urine. The kidney is about 10cm long, 6.5cm wide and 3cm thick. Its weighs around 120gms. The kidney has an outer region called the cortex and an inner region

known as the medulla that consists of the nephron. The nephron is the functional unit of the kidney. Now you will learn about the nephron.
The renal pelvis is divided into two or three spaces-the major calyces-which in turn divide into further minor calyces. The wall of the calyces, pelvis and urethras are line with smooth muscle that can contact to force urine towards the bladder by peristalsis. The cortex and the medulla are made up of nephrons; these are the functional units of the kidney, and each kidney contains about 1.3 million nephrons.

The Nephron
The kidney has a pale outer region-the cortex-and a darker inner region-the medulla. The medulla is divided into 8-16 conical regions, called the renal pyramids; the base of each pyramid starts at the corticomedullary border, and the apex ends in the renal papilla which merges to form the renal pelvis and then on to form the urethra.

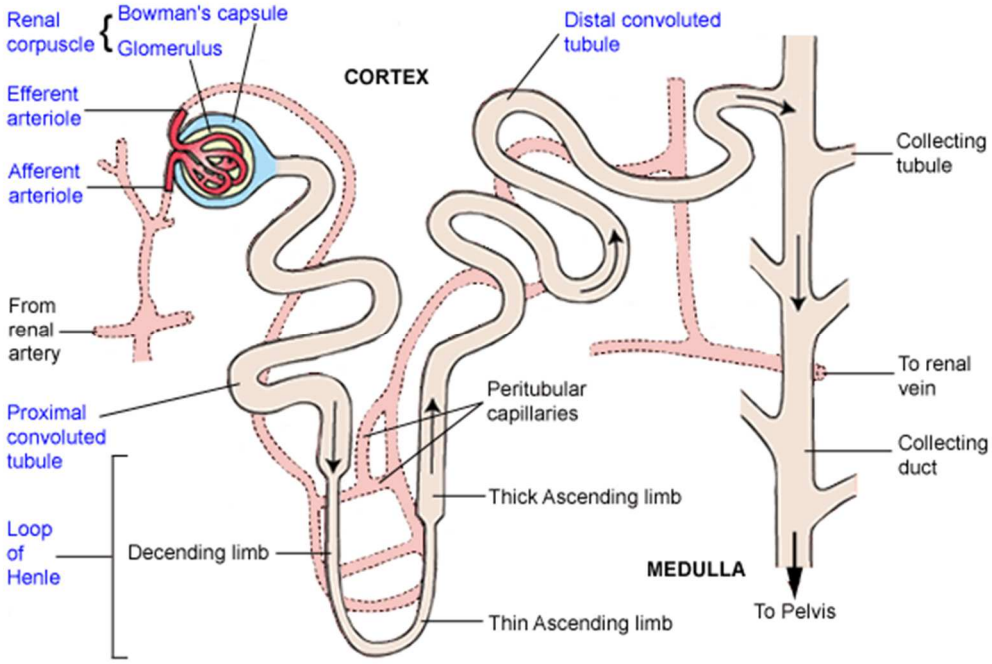


Figure 6.2: *Showing the nephron*

The nephron is the unit of the kidney responsible for ultrafiltration of the blood and reabsorption or execution of products in the subsequent filtrate. You will now consider the components of the nephron.

1. **A filtering unit- the glomerulus***:* 125ml/min of filtrate is formed by the kidneys as blood is filtered through this sieve-like structure. This filtration is uncontrolled.

Box 6.1 The Kidney
The kidney has and outer region the *cortex* and an inner region the *medulla*, that consists of *nephron*. The nephron is the functional unit of the kidney.

2. **The proximal convoluted tubule*:*** Controlled absorption of glucose, sodium, and other solutes goes on this region.
3. **The loop of Henle*:*** This region is responsible for concentration and dilution of urine by utilising a counter-current multiplying mechanism.
4. **The distal convoluted tubule.** This region is responsible, along with the collecting duct that it joins, for absorbing water back into the body, leaving highly concentrated urine to flow into the collecting duct and then into the renal pelvis.

In Text Question

The left kidney is located slightly higher than the right kidney. Why?

In Text Answer

The left kidney is located slightly higher than the right kidney because the right side of the liver is much larger than the left side.

5. **Blood Supply:** The artery enters at the renal hilum and forms a glomerulus for each nephron. Blood is collected and returned via the renal vein.
6. **Lymphatic Drainage:** Lymph vessels lie under the cortex and around the urine-bearing tubules. It drains into large lymphatic ducts, which emerge from the hilum and lead to the aortic lymph glands.

7. **Nerve Supply:** Nerves enter by the renal hilum and provide a sympathetic and para-sympathetic nerve supply.

In-text question

Explain the endocrine function of the kidney.

In Text Answer

The kidney secretes two hormones a) Renin which aids maintenance of blood pressure and b) Erythropoetin that stimulates the production of erythrocytes

6.2 Functions of the Kidneys

The kidney performs so many functions some of which include:This takes place in three stages:

- ❖ Filtration
- ❖ Reabsorption
- ❖ Secretion

6.2.1 Filtration

This is the simple process of water and the substances dissolved in it being passed from the glomerulus into the glomerular capsule because of the raised intracapillary pressure. Filtration increased in pregnancy as it helps to eliminate the additional wastes created by maternal and foetal metabolism.

6.2.2 Reabsorption

The body selects from the filtrate the substances which it needs: water, salts and glucose. Minerals are selected according to the body's needs.

6.2.3 Secretion

Certain substances, such as creatinine and toxins, are added directly to the urine in the ascending arm of the loop of Henle.

Box 6.2: The Nephron
The nephron is the unit of the kidney responsible for ultrafiltration of the blood and reabsorption or execution of products in the subsequent filtrate

6.2.4 Endocrine Activity

The kidney secretes two hormones. One, renin, is produced in the afferent arteriole and is secreted when the blood supply to the kidneys is reduced. And in response to lowered sodium levels, on angiotensinogen, which is present in the blood, to form angiotensin which raises blood pressure and encourages sodium reabsorption. The second hormone, erythropoietin, stimulates the production of red blood cells.

6.2.5 Summary of functions

The functions of the kidney may be summarised as follows:

1. Elimination of wastes, particularly the breakdown products of protein, such as urea, urates, uric acid, creatinine, ammonia and sulphates
2. Elimination of toxins
3. Regulation of the water content of the blood and indirectly of the tissues
4. Regulation of the pH of the blood
5. Regulation of the osmotic pressure of the blood
6. Secretion of the hormones renin and erythropoietin.

In Text Question

List the two hormones secreted by kidney?

In Text Answer

Rennin and Erythropoietin.

6.3 The Ureters

The tubes which convey the urine from the kidneys to the bladder are the ureters. The upper end is funnel-shaped and merges into the pelvis of the kidney where the urine is received from the renal tubules. Each tube is about 25-30cm long and runs from the renal hilum to the posterior wall of the bladder.

Structure
The ureters have three main layers
- ❖ The lining
- ❖ The muscular later
- ❖ The outer coat

The lining: Is formed of transitional epithelium arranged in longitudinal folds.
The muscular layer: Is arranged as an inner longitudinal layer, a middle circular layer and an outer longitudinal layer.
The outer coat is of fibrous connective tissue which is protective. It is continuous with the fibrous capsule of the kidney.

Blood, Lymph and Nerve Supply
The upper part of the ureter is supplied similarly to the kidney. In its pelvic portion it derives blood from the common iliac and internal arteries and from the uterine and vesical arteries. Venous return is along corresponding veins.
Lymph drains into the internal, external and common iliac nodes.
The nerve supply is sympathetic and parasympathetic.

6.4 The Bladder

Structure: The bladder is the urinary reservoir which stores the urine it is convenient for it to be voided. It is pyramidal; its base is triangular. When it is full, it becomes more globular in shape as its walls are distended.
Position: In the non-pregnant female, the bladder lies immediately behind the symphysis pubis and in front of the uterus and vagina. The intestines and peritoneal cavity also lie above. The ureters enter the bladder from behind; the urethra leaves it from below. Underneath the bladder is the muscular diaphragm of the pelvic floor which forms its main support.

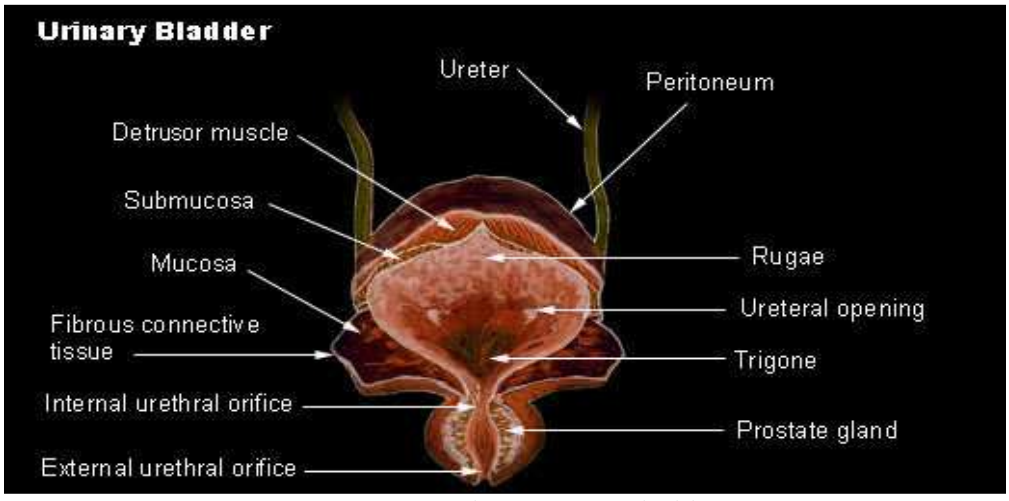


Figure 7.1: *The Urinary Bladder*
Source: *(http://www.innerbody.com)*

Structure: Its three angles are the exit of the urethra below and the two slit-like openings of the ureters above. The apex of the trigone is its lowest, is also termed the neck. Its capacity is around 600ml plus or minus.
Layers: The lining of the bladder is formed of transitional epithelium which helps to allow the distension of the bladder without losing its water-holding effect the lining, except which flatten out as the bladder expands and fills.

In Text Question
The tubes which convey the urine from the kidneys to the bladder are the ureters
In Text Answer
Ureters.

The musculature of the bladder consists chiefly of the large detrusor muscle function is to expel urine.
The outer layer of the bladder is formed of visceral pelvic fascia.
Blood, Lymph and Nerve Supplies
The vesical arteries, superior and inferior, are the main suppliers of blood.
Lymph drains into the internal iliac glands and into the obturator glands.
The nerve supply is parasympathetic and sympathetic.

6.5 Urethra.

The urethra is the tube through which urine passes from the bladder to the exterior of the body. The female urethra is around 2 inches long and inferior to the clitoris and superior to the vaginal opening. In males, the urethra is around 8 to 10 inches long and ends at the tip of the penis.

The urethra is also an organ of the male reproductive system as it carries sperm out of the body through the penis. The flow of urine through the urethra is controlled by the internal and external urethral sphincter muscles. The internal urethral sphincter is made up of smooth muscle and opens involuntarily when the bladder reaches a certain set level of distention.

In Text Question
Explain the position of the bladder?

In Text Answer
In the non-pregnant female, the bladder lies immediately behind the symphysis pubis and in front of the uterus and vagina. The intestines and peritoneal cavity also lie above. The ureters enter the bladder from behind; the urethra leaves it from below. Underneath the bladder is the muscular diaphragm of the pelvic floor which forms its main support.

The opening of the internal sphincter results in the sensation of needing to urinate. The external urethral sphincter is made up of skeletal muscle and may be opened to allow urine to pass through the urethra or may be held closed to delay urination.

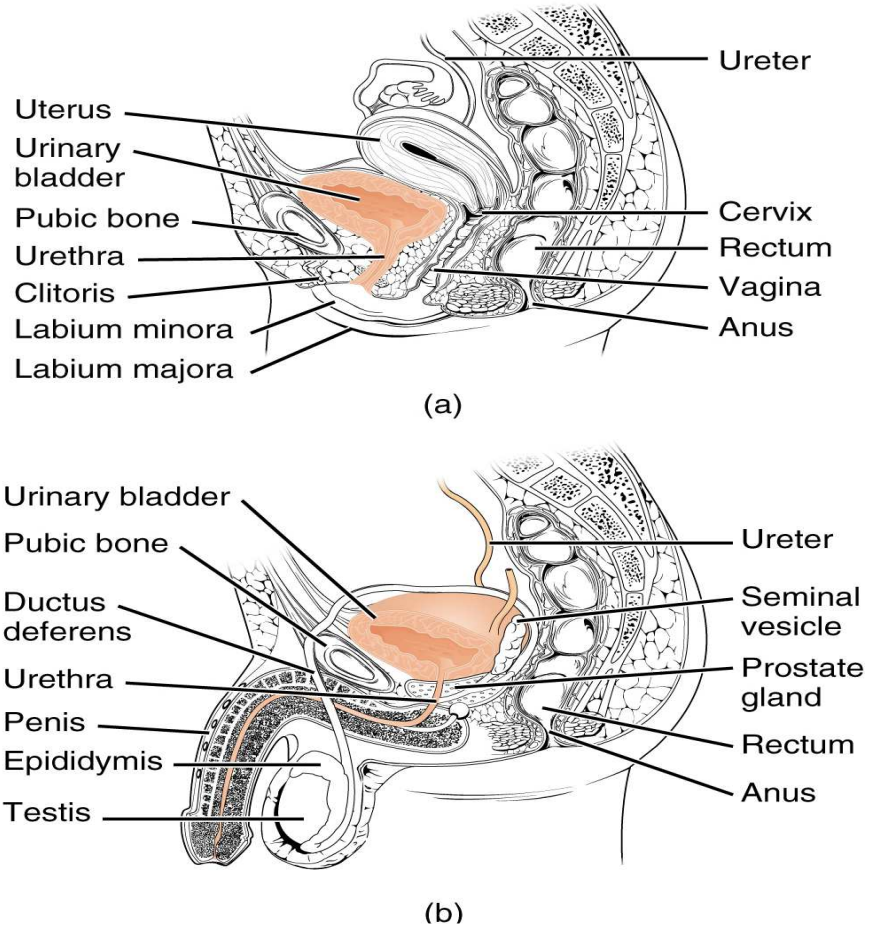


Figure 6.3: *a) Female Urethra b) Male Urethra*

Source:*http://upload.wikimedia.org/wikipedia/commons/7/7d/Female_and_Male_Urethra.jpg*

The Urethra in Pregnancy

The hormones of pregnancy, particularly progesterone, relax the walls of the ureters and allow dilatation and kinking. It tends to result in a slowing down or stasis of urinary flow, making infection a greater possibility. The lining is formed of transitional epithelium arranged in logitudinal folds.

The muscular layer is arranged as an inner longitudinal layer, a middle circular layer and an outer longitudinal layer. The outer coat is of fibrous connective tissue which is protective. It is continuous with the fibrous capsule of the kidney.

Activity

Time: 1hour

Step 1: Get a rat in your neighbourhood.

Step 2: Open the stomach and identify the four components of the urinary tract. 15mins

Step 3: Describe how the ureter looks in size colour and shape. 10mins

Step 4: List the function of the urethra? 10mins

Summary of Study Session 8

In this study session, you have learnt that;

1. The kidneys are a pair of bean-shaped darkened organs located along the posterior wall of the abdominal cavity.
2. The urinary system control water and electrolyte balance blood pressure and filters metabolic waste.
3. The ureter is a pair of tubes that carry urine from the kidneys to the urinary bladder; which is a hollow organ that stores urine, which is voided through the urethra.
4. The urethra is the tube through which urine passes from the bladder to the exterior of the body.

Self-Assessment Question (SAQs) for Study Session 8

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering these questions. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Module.

SAQ 6.1 (Test learning outcome 6.1)

Describe the position, support and appearance of the kidneys.

SAQ 6.2 (Test learning outcome 6.2)

Explain the functions of the kidneys.

SAQ 6.3 (Test learning outcome 6.3)

Describe the structure and function of the bladder.

Note of SAQ 6.1: Describe the position, support and appearance of the kidneys.

The kidneys are a pair of bean-shaped organs found along the posterior wall of the abdominal cavity. The left kidney is located slightly higher than the right kidney because the right side of the liver is much larger than the left side. The kidneys are located posterior to the peritoneum and touch the muscles of the back.

The kidneys are surrounded by a layer of adipose that holds them in place and protect them from physical damage. The kidneys filter excess ions, and chemicals from the blood to form urine. The kidney is about 10cm long, 6.5cm wide and 3cm thick, its weighs around 120gms.

Note of SAQ 6.2: Explain the functions of the kidneys.

This takes place in three stages:

- ✓ Filtration
- ✓ Reabsorption
- ✓ Secretion

Filtration: This is the simple process of water and the substances dissolved in it being passed from the glomerulus into the glomerular capsule as a result of the raised intra-

capillary pressure. Filtration is increased in pregnancy as it helps to eliminate the additional wastes created by maternal and foetal metabolism.

Reabsorption: The body selects from the filtrate the substances which it needs: water, salts and glucose. Minerals are selected according to the body's needs.

Secretion: Certain substances, such as creatinine and toxins, are added directly to the urine in the ascending arm of the loop of Henle.

Endocrine Activity

The kidney secretes two hormones. One, renin, is produced in the afferent arteriole and is secreted when the blood supply to the kidneys is reduced. And in response to lowered sodium levels, on angiotensinogen, which is present in the blood, to form angiotensin which raises blood pressure and encourages sodium reabsorption. The second hormone, erythropoietin, stimulates the production of red blood cells.

Note of SAQ 6.3: Describe the structure and function of the bladder.

The bladder is the urinary reservoir, which stores the urine it is convenient for it to be voided. It is pyramidal; its base is triangular. When it is full, it becomes more globular in shape as its walls are distended.

Position

In the non-pregnant female, the bladder lies immediately behind the symphysis pubis and in front of the uterus and vagina. The intestines and peritoneal cavity also lie above. The ureters enter the bladder from behind; the urethra leaves it from below. Underneath the bladder is the muscular diaphragm of the pelvic floor which forms its main support.

Structure

Its three angles are the exit of the urethra below and the two slit-like openings of the ureters above. The apex of the trigone is its lowest, is also termed the neck. Its capacity is around 600ml plus or minus.

Layers

The lining of the bladder is formed of transitional epithelium which helps to allow the distension of the bladder without losing its water-holding effect. The musculature of the bladder consists chiefly of the large detrusor muscle function is to expel urine. The outer layer of the bladder is formed of visceral pelvic fascia.

Blood, Lymph and Nerve Supplies

The vesical arteries, superior and inferior, are the main suppliers of blood.

Lymph drains into the internal iliac glands and into the obturator glands.

The nerve supply is parasympathetic and sympathetic.

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Answer to Self-Assessment Questions (SAQs):

Study Session 7: Endocrine System and Related Hormones

Expected Duration: 1 week of 2 contact hour

Introduction

Each month women of reproductive age who are not pregnant go through a cycle of fertility that results in either pregnancy or menstruation. The average menstrual cycle is 28 days, but ranges from 24 to 35days. This cycle usually begins near the thirteenth year of life and continues into middle age, then cease (menopause).

A female's first reproductive cycle (menarche) occurs after the ovaries and other organs of the female reproductive system mature (puberty) and responds to certain hormone. The hypothalamus control and governs the anterior pituitary gland which in terms governs the ovary by hormones and finally the ovary produces hormones which control changes in the uterus.

Learning Outcomes of Study Session 7

At the end of this lecture you will be able to:

9.1 Define terms associated with the topic.
9.2 Describe the hormones associated with menstruation.
9.3 Discuss the phases of the menstrual cycle.

]7.1 Definitions of Terms

Menstruation: is defined as the shedding of the uterus lining (Endometrium), which occurs on a regular basis in reproductive age.

Puberty: This is the time in life, when a person becomes sexually mature, (development of secondary sexual characteristics). It is a physical change that usually happens between ages 10 to 14 years and a number of physical and physiological changes Takes place these changes are explained in **Figure 7.1**

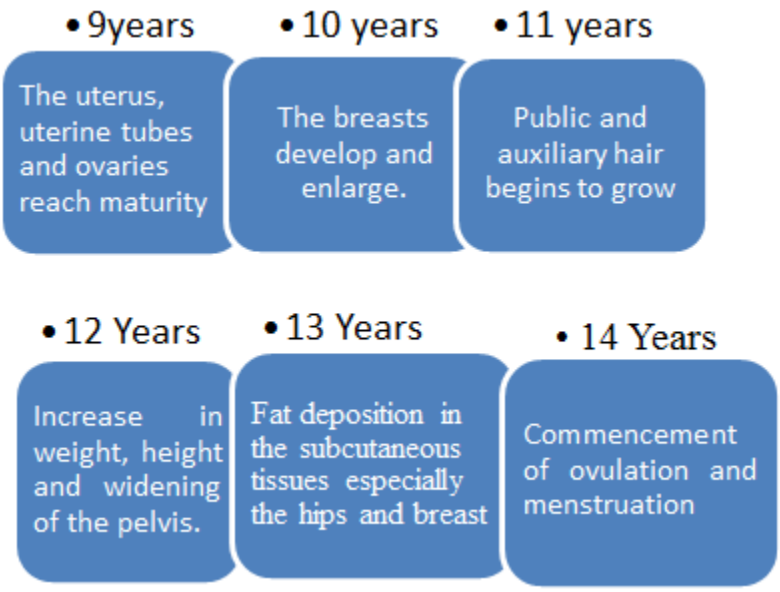

Figure 7.1: *Puberty changes between ages 9-14years*

Menarche: It is the first menstrual cycle, or first menstrual bleeding in female human from both social and medical perspectives, it is often considered the central event of female puberty, as it signals the possibility of fertility.

Menopause: Is a time in a woman's life when her periods (menstruation) eventually stops and the body goes through changes that no longer allow her to get pregnant it is a natural event that normally occurs in women aged 45-55years. It is usually accompanied physical symptoms like hot flushes and emotional changes such as mood swings. These changes are due to fail in the production of Oestrogen.

7.2 Hormones Involved in the Menstrual Cycle

There are four hormones-involved in the menstrual cycles; namely:

7.2.1 Follicle-Stimulated Hormone (FSH)
7.2.2 Estrogen
7.2.3 Luteinizing Hormone
7.2.4 Progesterone

7.2.1 Follicle-Stimulating Hormone (FSH)

As the name implies, this hormone stimulates the development of new follicles as well as the production of the hormone estrogen. This phase is called the menstrual cycles. This increase of follicle stimulating hormone stimulates the growth and develops into the ovulated egg.

7.2.2 Estrogen

This hormone is proved to be responsible for the continuing development of follicles within the ovaries. In the uterus, it also helps in the thickening of the endometrium, as

well as the cervix. Estrogen release act as suppressor of its own release called a negative feedback loop. This causes a surge in luteinizing hormone.

7.2.3 Luteinizing Hormone (LH)

Luteinizing hormone "surge" in the middle of the 28 days cycle, stimulate maturation and the mature ovum called (ovulation) from any of the two ovaries. At this peak, the concentration of this hormone becomes so high. The egg release from the ovary should be fertilized 48hrs after its release. If it does not become fertilized, it is release along with the inner lining of the uterus as part of the monthly menstruation.

7.2.4 Progesterone

Once ovulation has occurred, the hormone progesterone releases from a structure called corpus Luteum. One of the functions of progesterone includes helping to make the mucus of uterus-cervix wall to thickened, preparing for potential pregnancy. If the egg becomes fertilized, it will become implanted in the uterus and the foetus will begin to grow. If no pregnancy, it is discharge as menstruation.

In Text Question

Differentiate between menopause and menarche?

In Text Answer

menopuaseis a time in a woman's life when her periods (menstruation) eventually stops and the body goes through changes that no longer allow her to get pregnant it is a natural event that normally occurs in women aged 45-55 years. It is usually accompanied physical symptoms like hot flushes and emotional changes such as mood swings. These changes are due to fail in the production of Oestrogen.

The age of puberty varies between 10-14 years and a number of physical and physiological changes while **menarche** is the first menstrual cycle, or first menstrual bleeding in female human from both social and medical perspectives, it is often considered the central event of female puberty, as it signals the possibility of fertility.

7.3 THE PHASES OF MENSTRUAL CYCLE

Menstrual cycle is divided into three phases namely:

a. Menstrual phase
b. Proliferature phase
c. Secretary phase

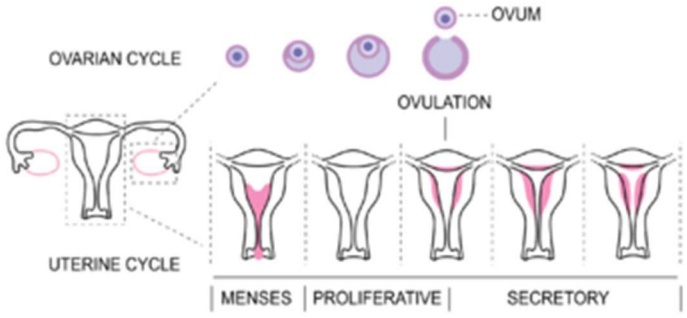

Figure 7.2: *Phases of menstrual cycle.*

a. **The Menstrual Phase;** When the ovum is not fertilized the anterior pituitary gland withdraws the Luteining hormone after 14 days. The withdrawal of the hormone causes degeneration of the corpus Luteum and the levels of progesterone and estrogen therefore falls. (In the case of pregnancy, the corpus Luteum is supported by human chorionic gona-dothrophic (h5g) secreted by developing embryo).

   When Progesterone is withdrawn, the cells lining the Endometrum disintegrates and the capillaries breakdown. Depending on the high level of ovarian hormones, the functional layers of the Endemetruim undergo necrosis and sloughs off or shed as menstruation.
   The menstruation flow consists of the secretions from the endometrial glands, endometrial cells, blood from the broken down capillaries and the unfertilized ovum. **This lasts 3-5 days**.
   When the progesterone and Estrogen level in the blood falls to a certain level, and the corpus Luteum degenerates, the anterior pituitary gland resumes its activity or starts to secretes follicle stimulating hormone and another ovarian follicle is stimulated and the next cycle is initiated.

b. **Proliferative Phase:** This begins at the end of the menstrual period when the actual loss of menstrual blood flow ceases and last for about 10days. During this phase, the anterior lobe of the pituitary gland produces follicle stimulating hormone which circulates in the blood stream, stimulating the growth and development of a Graafian follicle.
   The developing Graafian follicle produces Estrogen which is responsible for the repair and proliferation of the functional layer of the endometrium in preparation for the reception of a fertilized ovum.

In Text Question
How long does the menstrual phase last?

In Text Answer
3-5 days.

   The Endomentruim becomes thicker by rapid cell multiplication accompanied by an increase in the number of mucus-secretary glands and blood capillaries.This phase ends when ovulation occurs and Estrogen production declines.

c. **Secretary Phase:** Immediately after ovulation, the stimuli lining cells of the ovarian follicle are stimulated by luteinizing hormone to develop the corpus Luteum or yellow body which produces progesterone and some Estrogen.**This phase lasts for 14 days.**Progesterone is directly absorbed into the blood stream and has the following effects on the Endometruim;
   - ❖ The Endometruim become thickened on the Edematous.
   - ❖ The secretary glands produces increased amount of watery mucus into the uterine cavity.

- ❖ This is believed to assist the passage of the spermatozoa through the uterus to the uterine tubes, where the ovum is fertilized.

In Text Question
How long does the Secretary phase last?

In Test Answer
14days

- ❖ There is increase in the number of glands and blood capillaries. There is similar increase in the secretion of watery mucus by the glands of the uterine tubes and by the cervical glands which lubricate the vagina.
- ❖ The Endometruim is now thick, soft, moist, and vascular and is prepared if necessary, for the reception of fertilized ovum.

SUMMARY of Study Session 9
In this study session you have learnt that

1. Terms related to menstruation and you also learnt that **Menstruation:** is defined as the shedding of the uterus lining (Endometrium), which occurs on a regular basis in reproductive age.
2. Follicle-Stimulated Hormone (FSH), Estrogen, Luteinizing Hormone and Progesterone are the hormones associated with menstruation.

d. The phases of menstruation are menstrual phase, proliferature phase and secretary phase.

Self-Assessment Questions (SAQS) FOR Study Session 10:
Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering these questions. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Study Session.

Self-Assessment Question (SAQ 7.1) (Test Learning Outcome 7.1)
Define Menstruation and the related terms.

Self-Assessment Question (SAQ 7.2) (Test Learning Outcome 7.2):
List the hormones associated with menstruation.

Self-Assessment Question (SAQ 7.3) (Test Learning Outcome 7.3):
Describe the phases of menstruation.

Note of SAQ 7.1
Definition of menstruation: is defined as the shedding of the uterus lining (Endometrium), which occurs on a regular basis in reproductive age.

Definition of Puberty: this is the time in life, when a person becomes sexually mature (development of secondary sexual characteristics). It is a physical change that usually happens between ages 10 to 14 years.

Definition of Menarche: it is the first menstrual cycle, or first menstrual bleeding in female human from both social and medical perspectives, it is often considered the central event of female puberty, as it signals the possibility of fertility.
Definition of Menopause: is a time in a woman's life when her periods (menstruation) eventually stops and the body goes through changes that no longer allow her to get pregnant it is a natural event that normally occurs in women aged 4555 years. It is usually accompanied physical symptoms like hot flushes and emotional changes such as mood swings. These changes are due to fail in the production of Oestrogen.

Note of SAQ 7.2

Hormones associated with menstruation: There are four hormones-involved in the menstrual cycles; namely:

- ✓ Follicle-Stimulated Hormone (FSH)
- ✓ Estrogen
- ✓ Luteinizing Hormone
- ✓ Progesterone

Note of SAQ 7.3

Phases of menstrual cycle
Menstrual cycle is divided into three phases namely:

- ✓ Menstrual phase.
- ✓ Proliferature phase.
- ✓ Secretary phase

The Menstrual Phase: When the ovum is not fertilized the anterior pituitary gland withdraws the luteining hormone after 14 days. The withdrawal of the hormone causes degeneration of the corpus luteum and the levels of progesterone and estrogen therefore falls. (in the case of pregnancy, the corpus luteum is supported by human chorionic gona-dothrophic (h5g) secreted by developing embroyo).

- When progesterone is withdrawn, the cells lining the endometrum disintegrates and the capillaries breakdown.
- Depending on the high level of ovarian hormones, the fuctional layer of the-endemetruim undergoes necrosis and sloughs off or shed as menstruation.
- The menstruation flow consists of the secretions from the endometrial glands, endometrial cells, blood from the broken down capillaries and the unfertilized ovum. This lasts 3-5 days.
- When the progesterone and estrogen level in the blood falls to a certain level, and the corpus luteum degenerates, the anterior pituitary gland resumes its activity or starts to secretes follicle stimulating hormone and another ovarian follicle is stimulated and the next cycle is initiated.

Proliferative Phase: This begins at the end of the menstrual period when the actual loss of menstrual blood flow ceases and last for about 10 days.

- during this phase, the anterior lobe of the pituitary gland produces follicle stimulating hormone which circulates in the blood stream, stimulating the growth and development of a graafian follicle.

- the developing graafian follicle produces estrogen which is responsible for the repair and proliferation of the functional layer of the endometrium in preparation for the reception of a fertilized ovum.
- theendomentruim becomes thicker by rapid cell multiplicaition accompanied by an increase in the number of mucus-secretary glands and blood capillaries.
  This phase ends when ovulation occurs and estrogen production declines.

Secretary Phase: Immediately after ovulation, the lining cells of the ovarian follicle are stimuli lining cells of the ovarian follicle are stimulated by luteinizing hormone to develop the corpus luteum or yellow body which produces progesterone and some estrogen.

- Progesterone is directly absorbed into the blood stream and has the following effects on the endometruim
- theendometruim become thickened on the edematous
- the secretary glands produces increased amount of watery mucus into the uterine cavity.
- This is believed to assist the passage of the spermatozoa through the uterus to the uterine tubes, where the ovum is fertilized.
- There is increase in the number of glands and blood capillaries. There is similar increase in the secretion of watery mucus by the glands of the uterine tubes and by the cervical glands which lubricate the vagina.
- The endometruim is now thick, soft, moist, and vascular and is prepared if necessary, for the reception of fertilized ovum. This phase last for 14 days.

References

Dechernery, A. H., and Nathan, L., 2007. *Current Diagnosis and Treatment Obstetrics and Gynaecology*: New York, Pearson

Marieb, E.N., and Hoelem, K. 2010. *Human Anatomy and Physiology*. New York. Pearson Prentice Hall.

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Study Session 8: Fertilization and Development of the Fertilization Ovum

Expected Duration: 1 week of 2 contact hour

Introduction

When you take two maize seeds and plant the on the ground, if they are given the same nutrients and the same water but at the end of the planting season one grow and bear fruit but the other grow but did not bear any fruit therefore we can say the one that bear fruit is fertile while the one that did not bear fruit is not fertile.

Therefore, in the study session, you will be learning about fertilization which is the fusion of the ovum and the spermatozoon and early development of the fertilized ovum.

Learning Objectives for Study Session 8:

At the end of the lecture you will be able to:

8.1 Describe the process of fertilization

8.2 Analyse how Sex is determined

8.3 Explain the development of the fertilized ovum

8.1 Meaning of Fertilisation

Following ovulation, the ovum is wafted along by the cilia and by the peristaltic muscular contraction of the tube. The cervix under the influence of Oestrogen secretes mucus that attracts the spermatozoa. At intercourse about 300 million sperm are deposited in the posterior fornix of the vagina. Some survive to propel themselves towards the uterine tubes while the others are destroyed.

Fertilization is the process of combining the male gamete, or sperm, with the female gamete, or ovum. The product of fertilization is a cell called a zygote.

The sperm finally become mature and capable of releasing the enzyme, hyaluronidase, which allows penetration of the zonapellucida and the cell membrane surrounding the ovum. Only one spermatozoon will enter the ovum. After this, the membrane is sealed to prevent entry to any further sperm and the nuclei of the two cells fuse. The sperm and the ovum each contribute 23 pairs of chromosomes to make a total of 46 of which two are sex chromosomes. The sperm and ovum are known as the male and female gametes, the fertilized ovum as the zygote.

In Text Question

Another name for the sperm is?

In Text Answer
The male gamete

8.2 Sex Determination in Mammals

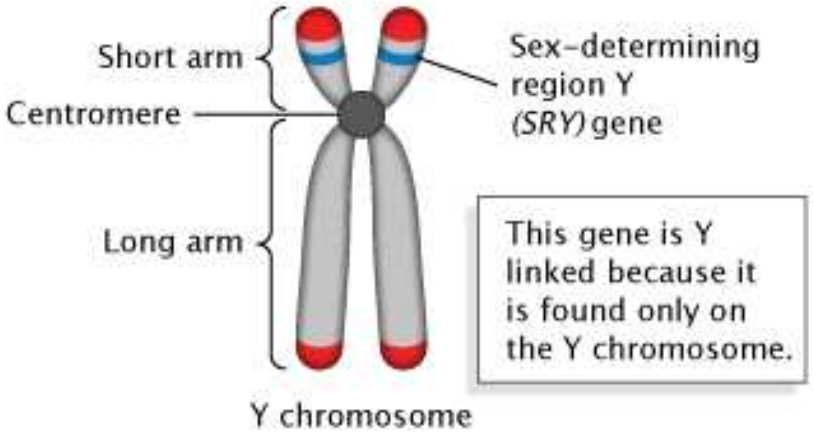

Figure 8.1: Showing the Y-chromosome

How do you know if a child will be male or female when they are been conceived? This is what you will be learning about in this session.
In placental mammals, the presence of a Y chromosome determines sex. Normally, cells from females contain two X chromosomes, and cells from males contain an X and a Y chromosome. Occasionally, individuals are born with sex chromosome aneuploidies, and the sex of these individuals is always determined by the absence or presence of a Y chromosome. Thus, individuals with 47,XXY and 47,XYY karyotypes are males, while individuals with 45,X and 47,XXX karyotypes are females.
Humans are able to tolerate supernumerary numbers of sex chromosomes because of X inactivation and the fact that the human Y chromosome is quite gene-poor. Although the role of the Y chromosome in mammalian sex determination has been known since the early twentieth century, it was not until 1959 that scientists were able to identify the region of the Y chromosome that controlled this process (McLaren, 1991).
Later, researcher David C. Page analyzed the chromosomes of sex-reversed XX men, rare individuals who look like men but have two X chromosomes instead of one X chromosome and one Y chromosome. Using DNA hybridization with probes corresponding to different regions of the Y chromosome, Page discovered that sex-reversed males carried genes from a 140-kilobase region on the short arm of the Y chromosome (Figure 8.1). Presumably, this region had been transferred to the X chromosome during a translocation (Page et al., 1985).
Subsequent experiments narrowed down this region (McLaren, 1991) and found that one gene, the sex-determining region of the Y, or SRY, was the master regulator of sex determination. The presence of just this region from the Y chromosome is thus sufficient to cause male development (Koopman et al., 1991).

In human embryos, the SRY gene encodes a unique transcription factor that activates a testis-forming pathway at about week seven of development. Before this time, the embryonic gonad is "indifferent," meaning that it is capable of developing into either a testis or an ovary (Figure 2). Likewise, the early embryo has two systems of ducts, Wolffian and Müllerian ducts, which are capable of developing into the male and female reproductive tracts, respectively.
Once the SRY gene product stimulates the indifferent gonad to develop into a testis, the testis begins producing two hormones, testosterone and anti-Müllerian hormone, or AMH. Testosterone and one of its derivatives, dihydrotestosterone, induce formation of other organs in the male reproductive system, while AMH causes the degeneration of the Müllerian duct. In females, who do not contain the SRY protein, the ovary-forming pathway is activated by a different set of proteins. The fully developed ovary then producesestrogen, which triggers development of the uterus, oviducts, and cervix from the

8.3 Development of the Fertilized Ovum

After fertilization, cell division occur and the fertilized ovum continue to divided until a cluster of cells known as the *morula* is formed, Next, a fluid-filled cavity or *blastocele* appears in the morula which now becomes the *blastocyst*. Outside the blastocyst there is a single layer of cells known as the *trophoblast* while the remaining cells form the inner cell mass. The trophoblast will form the placenta and Chorion, while the inner cell mass will become the foetus and the amnion.

Activity 7.1
15mins

Describe the menstrual phase?
The trophoblast, especially the part which lies over the inner cell mass, adheres to the endometrium. It begins to secrete substances which digest the endometrial cells, allowing the blastocyst to become embedded in the endometium. *Embedding*, or *nidation* (nesting), is normally complete by the 11^{th} day after ovulation and the endometrium closes over it complete by the 11^{th} day after ovulation and the endometrium close over it completely.

In Text Question
Explain the process of sex determination?
In Text Answer
Females carry two similar sex chromosomes, XX; males carry two dissimilar sex chromosomes, XY. Each spermatozoon will carry either an X or a Y chromosome, whereas the ovum always carries an X chromosome. If the ovum is fertilized by an X-carrying spermatozoon a female is conceived, if by a Y- carrying one, a male.
The Decidua: This is the name given to the endometruim during pregnancy. Increased secretion of oestrogens causes the endometrium to grow to four times its non-pregnant thickness. The corpus leteum also produces progesterone which stimulates the secretory activity of the endometrial glands and increases the size of the blood vessels. Three layers

are found in the decidua which are; the basal layer, functional layer and the compact layer.

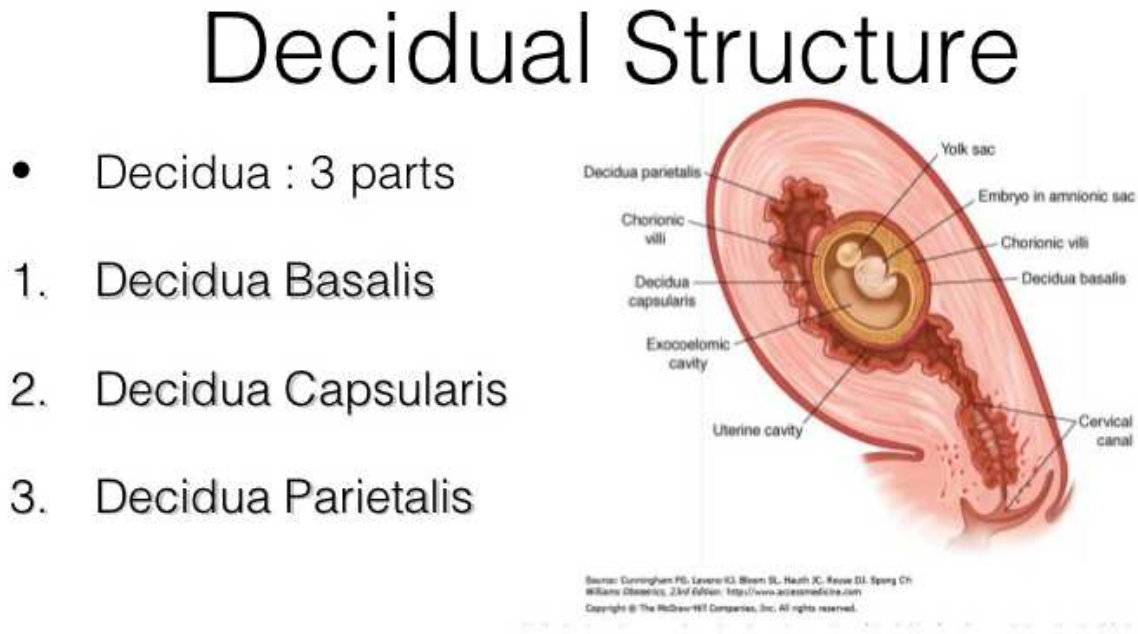

Figure 8.2: *Showing the structure of Decidua.*

- **The basal layer/Decidua Basalis:-** lies immediately above the myometrium. It remains unchanged in itself but regenerates the new endometrium during the puerperium.

- **The Functional layer/Decidua Capsularis:-** Consists of tortuous glands which are rich in secretions, it provides a secure anchorage for the placenta and allows it access to nutrition and oxygen but as soon as the baby is born, separation can occur.

- **The Compact Layer/Decidua Parietalis:-** forms the surface of the deciduas and is composed of closely packed stroma cells and the necks of the glands. The decidua underneath the blastocyst is termed the *basal deciduas,* that which covers it is the *capsular deciduas,* and the remainder is called the *parietal deciduas*. The capsular decidua meets and fuses with the partietaldeciduas.

The Trophoblast; The trophoblastic cells differentiate into layers, the outer syncytiotrophoblast (syncytium), the inner cytotrophoblast and below this a layer of mesoderm or primitive mesenchyme.
The syncytiotrophoblast: makes the nutrients in the material blood accessible to the developing fetus.

The Cytotrophroblast: is a single layer of cells which produces a hormones known as human chorionic gonadotrophin (HCG). This makes the corpus luteum to continue to produce oestrogen and production of FSH.

In Text Question

……. is the process of combining the male gamete, or sperm, with the female gamete, or ovum. The product of fertilization is a cell called a zygote.

In Text Answer

Fertilization

The Mesoderm consists of loose connective tissue. There is similar tissue in the inner cell mass and the two are continuous at the point where they join in the body stalk.

The inner Cell Mass: While the trophoblast is developing into the placenta, the inner cell mass is forming the fetus itself. The cells differentiate into three layers, each of which will form particular parts of the fetus.

The ectoderm: mainly forms the skin and nervous system.

Activities:

Time:20mins

How will you educate a couple that is facing the challenge of their three children being females?

The mesoderm: forms bones and muscles and also the heart and blood vessels, including those which are in the placenta.

The amniotic cavity: lies on the side of the ectoderm. The cavity, which is filled with fluid, gradually enlarges and folds round the embryo to enclose it. The amnion forms from its lining.

The yolk sac: lies on the side of the endoderm and provides nourishment for the embryo until the trophoblast is sufficiently developed to take over.

The embryo: This name is applied to the developing offspring after implantation and until 8 weeks after conception. During the embryonic period all the organs and systems of the body are laid down in rudimentary form so that as its completion they have simply to grow and mature for a further 7 months. The conceptus is known as a fetus during the time.

In Text Question

Describe the Decidua, inner cell mass?

In Text Answer

This is the name given to the endometruim during pregnancy. Increased secretion of oestrogens causes the endometrium to grow to four times its non-pregnant thickness. The corpus leteum also produces progesterone which stimulate the secretory activity of the endometrial glands and increase the size of the blood vessels. Three layers are found:

Summary of Study Session 10

In this study session, you have learnt that

1.**Fertilization** is the process of combining the male gamete, or sperm, with the female gamete, or ovum. The product of fertilization is a cell called a zygote.
fertilized and development of the fertilized ovum.

Self-Assessment Questions (SAQs) for Module 8.1

Now that you have completed this study session, you can assess how well you have achieved its Learning Outcomes by answering these questions. You can check your answers with the Notes on the Self-Assessment Questions at the end of this Study Session.

.SAQ8.1 (Test learning outcome 8.1 and 8.2)
Explain the word fertilization and process of sex determination.

SAQ8.2 (Test learning outcome 8.3)

Describe the Decidua, inner cell mass

Notes on the Self-Assessment Questions (SAQs) for Study Session 10

SAQ 8.1 Meaning of Fertilisation

Following ovulation, the ovum is wafted along by the cilia and by the peristaltic muscular contraction of the tube. The cervix under the influence of oestrogen, secretes mucus that attracts the spermatozoa. At intercourse about 300 million sperm are deposited in the posterior fornix of the vagina. Some survive to propel themselves towards the uterine tubes while the remaining are destroyed.

The sperm one spermatozoon will enter the ovum. After this, the membrane is sealed to prevent entry to any further sperm and the nuclei of the two cells fuse. The sperm and the ovum each contribute 23 pairs of chromosomes to make a total of 46 of which two are sex finally become mature and capable of releasing the enzyme, hyaluronidase, which allows penetration of the zonapellucida and the cell membrane surrounding the ovumonly chromosomes. The sperm and ovum are known as the male and female gametes, the fertilized ovum as the zygote.

Sex Determination

Females carry two similar sex chromosomes, XX; males carry two dissimilar sex chromosomes, XY. Each spermatozoon will carry either an X or a Y chromosome, whereas the ovum always carries l.an X chromosome. If the ovum is fertilized by an X-carrying spermatozoon a female is conceived, if by a Y- carrying one, a male.

SAQ8.2

The Decidua: This is the name given to the endometruim during pregnancy. Increased secretion of oestrogens causes the endometrium to grow to four times its non-pregnant thickness. The corpus leteum also produces progesterone which stimulate the secretory

activity of the endometrial glands and increase the size of the blood vessels. Three layers are found:
The basal layer:- lies immediately above the myometrium. It remains unchanged in itself but regenerates the new endometrium during the puerperium.
The Functional layer:- Consists of tortuous glands which are rich in secretions, it provides a secure anchorage for the placenta and allows it access to nutrition and oxygen but as soon as the baby is born, separation can occur.
The Compact Layer:- forms the surface of the deciduas and is composed of closely packed stroma cells and the necks of the glands. The decidua underneath the blastocyst is termed the *basal deciduas,* that which covers it is the *capsular deciduas,* and the remainder is called the *parietal deciduas*. The capsular deciduas meets and fuses with the partietaldeciduas.
The Trophoblast

The trophoblastic cells differentiate into layers, the outer syncytiotrophoblast (syncytium), the inner cytotrophoblast and below this a layer of mesoderm or primitive mesenchyme.
The syncytiotrophoblast: makes the nutrients in the material blood accessible to the developing fetus.
The Cytotrophroblast: is a single layer of cells which produces a hormones known as human chorionic gonadotrophin (HCG). This makes the corpus luteum to continue to produce oestrogen and production of FSH.
The Mesoderm consists of loose connective tissue. There is similar tissue in the inner cell mass and the two are continuous at the point where they join in the body stalk.
The inner Cell Mass: While the trophoblast is developing into the placenta, the inner cell mass is forming the fetus itself. The cells differentiate into three layers, each of which will form particular parts of the fetus.
The ectoderm: mainly forms the skin and nervous system
The mesoderm: forms bones and muscles and also the heart and blood vessels, including those which are in the placenta.
The amniotic cavity: lies on the side of the ectoderm. The cavity, which is filled with fluid, gradually enlarges and folds round the embryo to enclose it. The amnion forms from its lining.

Reference
Cooper, A. M., Fraser, D. M., Myles, Margaret.2006 *Myles Textbook for midwives* 15th Edition. Churchill livingstone.

Study Session 9: The Placenta

Expected Duration: 1 week of 2 contact hour

Introduction

A baby in the stomach carries out the characteristics of living things which are movement, respiration, nutrition, excretion, growth and others but you are aware that the baby cannot come out of the womb to carry out all these activities, think about it, how then does the baby feed, breath and even pass out waste? It very simple, through the placenta the parents pass nutrients to the baby and the baby passes waste to the mother for evacuation.

When a woman is pregnant the baby is connected to the mother through what is called the placenta. Therefore, in this lecture you will learn about the organ called the *Placenta* which links the fetus closely with the mother's circulation to perform many functions. The survival of the fetus depends on the integrity of the placenta.

Learning objectives for Study Session 9:

At the end of this lecture you will be able to:

9.1 Define and describe the development of the placenta.
9.2 Explain the functions of the placenta.
9.3 Discuss the appearance of the placenta at term.

9.1 DEVELOPMENT OF THE PLACENTA

The placenta also known as afterbirth is an organ that connects the developing fetus to the uterine wall to allow nutrient uptake, waste elimination and gas exchange through the mother's blood supply, fight against internal infection and produce hormones to support pregnancy.

The chorionfrondosum which is part of the trophoblast develops into the placenta will eventually develop into the placenta. The villi under the capsular decidua form the chorionleave (bald chorion) which is the origin of the chorionic membrane.

The villi penetrate the deciduas, opening to form sinuses. The area surrounding the villi is known as blood spaces. The maternal blood circulates slowly, enabling the villi to absorb food and oxygen and excrete waste. These are known as the nutritive villi. A few villi are more deeply attached to the deciduas and are called anchoring villi.

In Text Question
…… also known as afterbirth
In Text Answer
Placenta
Each chorionic villus arises from one stem. Its centre consists of mesoderm and fetal blood vessels, and branches of the umbilical artery and vein. The external layer of the villus is the syncytiotrophoblast. Four layers of the tissue separate the maternal blood from the fetal blood and make it impossible for the two circulations to mix unless any villi are damaged. The placenta is completely formed and functioning from 10 weeks after fertilization.
Four layers of tissue separate mater blood from fetal blood and make it impossible for the two circulations to meet unless any villi are damage. The blood spaces, the nutritive villi, the anchoring villi and the syncytiotrophoblast.
The Mature Placenta: In its early stages it is a relatively loose structure, but becomes more compact as it matures. Between 12 and 20 weeks' gestation the placenta weighs more than the fetus because the fetal organs are insufficiently developed to cope with the metabolic processes of nutrition.

9.2 Functions of the Placenta
From the introduction you have studied that the placenta is the medium communication between the mother and the baby in the womb. By communication it means that the baby carries out activities through the help of the mother and all this are made possible with the placenta.

9.2.1 Physiological Functions of the Hormone
Now therefore, you are going to learn in details the fuctions of the placenta.

1. Respiration
2. Nutrition
3. Storage
4. Excretion
5. Protection

1. **Respiration:** The fetus obtains oxygen and excretes carbon dioxide through the placenta. Oxygen from the mother's haemoglobin passes into fetal blood by simple diffusion and similarly the fetus gives off carbon dioxide into the maternal blood.
2. **Nutrition**: Amino acids are required for body building, glucose for energy, calcium and phosphorus for bones and teeth, and iron and other minerals for blood formation. Food for the fetus derives from the mother's diet and has already been broken down into simpler forms by the time it reaches the placenta site. The placenta is able to select those substances required by the fetus. It can also break down complex nutrients into compounds which can be used by the fetus.

3. **Storage:** The placenta metabolises glucose, stores it in the form of glycogen and re-converts it to glucose as required. The placenta can also store iron and the fat-soluble vitamins.
4. **Excretion:** The main substance excreted from the fetus is carbon dioxide. Bilirubin is also excreted. The amounts of urea and uric acid excreted are very small.
5. **Protection:** The placenta provides a limited barrier to infection. Few bacteria can penetrate. Viruses cross freely and may cause congenital abnormalities, as in the case of the rubella virus. Some drugs will cross to the fetus although there are exceptions, for example heparin.

   Towards the end of pregnancy small antibodies, immunoglobulins G (IgG), will be transferred to the fetus, and these will confer immunity on the baby for the first 3 months after birth. Only those antibodies which the mother herself possesses can be passed on.

9.2.1 Hormonal (Endocrine) Functions of the Placenta

The placenta also performs some hormone functions which are:

1. Human chorionicgonadotrophin (HCG)
2. Production of Oestrogens
3. Progesterone
4. Human Placental Lactogen (HPL)

1. **Human chorionic gonadotrophin (HCG):** This is produced by the cytotrophoblastic layer of the chorionic villi. Initially it is present in very large quantities, it gradually reduces as the pregnancy advances. HCG forms the basis of the many pregnancy tests which are available, as it is excreted in the mother's urine. Its function is to stimulate the growth and activity of the corpus luteum.
2. **Production of Oestrogens**: The placenta produces oestrogen, which are secreted in large amounts throughout pregnancy. The fetus provides the placenta with the vital precursors for the production of oestrogens. Oestrogen production is an index of fetoplacental well-being.
3. **Progesterone:** This is made in the syncytial layer of the placenta in increasing quantities until immediately before the onset of labour when its level falls.
4. **Human Placental Lactogen (HPL):** HPL has a role in glucose metabolism in pregnancy. It appears to have a connection with the activity of human growth hormone. As the level of HCG falls, so the level of HPL rises and continues throughout pregnancy.

In Text Question

Explain the function of the placenta?

In Text Answer

The Foetus obtains oxygen and excretes carbon dioxide through the placenta. It metabolises glucose, stores it in the form of glycogen and reconverts it to glucose as required. The placenta can also store iron and the fat-soluble vitamins.

9.3 APPEARANCE OF THE PLACENTA AT TERM

The placenta is a round; flat mass about 20cm in diameter and 2.5cm thick at its centre. It weighs approximately one-sixth of the baby's weight at term.

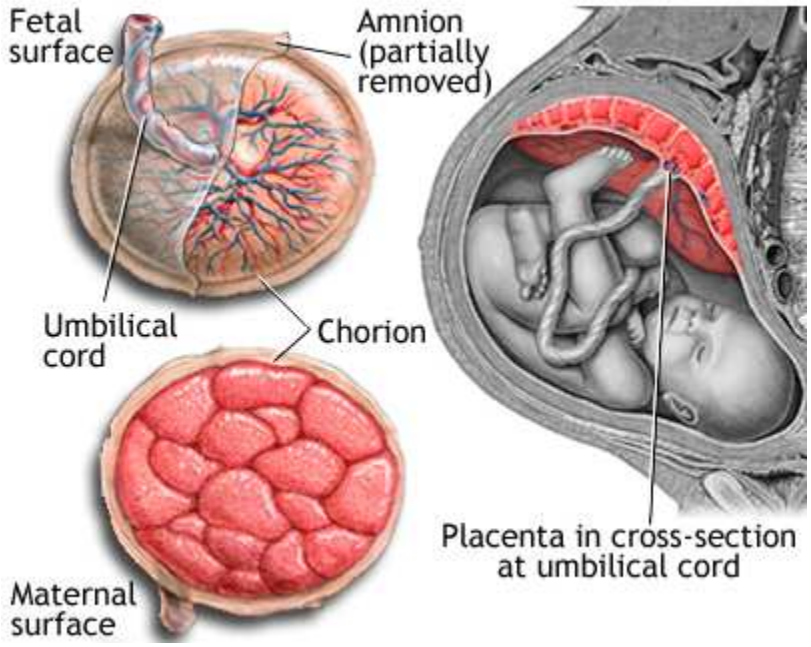

Figure 9.1: *Showing the appearance of the placenta*

Source:*https://www.google.com.ng/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=0CAcQjRw&url=http%3A%2F%2Fdj003.k12.sd.us%2FSCHOOL%2520NOTE*

The Maternal Surface: This surface is dark red in colour and part of the basal decidua will have been separated with it. The surface is arranged in about 20 lobes which are separated by sulci (furrows), into which the decidua's dips down to form septa (walls). The lobes are made up of lobules, each of which contains a single villus with its branches.

Activity
Time: 2hours

Visit the labour ward. Examine a placenta. Try to identify the surfaces and the lobules.

The Foetal Surface: The amnion covering the foetal surface of the placenta gives it a white, shiny appearance. Branches of the umbilical vein and arteries are visible, spreading out from the insertion of the umbilical cord which is normally in the centre.

The Foetal Sac: The foetal sac consists of a double membrane. The outer membrane is the chorion which lies under the capsular decidua and becomes close to the uterine wall.

The inner membrane is the amnion which contains the amniotic fluid. As long as it remains intact, the foetal sac protects the foetus against ascending bacterial infection.

Box 9.1	Thetwo surfaces of the placental.
The *maternal surface* is dark red in colour arrange in about twenty lobes made up of lobules.**The *foetal surface*** is shining white in appearance with visible branches of umbilical vein and arteries.	

Chorion: This is a thick, opaque, friable membrane derived from the trophoblast. It is continuous with the chorionic plate which forms the base of the placenta.
Amnion: This is a smooth, tough, translucent membrane derived from the inner cell mass. It is thought to have a role in the formation of the amniotic fluid.

In Text Question
Explain the appearance of the placenta at term.
In Text Answer:
The placenta is a round flat mass about 20cm in diameter and 2.5cm thick at its centre

Summary of Study Session 11

In this unit, you have learnt that:

1. The chorionfondosum which is part of the trophoblast will eventually develop into the placenta and the process of placenta development.

2. The placenta performs functions which the fetus is unable to perform for itself during intra uterine life.

3. The placenta at term is dark red in colour and has two surfaces, the maternal and the fetal surfaces.

Self-Assessment Questions (SAQs) For Study Session 11

Now that you have completed this study Session, you will need to assess yourself to see if you have achieved the learning objectives. Try to answer the questions below. Compare your answers to the correct answers at the end of the module.

SAQ 9.1 (Test Learning Outcome 9.1)
Describe the development of the placenta.
SAQ 9.2 (Test Learning Outcome 9.2)
List the endocrine functions of the placenta
SAQ 9.3 (Test Learning Outcome 9.3)
Explain the appearance of the placenta at term.

The placenta Notes on the Self-Assessment Questions (SAQs) for Study Session 11

Note on SAQs 9.1

also known as afterbirth is an organ that connects the developing fetus to the uterine wall to allow nutrient uptake, waste elimination and gas exchange through the mother's blood supply, fight against internal infection and produce hormones to support pregnancy.

The chorionfrondosum which is part of the trophoblast develops into the placenta will eventually develop into the placenta. The villi under the capsular decidua form the chorionleave (bald chorion) which is the origin of the chorionic membrane.

The villi penetrate the deciduas, opening to form sinuses. The area surrounding the villi is known as blood spaces. The maternal blood circulates slowly, enabling the villi to absorb food and oxygen and excrete waste. These are known as the nutritive villi. A few villi are more deeply attached to the deciduas and are called anchoring villi.

Note on SAQs 9.2

1. Human chrionicgonadotrophin (HCG)
2. Production of Oestrogens
3. Progesterone
4. Human Placental Lactogen (HPL)

Note on SAQs 9.3

Appearance of the placenta at term

The placenta is a round; flat mass about 20cm in diameter and 2.5cm thick at its centre. It weighs approximately one-sixth of the baby's weight at term.

The *maternal surface* is dark red in colour arrange in about twenty lobes made up of lobules.**The *foetal surface*** is shining white in appearance with visible branches of umbilical vein and arteries.

Reference

Cooper, M., Frazer, D. and Myles, M. 2009.Myles Textbook for Midwives. 15th Ed., Churchill, Livingstone.

Study Session10: The Anatomy and Physiology of the Foetus and Foetal

Expected Duration: 1 week of 2 contact hour

Introduction

In the previous study session, you have learnt about the *Placenta* which links the fetus closely with the mother's circulation to perform many functions. The survival of the fetus depends on the integrity of the placenta.

In this study session you will learn about the anatomy and physiology of the fetus and fetal. These organs are of vital importance to the midwife because of their effect on the newborn baby.

Learning Outcome for Study Session 10

At the end of this study session, you should be able to:

12.1 Discuss the Fetal circulation

12.2 Explain how the baby adapts to intrauterine life

12.3 Highlight parts of the foetal skull, the bones, sutures, fontanels, landmarks, diameters, and presentation.

10.1 The Foetal Circulation

The key to understanding the foetal circulation is the fact that oxygen is derived from the placenta. In addition, the placenta is the source of nutrition and the site of elimination of waste. Temporary structures in addition to the placenta and the umbilical cord enable foetal circulation to take place. These temporary structures are:

a. **The umbilical vein:** leads from the umbilical cord to the underside of the liver and carries blood rich in oxygen and nutrients. It has a branch which joins the portal vein and supplies the liver.

b. **The ductus venous:** connects the umbilical vein to the inferior vena cava. At this point the blood mixes with deoxygenated blood returning from the lower parts of the body.

c. **The foramen ovale:** is a temporary opening between the atria which allows the majority of blood entering from the inferior vena cava to pass across into the left atrium.

d. **The ductusarteriousus:** (from an artery to an artery) leads from the bifurcation of the pulmonary artery to the descending aorta, entering it just beyond the point where the subclavian and carotid arteries leave.
e. **The hypogastric arteries:** Branch off from the internal iliac arteries and become the umbilical arteries when they enter the umbilical cord. They return blood to the placenta. The blood takes about half a minute to circulate and takes the following course.

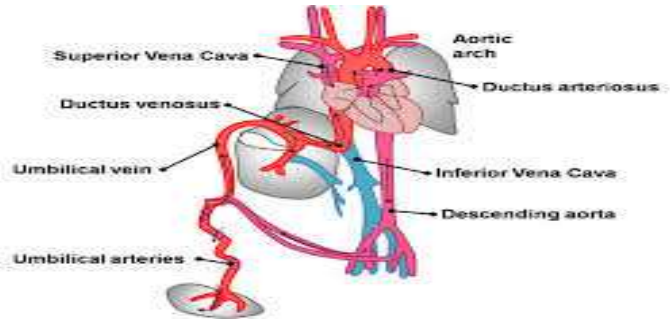

Fig 10.1: The Fetal Circulation

From the placenta, blood passes along the umbilical vein through the abdominal wall to the under surface of the liver. This is the only vessel in the fetus which carries unmixed blood. The ductus venous carries blood to the inferior vena cava where it mixes with blood from the lower body.

From here the blood passes into the right atrium and most of it is directed across through the foramen ovale into the left atrium. Following its normal route it enters the left ventricle and passes into the aorta. The heart and brain and the arms each receive a supply of well-oxygenated blood.

Blood collected from the upper parts of the body returns to the right atrium in the superior vena cava, passes into the right ventricle. There's a mixing of 25% of the blood, allowing a little oxygen and food to be taken to the lungs through the pulmonary artery. The remainder passes through the ductursarteriosus to the aorta. Bloods continues along the aorta and supply the remaining body organs and legs.

The internal iliac arteries lead into the hypogastric arteries which return blood to the placenta via the umbilical arteries. The remaining blood supplies the lower limbs and returns to the inferior vena cava.

Adaptation of extrauterine life:

a. Closure of the flap over the foramen ovale
b. The ductus arteriosus constrict and close
c. The umbilical vein becomes theligamentumteres,
d. The foramen ovale becomes the fossa ovales
e. The baby obtain nutrition through breast feeding
f. The baby eliminate waste through the kidney and gastrointestinal tract

In-Text-Question

What causes the ductus arteries to constrict and close?

In-Text-Answer

The oxygen concentration in the bloodstream; this arises because of the establishment pulmonary respiration.

10.2 Adaptation to Extra Uterine Life

At birth the baby takes a breath and blood is drawn to the lungs through the pulmonary arteries. It is then collected and returned to the left atrium via the pulmonary veins resulting in a sudden inflow of blood. The placental circulation ceases soon after birth and so less blood returns to the right side of the heart.

In this way the pressure in the left side of the heart is greater while that in the right side of the heart becomes less. This results in the closure of a flap over the foramen ovale, which separates the two sides of the heart and stops the blood following from right to left. With the establishment of pulmonary respiration the oxygen concentration in the bloodstream rises. This causes the ductus arteries to constrict and close.

The cessation of the placental circulation results in the collapse of the umbilical vein, the ductusvenosus and the hypogastric arteries. This cessation of the placental circulation results in the collapse of the umbilical vein, the ductusvenosus and the hypogastric arteries. These immediate changes are functional and those related to the heart are reversible in certain circumstances. Later they become permanent and anatomical.

The umbilical vin becomes the ligament tares, the ductusvenosus the ligamentumvenosum and the ductus arteries the ligament arteriosum. The foramen ovale becomes the fossa ovalis and the hypogastric arteries are known as the obliterated hypogastric arteries except for the first few centimeters which remain open as the superior vesical arteries.

After birth the baby has to obtain nutrition through the establishment of breast feeding or a breast feeding substitute and to eliminate waste via the kidneys and gastrointestinal system. Other complex changes take also place.

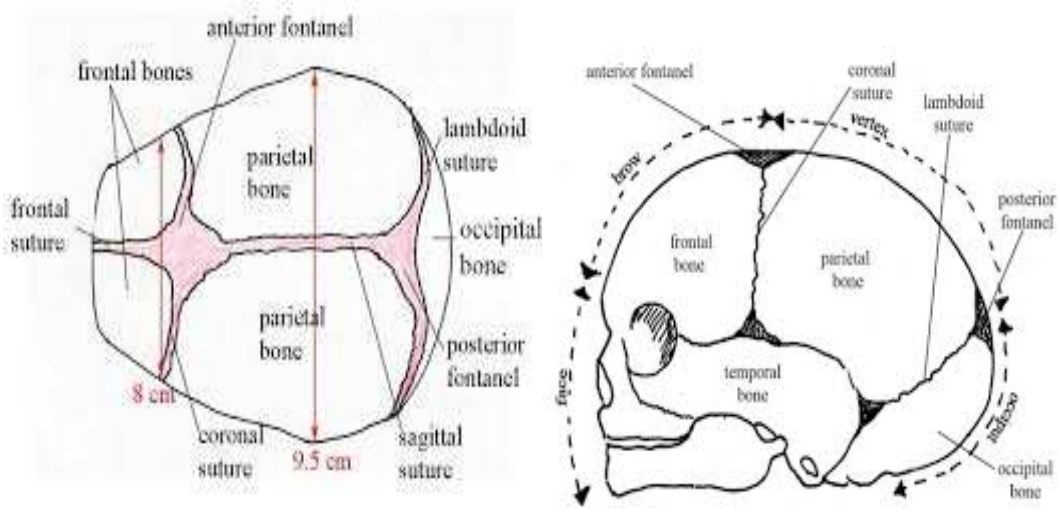

Fig 10.2: The frontal view of the foetal skull and the side viewof the foetal skull (Fazer&Cooper, 2009)

The foetal skull contains the brain. It is large in relation to the foetal body and in comparison with the true pelvis; therefore some adaptation between skull and pelvis must take place during labour. The head is the most difficult part to deliver whether it comes first or last.

An understanding of the landmarks and measurements of the foetal skull enables the midwife to recognize normal presentations and positions and to facilitate delivery. Where mal-presentation or disproportion exists she will be able to identify it and alert the medical staff.

Ossification: The bones of the foetal head originate in two different ways. The face is laid down in cartilage and is almost completely ossified at birth, the bones being fused together and firm. The bones of the vault are laid down in membrane and are much flatter and more pliable. They ossify from the center outwards and this process is incomplete at birth leaving small gaps which form the sutures and fontanelles.

Bones of the Vault

There are five main bones in the vault of the foetal skull namely:

a. **The occipital bone:** This lies at the back of the head and forms the region of the occiput. Part of it contributes to the base of the skull as it contains the foramen magnum. At the center is the occipital protuberance.
b. **The two parietal bones:**This lies on either side of the skull. The ossification center of each is called the parietal eminence.
c. **The two frontal bones:** Form the forehead or sinciput. At the center of each is a frontal boss or frontal eminence. The frontal bones fuse into a single bone by 8 years of age.
d. The upper part of the temporal bone is also flat and forms a small part of the vault.
e. **Sutures** are cranial joints and are formed where two bones adjoin. Where two or more sutures meet, fontanel is formed. The sutures and fontanelles obstetrical significance are described below:

- **The lambdoidal suture:** This is separates the occipital bone from the two parietal bones.
- **The coronal suture:** This separates the frontal bones from the parietal bone's passing from one temple to the other.
- **The sagittal suture:** This lies between the two parietal bones.
- **The frontal suture:** This runs between the two halves of the frontal bone. The frontal suture becomes obliterated in time while the other sutures eventually become fixed joints. Ossification of the skull is not complete until early adulthood.

f. **The posterior fontanelle or lambda:** This is situated at the junction of the lambdoidal and sagittal sutures. It is small, triangular in shape. It normally closes by 6 weeks of age.
g. **The anterior fontanelle or bregma:** This is found at the junction of the sagittal, coronal and frontal sutures. It is broad, kite shaped. It measures 3-4 cm long and 1.5-2 cm wide and normally closes by the time the child is 16 months old.

Pulsations of cerebral vessels can be felt through it. Thesutures and fontanelles, because they consist of membranous spaces, allow for a degree of overlapping of the skull bones during labour and delivery.

In-Text-Question

What relevant is the knowledge of foetal landmark and measurement to the midwife?

In-Text-Answer

Knowledge of foetal landmarks and measurement enable the mid-wife to recognise normal presentation and position to facilitate delivery.

10.3 Regions and Landmarks of the Foetal Skull

The skulls are divided into the vault, the base and the face. The *vault* is the large, dome-shaped part above an imaginary line drawn between the orbital ridges and the nape of the neck. The *base* is comprised of bones which are firmly united to protect the vital centers in the medulla. The *face* is composed of 14 small bones which are also firmly united and non-compressible.

10.3.1 The Regions of the skull

The regions of the skull are described as follows:

a. **The occiput:** lies between the foramen magnum and the posterior fontanelle. The part below the occipital protuberance is known as the suboccipital region. The protuberance itself can be seen and felt as a prominent point on the posterior aspect of the skull.

b. **The sinciput or brow:** extends from the anterior fontanelle and the coronal suture tot the orbital ridges.

c. **The Face:** is small in the newborn baby. It extends from the orbital ridges and he root of the nose to the junction of the chin and the neck. The point between the eyebrows is known as the *glabella*. The chin is termed the *mentum*.

d. Diameter of the fetal skull: The measurements of the skull are important because the midwife needs a practical understanding of the relationship between the fetal head and the mother's pelvis. There are two transverse diametersnamely**:**

- **Biparietal diameter**: 7.5 cm – between the twoparietal eminences.
- **Bitemporal diameter:**6.2cm – between the furthest points of the coronal suture at the temples.The remaining diameters described are antero posterior or longitudinal.

e. **Suboccipitobregmatic:** 7.5cm – from below the occipital protuberance to the center of the anterior fontanelle or bregma.

f. **Suboccipitofrontal:** 10cm- from below the occipital protuberance to the center of the frontal suture. Occipitofrontal 11.5cm-from the occipital protuberate to the glabella mentovertical11.5cm – from the point of the chin to the highest point on the vertex, slightly nearer to the posterior than tot eh anterior fontanelle.

g. **Submentovertical:** 11.5cm- from the point where the chin joins the neck to the highest point on the vertex.

In-Text-Question
Name the landmarks of the foetal skull.
In-Text-Answer
The landmarks of the foetal skull are divided in the vault, the base and the face.

10.3.2 Attitude of the foetal head
This term is used to describe the degree of flexion or extension of the head on the neck. The attitude influences the outcome of labour.

Presenting diameters
The diameters of the head which are called the presenting diameters are those which are at right angles to the curve of Carus. There are always two an anteroposterior or longitudinal diameter and a transverse diameter. The diameters presenting in the individual cephalic or head presentations are as follows:

a. **Vertex presentation:** When the head is well flexed, the suboccipitobregmatic diameter and the biparietal diameter present. As these two diameters are the same length, 7.5 cm, the presenting area is circular which the most favourable shape for dilating the cervix is. The diameter which distends the vaginal orifice is the suboccipitofrontal diameter 10cm.
   When the head is not flexed but erect, the presenting diameters are the occipitofrontal, 11.5cm and the biparietal, 7.5cm. This situation often arises when the occipital is in a posterior position. If it remains so, the diameter distending the vaginal orifice will be the occipito frontal, 11.5cm.
b. **Brow presentation:** This is when the head is partially extended, the, mentovertical diameter, 11.5cm, and the bitemporal diameter, 6.2cm, present. If this presentation persists, vaginal delivery is extremely unlikely.
c. **Face presentation:** When the head is completely extended, the presenting of diameters are the submentobregmatic, 7.5 cm, and the bitemporal, 6.2 cm. The submentovertical diameter, 11.5cm, will distend the vagina orifice

10.3.3 Diameters of the foetal trunk
There are two foetal trunksnamely:

a. **Bisacromial diameter 12cm:** This is the distance between the acromion processes on the two shoulder blades and is the dimension that needs to pass thorough the pelvis for the shoulders to be born. The articulation of the clavicles on the sternum allows forward movement of the shoulders which may reduce the diameter slightly.
b. **Bitrochanteric diameter 10cm:** This is measured between the greater trochanters of the femurs and is the presenting diameter in breech presentation.

10.3.4 Moulding
This is the term applied to the change in shape of the foetal head that takes place during its passage through the birth canal. Alteration in shape is possible because the skull bones

are able to override at the sutures. This overriding allows a considerable reduction in the size of the presenting diameters.
Moulding is a protective mechanism and prevents the foetal brain from being compressed as long as it is not excessive, too rapid or in an unfavourable direction.

In-Text-Question
The diameters of the head are called……

a. The presenting diameters
b. The right angles to the curve of Carus
c. Curve of Carus
d. None of the above

In-Text-Answer
The presenting diameters

Summary
In study session 12, you have learnt that:

1. Oxygen is derived from the placenta; in addition the placenta is the source of nutrition and site of waste elimination. Temporary structures in addition to the placenta enable fetal circulation to occur.
2. At birth cessation of placental circulation occurs there is establishment of pulmonary circulation nutrition through breastfeeding, while elimination is through the kidneys and gastrointestinal system.
3. The fetal skull contains the brain. Understanding the land marks and measurements of the brain, enables the midwife to recognize normal presentations and positions and to facilitate delivery.

Self-Assessment Question (SAQS) for Study Session 12
Now that you have completed study session 12, you will need to assess yourself to see if you have achieved the learning objectives. Try to answer the questions below. Compare your answers to the correct answers at the end of the study session.

SAQ 10.1 (Test learning outcome 10.1)
Draw and label the foetal circulation

SAQ 10.2 (Test learning outcome 10.2)
Explain how the baby adapt to extra uterine life

SAQ 10.3 (Test learning outcome 10.3)
Describe the sutures and fontanelles and vertex presentation

Note on SAQs
SAQ 10.1
SAQ 1 Diagram of foetal circulation.

SAQ 10.2
At birth the baby takes a breath and blood is drawn to the lungs through the pulmonary arteries. It is then collected and returned to the left atrium via the pulmonary veins

resulting in a sudden inflow of blood. The placental circulation ceases soon after birth and so less blood returns to the right side of the heart.
In this way the pressure in the left side of the heart is greater while that in the right side of the heart becomes less. This results in the closure of a flap over the foramen ovale, which separates the two sides of the heart and stops the blood following from right to left.
With the establishment of pulmonary respiration the oxygen concentration in the bloodstream rises. This causes the ductus arteries to constrict and close. The cessation of the placental circulation results in the collapse of the umbilical vein, the ductusvenosus and the hypogastric arteries. This cessation of the placental circulation results in the collapse of the umbilical vein, the ductusvenosus and the hypogastric arteries.
These immediate changes are functional and those related to the heart are reversible in certain circumstances. Later they become permanent and anatomical. The umbilical vein becomes the ligament tares, the ductusvenosus the ligamentumvenosum and the ductus arteries the ligament arteriosum. The foramen ovale becomes the fossa ovalis and the hypogastric arteries are known as the obliterated hypogastric arteries except for the first few centimeters which remain open as the superior vesical arteries.
After birth the baby has to obtain nutrition through the establishment of breast feeding or a breast feeding substitute and to eliminate waste via the kidneys and gastrointestinal system. Other complex changes take also place.

SAQ 10.3

Sutures and Fontanelels

a. **The lambdoidal suture:** is separates the occipital bone from the two parietal bones.
b. **The coronal suture:** separates the frontal bones from the parietal bone's passing from one temple to the other.
c. **The sagittal suture:** lies between the two parietal bones.
d. **The frontal suture:** runs between the two halves of the frontal bone. The frontal suture becomes obliterated in time while the other sutures eventually become fixed joints. Ossification of the skull is not complete until early adulthood.
e. **The posterior fontanelle or lambda:** is situated at the junction of the lambdoidal and sagittal sutures. It is small, triangular in shape. It normally closes by 6 weeks of age.
f. **The anterior fontanelle or bregma:** is found at the junction of the sagittal, coronal and frontal sutures. It is broad, kite shaped. It measures 3-4 cm long and 1.5-2 cm wide and normally closes by the time the child is 16 months old. Pulsations of cerebral vessels can be felt through it.

Thesutures and fontanelles, because they consist of membranous spaces, allow for a degree of overlapping of he skull bones during labour and delivery.

(a) Vertex presentation

When the head is well flexed, the suboccipitobregmatic diameter and the biparietal diameter present. As these two diameters are the same length, 7.5 cm, the presenting area is circular which is the most favourable shape for dilating the cervix. The diameter which distends the vaginal orifice is the suboccipitofrontal diameter 10cm.

When the head is not flexed but erect, the presenting diameters are the occipitofrontal, 11.5cm and the biparietal, 7.5cm. This situation often arises when the occipital is in a posterior position. If it remains so, the diameter distending the vaginal orifice will be the occipito frontal, 11.5cm

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Johnson M. Everitt B. 1995 *Essential reproduction*, 4thedn.Blackwell Science.Cooper, M.,

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Study Session 11: Normal Pre-Natal Care

Expected Duration: 1 week of 2 contact hour

Introduction

Families play an essential role in the emotional, physical, and social development of individual family members. Healthy families are able to cope with and adapt to stressful life events and transitions. Therefore, "prenatal care" (known as antenatal care) is the regular medical and nursing care recommended for women during pregnancy.

In this study session, you are going to learn about developmental task of the child bearing mother, the child bearing family, and pre-conceptual care.

Learning Outcome for Study Session 11

At the end of this study session, you should be able to:

11.1 Discus the developmental task of the child bearing mother.
11.2 Explain the child bearing family.
11.3 Explain the pre-conceptual care.

11.1 Developmental Task of the Child Bearing Family

Prenatal care is a type of preventive care with the goal of providing regular check-ups that allow doctors or midwives to treat and prevent potential health problems throughout the course of the pregnancy while promoting healthy lifestyles that benefit both mother and child.

During check-ups, women will receive medical information over maternal physiological changes in pregnancy, biological changes, and prenatal nutrition including prenatal vitamins. Recommendations on management and healthy lifestyle changes are also made during regular check-ups.

Figure 11.1:*Prenatal care*

The availability of routine prenatal care has played a part in reducing maternal death rates and miscarriages as well as birth defects, low birth weight and other preventable health problems.Prenatal care generally consists of:

- monthly visits to the doctors during the first two trimesters (from week 1–28)
- fortnightly visits to doctor from 28th week to 36th week of pregnancy
- weekly visits to doctor after 36th week till delivery(delivery at week 38–40)
- Assessment of parental needs and family dynamic

In-Text-Question

What is a prenatal care?

In-Text-Answer

Prenatal care is a type of preventive care with the goal of providing regular check-ups that allow doctors or midwives to treat and prevent potential health problems throughout the course of the pregnancy while promoting healthy lifestyles that benefit both mother and child.

11.1 Keys to Successful Family Functioning

Healthy families promote the emotional, physical and social welfare of individual family members. Among the many factors that contribute to this process are a family's internal strengths and the durability of the family unit. Unlike any other social group, families are able to provide the close emotional support needed to produce self-confident and well-adjusted children and adults.

Figure 11.2:*Healthy Family*

Likewise, families that function in a healthy manner are well equipped to deal with the many normal changes and unexpected crises that confront them throughout their lifetime. Therefore, the family's primary function is to create a healthy environment where family members can successfully grow and develop.

1. **Family Task Areas**

The family's task areas include basic, developmental and crisis tasks. The basic task area is concerned with the provision of food, money, shelter and other necessities of life. The developmental tasks include individual and family stages of growth. Individual developmental stages include infancy, childhood, adolescence, adulthood, and aging. The family developmental tasks are stages in the family life cycle.

These stages include the marriage and early years before children; the childbearing family; the family with school age children; the family with teenagers; the family/ launching center; the family/middle years; and the aging family.
Crisis tasks are family hardship events such as illness, pregnancy, job loss, accidents, relocation, or death. Families that are able to cope with and adapt to stressful life events and transitions are better able to maintain a healthy family environment.

2. **Developmental Task**

A physical or cognitive skill that a person must accomplish during a particular age period to continue development. An example is walking, which precedes the development of a sense of autonomy in the toddler period. The nurse may also outline developmental tasks for families.

In-Text-Question

What is the family's primary function?

In-Text-Answer

The family's primary function is to create a healthy environment where family members can successfully grow and develop.

11.2 The Childbearing Family

For the child bearing family, the period of pregnancy is a crises period that involves a lot of physical, emotional and psychological stress which will require additional care and support from the family members to the individual who is undergoing this developmental period.

Figure 11.2:*ThePeriod of Pregnancy*

Caring for a woman in pregnancy involves physical care and emotional and psychological support from the family in collaboration with the health care institution. The presence of a new born in the home calls for serious adjustment in the family and this starts from the pre-natal period.

The Role of the Family

a. The family should ensure that the expectant woman is physically, emotionally and nutritionally prepared before pregnancy arrives this will help to prepare the woman before the demands and stress of pregnancy sets in.

b. The family should ensure a stable, happy and conducive home environment for the woman to feel relaxed.
c. There should be support for and encouragement for adequate rest and exercise
d. There may be need for a house help.
e. There should be provision of adequate finances for good ante-natal care, nourishing food, purchase of new clothing and some other requirements to aid the comfort and wellbeing of the expectant mother.
f. There should be opportunity for the woman to learn some new skills to be able to take up the new role of a mother especially if she is a first timer.
g. The family structure will need to be adjusted to meet the needs of a new born in the home.
h. It is always good if the husband takes interest in the wife's well-being especially concerning nutrition, rest and recreation; by this he is meeting her psychological needs and demonstrating his protective role for her welfare.
i. The discomfort of pregnancy may make the woman irritable sometimes but the husband should bear with her.
j. Husbands should be encouraged to attend classes on preparation for labour so that he can give his emotional support. The husband should provide for the needs of the woman generally.

Therefore, families play an essential role in the emotional, physical, and social development of individual family members. Healthy families are able to cope with and adapt to stressful life events and transitions especially during pregnancy which comes with mixed feelings. The developmental task of a child bearing family is that of support to ensure the general well-being of the mother.

In-Text-Question

For the child bearing family, the period of pregnancy is a crises period that involves……

a. Physical stress
b. Emotional stress
c. Psychological stress
d. All of the above

In-Text-Answer

All of the above

11.3 Pre-Conceptual Care

Pre-conceptual care is the care given to a woman before she become pregnant to help limit any chances of health risk to either her or the baby. The process involves information on how the couple can stay healthy and simple advice on the way to handle early pregnancy issues. Pre-conceptual care involves a lot of counselling interactions between the health care giver and the client who intends to get pregnant.

Pre-conception Counselling

This is a meeting with a health-care professional by a woman before attempting to become pregnant. It generally includes a pre-conception risk assessment for any potential complications of pregnancy as well as modifications of risk factors, such as increasing folic acid intake to reduce the risk of neural tube defects and counselling on smoking cessation, alcohol reduction, and medications that may compromise fetal development.

Figure 11.3:Pre-conception Counselling

Physicians and baby experts recommend that a woman visit her physician as soon as the woman is contemplating having a child, and optimally around 3 to 6 months before actual attempts are made to conceive] This time frame allows a woman to better prepare her body for successful conception and pregnancy, and allows her to reduce any health risks which are within her control.

Some agencies have developed screening tools that physicians can use with their patients. In addition, obstetricians have developed comprehensive check-lists and assessments for the woman who is planning to become pregnant.

In one sense, pre-conception counselling and assessment can be compared to a well-baby visit in which a baby is screened for normal health, normal development, with the benefit of identifying emerging problems that may have gone unnoticed in an infant. For a woman, the Pre-Conception Counselling Assessment and Screening is intended to assess normal health of a child-bearing woman, while at the same time identifying:

- Existing or emerging illness or disease which may have gone undetected before,
- Existing risks for the woman who may become pregnant, and
- Existing risks which may affect a foetus if the woman does become pregnant.

Some of the things you may wish to discuss are mentioned below: These depending on the culture of the client and the social life:

Smoking

a. Smoking causes problems for both mother and baby
b. In the mother it can make problems such as high blood pressure worse
c. In the baby it has been shown to be associated with low birth weight and prematurity (early delivery)
d. For these reasons it is strongly advised that the woman who intends to get pregnant or the pregnant woman should stop smoking

e. Recent research suggested that the smoke inhaled passively by a pregnant mother from a partner who smokes can also cause the same problems
f. Partners should also completely stop if they can, or cut down as much as possible

Diet

a. Having a healthy balanced diet before and during pregnancy is important
b. Evidence shows that the risk of some birth defects such as spina-bifida may be decreased by taking a vitamin called folic acid for some weeks before, and during the early months of pregnancy
c. You can buy folic acid tablets for this purpose and prescriptions can also be given for them upon request. Women with a family history of such problems are advised to take higher dose before pregnancy. Please ask for details if this applies to you
d. Certain foods should be avoided. The pregnant woman should not eat liver or take extra vitamin A supplements
e. Unpasteurised cheeses (e.g. Brie) or milk, soft boiled eggs, pate or soft cheese may contain harmful bacteria and should be avoided

Alcohol

a. Consumption of alcohol in any amount has been associated with abnormalities in new born babies
b. The likelihood of an abnormality is related to the amount of alcohol drunk. It is therefore recommended that alcohol consumption be kept to a minimum or stopped around the time you plan to become pregnant and during pregnancy

Drug Misuse

a. If the woman takes medicines or tablets regularly, she should ask her doctor whether this might cause problems for the baby during pregnancy.
b. The best time to discuss this is before pregnancy so that any potentially harmful medication can be changed.
c. Certain minor illness remedies, such as for coughs and colds, can also cause problems.
d. During the pregnancy, especially in the first three months, the expectant mother should not take any tablets or medicines unless prescribed by her doctor
e. The use of illicit hard drugs such as heroin is clearly associated with abnormalities and dependency syndromes in babies. These drugs should be avoided at all costs

Rubella (German measles)

a. If an expectant mother catches rubella in early pregnancy, the developing baby's sight, hearing, heart or brain can be severely damaged. For this reason it is important to know whether the woman is protected from rubella.
b. Many women have been immunised, or have had the infection as a child. Occasionally protection can be lost.
c. Your health care giver can arrange for the woman to have a simple blood test which will tell whether she is protected. If she is not protected it is important that she is immunised at least one month before she becomes pregnant.
d. The woman cannot be immunised during pregnancy.

Generically Inherited Conditions

a. If the woman has a family history of any congenital diseases (problems present from birth) this can be discussed and in some cases investigated.
b. It is particularly important to know if she has had any previous problems in pregnancy.
c. Screening for conditions such as Downs Syndrome is now available land the health care giver or midwife will be able to guide as to what is appropriate.

Pre-Existing Medical Conditions

a. Certain medical conditions can be affected by pregnancy. If the woman has diabetes, epilepsy, multiple sclerosis, thyroid disease or any long term illness, she should discuss it with her health care giver before becoming pregnant.
b. Potential problems may be identified and specialist advice arranged if needed.

Contact with Animals

a. Certain animals can carry bacteria that can cause harm to a developing embryo. Cats may carry Toxoplasmosis. Sheep and goats may carry Brucella.
b. These can harm a baby. Basic hygiene is very important. Wear gloves if cleaning cat litter, handling animals or working in the garden.
c. Always wash your hands thoroughly afterwards. If you work closely with animals or you have any specific worries your health care giver will discuss these with you.

General Advice

a. If you are due to have a smear this is ideally done before pregnancy.
b. The health care giver can arrange for the woman to have a pregnancy test.
c. You are likely to have to wait longer for the result if your doctor arranges one. If your pregnancy test is positive or you know you are pregnant, arrange to see your doctor or midwife as early as possible.
d. If you are able to make a note of the first day of your last period this will help in predicting when your baby is due.

In-Text-Question

What is pre-conceptual care?

In-Text-Answer

Pre-conceptual care is the care given to a woman before she become pregnant to help limit any chances of health risk to either her or the baby.

Definition of terms:

Developmental: This can be defined as progressive stages of change following an incident.

Task: Job assigned to somebody or a piece of work that an individual is given to do, usually short in duration or with a deadline

Child: A child can be defined in many ways depending on the context or situation where it is being used, some definitions are:

- A young human being between birth and puberty
- A baby or infant
- A child that is not yet born (an unborn child)

Bearing: The act of carrying something.

Family: A group of relatives or people who are closely related by birth, marriage or adoption.

In study session 13, you have learnt that:

1. Prenatal care is a type of preventive of preventive care with the goal of providing regular check-ups that allow doctors or midwives to treat and prevent potential health problems throughout the course of the pregnancy while promoting healthy lifestyles that benefit both mother and child.
2. Prenatal care generally consists of: monthly visits to the doctors during the first two trimesters (from week 1–28), fortnightly visits to doctor from 28th week to 36th week of pregnancy, weekly visits to doctor after 36th week till delivery (delivery at week 38–40), and assessment of parental needs and family dynamic.
3. For the child bearing family, the period of pregnancy is a crises period that involves a lot of physical, emotional and psychological stress which will require additional care and support from the family members to the individual who is undergoing this developmental period.
4. Caring for a woman in pregnancy involves physical care and emotional and psychological support from the family in collaboration with the health care institution. The presence of a new born in the home calls for serious adjustment in the family and this starts from the pre-natal period.
5. Pre-conceptual care is the care given to a woman before she become pregnant to help limit any chances of health risk to either her or the baby. The process involves information on how the couple can stay healthy and simple advice on the way to handle early pregnancy issues. Pre-conceptual care involves a lot of counselling interactions between the health care giver and the client who intends to get pregnant.

Self-Assessment Question (SAQS) for Study Session 13

Now that you have completed study session 13, you will need to assess yourself to see if you have achieved the learning objectives. Try to answer the questions below. Compare your answers to the correct answers at the end of the study session.

SAQ 11.1 (Test learning outcome 11.1)

Explain briefly the developmental task of the child bearing family.

SAQ 11.2 (Test learning outcome 11.2)

Outline five roles of the child bearing family in support of the expectant mother.

SAQ 11.3 (Test learning outcome 11.3)

What are the advices you will give a woman who is planning to get pregnant or is pregnant?

Note on SAQs

SAQ 11.1

The developmental task of the child bearing family is the physical or cognitive skill that a person must accomplish during a particular age period to continue development. An example is walking, which precedes the development of a sense of autonomy in the toddler period.

SAQ 11.2

a. The family should ensure that the expectant woman is physically, emotionally and nutritionally prepared before pregnancy arrives.
b. The family should ensure a stable, happy and conducive home environment for the woman to feel relaxed.
c. There should be support for and encouragement for adequate rest and exercise
d. There may be need for a house help.
e. There should be provision of adequate finances for good ante-natal care, nourishing food, purchase of new clothing and some other requirements to aid the comfort and wellbeing of the expectant mother.

SAQ 11.3

a. They should go for apre-conception risk assessment for any potential complications of pregnancy as well as modifications of risk factors, such as increasing folic acid intake to reduce the risk of neural tube defects and counselling on smoking cessation, alcohol reduction, and medications that may compromise fetal development.
b. They should visit the physician as soon as the woman is contemplating having a child, and optimally around 3 to 6 months before actual attempts are made to conceive. This time frame allows a woman to better prepare her body for successful conception and pregnancy, and allows her to reduce any health risks which are within her control.
c. They should seek the help of some obstetricians who have developed comprehensive check-lists and assessments for the woman who is planning to become pregnant.

Study Session 12: Changes and Adaptation in Pregnancy

Expected Duration: 1 week of 2 contact hour

Introduction

In the previous study session, you have learnt about the developmental task of the child bearing mother, the child bearing family and pre-conceptual care. Every pregnancy is different but many women find that some bodily changes are uncomfortable. Fortunately, after the baby arrives, most women find relief from these symptoms. In the meantime, there are ways to decrease some of the discomforts.

In this study session, you will learn about the changes and adaptation in pregnancy, and the physiological changes in pregnancy.

Learning Outcome for Study Session 12

At the end of this study session you will be able to:

14.1 Discuss the changes and adaptation in pregnancy

14.2 Explain the physiological changes in pregnancy.

12.1 Changes and Adaptation in Pregnancy

Pregnancy is an amazing time of growth both for mother and baby. As a new life is growing within a woman, her body undergoes many changes due to hormones. The first trimester of pregnancy can be easy for some women.

Figure 12.1:*The First Trimester of Pregnancy*

For others, these first three months can be the most challenging time of pregnancy due to the following common symptoms:

1. **Tiredness**
   It is common for many women to feel very tired in the first few months of pregnancy. Try to get at least eight hours of sleep and take naps if needed.
2. **Breast Tenderness**
   As breasts change to prepare for breastfeeding, they often become tender within the first eight weeks of pregnancy. Throughout the pregnancy, the tenderness may

come and go, especially as breasts get bigger. Colostrum, an early form of breast milk, may even leak out in the second and/or third trimesters. Women should wear a supportive bra. Avoid using soap on the breasts, as this tends to dry out the skin. Wear breast pads if breasts are leaking.

3. **Nausea and Vomiting**

Many women have feelings of nausea and vomiting during pregnancy. It usually occurs between 6-16 weeks of pregnancy. Although it is often called morning sickness, women may have these symptoms at any time of the day. Encourage women to eat small, frequent meals; Drink liquids in between meals, not with meals; Eat dry crackers before getting out of bed in the morning; Avoid smells, foods, or other stimulation that triggers your nausea.

4. **Constipation and Bloating**

Hormones cause the gut to slow down its normal movement, which can cause bloating and constipation. Iron supplements, which are often needed, may make constipation worse. To avoid this women should Drink plenty of water and non-caffeinated fluids each day; Eat fibre-rich foods, such as fruits, vegetables, and whole grains; Remain active; Talk to your doctor before taking laxatives.

5. **Frequent Urination**

Hormones are to blame for frequent urination in the first trimester. As the pregnancy progresses, a growing uterus puts pressure on the bladder. Therefore, frequent urination is often a discomfort for many women throughout the pregnancy.

6. **Shortness of Breath**

As pregnancy progresses, a large uterus puts pressure on the diaphragm, making it less able to move freely during breathing. This causes some women to feel short of breath. Women should seek help if severe.

7. **Heartburn**

Many pregnant women have heartburn in the third trimester. Pregnancy hormones loosen the muscle that closes off the oesophagus from the stomach. When this happens, stomach contents can back up into the oesophagus, causing the burning sensation known as heartburn.

A growing uterus also squeezes the stomach, which contributes to heartburn. This can be minimized if pregnant women eat small, frequent meals and also avoid high-fat foods, spicy foods, and caffeine.

8. **Leg Cramps**

Leg cramps usually occur in the calf muscles during the night and are thought to be related to inadequate calcium or magnesium intake. Talk to your doctor about whether you need increased amounts of these nutrients.

9. **Ankle or Leg Swelling**

Most pregnant women have some leg swelling due to the extra volume of blood providing circulation to the placenta and baby. The uterus puts pressure on the large blood vessels draining blood from the lower half of the body, which can cause oedema. Limit sodium from foods.

10. Varicose Veins and Haemorrhoids

Varicose veins on the legs and haemorrhoids often occur during pregnancy due to increased blood volume. Prevent constipation. Eat a high-fibre diet fruits, vegetables, whole grains. Avoid prolonged periods of standing or sitting.

In-Text-Question

When patients develop Varicose Veins and Haemorrhoids, what advice will you give?

In-Text-Answer

They should:

a. Avoid caffeine
b. Take a warm shower before bedtime to relax
c. Avoid exercise late in the day
d. Try to get comfortable with pillows

12.2 Physiological Changes in Pregnancy

These are the normal adaptations that a woman undergoes during pregnancy to better accommodate the embryo or foetus.

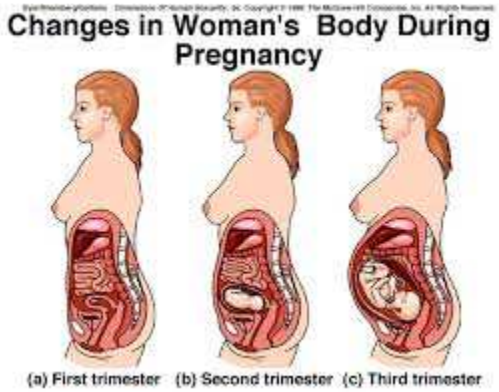

Figure 12.2:*Physiological Changes in Pregnancy*

They are physiological changes, that is, they are entirely normal, and include cardiovascular, hematologic, metabolic, renal and respiratory changes that become very important in the event of complications.

1. Hormonal

Pregnant women experience adjustments in their endocrine system. Levels of progesterone and oestrogens rise continually throughout pregnancy, suppressing the hypothalamic axis and subsequently the menstrual cycle. Oestrogen is mainly produced by the placenta and is associated with foetal well–being. Women also experience increased human chorionic gonadotropin (β-hCG); which is produced by the placenta.

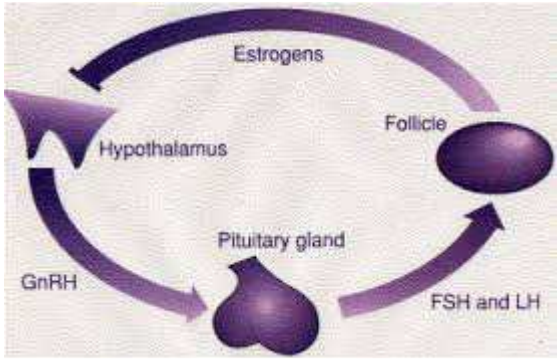

Figure 12.3:Hormonal Cycle during Pregnancy

This maintains progesterone production by the corpus luteum. The increased progesterone production, first by corpus luteum and later by the placenta, mainly functions to relax smooth muscle. Prolactin levels increase due to maternal pituitary gland enlargement by 50%. This mediates a change in the structure of the mammary gland from ductal to lobular-alveolar.

Parathyroid hormone is increased which leads to increases of calcium uptake in the gut and reabsorption by the kidney. Adrenal hormones such as cortisol and aldosterone also increase. Human placental lactogen (hPL) is produced by the placenta and stimulates lipolysis and fatty acid metabolism by the woman, conserving blood glucose for use by the foetus. It can also decrease maternal tissue sensitivity to insulin, resulting in gestational diabetes.

One of the most noticeable alterations in pregnancy is the gain in weight. The enlarging uterus, the growing foetus, the placenta and liquor amnii, the acquisition of fat and water retention, all contribute to this increase in weight.

The weight gain varies from person to person and can be anywhere from 5 pounds (2.3 kg) to over 100 pounds (45 kg). In America, the doctor-recommended weight gain range is 25 pounds (11 kg) to 35 pounds (16 kg), less if the woman is overweight; more (up to 40 pounds (16 kg)) if the woman is underweight.

2. Breast size

A woman's breasts grow during pregnancy, usually 1 to 2 cup sizes and potentially several cup sizes. A woman who wore a C cup bra prior to her pregnancy may need to buy an F cup or larger bra while nursing.

3. Cardiovascular

The woman is the sole provider of nourishment for the embryo and later, the foetus, and so her plasma and blood volume slowly increase by 40-50% over the course of the pregnancy to accommodate the changes. The increase is mainly due to an increase in plasma volume through increased aldosterone. It results in an increase in heart rate (15 beats/min more than usual), stroke volume, and cardiac output.

Cardiac output increases by about 50%, mostly during the first trimester. The systemic vascular resistance also drops due to the smooth muscle relaxation and overall vasodilatation caused by elevated progesterone, leading to a fall in blood pressure.

Diastolic blood pressure consequently decreases between 12–26 weeks, and increases again to pre-pregnancy levels by 36 weeks.
If the blood pressure becomes abnormally high, the woman should be investigated for pre-eclampsia and other causes of hypertension. This is due to an increase in plasma volume through increased aldosterone. Progesterone may also interact with the aldosterone receptor, thus leading to increased levels. Red blood cell numbers increase due to increased erythropoietin levels.

4. Haematology

During pregnancy the plasma volume increases by 50% and the red blood cell volume increases only by 20-30%. Consequently, the haematocrit decreases on lab value; this is not a true decrease in haematocrit, however, but rather due to the dilution. The white blood cell count increases and may peak at over 20 mg/mL in stressful conditions. Conversely, there is a decrease in platelet concentration to minimal normal values of 100-150 mil/mL.

A pregnant woman will also become hypercoagulable, leading to increased risk for developing blood clots and embolisms, due to increased liver production of coagulation factors, mainly fibrinogen and factor VIII (this hypercoagulable state along with the decreased ambulation (exercise involving legs) causes an increased risk of both deep vein thrombosis). Women are at highest risk for developing clots, or thrombi, during the weeks following labour.
Clots usually develop in the left leg or the left iliac venous system. The left side is most afflicted because the left iliac vein is crossed by the right iliac artery. The increased flow in the right iliac artery after birth compresses the left iliac vein leading to an increased risk for thrombosis (clotting) which is exacerbated by the aforementioned lack of ambulation following delivery.
Both underlying thrombophilia and caesarean section can further increase these risks. Oedema, or swelling, of the feet is common during pregnancy, partly because the enlarging uterus compresses veins and lymphatic drainage from the legs.

5. Metabolic

During pregnancy, both protein metabolism and carbohydrate metabolism are affected. One kilogram of extra protein is deposited, with half going to the foetus and placenta, and another half going to uterine contractile proteins, breast glandular tissue, plasma protein, and haemoglobin.
An increased requirement for nutrients is given by foetal growth and fat deposition. Changes are caused by steroid hormones, lactogen, and cortisol. Maternal insulin resistance can lead to gestational diabetes. Increased liver metabolism is also seen, with increased gluconeogenesis to increase maternal glucose levels.

6. Nutrition

Nutritionally, pregnant women require a caloric increase of 300 kcal/day and an increase in protein to 70 or 75 g/day] There is also an increased folate requirement from 0.4 to 0.8 mg/day (important in preventing neural tube defects). On average, a weight gain of 20 to 30 lb (7.1 to 14 kg) is experienced.

All patients are advised to take prenatal vitamins to compensate for the increased nutritional requirements. The use of Omega 3 fatty acids supports mental and visual development of infants. Choline. Supplementation of research mammals supports mental development that lasts throughout life

7. Renal

A pregnant woman may experience an increase in kidney and ureter size. The glomerular filtration rate (GFR) commonly increases by 50%, returning to normal around 20 weeks postpartum. Plasma sodium does not change because this is offset by the increase in GFR.

There is decreased blood urea nitrogen (BUN) and creatinin and glucosuria (due to saturated tubular reabsorption) may be seen. Persistent glucosuria may suggest gestational diabetes. The renin-angiotensin system is upregulated, causing increased aldosterone levels.

8. Gastrointestinal

During pregnancy, woman can experience nausea and vomiting (morning sickness)); which may be due to elevated blood-human chorionic gonadotrophin and should resolve by 14 to 16 weeks.Additionally, there is prolonged gastric empty time, decreased gastroesophageal sphincter tone, which can lead to acid reflux, and decreased colonic motility, which leads to increased water absorption and constipation.

9. Immune tolerance

The foetus inside a pregnant woman may be viewed as an unusually successful allograft, since it genetically differs from the woman. In the same way, many cases of spontaneous abortion may be described in the same way as maternal transplant rejection.

10. Musculoskeletal

Neuromechanical adaptations to pregnancy refer to the change in gait, postural parameters, as well as sensory feedback, due to the numerous anatomical, physiological, and hormonal changes women experience during pregnancy. Such changes increase their risk for musculoskeletal disorders and fall injuries. Musculoskeletal disorders include lower-back pain, leg cramps, and hip pain.

Pregnant women fall at a similar rate (27%) to women over age of 70 years (28%). Most of the falls (64%) occur during the second trimester. Additionally, two-thirds of falls are associated with walking on slippery floors, rushing, or carrying an object. The root causes for these falls are not well known. However, some factors that may contribute to these injuries include deviations from normal posture, balance and gait.

The body's posture changes as the pregnancy progresses. The pelvis tilts and the back arches to help keep balance. Poor posture occurs naturally from the stretching of the woman's abdominal muscles as the foetus grows. These muscles are less able to contract and keep the lower back in proper alignment. The pregnant woman has a different pattern of gait. The step lengthens as the pregnancy progresses, due to weight gain and changes in posture.

On average, a woman's foot can grow by a half size or more during pregnancy. In addition, the increased body weight of pregnancy, fluid retention, and weight gain lowers the arches of the foot, further adding to the foot's length and width. The influences of

increased hormones such as oestrogen and relaxing initiate the remodelling of soft tissues, cartilage and ligaments. Certain skeletal joints such as the pubic symphysis and sacroiliac widen or have increased laxity.

11. Respiratory

Progesterone has noticeable effects on respiratory physiology, increasing minute ventilation by 40% in the first trimester.

12. Nausea (morning sickness)

Morning sickness occurs in about seventy percent of all pregnant women, and typically improves after the first trimester. Although described as "morning sickness", women can experience this nausea during afternoon, evening, and throughout the entire day.

13. Back pain

Back pain is common in pregnancy, can be very debilitating and can worsen in later pregnancy. Estimates of prevalence ranging from 35% to 61% have been reported, with half or more beginning from the fifth month. It is believed to be caused by changing posture and can be worse in the evening. Trials have shown benefit from exercising in water, massage therapy, and back care classes. Support from pillows while sleeping might be able to help.

Back care classes for pregnancy include a variety of exercises and guidance. General exercise that is not tailored to strengthen the back may not prevent or reduce back pain, but more research is needed to be sure Maternity support belts have not been shown to reduce low back pain in pregnancy. They may have some adverse effects, including pain and skin irritation for the mother, and potential effects on the foetus.

14. Pelvic girdle pain

Pelvic girdle pain is complex and multi-factorial and likely to be represented by a series of sub-groups with different underlying pain drivers from peripheral or central nervous system altered laxity/stiffness of muscles, laxity to injury of tendinous/ligamentous structures to 'mal-adaptive' body mechanics.

Musculo-Skeletal Mechanics involved in gait and weight bearing activities can be mild to grossly impair. Pelvic girdle pain can begin peri or postpartum. There is pain, instability or dysfunction in the symphysis pubis and /or sacroiliac joints.

15. Carpal tunnel syndrome

This occurs in between an estimated 21% to 62% of cases, possibly due to edema.

16. Leg cramps

Leg cramps (spasms in the calves) can be very painful, and possibly affect almost half of all pregnant women. Leg cramps usually occur at night, lasting from seconds to minutes. Although a variety of interventions such as compression stockings, salt, calcium and magnesium are sometimes used, it is not known whether any are both effective at reducing leg cramps and safe for the foetus.

17. Constipation

Constipation is believed to be caused by decreased bowel mobility secondary to elevated progesterone (normal in pregnancy), which can lead to greater absorption of water, but it can also be caused or worsened by iron supplementation. It causes the smooth muscle

along the walls of the intestines to relax. Thus, making sure that the future mother will absorb as much nutrients from her diet as possible in order to nourish the foetus and herself.

As a side effect the faeces can get extremely dehydrated and hard to pass. Constipation can decrease as pregnancy progresses, with a rate as high as 39% at 14 weeks of gestation reducing to 20% at 36 weeks in one study at a time when iron supplementation was common.

Dietary modification with more fibre or fibre supplements at increased oral fluids, stool softeners bulking agents, and eating fruit and fibre enriched foods often help.A woman experiencing sudden defecation should report this to her practitioner.

16. Contractions

Occasional, irregular, painless contractions that occur several times per day are normal and are known as Braxton Hicks contractions.

- *Caused by*: dehydration
- *Treatment*: fluid intake
- Regular contractions (every 10–15 min) are a sign of preterm labour and should be assessed by cervical examination.

19. Dehydration

- *Caused by*: expanded intravascular space and increased third spacing of fluids
- *Treatment*: fluid intake
- *Complication*: uterine contractions, which may occur because dehydration causes body release of anti-diuretic hormone, which is similar to oxytocin in structure. Oxytocin itself can cause uterine contractions and thus ADH can cross-react with oxytocin receptors and also cause contractions.

20. Edema

- *Caused by*: compression of the inferior vena cava (IVC) and pelvic veins by the uterus leads to increased hydrostatic pressure in lower extremities.
- *Treatment*: raising legs above the heart, patient sleeps on her side.

21. Regurgitation and heartburn

These are caused by: relaxation of the lower oesophageal sphincter (LES) and increased transit time in the stomach (normal in pregnancy), as well as by increased intra-abdominal pressure, caused by the enlarging uterus. It is treated with antacids, multiple small meals a day, avoid lying down within an hour of eating, H2 blockers, proton pump inhibitors. If more severe, it may be diagnosed as gastro oesophageal reflux disease (GERD).

22. Haemorrhoids

Haemorrhoids (piles) are swollen veins at or inside the anal area, resulting from impaired venous return, straining associated with constipation, or increased intra-abdominal pressure in later pregnancy. They are more common in pregnant than non-pregnant women. Most pregnant women in countries where the diet is not heavily fibre-based may develop haemorrhoids, although they will usually be asymptomatic.

Haemorrhoids can cause bleeding, itching, soiling or pain, and they can become strangulated. Symptoms may resolve spontaneously after pregnancy, although

haemorrhoids are also common in the days after childbirth. Conservative treatments for haemorrhoids in pregnancy include dietary modification, local treatments, bowel stimulants or antidepressants, or phlebotonics (to strengthen capillaries and improve microcirculation).
Treatment with oral hydroxyethylrutosides may help improve first and second degree haemorrhoids, but more information on safety in pregnancy is needed. Other treatments and approaches have not been evaluated in pregnant women.

23. Pica

This is cravings for nonedible items such as dirt or clay. Caused by Iron deficiency which is normal during pregnancy and can be overcome with Iron supplements, prenatal vitamins or if severe enough parenteral iron.

24. Lower abdominal pain

This is caused by rapid expansion of the uterus and stretching of ligaments such as the round ligament. *Treatment*: paracetamol (acetaminophen)

25. Increased urinary frequency

This is increased intravascular volume, elevated Glomerular Filtration Rate), and compression of the bladder by the expanding uterus. It may appear rather sudden by head engagement of the foetus into cephalic presentation.
Patients are advised to continue fluid intake despite this. Urinalysis and culture should be ordered to rule out infection, which can also cause increased urinary frequency but typically is accompanied by dysuria (pain when urinating).

26. Varicose Veins

This is caused by relaxation of the venous smooth muscle and increased intravascular pressure.
Treatment: Elevations of the legs, pressure stockings relieve swelling and pain with warm sitz bath. Avoid obesity, lengthy standing or sitting, constrictive clothing and constipation a bearing down with bowel movements

27. Abdominal separation

During pregnancy, many women experience a separation of their stomach muscles, known as diastasis recti. It affects the rectus abdominis muscle. The rectus abdominis muscle is divided down the middle by the tendinous line called the lineaalba. It is kept in line by the transverse abdominal and oblique abdominal muscles. During pregnancy, the growth of the foetus exerts pressure on abdominal cavity muscles, in particular the rectus abdominis.
In pregnancies that experience rapid foetus growth or women with particularly weak abdominal muscles, this pressure can sometimes causes the rectus abdominis muscle to separate along the linea alba, creating a split between the left and right sides of the rectus abdominis.
About one-third of all pregnant women experience diastasis recti at some point in their pregnancy, however it is much more likely to occur during the second trimester or third trimester of pregnancy. However, separation also frequently occurs during labour and delivery, or with women carrying more than one baby.

Many cases of diastasis recti correct themselves after birth, but some do not. In cases where it persists, exercise may help improve the condition, and sometimes surgery is needed to correct the problem to prevent pain and future complications.

28. Striaegravidarum

Striaegravidarum (pregnancy-related stretch marks) occur in 50% to 90% of women, and are caused both by the skin stretching and by the effects of hormonal changes on fibres in the skin. They are more common in younger women, women of colour, women having larger babies and women who are overweight or obese, and they sometimes run in families.

Stretch marks generally begin as red or purple stripes (striaerubra), fading to pale or flesh-colour (striaealba) after pregnancy that will generally be permanent.

29. Round ligament pain

This is pain experienced when the ligaments positioned under the uterus stretch and expand to support the woman's growing uterus.

In-Text-Question

What are physiological changes?

In-Text-Answer

These are the normal adaptations that a woman undergoes during pregnancy to better accommodate the embryo or foetus.

Summary

In study session 14, you have learnt that:

1. Pregnancy is an amazing time of growth both for mother and baby. The first trimester of pregnancy can be easy for some women.
2. As a new life is growing within a woman, her body undergoes many changes due to hormones.
3. Physiological changes are the normal adaptations that a woman undergoes during pregnancy to better accommodate the embryo or foetus.

Self-Assessment Question (SAQS) for Study Session 14

Now that you have completed study session14, you will need to assess yourself to see if you have achieved the learning objectives. Try to answer the questions below. Compare your answers to the correct answers at the end of the study session.

SAQ 12.1 (Test learning outcome 12.1)

List ten (10) possible common symptomswithin the first three months of pregnancy?

SAQ 12.2 (Test learning outcome 12.2)

Outline five physiological changes thatis observe with pregnancy.

Note on SAQs

SAQ 12.1

The following common symptoms are:

1. Tiredness
2. Breast Tenderness
3. Nausea and Vomiting
4. Constipation and Bloating
5. Frequent Urination
6. Shortness of Breath
7. Heartburn
8. Leg Cramps
9. Ankle or Leg Swelling
10. Varicose Veins and Haemorrhoids

SAQ 12.2

These changes include:

1. Cardiovascular
2. Hematologic
3. Metabolic
4. Renal
5. Respiratory

Study Session 13: Psychosocial Care in Pregnancy

Expected Duration: 1 week of 2 contact hour

Introduction

In the previous study session, you have learnt about the changes and adaptation in pregnancy, and the physiological changes in pregnancy. However, the presence of the new born in the home calls for a serious adjustment in the family and this starts from pre-natal period. If the pregnancy is expected, the family adjusts to it easily than when the pregnancy is unplanned for.

In this study session, you will learn about the psychosocial changes in pregnancy, diagnosis of pregnancy, objectives of prenatal care, and process of prenatal care.

Learning Outcome for Study Session 13

At the end of this study session, you should be able to:

13.1 Explain the psychosocial changes in pregnancy.

13.2 Discuss the diagnosis of pregnancy.

13.3 Highlight the objectives of prenatal care, and process of prenatal care.

13.1 The Psychosocial Changes in Pregnancy

Most women are delighted even when the pregnancy is unplanned. However the couple are faced with impending new responsibilities, practical, financial and its effect on their independence. It is a period of great transition especially in the life of the woman which involves not only major social and economic and emotional changes but also acquisition of a new identity, new rule and skill.

Family relationship is re-appraised when the woman gets pregnant. In some cultures, pregnancy involves giving up ones job, this leads to reduction in family income and the woman becomes more dependent on her partner. In some, the couple draws closer while in some, it may be the beginning of conflict. It is worse if the pregnancy is unplanned and unwanted.

Some women may feel they have lost control of their bodies and this can cause great distress. In some cases, they need helper in the home. They will need to readjust their living structure to meet with the demand of the new baby. A caring and considerate husband plays a great role in the stability of the pregnant woman. It is always good if:

- Husbands takes interest in their wives' wellbeing especially concerning nutrition, rest and recreation, by this he is meeting her psychological needs and by that

demonstrating his protective role for her welfare. The discomfort of pregnancy may make her irritable sometimes but the husband should bear with her.

- Husbands are encouraged to attend classes on preparation for labour so that he can give his emotional support.
- Husbands provide for the needs of the woman (wives) generally.

In-Text-Question

Pregnancy is a period of great transition especially in the life of the woman which involves not only major social, economic and emotional changes but also acquisition of……

a. A new identity
b. A new rule
c. A new skill
d. All of the above

In-Text-Answer

All of the above

13.2 Diagnosis of Pregnancy

The diagnosis of pregnancy requires a multifaceted approach using 3 main diagnostic tools. These are history and physical examination, laboratory evaluation, and ultrasonography. Currently, physicians may use all of these tools to diagnose pregnancy at early gestation and to help rule out other pathologies.

13.2.1 History and Physical Examination

The diagnosis of pregnancy has traditionally been made based on history and physical examination findings. Important aspects of the menstrual history must be obtained. The woman should describe her usual menstrual pattern, including date of onset of last menses, duration, flow, and frequency. Items that may confuse the diagnosis of early pregnancy are an atypical last menstrual period, contraceptive use, and a history of irregular menses.

Additionally, 25% of women bleed during their first trimester, thus, further complicating the assessment. Be alert for rising human chorionic gonadotropin (hCG) levels, an empty uterus observed on sonogram, abdominal pain, and vaginal bleeding because these may signal an ectopic pregnancy.

Ectopic pregnancies are the primary cause of first trimester maternal mortality and should be diagnosed early, before the pregnancy ruptures or the patient becomes unstable. The classic presentation of pregnancy is a woman with menses of regular frequency who presents with amenorrhea, nausea, vomiting, generalized malaise, and breast tenderness.

Upon physical examination, one may find an enlarged uterus after bimanual examination, breast changes, and softening and enlargement of the cervix (Hegar sign; observed at approximately 6 wks.). The Chadwick sign is a bluish discoloration of the cervix from venous congestion and can be observed by 8-10 weeks.

A gravid uterus may be palpable low in the abdomen if the pregnancy has progressed far enough, usually by 12 weeks. Currently, through the use of chemical assays and ultrasonography, physicians are capable of making the diagnosis of pregnancy before many of the physical signs and symptoms are evident.

In-Text-Question

The diagnosis of pregnancy requires a multifaceted approach. What are these three main diagnostic tools?

In-Text-Answer

These include:

a. History and physical examination
b. Laboratory evaluation
c. Ultrasonography

13.2.2 Laboratory Evaluation

Several hormones can be measured and monitored to aid in the diagnosis of pregnancy. The most commonly used assays are for the beta subunit of hCG. Other hormones that have been used include progesterone and early pregnancy factor. The cytotrophoblast and syncytiotrophoblast each secrete a variety of hormones that include, but are not limited to:

1. Corticotrophin-releasing hormone
2. Gonadotropin-releasing hormone
3. Thyrotropin-releasing hormone
4. Somatostatin
5. Corticotrophin
6. Human chorionic thyrotropin
7. Human placental lactogen
8. Inhibin/activin
9. Transforming growth factor-beta
10. Insulin like growth factors 1 and 2
11. Epidermal growth factor
12. Pregnancy-specific beta-1 glycoprotein, placental protein 5
13. Pregnancy-associated plasma protein-A

To date, no commercially feasible tests that use these hormones have been made available to aid in the diagnosis of pregnancy. Beta-human chorionic gonadotropinhCG is a glycoprotein similar in structure to follicle-stimulating hormone (FSH), luteinizing hormone (LH), and thyrotropin. hCG is composed of alpha and beta subunits. The alpha subunit of hCG is similar to the alpha subunit of FSH, LH, and thyrotropin.

The free beta subunit of hCG differs from the others in that it has a 30–amino acid tailpiece at the COOH terminus. Free beta subunits are degraded by macrophage enzymes in the kidney to make a beta subunit core fragment, which is primarily detected in urine samples. The beta-hCG subunit is present in the syncytial layer of the blastomere.

HyperglycosylatedhCG is a form of hCG produced by invasive cytotrophoblast cells in early pregnancy and implantation. hCG messenger RNA is detectable in the blastomeres

of 6- to 8-cell embryos at 2 days but cannot be isolated in culture medium until 6 days. Detection in maternal serum and urine is evident only after implantation and vascular communication has been established with the decidua by the syncytiotrophoblast 8-10 days after conception.
Optimally, tests used for early pregnancy detection should be able to recognize all forms of intact hCG, including the free beta subunit and the beta core fragment. Currently, 4 main hCG assays are used:

1. Radioimmunoassay,
2. Immunoradiometric assay,
3. Enzyme-linked immunosorbent assay (ELISA), and
4. Fluoroimmunoassay.

These assays are highly specific for hCG with antibodies directed against 2 or more isotopes on the intact hCG molecule. Time of detection is related to the sensitivity of the assay being used. Most current pregnancy tests have sensitivity to approximately 25 mIU/mL. Urine devices must be formulated to detect hyperglycosylatedhCG, which is the key molecule in early pregnancy.

13.2.3 Ultrasonography

Ultrasonography (ultrasound) comes from a machine that creates an image of the inside of your body. It shows what your baby looks like while still inside your womb (uterus). A pregnancy ultrasound is an imaging test that uses sound waves to create a picture of how a baby is developing in the womb. It is also used to check the female pelvic organs during pregnancy.
The average number of ultrasounds varies with each pregnancy and should only be used when medically indicated.An ultrasound, also called a sonogram, can help to monitor normal fetal development and screen for any potential problems. Along with a standard ultrasound, there are a number of different, more advanced, ultrasounds including a 3D ultrasound, a 4D ultrasound, and a fetal echocardiography, which is an ultrasound that looks in detail at the fetus' heart.

Why Is a Pregnancy Ultrasound Needed?
An ultrasound can be used for a variety of reasons during pregnancy, depending on the stage in which it is done. Your doctor may order more ultrasounds if he or she detected a problem in a previous ultrasound or blood test. Ultrasounds may also be done for non-medical reasons, such as to produce images for the parents or to determine the sex of the baby.
While ultrasound technology is safe for both mother and child, healthcare practitioners discourage the use of ultrasounds when there is no medical reason or benefit. In the first trimester of pregnancy (weeks one to 12), ultrasounds may be done to:

1. confirm pregnancy
2. check the foetal heartbeat
3. determine the gestational age of the baby and estimate a due date

4. check for multiple pregnancies
5. examine the placenta, uterus, ovaries, and cervix
6. diagnose an ectopic pregnancy (when the foetus does not attach to the uterus) or miscarriage
7. look for any abnormal growth in the foetus

In the second trimester (12 weeks to 24 weeks) and the third trimester (24 weeks to 40 weeks or birth), an ultrasound may be done to:

1. monitor the foetus' growth and position
2. determine the baby's sex
3. confirm multiple pregnancies
4. look at the placenta to check for problems, such as placenta previa (when the placenta covers the cervix) and placental abruption (when the placenta separates from the uterus prior to delivery)
5. check for characteristics of Down syndrome (normally done between 13 and 14 weeks)
6. check for congenital abnormalities or birth defects
7. examine the foetus for structural abnormalities or blood flow problems
8. monitor the levels of amniotic fluid
9. determine if the foetus is getting enough oxygen
10. diagnose problems with the ovaries or uterus, such as pregnancy, tumours
11. measure the length of the cervix
12. guide other tests, such as amniocentesis
13. confirm an intrauterine death

How to Prepare for a Pregnancy Ultrasound

In order to get a clear image of the fetus and your reproductive organs in the earlier part of the pregnancy, you may need to have a full bladder during your ultrasound. You should drink two to three eight-ounce glasses of water one hour before your scheduled ultrasound. You should not urinate before your ultrasound, so you arrive at your appointment with a full bladder.

To perform a pregnancy ultrasound, you will be instructed to lie down on an examination table or bed. An ultrasound technician will apply a special gel to your abdomen and pelvic area. This gel is water-based, so it should not leave marks on your clothes or skin. This gel helps the sound waves to travel properly. Next, the technician will place a small wand, called a transducer, onto your belly.

The technician will move the transducer to capture black and white images onto the ultrasound screen. He or she may also take measurements of the image on the screen. The technician may ask you to move or to hold your breath while capturing images.

A transvaginal ultrasound may be done to produce a clearer image. This is more likely to be used during the early stages of pregnancy, when capturing a clear image may be more difficult. For this test, a small ultrasound probe will be inserted into the vagina. The probe will rest against the back of your vagina while the images are captured.

The technician will check to see if the necessary images have been captured and are clear. The gel will then be wiped off and you will be able to empty your bladder.

Foetal Echocardiography

A fetal echocardiography is performed if your doctor suspects your baby may have congenital heart defects. This ultrasound captures an in-depth image of the fetus' heart - one that shows the heart's size, shape, and structure.

This ultrasound also gives your doctor a look at how your baby's heart is functioning, which can be helpful in diagnosing heart problems. This test may be done in a similar manner to a traditional pregnancy ultrasound, but might take longer to complete.

In-Text-Question

What is ultrasonography?

In-Text-Answer

Ultrasonography is a machine that creates an image on the inside of a pregnant woman. It shows what your baby looks like while still inside your womb (uterus).

13.3 Objectives Prenatal Care

Prenatal care is the regular medical and nursing care recommended for women during pregnancy. Prenatal care is a type of preventive care with the goal of providing regular check-ups that allow doctors or midwives to treat and prevent potential health problems throughout the course of the pregnancy while promoting healthy lifestyles that benefit both mother and child. Prenatal care generally consists of:

a. monthly visits to the health care give during the first two trimester (from week 1–28)
b. fortnightly visits to doctor from 28th week to 36th week of pregnancy
c. weekly visits to doctor after 36th week till delivery(delivery at week 38–40)
d. Assessment of parental needs and family dynamic.

Objectives of Pre-Natal Care

1. To promote and maintain good physical and mental health during pregnancy and through health education on hygiene, nutrition etc.
2. To promote an awareness of sociological aspect of child bearing and the influence these may have on the family
3. To build up a trusting relationship between the family and the care giver
4. To monitor the progress of pregnancy
5. To reduce maternal and perinatal mortality
6. To recognise deviation from normal and provide prompt management and treatment as required or referring the woman to appropriate health team
7. To ensure that a life and healthy baby is delivered at the end of pregnancy
8. To help and support the mother in her choice of infant feeding
9. To offer the family advise on parenthood
10. Providing a holistic approach to the woman's care that meets her individual needs.

In-Text-Question
What do you understand by prenatal care?
In-Text-Answer
It is a type of preventive care with the goal of providing regular check-ups that allow doctors or midwives to treat and prevent potential health problems throughout the course of the pregnancy while promoting healthy lifestyles that benefit both mother and child.

13.3.1 Process of Prenatal Care
At the initial antenatal care visit and with the aid of a special booking checklist the pregnant women become classified into either normal risk or high risk. Prenatal diagnosis or prenatal screening (note that "Prenatal Diagnosis" and "Prenatal Screening" refer to two different types of tests) is testing for diseases or conditions in a foetus or embryo before it is born.

Obstetricians and midwives have the ability to monitor mother's health and prenatal development during pregnancy through series of regular check-ups.

Booking

Women are encouraged to start antenatal visit as soon as pregnancy is suspected or they miss their menses. This is necessary to confirm pregnancy and plan for appropriate care. To ascertain baseline data of vital signs: Blood pressure, blood values, urinalysis and foetal wellbeing.

History taking

This is not just for record keeping alone but also assesses the health of the woman. Great patience is needed when taking history of a new patient especially a primigravida. Patient must be prepared to give accurate details of herself.

a. Gain her cooperation
b. Provide privacy
c. Ensure friendliness and kindness
d. Ask direct questions
e. Do not help her to answer the questions
f. Use simple non-technical language

History is taken in the following areas:

a. Social history
b. Family history
c. Medical history
d. Surgical history
e. Obstetric history
f. Previous pregnancies
g. Labour
h. Pueperium
i. Baby’s history
j. History of present pregnancy

Advise to the pregnant woman
This should cover:

a. Hygiene
b. Recreation and exercise
c. Travel
d. Rest and sleep
e. Suitable clothing
f. Bowel care
g. Care of the teeth
h. Bathing
i. Smoking
j. Marital relationship
k. Care of the breast
l. Drugs
m. Diet in pregnancy and necessary foodstuff nutrients

13.3.2 General Examination of the Antenatal Patient

The general examination is embarked upon after the routine examinations have been completed. These are as follows:

- The neck, upper limbs, the breast, palpation and advice. Advice should cover the diet.
- Prepare patient by ensuring she empties her bladder, and physical examination progresses from the head, eyes, ears, nose, mouth, and face. Patients with abnormal findings are referred.
- All findings are recorded in the patients' ante-natal notes. Routine drugs are given; appointment is given for the next visit as a thorough explanation is outlined to this effect.

Investigations recommended:
Blood test, urinalysis and ultrasound. Ultrasoundis most commonly performed during the second trimester at approximately week 20. Ultrasounds are considered relatively safe and have been used for over 35 years for monitoring pregnancy. Among other things, ultrasounds are used to:

a. Diagnose pregnancy (uncommon)
b. Check for multiple foetuses
c. Assess possible risks to the mother (e.g. miscarriage, blighted ovum, ectopic pregnancy, and or molar pregnancy condition)
d. Check for foetal malformation
e. Determine if an intrauterine growth retardation condition exists
f. Check the amniotic fluid and umbilical cord for possible problems
g. Determine due date (based on measurements and relative developmental progress)

Generally an ultrasound is ordered whenever an abnormality is suspected or along a schedule similar to the following:

- 7 weeks — confirm pregnancy, ensure that it's neither molar or ectopic, determine due date
- 16–20 weeks — see the expanded list above
- 34 weeks (some areas) — evaluate size, verify placental position

Therefore**, c**aring for a woman in pregnancy involves physical care and psychological support. It requires collaborative effort of the nurses' midwives and the doctors. Careful examination during hospital visit will help to monitor the progress of the pregnancy and maintain a good state of health of the mother and the baby.

Good history taking serves as a parameter on which other assessment and evaluation will be based on. It is therefore necessary that a pregnant woman books early so that the necessary care is obtained. She should be encouraged to attend antenatal visits regularly.

Summary

In study session 15, you have learnt that:

1. Antenatal care is part of a preventive care which aims at maintaining physical and mental wellbeing of a pregnant woman to ensure life and healthy baby at term. It prepares the family psychologically on how to cope with the demand of child bearing.
2. The process of antenatal care is in two parts; booking- a comprehensive history is obtained from the women who cover social, medical, surgical, obstetrics and baby of previous pregnancies. This is followed by thorough general examinations.
3. The subsequent care is based mainly on assessment of progress of pregnancy and any problem that may crop up and prompt treatment is given.

Self-Assessment Question (SAQS) for Study Session 13

Now that you have completed study session13, you will need to assess yourself to see if you have achieved the learning objectives. Try to answer the questions below. Compare your answers to the correct answers at the end of the study session.

SAQ 18.1 (Test learning outcome 13.1)

1. A caring and considerate husband plays a great role in the stability of the pregnant woman. Highlight.

SAQ 18.2 (Test learning outcome 13.2)

1. Explain the importance of history taking in antenatal care.
2. State five uses of ultrasound in medical health care.

Note on SAQs

SAQ 13.1

Husbands play a great role in the stability of the pregnant woman such as:

a. They take interest in their wives' wellbeing especially concerning nutrition, rest and recreation.
b. They are encouraged to attend classes on preparation for labour so that he can give his emotional support.
c. They provide for the needs of their woman (wives) generally.

SAQ 13.2

1. History taking is the process of keeping record and also assessing the health of the patient (woman). Great patience is needed when taking history of a new patient especially a primigravida. Patient must be prepared to give accurate details of herself, gain her cooperation, provide privacy, ensure friendliness and kindness, ask direct questions, do not help her to answer the questions, and use simple non-technical language.

2. Ultrasounds are used to:

a. Diagnose pregnancy
b. Check for multiple foetuses
c. Assess possible risks to the mother (e.g. miscarriage, blighted ovum, etc.)
d. Check for foetal malformation
e. Determine if an intrauterine growth retardation condition exists

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Study Session 14: Assessment Needs and Care during Pregnancy

Expected Duration: 1 week of 2 contact hour

Introduction:

In the previous study session, you have learnt about the psychosocial changes in pregnancy, diagnosis of pregnancy, objectives of prenatal care, and process of prenatal care. In this Study Session we will be discussing the expectant mothers: general physical examination, abdominal examination and how pelvic assessment is conducted.

Learning Objectives for Study Session 14

At the end of this study session, you should be able to:

14.1 Explain the general physical examination of the woman prenatally and how to conduct examination.

14.0 General Physical Examination during Pregnancy

This involve "A head to toe" physical observation. The ***head***is examined for lies and dandruff, these could result in anaemia and disturbed sleep. The conjunctiva and the lips are observed for paleness. If the nose is discharging, this will indicate upper respiratory tract infection. The tongue for glossitis and dental carries is also identified if any. The finger nails are also examined for pallor.

Height- Height of over 160cm is indication of normal sized pelvis, conversely abnormally short stature may indicate contracted pelvis.

Weight- Weight should always be measured using the same scales and the woman asked to wear similar clothing each time she is weighed. Obesity could be associated with gestational diabetes and Pregnancy Induced Hypertension IPIH).

***Blood Pressure*:** Is monitored in order to ascertain normality and provide a baseline reading for comparison throughout pregnancy. She should always be in the same position to ensure a comparable reading. An adequate blood pressure is required to maintain placental perfusion but systolic blood pressure of 140 mmHg or diastolic pressure of 90 mmHg at booking is indicative of hypertension and could cause damage to the placenta.

Factors that increase accuracy of blood pressure measurement and recording are:

1. A regular serviced mercury column.
2. Sphygmomanometer should be used.

3. The correct width of cuff should be chosen for the woman.
4. Initial estimation of the systolic pressure should be by palpation.
5. Blood pressure should be recorded to the nearest mmHg.

Urinalysis: Is performed to exclude abnormality. Like asymptomatic bacillary.

- Ketones due to increased maternal metabolism caused by fetal need or because of vomiting.
- Glucose caused by higher circulating blood levels, reduced renal threshold or disease.
- Protein due to contamination by vaginal leucorrhoea, or disease such as Urinary Tract Infection (**UTI** or **PIH).**

In-Text-Question

What are routine laboratory test perform at the booking visit and state the importance?

In-Text-Answer

a. Urinalysis for protein- to exclude P.I.H
b. Haemoglobin estimation- to exclude anaemia
c. Blood grouping and genotype- in case of blood transfusion and to exclude sic
d. Human immunodeficiency virus (HIV) - to detect HIV infection, with patient consent

14.0.1 Abdominal examination

These include inspection palpation, and auscultation.

A. Inspection: Inspect the abdomen for size, scar, straegravidarum and lineanigrae, the shape whether it is oval, globular or pendulous.

B. Palpation: Includes fundal, lateral and pelvic palpations to determine the height of fundus, fundal presentation and engagement of the presenting part. Palpate as follows:

a. Fundal palpation: To find out what is in the top of the uterus. Face the woman's head. Put your hands on both sides of the top of the uterus and curve your fingers around. Palpate for shape, size, firmness, and how easily the baby moves.

- If the foetal head is in the top of the uterus, you will feel a round and hard part which is movable.
- If the buttocks are felt, they will be irregular, bulky, and softer than the head, and the top of the uterus will feel full and not easily moved.
- If there is a transverse lie, the fundus will feel empty.

b. Lateral palpation: Continue to face the women's head. Place both hands further down on the abdomen; push down with one hand, pushing the foetus to the other side of the abdomen. Feel the foetus so that you can tell the parts. Gently move the baby from side to side to more easily tell which side has the back and which side has the arms and legs.

C. Auscultation: Listen to the foetal heart rate. Normal rate is between 120-160 beats per minutes. If the heart rate is above 160 or below 120 beats per minute, the baby may be having problems.

Aims Abdominal Examination

The aims of abdominal examination are as follows:

1. To observe signs of pregnancy.
2. To assess fetal size and growth.
3. To assess fetal health.
4. To diagnose location of fetal parts.
5. To detect any deviation from normal.

14.0.2 Pelvic Assessment

Continue to face the woman's head. Have the woman bend her knees. Grasp the part of the baby in the lower part of the abdomen. Ask yourself "What is in the lower part of the abdomen?" Compare to your findings of the first palpation.

Turn and face the woman's feet. Make sure that the woman's knees are bent. Place both hands on the sides of the abdomen and press them towards the pelvis. Compare the findings to the other palpation and figure out the presentation. Check if you feel more than one baby.

14.0.3 Locating Landmarks for Descent

Landmarks used in measuring the descent are the foetal head and the maternal pelvic brim.

Procedure:

a. Stand at the side of the woman. If you are right handed, stand at the woman's right side.
b. Feel the head with your right hand. The head can be moved. When all of the head is felt, it is measured as **five-fifths** above the brim i.e. five of your fingers can cover the head above the brim.
c. When the baby's head is **four-fifths** above the brim, four of your fingers can cover the head above the brim, it is just entering the brim.
d. When it is **three-fifths**, three of your fingers can still go partially round the head.
e. When it is **two-fifths** above the brim, only two fingers measure the head because more than half of the head has entered the brim. You can no longer feel the roundness of the head.
f. The head is now **ENGAGED**. It is almost impossible to move the head.
g. When the head is all the way in the pelvis you cannot feel it abdominally.

Activity 14.0

Time allowed: 30 min

Visit a haematology laboratory and observe the various blood tests assessed during pregnancy. Discuss the significance of each of the test.

Summary

In this study session, you have learnt that:

1. General physical examination involves observing the expectant mothers state of health physically and taking note of any deviation from normal.
2. Abdominal examination is conducted to observe signs of pregnancy, assess fetal growth and to detect any abnormality.
3. Pelvic palpation is used to judge the size, flexion, and mobility of the head determine position in a vertex presentation.

Self-Assessment Questions (SAQs) for Study Session 14

Now that you have completed Study Session 3i, you will need to assess yourself to see if you have achieved the learning objectives. Try to answer the questions below. Compare your answers with the correct ones at the end of the study session**.**

SAQ 14.0 (Test learning outcome 14.0)

1. Explain the following assessment and their importance (a) Height (b) Weight (c) Blood pressure and (c) Urinalysis**.**
2. What is the aim of abdominal examination?
3. Using the following guidelines write on abdominal examination (i) inspection
4. (ii) Palpation (iii) Lateral palpation.
5. Explain the procedure for locating landmarks for descent.

Note on SAQs

SAQ 14.0

1).General Physical Examination:

a. *Height*- Height of over 160cm is indication of normal sized pelvis, conversely abnormally start stature may indicate contracted pelvis

b. *Weight*- Weight should always be measured using the same scales and the woman asked to wear similar clothing each time she is weighed. Obesity could be associated with gestational diabetes and pregnancy induced Hypertension.

c. *Blood Pressure*: Is taken in order to ascertain normality and provide a baseline reading for comparison throughout pregnancy. She should always be in the same position to ensure a comparable reading. An adequate blood pressure is required to maintain placental perfusion but systolic blood pressure of 140 mmHg or diastolic pressure of 90 mmHg at booking is indicative of hypertension and could cause damage to the placenta.

d. Urinalysis: Is performed to exclude abnormality. Like asymptomatic bacilluria.

- Ketones due to increased maternal metabolism caused by fetal need or because of vomiting.
- Glucose caused by higher circulating blood levels, reduced renal threshold or disease.
- Protein due to contamination by vaginal Leucorrhoea, or disease such as **UTI** or **PIH.**

2. Aims Abdominal Examination

The aims of abdominal examination are as follows:

a. To observe signs of pregnancy.
b. To assess fetal size and growth.
c. To assess fetal health.
d. To diagnose location of fetal parts.
e. To detect any deviation from normal.

3. The significances of abdominal examination are:

a. Inspection**:** Inspect the abdomen for size, scar, straegravidarum and lineanigrae, the shape whether it is oval, globular or pendulous.

b. Palpation**:** Includes fundal, lateral and pelvic palpations to determine the height of fundus, fundal presentation and engagement of the presenting part.Palpate as follows:

- Fundal palpation: To find out what is in the top of the uterus.
- Lateral palpation: Continue to face the women's head. Place both hands further down on the abdomen; push down with one hand, pushing the foetus to the other side of the abdomen. Feel the foetus so that you can tell the parts. Gently move the baby from side to side to more easily tell which side has the back and which side has the arms and legs.

4 The procedure for locating landmarks for descent is:

Procedures:

a. Stand at the side of the woman. If you are right handed, stand at the woman's right side.
b. Feel the head with your right hand. The head can be moved. When all of the head is felt, it is measured as **five-fifths** above the brim i.e. five of your fingers can cover the head above the brim.
c. When the baby's head is **four-fifths** above the brim, four of your fingers can cover the head above the brim, it is just entering the brim.
d. When it is **three-fifths**, three of your fingers can still go partially round the head.
e. When it is **two-fifths** above the brim, only two fingers measure the head because more than half of the head has entered the brim. You can no longer feel the roundness of the head.
f. The head is now ***engaged***. It is almost impossible to move the head.
g. When the head is all the way in the pelvis you cannot feel it abdominally.

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Study Session 15: Minor Discomforts of Pregnancy

Expected Duration: 1 week of 2 contact hour

Introduction

Minor discomforts occur in majority of pregnancies. These are transient minor ailments that are caused by hormonal and physiological changes, which are normal and usually resolve after delivery.

Minor discomfort of pregnancy affects most systems of the body for example Digestive- Nausea and vomiting, Nervous- Fatigue, Cardiovascular- Leg cramps, Urinary- frequent urination, -Musculoskeletal- backache and Reproductive- Sore breast

In this study session, you will be learning minor ailments commonly experienced the possible causes and some solutions.

Learning Outcomes for Study Session 15

At the end of this study session, you should be able to:

Explain the meaning, causes and proffer solutions for minor ailments affecting the following systems:

15.1 Digestive
15.2 Nervous
15.3 Urinary
15.4 Cardiovascular
15.5 Reproductive
15.6 Musculoskeletal

15.1 Discomforts Affecting the Digestive System

The discomfort that affects digestive system in pregnancies is as follows;

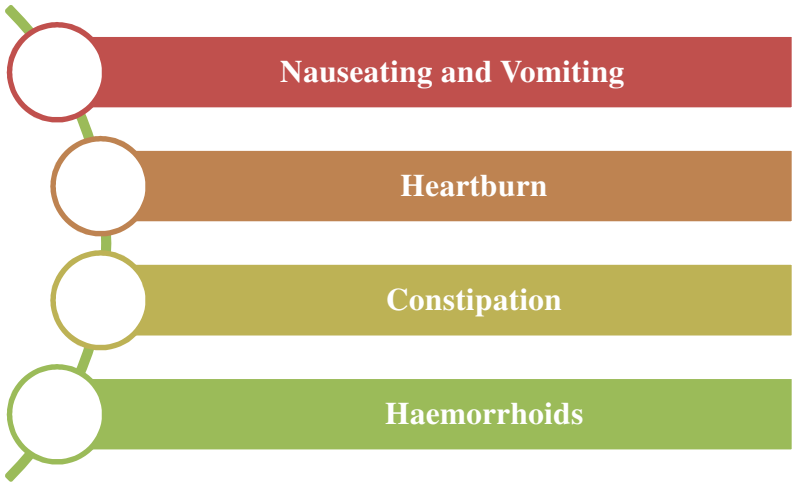

Figure 15.1: *Discomforts in Digestive System*

1. **Nausea and vomiting:** Nausea is a feeling to vomit; vomiting is expelling the content of the stomach forcefully through the mouth and nasal passages.

   Timing: Usually lasts from 4-12 weeks gestation.

   Cause: Hormonal changes in pregnancy.

In-text Question

MrsFolake is in her early pregnancy and experiences nausea and vomiting. And she knows that hormonal changes can cause it and what to know other causes. What will you tell her?

In-text Answer

Other causes can be an enhanced sense of smell and sensitivity to smell, a sensitive stomach and stress

Management:

- Eat frequent small amounts of food you can tolerate throughout the day.
- Avoid greasy or spicy foods, or strong food smells.
- Maintain your hydration.
- Decrease stress levels.
- Eat crackers or dry toast before getting out of bed.
- Temporarily discontinue vitamins with iron, but continue with folic acid.
- Take vitamin B6 25-50mg/day.
- Have a high protein bedtime snack.
- Eat a small bedside snack (nuts/dried fruit) if you waken in the night.
- Get out of bed slowly.
- Get help with housework/childcare and get more rest.
- Try ginger candies, ginger tea, peppermint tea, or Ginger Gravol.

If the vomiting is excessive and persistent, contact your midwife for advice.

Figure 15.2: *Image example of pregnant woman with nauseating and vomiting*
Source:*http://specialkidsstuff.com/wp-content/uploads/2014/01/Pregnancy-Symptoms.jpg*

(2)Heart burn: Peppering sensation felt around the chest region.

Timing: From 16 weeks to term.

Causes: Stomach acid gets into the esophagus due to hormonal effects.

Heartburn often begins in early pregnancy especially at first trimester and continues to third trimester (delivery period).

Figure 15.3: *Image Example of Heartburns in pregnancy*
Source:*http://www.clivir.com/lessons/show/heartburn-in-early-pregnancy.html*

Management:

- Eat smaller more frequent meals.
- Avoid greasy, spicy, or acidic foods.
- Eat your last meal well before bedtime.
- Elevate your head or upper body while sleeping.
- Avoid bending over.
- Chew your food well and eat slowly.

In-text Question

Mrs Udoaprimigravida complained of vomiting, backache, frequent urination and leg cramps. How would you advise her?

In-text Answer

She is experiencing transient minor ailment-that results from hormonal and physical changes, which usually resolve after delivery.

(3) Constipation: Inability to move the bowel.

Timing: Occurs any time in pregnancy

Causes: Decreased motility of food through the body due to hormones, poor diet, inadequate fluids or fiber, white bread products, inadequate exercise.

In-text Question

What advice can you give a pregnant patient that complained of constipation?

In-text Answer

The patient can control constipation by consuming specific foods and drink and also perform exercises.

Management:

- Increase fluids, 8-10 glasses of water a day
- Drink a hot cup of water 3 times a day
- Eat fiber, such as raw fruits, vegetables, prunes, prune juice and bran and whole wheat meal.
- Avoid white breads, eat whole-wheat products
- Decrease dairy products
- Avoid all other laxatives

Figure 15.4: Constipation in Pregnancy

Source: http://www.wikihow.com/Cope-With-Pregnancy-Discomforts

(4) Haemorrhoids: Protrusion of the rectum due to slackness.

Timing: More commonly occurring in second and third trimesters.

Management:

- Use constipation prevention and treatment as previously outlined.

- Do kegel exercises daily
- Increase fluid and fiber
- Warm baths or sitz baths
- Use a small stool to elevate feet with bowel movement

Consult with the midwife at your next appointment.

Figure 15.5: Image Example of Hemorrhoids in pregnancy
Source:http://www.wikihow.com/Cope-With-Pregnancy-Discomforts

15.2 Nervous System

The nervous system experiences the following discomfort as a result of pregnancy;

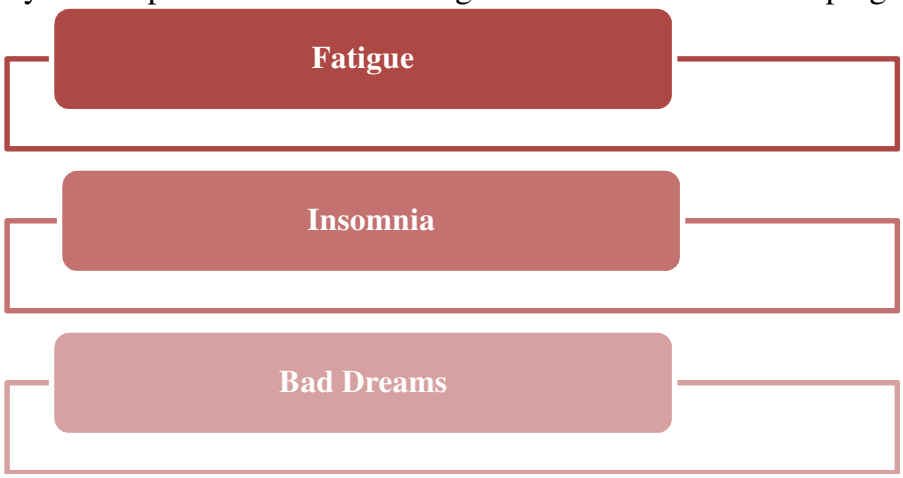

Figure 15.6: *Discomfort in Nervous System*

1. Fatigue: This is a feeling of exhaustion or a need to rest because of lack of energy or strength.

Timing: Common in early and late pregnancy.

Causes: Hormones of pregnancy, increasing weight and pressure, low iron levels, inadequate rest.

Figure18.6: Fatigue Patient
Source:*http://simply-living-simply.com/wp-content/uploads/2013/07/Fatigue-During-Pregnancy-article.jpg*

Management:

- Increase rest, more naps, earlier bedtime
- Eat 5-6 smaller meals a day and exercise.

Consult with the midwife and have your hemoglobin checked.

In-text Question

For a fatigue patient, what advice can you give to reduce it?

In-text Answer

Firstly, listen to your body, ask for help if the need arises, get more sleep, eat right, eat often and get a move on.

2. Insomnia: Inability to sleep.

Timing: Occurring in last half of pregnancy.

Causes: Stress, urinary frequency, lack of exercise, increasing weight and pressure.

Figure 15.8: *Patient with Insomnia*
Source:*http://yatinjpatel.com/tag/bedroom/*

Management:

- Exercise every day, walking, yoga
- Fresh air in your sleeping area
- Avoid caffeine
- Take calcium 1200 mg before bed, other vitamins earlier in the day
- Have a warm bath or a massage before bed
- Use relaxation exercises or meditation
- Decrease fluids and food intake in the evening after dinner
- Decrease stress
- Use a comfortable supportive mattress with lots of pillows
- Sleep in a quiet area away from family activity
- Do not use sleeping pills or herbals during pregnancy.

3. Bad Dreams

Timing: May occur any time in pregnancy.
Causes: Anxiety, subconscious fears, overtiredness, stress.
Management:

- Talk to your midwife or to a support person
- Do not watch violent or disturbing television programming
- Decrease stress levels/exercise
- Remember these dreams are not predictive
- Use relaxation and meditation techniques.

15.3 Musculoskeletal System:

Back pain
Timing: Occurs from 20-24 weeks to term

Causes: Increased weight pulling on back, poor posture, poor body position when lifting or bending loosening of pelvic joints due to pregnancy hormones, urinary tract infections.

Management:

- Rest more often/discontinue strenuous physical activity
- Be aware of your posture while standing/sitting/walking
- Avoid standing for prolonged periods
- Listen to your body/discontinue uncomfortable exercise programs or duties at work
- Wear good quality shoes with supports/avoid high heels
- Bend at the knees when lifting objects or young children
- Use a pre-natal wrap/support
- Visit your massage therapist/chiropractor/physiotherapist
- Maintain a healthy weight gain
- Try a warm pack of avoid heating pads.

Consult with the midwife if your backache is associated with urethral burning, urinary frequency, or pain over your pubic bone, advice midwife if you have a history of back injury.

In-text Question

15.4 Cardiovascular System

Physiological changes in cardiovascular system can cause the following below;

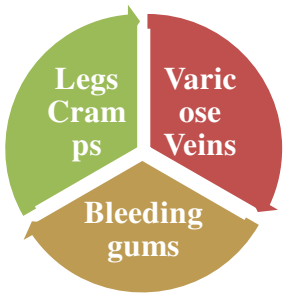

Figure 15. 9: Discomfort in Cardiovascular System

(1) Leg Cramps

Timing: Occurs from 20 weeks to term.

Causes: Poor circulation due to inadequate exercise or pressure, insufficient calcium intake.

Management:

- Take a calcium supplement 1200-2,000mg/day
- Increase dairy intake and calcium source foods
- Elevate legs more often
- Massage site of the leg cramp
- Pull upward on your toes/foot, do not point your toes
- Increase walking.

Figure 15.9: *Leg Cramps in Patient*
Source:*http://organichealth.co/leg-cramps-causes-cures/*

(2) Varicose Veins: Enlarge tortuous veins.

Timing: More commonly seen from 24 weeks to term.

Causes: Hereditary predisposition, hormones of pregnancy and increasing weight and pressure.

Management:

- Use maternity support hose, put on before getting out of bed in the morning
- Exercise, especially swimming and yoga
- Avoid sitting with legs crossed or prolonged standing or sitting
- Increase rest and naps
- Use witch hazel compresses or Tucks Pad externally on vein
- Avoid tight stockings, or pants

Consult with the midwife if you experience pain, swelling, redness, heat or tenderness at the site of a varicose vein.

In-text Question

Highlight the cause, time of occurrence and management of leg cramps.

In-text Answer

: **Timing:** Occurs from 20 weeks to term.

Management:

- Take a calcium supplement 1200-2,000mg/day
- Increase dairy intake and calcium source foods
- Elevate legs more often
- Massage site of the leg cramp
- Pull upward on your toes/foot, do not point your toes
- Increase walking.

Causes: Poor circulation due to inadequate exercise or pressure, insufficient calcium intake.

15.5 Reproductive System

Pregnant woman Reproductive system has discomfort

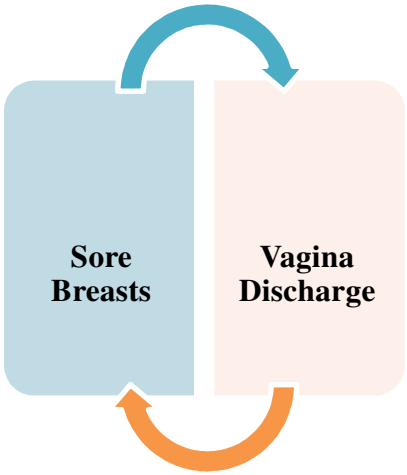

Figure 15.10:*Discomfort in Reproductive System*

(1) Sore Breasts

Timing: Common in early pregnancy
Causes: Hormones of pregnancy
Management:

- Wear a good bra
- Handle area with care

(2) Vagina Discharge

Timing: May occur any time in pregnancy
Causes: Normal hormonal changes, yeast
Management:

- Wear cotton underwear
- Avoid tight pants or hose
- Do not use feminine sprays or powders
- Bathe or shower often
- Consult with the midwife if burning, itching, or odour.

15.6 Urinary System

Pregnant women experience discomfort in their urinary system and this is because of frequent urination.

Frequent urination

Timing: Occurs in first and third trimesters
Causes: Pressure on the bladder by growing uterus
Management:

- Limit fluids in the evening hours
- Avoid caffeine products

Contact the midwife if associated with burning, fever, or pain.

Activity 15.1: Discomfort in Pregnancy

Allowed Time: Anytime

Task: Visit the gynaecology ward or unit in your health center and counsel clients hospitalized for persistent minor discomfort(s) of pregnancy.

Summary of Study Session 15

In this study session, you have learnt that:

Minor ailments are experienced by majority of expectant mothers; they are physiological and resolve after labour.

Self-Assessment Questions (SAQs)

Now that you have completed this study, you can assess how well you have achieved its Learning outcomes by answering the following questions. Write your answers in your study Diary and discuss them with your Tutor at the next! Support meeting.

SAQ 18.1 (Test Learning Outcome 15.1):

How will you counsel a pregnant neighbor who has complained of frequent constipation?

SAQ3 18.2 (Test Learning Outcome 15.2)

How will you manage an expectant client who is fatigued?

SAQ 18.3 (Test Learning Outcome 15.3)

What is the cause of back pain in pregnancy?

SAQ 18.4 (Test Learning Outcome 15.4)

Highlight the cause, time of occurrence and management of leg cramps

SAQ 18.5 (Test Learning Outcome 15.5)

What does sore breast indicates in a woman?

Notes on SAQs:

15.1 Counselling a pregnant neighbour with constipation.

Constipation: Inability to move the bowel.

Timing: Occurs any time in pregnancy

Causes: Decreased motility of food through the body due to hormones, poor diet, inadequate fluids or fiber, white bread products, inadequate exercise.

Management:

- Increase fluids, 8-10 glasses of water a day
- Drink a hot cup of water 3 times a day
- Eat fiber, such as raw fruits, vegetables, prunes, prune juice and bran and whole wheat meal.
- Avoid white breads, eat whole-wheat products
- Decrease dairy products
- Avoid all other laxatives

15.2 Management of fatigue.

(1) Fatigue: This is a feeling of exhaustion or a need to rest because of lack of energy or strength.

Timing: Common in early and late pregnancy.

Causes: Hormones of pregnancy, increasing weight and pressure, low iron levels, inadequate rest.

Management:

- Increase rest, more naps, earlier bedtime
- Eat 5-6 smaller meals a day and exercise.

Consult with the midwife and have your hemoglobin checked.

15.3 Description of the management and cause of leg cramps.

Leg Cramps

Timing: Occurs from 20 weeks to term.

Management:

- Take a calcium supplement 1200-2,000mg/day
- Increase dairy intake and calcium source foods
- Elevate legs more often
- Massage site of the leg cramp
- Pull upward on your toes/foot, do not point your toes
- Increase walking.

Causes: Poor circulation due to inadequate exercise or pressure, insufficient calcium intake.

References

Bendtsen, L. and Jensen, R. 2009. Tension Type Headache. Neurology Clinical 27: 525-535.

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www.comoxvalleymidwifery.com.

Study Session16: Role and Responsibility of the Midwife in Prenatal Care

Expected Duration: 1 week of 2 contact hour

Introduction:

The midwife works in partnership with women to give the necessary support, care, and advice during pregnancy, labour, conduct births, and care for mother and child postnatal. In this study session, you will be learning about the midwife's role in prenatally.

Learning Objectives for Study Session 16

At the end of this study session, you should be able to:

16.1 Define the meaning of the word midwife, explain, her role

16.2 Discuss the specific prenatal responsibilities

16.0 Meaning of 'Midwife' and Her Role Prenatally

The midwife is a person who having been regularly admitted into an accredited midwifery educational programme in the country which it is located, has successfully completed the prescribed course of studies, and has met the requirements to be legally licensed to practice midwifery (WHO).

The midwife's *role*- A practicing midwife is responsible for providing midwifery care in accordance with such standards as the council may specify from time to time to a woman and her baby during the antenatal, intra-natal, and post-natal periods. The care includes:

- Antenatal education,
- Preparation for parenthood,
- The promotion of normal birth
- The detection of complications in the mother and the foetus

16.2 Specific Prenatal Responsibility

Prenatal responsibilities is the care an expectant mother receive from health care professionals which include education supervision and treatment given to the pregnant woman from the time of conception until the beginning of labour in order to ensure safe pregnancy, labour and puerperium. The care consists of the following components of Focused Antenatal Care (FAC):

In-text Question

How will you correctly explain the meaning of midwife?

In-text Answer

A *midwife* is a licensed and trained health professional who provides primary health care to womenduring labour, delivery, and after the birth of their babies. *Midwives*may deliver babies at birthing centers or at home, but most can also deliver babies at a hospital.

16.2.1 The Midwife's Role

A practicing midwife is responsible for providing midwifery care in accordance with such standards as the council may specify from time to time to a woman and her baby during the antenatal, intra-natal, and post-natal periods. The care includes antenatal education, preparation for parenthood the promotion of normal birth and the detection of complications in the mother and the foetus.

-Health promotion and Counselling
-Examination- General and Obstetric
-Screening test- syphilis, HIV, Urinalysis and Blood
-Treatments- As appropriate
-Preventive measures- Tetanus toxoid and haematinic

1. Health Promotion and Education/Counseling

Inform and educate the woman with health messages and counseling appropriate to individual.

- Needs,
- Concerns,
- Circumstances
- Gestational Age
- Most prevalent health issues

Support the woman in making decisions and solving actual or anticipated problems involve partner and family in supporting and adopting healthy practices.

Health educates clients on the following:

Malaria control in pregnancy	Though the use of Intermittent Preventive Treatment (IPT), - **use of insecticide – treated nets (ITS)** and other methods of environmental sanitation practices to eliminate breeding sites for mosquitoes and personal protection.
Diet and Nutrition	1. Advice on balanced diet. Prevention and treatment of anaemia. 2. Care of common discomforts.
Use only prescribed drugs.	Avoid use of potentially harmful substances (e.g. herbs, un-prescribed drugs). Advise on tobacco and cigarette smoking and effects of alcohol

	intake.
Infection prevention hygiene	Hand washing before preparing food, eating, drinking.
Hygiene – personal and environment e.g.	. Use safe drinking water, handle and store food safely, practice good dental hygiene**.**
Rest and activity -	- Tell clients to: Decrease the amount of heavy work and increase rest time. Avoid lying on back late in pregnancy to prevent decreased blood supply to the placental site. Lie on side. Maintain good body posture and avoid overexertion
Sexual Relations and Safer Sex	Reassure clients that sexual intercourse will not harm the fetus. Have sexual relationship with only one partner who is free from HIV and STIs practice abstinence if desirable. For those at risk of STIs and HIV, use condoms correctly and consistently.
3. **Importance of delivery by skilled** attendant 4. Birth/delivery preparedness 5. Early and exclusive breastfeeding and immunization 6. HIV/AIDs prevention and care, and role at VCT and MTCT 7. Prevention of other endemic disease/deficiencies e.g. Hookworm infestation 8. Post-partum child spacing (family planning) 9. Postnatal care 10. Danger signs in pregnancy and during labour.	

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I. Prevention of complications of pregnancy and childbirth.
II. Early detection and treatment of existing complications and problems such as
   - ❖ Malaria\
   - ❖ Severe anaemia by physical examination and testing.
   - ❖ Pre-eclampsia through measurement of blood pressure.
   - ❖ HIV through voluntary counseling and testing, and prevention of MTCT.

- ❖ Sexual transmissible infections including syphilis testing.
- ❖ Screening for tuberculosis.

III. Birth planning/preparedness and complication readiness:

The purpose is to develop birth plan, the exact plan for normal birth of the baby and establishing a financial plan/scheme.

Recognition of danger signs:

- ❖ Vaginal bleeding
- ❖ Difficulty in bleeding
- ❖ Severe abdominal pain
- ❖ Severe headache/blurred vision
- ❖ Fits/convulsions/loss of consciousness
- ❖ Labour pains before 37 weeks
- ❖ Swelling of the face, hands and legs
- ❖ Decreased or absent fetal movements.

In-text Question

One of these is not a test conducted by a pregnant woman?

a. Malaria test
b. HIV screening
c. Blood Level Test
d. Eye Test

In-text Answer

The answer is d

Nutrition: Educate on balanced diet. Food to avoid includes, coffee, alcohol, because of their effects on the foetus. Emphasize: at least one extra serving of staple food per day eating adequate diet that contains beans, nuts, starchy foods, animal products, fruits, and vegetables as well as foods rich in vitamins and minerals demystification of food taboos give vitamin A: supplement where deficiency is endemic – give 10,000 IU vitamin A daily or 25,000 IU weekly during the second and third trimesters.

The dose should never exceed 25,000 IU and should not be given during the first 60 days of pregnancy. Give Iron and folate: at least 60mg iron plus 400 mcg* of folate by mouth daily throughout pregnancy and for three months postpartum. Be encouraged to eat foods rich in iron e.g. green leafy vegetables and vitamin C e.g. fruits (which aids iron absorption), and avoid drinks such as tea and coffee, which may inhibit iron absorption.

1. PICA should be avoided. These are non-food substances with little or no nutritional value which can lead to anaemia, e.g. dust, ice blocks or corn starch.

2. Emphasis information on exclusive breast feeding/lactation management, compliance with medication, preparation for labour and delivery, child spacing after delivery, immunization/child care/HIV counseling and confidential testing and emergency readiness.

3. History taking: Obtain a comprehensive history: Information on biodata/social history such as name, address, age occupation, religion marital status, nationality, state of origin, next of kin, habits, substance use.

4. Family history: If there are any hereditary diseases or conditions such as diabetes, hypertension, psychoactive disorders, tuberculosis, congenital malformations, multiple pregnancy among others.

5. Medical/history: Past and present medical conditions, if hospitalized before or history of any health problem, and tetanus immunization history.

6. Surgical history: enquiries are made into previous and present surgical conditions e.g. previous surgical/obstetric operations, blood transfusions or accidents involving the pelvis and limbs.

7. Obstetric history: Number of child alive, sex and their health status, condition of the babies including the birth weights, immunizations and feeding methods, duration. Contraceptive use, success, or failure. Previous complications, previous breastfeeding experience.

8. Menstrual history: Age at menarche, regularity and duration of menstruation, this will indicate if she is at high risk of anaemia.

9. History of present pregnancy: Take history of last menstrual period, in order to calculate the expected date of delivery (EDD) and gestational age.

In-text Question

Why will you advice a pregnant woman to avoid foods like coffee and alcohol?

In-text Answer

It can affect foetal heart development and reduce heart function

How to calculate Expected Date of Delivery (EDD):

- For a normal 28^{th} days circle, add 7 days and 9 months to the first day of the last menstrual circle.
- Example, if last menstrual period is 15^{th} January, 2009, the expected date of delivery (EDD) will be 22^{nd} October, 2009 or add 7 days to the last day of the last menstrual period and subtract 3 months from the month of the last menstrual period (LMP) i.e. if LMP is 15 January, 2009 EDD will be (15^{th} + 7 days) = 22^{nd} of (minus Jan, Dec and Nov) – October 2009 i.e. EDD will be 22-10-2009.
- Take history of presence of any ill-health such as swelling of the limbs, excessive weight gain, raised/rising blood pressure, proteinuria, excessive vomiting, excessive vaginal discharges, fever, dizziness, vaginal bleeding, unusual tiredness or breathlessness (if any two of the first four features are present, then the woman is prone to hypertensive complications in this pregnancy).

Activity 16.0:

Allowed Time:

Discuss the **WHO** Focused Antenatal Care Four-Visit Model, highlight the advantages and disadvantages.

Summary of Study Session 16

In this study session, you have learnt that:

(1) A midwife is a professional who has successfully completed a course of studies in midwifery education and is legally licensed to practice her role and her responsibilities include caring for clients prenatally, intranatally and postnatally.

(2) Specifically the midwife prenatally ensure good outcome of pregnancy labour and puerperium by health promotion, counseling, prevention of complications, early detection and prompt management of existing problems and birth preparedness and emergency readiness.

Self-Assessment Questions (SAQs)

Now that you have completed this study, you can assess how well you have achieved its Learning outcomes by answering the following questions. Write your answers in your study Diary and discuss them with your Tutor at the next! Support meeting.

SAQ 16.0 (Test learning outcome 16.0)

How will you correctly explain the meaning of midwife and her role?

SAQ 16.2 (Test learning outcome 16.2)

Highlight the ***Specific*** educative and counseling responsibilities of the midwife prenatally.

Reference

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Sandall, J., Sohani, H., Gates, S, Shennan, A, Devane, D 2013. Midwife-led continuity models versus other models of case for childbearing women. *Cochrane Database of Systematic Reviews*.doi: 8.1002/14651658. Cd004667. Pub3.edit

Study Session 17: Assessment Needs and Care during Pregnancy

Expected Duration: 1 week of 2 contact hour

Introduction

In the previous study session, you have learnt the role and responsibility of the midwife in prenatal care. This study session will introduce you to how to assess needs and care during pregnancy

In this Study session, you will be discussing the expectant mothers; where the following will be considered;

- ❖ General physical examination
- ❖ Abdominal examination and
- ❖ How pelvic assessment is conducted.

These procedures play an important part in ascertaining normality.

Learning Outcomes for Study Session 17

At the end of this study session, you should be able to:

17.1Describe the general physical examination of the woman prenatally.

17.2Explain how to conduct examination, this include inspection, palpation and auscultation

17.3Highlight how Pelvic assessment is conducted.

17.1 General Physical Examination

General physical examination involves "A head to toe" physical observation. The *head* is examined for lies and dandruff, these could result in anaemia and disturbed sleep. The conjunctiva and the lips are observed for paleness. If the nose is discharging, this will indicate upper respiratory tract infection. The tongue for glosities and dental carries is also identified if any. The finger nails are also examined for pallor.

Height- Height of over 160cm is indication of normal sized pelvis, conversely abnormally short stature may indicate contracted pelvis.

Weight- Weight should always be measured using the same scales and the woman asked to wear similar clothing each time she is weighed. Obesity could be associated with gestational diabetes and Pregnancy Induced Hypertension IPIH).

***Blood Pressure*:** Is monitored in order to ascertain normality and provide a baseline reading for comparison throughout pregnancy. She should always be in

the same position to ensure a comparable reading. An adequate blood pressure is required to maintain placental perfusion but systolic blood pressure of 140 mmHg or diastolic pressure of 90 mmHg at booking is indicative of hypertension and could cause damage to the placenta.

Factors that increase accuracy of blood pressure measurement and recording are:

- ❖ A regular serviced mercury column.
- ❖ Sphygmomanometer should be used.
- ❖ The correct width of cuff should be chosen for the woman.
- ❖ Initial estimation of the systolic pressure should be by palpation.
- ❖ Blood pressure should be recorded to the nearest mmHg.

Urinalysis: Is performed to exclude abnormality. Like asymptomatic bacilluria.

- Ketones due to increased maternal metabolism caused by fetal need or because of vomiting.
- Glucose caused by higher circulating blood levels, reduced renal threshold or disease.
- Protein due to contamination by vaginal leucorrhoea, or disease such as Urinary Tract Infection (**UTI** or **PIH).**

In-text question

What are routine laboratory test perform at the booking visit and state the importance?

In-text Answer

-Urinalysis for protein- to exclude P.I.H.

-Haemoglobin estimation- to exclude aneamia

-Blood grouping and genotype- in case of blood transfusion and to exclude sic

-Human immunodeficiency virus (HIV) -to detect HIV infection, with patient consent.

17.2 Abdominal Examination

The aim of abdominal examination is listed below in figure 18.1 below;

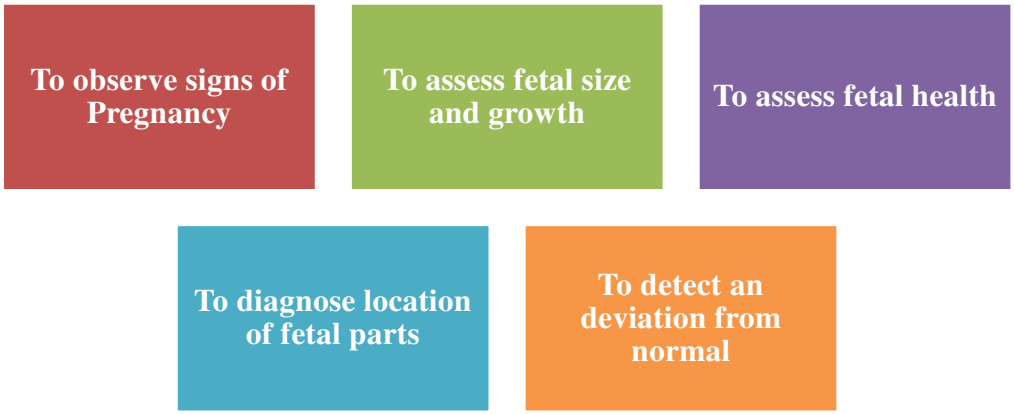

Figure 18.1: *Aims of Abdominal Examination*

Abdominal examinationincludes inspection palpation and auscultation

a. **Inspection:** Inspect the abdomen for size, scar, strae, and gravid arum and lineanigrae, the shape whether it is oval, globular or pendulous.
b. **Palpation:** Includes fundal, lateral and pelvic palpations to determine the height of fundus, fundal presentation and engagement of the presenting part.
   Palpate as follows:
   - **Fundal palpation:** To find out what is in the top of the uterus.

   Face the woman's head. Put your hands on both sides of the top of the uterus and curve your fingers around. Palpate for shape, size, firmness, and how easily the baby moves. If the foetal head is in the top of the uterus, you will feel a round and hard part which is movable. If the buttocks are felt, they will be irregular, bulky, and softer than the head, and the top of the uterus will feel full and not easily moved. If there is a transverse lie, the fundus will feel empty.

Figure 17.2: *A pregnant woman on palpation*
Source*: http://commons.wikimedia.org/wiki/File:Flickr_-_Israel_Defense_Forces_-_Doctors_Examining_Pregnant_Woman.jpg*

- **Lateral palpation:** Continue to face the women's head. Place both hands further down on the abdomen; push down with one hand, pushing the foetus to the other side of the abdomen. Feel the foetus so that you can tell the parts. Gently move the baby from side to side to more easily tell which side has the back and which side has the arms and legs.

In-text Question

Why do you carry out fundal palpation on a pregnant woman?

In-text Answer

To check the development of the baby, its height, heartbeat, position, head, back and limbs etc

18.3 Pelvic Assessment

A pelvic exam is a way for doctors to look for signs of illness in certain organs in a woman's body. The word "pelvic" refers to the pelvis. The exam is used to look at a woman's:

- Vulva
- Uterus (womb)
- Cervix
- Fallopian Tube
- Ovaries
- Bladder
- Rectum
- Readers Activities

Activity 17.1: A visit to haematology lab

Allowed Time: Anytime

Task: Visit a haematology laboratory and observe the various blood tests assessed during pregnancy. Discuss the significance of each of the test.

(i) Continue to face the woman's head. Have the woman bend her knees. Grasp the part of the baby in the lower part of the abdomen. Ask yourself "What is in the lower part of the abdomen?" Compare to your findings of the first palpation.

(ii) Turn and face the woman's feet. Make sure that the woman's knees are bent. Place both hands on the sides of the abdomen and press them towards the pelvis. Compare the findings to the other palpation and figure out the presentation. Check if you feel more than one baby.

Auscultation: Listen to the foetal heart rate. Normal rate is between 120-160 beats per minutes. If the heart rate is above 160 or below 120 beats per minute, the baby may be having problems.

Locating landmarks for descent:

Landmarks used in measuring the descent are the foetal head and the maternal pelvic brim.

Procedure:

- Stand at the side of the woman. If you are right handed, stand at the woman's right side.
- Feel the head with your right hand. The head can be moved. When all of the head is felt, it is measured as **five-fifths** above the brim i.e. five of your fingers can cover the head above the brim.
- When the baby's head is **four-fifths** above the brim, four of your fingers can cover the head above the brim, it is just entering the brim. When it is **three-fifths**, three of your fingers can still go partially round the head. When it is **two-fifths** above the brim, only two fingers measure the head because more

than half of the head has entered the brim. You can no longer feel the roundness of the head.

- ❖ The head is now **ENGAGED**. It is almost impossible to move the head.
- ❖ When the head is all the way in the pelvis you cannot feel it abdominally.

In-text Question

When can a pelvic assessment be done?

In-text Answer

It can be done during a yearly physical examination, when a woman is pregnant ,when doctor is checking for infection and when a woman is having pain in her pelvic area.

Summary of Study Session 17

In this study session, you have learnt that:

1. General physical examination involves observing the expectant mothers state of health physically and taking note of any deviation from normal.
2. Abdominal examination is conducted to observe signs of pregnancy, assess fetal growth and to detect any abnormality.
3. Pelvic palpation is used to judge the size, flexion, and mobility of the head determine position in a vertex presentation.

Self-Assessment Questions (SAQs)

Now that you have completed this study, you can assess how well you have achieved its Learning outcomes by answering the following questions. Write your answers in your study Diary and discuss them with your Tutor at the next! Support meeting.

SAQ 18.1 (Test learning outcome 17.1)

Now that you have completed this study session, you will need to assess yourself to see if you have achieved the learning objectives. Try to answer the questions below. Compare your answers with the correct ones at the end of the module**.**

SAQ 1.1 (Test learning outcome 17.1)

Explain the following assessment and their importance (a) Height (b) Weight (c) Blood pressure and (c) Urinalysis**.**

SAQ 1.2 (Test learning outcome 17.2)

What is the aim of abdominal examination? Using the following guidelines write on abdominal examination (i) inspection

(ii) Palpation (iii) Lateral palpation.

SAQ 3 (Test learning outcome 17.3)

Explain the procedure for locating landmarks for descent.

Notes on SAQs:

SAQ17.1: Explain the following assessment and their importance (a) Height (b) Weight

c. Blood pressure and (c) Urinalysis**.**

General Physical Examination

Height- Height of over 160cm is indication of normal sized pelvis, conversely abnormally start stature may indicate contracted pelvis

Weight- Weight should always be measured using the same scales and the woman asked to wear similar clothing each time she is weighed. Obesity could be associated with gestational diabetes and pregnancy induced Hypertension.

Blood Pressure**:** Is taken in order to ascertain normality and provide a baseline reading for comparison throughout pregnancy. She should always be in the same position to ensure a comparable reading. An adequate blood pressure is required to maintain placental perfusion but systolic blood pressure of 140 mmHg or diastolic pressure of 90 mmHg at booking is indicative of hypertension and could cause damage to the placenta.

Factors that increase accuracy of blood pressure measurement and recording are:

- A regular serviced mercury column.
- Sphygmomanometer should be used.
- The correct width of cuff should be chosen for the woman.
- Initial estimation of the systolic pressure should palpation.
- Blood pressure should be recorded to the nearest 2mmHg.

Urinalysis: Is performed to exclude abnormality. Like asymptomatic bacilluria.

- Ketones due to increased maternal metabolism caused by fetal need or because of vomiting.
- Glucose caused by higher circulating blood levels, reduced renal threshold or disease.
- Protein due to contamination by vaginal Leucorrhoea, or disease such as **UTI** or **PIH.**

SAQ17.2: What is the significance of Abdominal examination. Using the following guidelines write on abdominal examination (i) inspection (ii) Palpation (iii) Lateral palpation.

Inspection: Inspect the abdomen for size, scar, strae gravidarum and lineanigrae, the shape whether it is oval, globular or pendulous.

Palpation: Includes fundal, lateral and pelvic palpations to determine the height of fundus, fundal presentation and engagement of the presenting part.

Palpate as follows:

❖ **Fundal palpation:** To find out what is in the top of the uterus.

Face the woman's head. Put your hands on both sides of the top of the uterus and curve your fingers around. Palpate for shape, size, firmness, and how easily the

baby moves. If the foetal head is in the top of the uterus, you will feel a round and hard part which is movable. If the buttocks are felt, they will be irregular, bulky, and softer than the head, and the top of the uterus will feel full and not easily moved. If there is a transverse lie, the fundus will feel empty.

Lateral palpation: Continue to face the women's head. Place both hands further down on the abdomen; push down with one hand, pushing the foetus to the other side of the abdomen. Feel the foetus so that you can tell the parts. Gently move the baby from side to side to more easily tell which side has the back and which side has the arms and legs.

SAQ17.3: Explain the procedure for locating landmarks for descent.

Landmarks used in measuring the descent are the foetal head and the maternal pelvic brim.

Procedure:

- Stand at the side of the woman. If you are right handed, stand at the woman's right side.
- Feel the head with your right hand. The head can be moved. When all of the head is felt, it is measured as **five-fifths** above the brim i.e five of your fingers can cover the head above the brim.
- When the baby's head is **four-fifths** above the brim, four of your fingers can cover the head above the brim, it is just entering the brim. When it is **three-fifths**, three of your fingers can still go partially round the head. When it is **two-fifths** above the brim, only two fingers measure the head because more than half of the head has entered the brim. You can no longer feel the roundness of the head.
- The head is now ***engaged***. It is almost impossible to move the head.
- When the head is all the way in the pelvis you cannot feel it abdominally.

References

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