2020

Normal Midwifery Lecture Notes

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KENYA MEDICAL TRAINING COLLEGE-KABARNET CAMPUS
COURSE OUTLINE
NORMAL MIDWIFERY 30 HOURS
YEAR ONE, SEMESTER TWO –SEPTEMBER 2019 KECHN
LECTURER: RUGENDO.M.M.(MR.) & M.S J. WACHIRA

Module competence

This module is designed to enable the learner to acquire knowledge, skills and attitude in midwifery so as to be able to promote healthy pregnancy, provide quality care during pregnancy, labour and puerperium for a woman as well as to the newborn.

Module units

S.N	UNITS	HOURS		LECTURER
		THEORY	PRACTICUM	
1.	Normal Pregnancy	08	04	MR. RUGENDO.M.M
2.	Normal Labour	10	10	MR. RUGENDO.M.M
3.	Normal Puerperium	06	02	M/S J. WACHIRA
4.	Normal Baby	06	04	M/S J. WACHIRA

Module Learning Outcomes

At the end of this module, the learner should be able to: -

1. Identify mothers with normal pregnancy
2. Provide appropriate antenatal care
3. Conduct and manage safe delivery
4. Provide care to mothers during puerperium period
5. Provide essential newborn care.

Module Content

1. **Normal Pregnancy**: Definition, Terminologies, pillars and concepts in MNH(Pre-conception care),essential obstetric and newborn care, physiological changes during pregnancy, physical, emotional/psychological changes during pregnancy, history taking, physical examination (General examination, abdominal examination, breast examination, vaginal examination), Focused Antenatal Care (FANC), estimation of gestational age, diagnosis of pregnancy, Individualized Birth Plan, health messages shared during pregnancy, eMTCT , danger signs during pregnancy, minor disorders during pregnancy.
2. **Normal Labour:** Definition (labour, normal labour), admitting a mother into labour ward (history taking, general physical examination, breast examination, abdominal examination, vaginal examination, pelvic examination weight, vital signs, laboratory investigations), documentation, characteristics of normal labour, diagnosis of labour, true & false labour, premonitory signs of labour, physiology of the onset of labour, mechanisms of labour, stages of labour, physiological changes in all stage of

labour,4Ps, management of all stages of labour, use of partograph, Active Management of Third Stage of Labour (AMTSL), pain management.

3. **Normal Puerperium**: Definition, physiological and Emotional changes during puerperium, Targeted postnatal care, physiology of lactation, psychosocial care, immediate and subsequent management of the mother, health messages, postnatal danger signs. eMTCT , Infant feeding methods (exclusive breastfeeding, cup and spoon), minor complications of puerperium.
4. **Normal Baby**: APGAR Scoring, physiological adaptation of a newborn, characteristics of a normal newborn, immediate and subsequent management of the newborn (warm chain, administration of Tetracycline Eye Ointment and Vitamin K, initiation of breastfeeding, cord care, care of the eyes, immunization), First examination of the newborn, daily(routine) examination of the newborn danger signs.

TEACHING AND LEARNING METHODS:

This course will be taught through various teaching and learning methods including and not limited to: lecture, demonstration, small group discussion, brainstorming, class presentation, and self-directed study, among others

INSTRUCTIONAL MATERIALS/EQUIPMENTS

Computers/laptops, manuals/notes, whiteboard, presentation slides/projector, projection boards, library, charts.

MODE OF EVALUATION AND ASSESSMENT

Evaluation and assessment of this module will be conducted as per the KMTC examination policies; however, the following will form part of evaluation and assessment

1. Assignments and class presentation.
2. Sit-in & take away C.A.Ts.
3. END SEMESTER EXAMINATION.

REFERENCES:

1. Fraser, D.M, 2010, Myles textbook for midwives African edition 2nd edition, Edinburg: Churchill Livingstone
2. MOH, 2004, National guidelines for obstetric & perinatal care, Nairobi: Ministry of health.
3. Waugh, A. and Grant, A. (2010) Ross and Wilson Anatomy and Physiology in Healthy and Illness. Churchill Livingstone.
4. Arthur C.Guyton and John E.Hall (2006).Text book of Medical physiology, 11th edition. Elsevier Saunders, Philadelphia.
5. William F.Ganong (2003).Review of medical physiology, 21st Edition. McGraw-Hill Companies, New York.
6. MOH (2007) National reproductive health policy-enhancing reproductive health status for all Kenyans. Nairobi: Ministry of Health
7. MOH (2003) Adolescent sexual reproductive health. A trainer's manual for health service providers.

Definition of terminologies.

Pregnancy-This is a term used to refer to the maternal condition of having a developing fetus in the uterus.

Normal pregnancy - refer to the maternal condition of having a single developing fetus in the uterus with no associated complications both to the mother and the fetus.

Obstetrics- This a branch of medicine that deals with the care of women's' reproductive health, pregnancy, labour and postnatal period.

Embryo- It is a term used to refer to developing conceptus from fertilization to 8^{th} week of pregnancy.

Foetus-it is the term used to refer to developing conceptus from 8^{th} week of gestation until delivery.

Gestational age- Refers to the duration of pregnancy mostly calculated from the first day of the last (normal) menstrual period(LMP). Gestational age is expressed in terms of completed weeks.

Gravid-Means the state of being pregnant.

Gravidity(Gravida)-Means the total number of pregnancies both normal or abnormal. It can also be defined as the number of times the mother has been pregnant regardless of whether the pregnancies were carried to term or not. The current pregnancy is always included in the gravidity.

Nulligravida- A woman who has never been pregnant.

Multigravida-This is a term that refers to a woman who has been pregnant more than one time.

Parity-It is the state of having given birth to an infant after the age of viability (28 weeks in Kenya) or an infant weighing 500gms or more whether alive or dead.

Gestation-It refers to the state of carrying an embryo/foetus in the uterus.

Trimester- This refers to the way of dividing pregnancy into three distinct periods; namely:

a) **First trimester**-period between first and 12^{th} week of gestation.
b) **Second trimester**- Period between 13^{th} week to 28^{th} week of gestation.
c) **Third trimester**- Period from 29^{th} week of gestation until delivery.

Live birth- It refers to complete expulsion or extraction of product of conception that shows evidence of life (eg heart rate, pulsation of umbilical cord, observable movements of involuntary muscles) regardless of the duration of pregnancy.

Infant- This is a term that refers to a live-born individual from birth until completion of one year of life.

Preterm infant- Any fetus born between 28^{th}-37^{th} weeks of gestation.

Miscarriage (Abortion)-Refers to termination of pregnancy before viability (28 weeks of gestation). There are various causes of miscarriage (This will be covered in details in gynecological nursing) which may include: -

a) Chromosomal abnormalities
b) Malformed uterus
c) Foetal congenital abnormalities.
d) Cervical weakness
e) Hormonal disorders
f) Severe infections

Types of miscarriage(Abortion):

a) Threatened
b) Inevitable
c) Complete
d) Missed
e) Septic
f) Recurrent/habitual

Presentation-This refers which anatomical part of the uterus is closest to the pelvic inlet of the birth canal during pregnancy or just before birth.

Lie- This is the relationship of the longitudinal axis of the fetus to the longitudinal axis of the mother (Lie can be longitudinal, oblique, transverse).

Station-This refers to the relationship of the fetal presenting part to ischial spines.

Attitude-Refers to the relationship of foetal parts to its trunk (The normal attitude is flexed one).

Moulding –Refers to the process through which fetal skull bones come closer to each other due to pelvic forces when the fetal head is moving through the pelvis during delivery. Moulding enables reduction of fetal skull diameter and encourages progress of delivery through maternal pelvis. However, in some circumstances moulding can be excessive. Moulding has therefore been graded as follows:

- 0 If bones are separated and the sutures can be felt easily
- + If sutures are apposed but no overlap i.e. the bones are just touching each other
- ++ If there is overlapping of the sutures but it is reducible
- +++ If the sutures overlap but not reducible

Effacement- It is the process through which cervix shortens as it becomes included in the lower uterine segment.

Engagement- Engagement is said to have taken place when the widest part of the presenting part of the fetus has successfully passed through the pelvic inlet.

Diagnosis of pregnancy.

The average duration of pregnancy 280 days or 40 weeks. To correctly calculate you need to get first day of the last Normal Menstrual Period.

Diagnosis of pregnancy can be made through the following approaches: -

a) History taking
b) Physical examination
c) Laboratory investigations (e.g Pregnancy test)
d) Radiological tests (X-Ray, U/S)
e) Signs and symptoms.

This part of the lecture will discuss Signs and Symptoms of pregnancy in details. Each student ito read more on other approaches in diagnosing pregnancy.

Signs and symptoms of pregnancy.

Signs and symptoms of pregnancy are categorized into three groups, namely;

a) Possible signs (Presumptive signs)
b) Probable signs
c) Positive signs (Confirmatory signs)

a) Possible signs (Presumptive signs)

These are signs reported by the woman. They are signs that accompanies pregnancy but there are other causes to these signs other than pregnancy. These signs include: -

- Amenorrhea (4 weeks +) but may have other causes e.g. stress. Breastfeeding, menopause, anemia, contraceptive use, emotional stress.
- Morning sickness (4 – 14 weeks) especially nausea and vomiting from 6 weeks due to gastric upset related to HcG production. Differential diagnosis is indigestion, emotional stress or appendicitis.
- Frequency in micturition/Bladder irritability (6 – 12 weeks) due to increased vascularity and pressure on the bladder. Other than pregnancy this can be caused by Diabetes Mellitus ,Urinary tract infections or Urinary system tumors.
- Breast changes (3-4 weeks +) e.g. increased vascularity, primary areola become more pigmented and the Montgomery tubercles are more marked. However this can be caused by hormonal changes, contraceptive use among others.
- Skin changes at external genitalia and anal area become darker due to increased vascularity. At 12 weeks, abdomen may have striae and linea nigra. Skin changes in pregnancy is mainly due to increased production or sensitivity to adrenocortical hormone during pregnancy. Skin changes may not be definitive sign of pregnancy since it can occur due to Cushing's syndrome or in sudden weight loss. Other skin changes seen in pregnancy include: -Chloasma, Linea nigra, Striae gravidarum, stretch marks and spider telangiectasia.
- Quickening (16-20 weeks) – is a feeling of life within the uterus and occurs at about 16 weeks' gestation. This can also be caused by intestinal movement(Wind).
- Leucorrhea- This occurs mainly due to hyperplasia of vaginal epithelial cells and also due to cervical changes as a result of increased hormonal levels during pregnancy. It can also be as a result of vaginal infection or vaginal irritants.

b) Probable signs.

These are signs that are highly suggestive of pregnancy however they are not specific(definitive) to pregnancy.
They are signs obtained from physical examination.
These signs include:

- Enlargement of the uterus to become globular in shape. This sign might also be as a result of uterine tumours.
- Cervix become soft (**Hegar's or Goodell's sign or Ladin's sign**) – on bimanual examination, a firm cervix is felt softer body and compressible, softer isthmus at about 6 -8 weeks. Although this sign is associated with pregnancy, it may also occur in pelvic congestion.
- Darkening of the vaginal mucosa from 8 weeks. It reaches maximum intensity at the 16^{th} week and then persists throughout pregnancy. Also known as **Chadwick's sign or Jacquemier's sign** which is the dark purplish/bluish colour and congestion of the vulva and vaginal mucous membranes.
- Pulsation in fornices (**Osiander's sign**). When this is due to pregnancy, it occurs at around 8 weeks. However this can also be found in pelvic congestion.
- Immunological test in which the HcG secreted by the blastocyst is found in the woman's early morning urine/ blood specimen as early as 2 weeks gestation. HcG is also found in women with Choriocarcinoma and Hydatidiform mole hence making this test not specific to pregnancy.
- Internal ballotment may be done from 16 weeks but this may be difficult in primigravida and fat women.
- Ease in flexibility of the body of uterus (**McDonald's sign**).
- Irregular softening and enlargement of the uterine fundus (**Von Fernwald's sign).**
- Uterine contractions elicited by bimanual examination **(Palmer's sign).**
- **Piskacek's sign**-This refers to a palpable soft prominence in one of the location where uterine tubes meets the uterus (Cornua).
- Early bleeding that may be associated with implantation process **(Hartman's sign).** This is not a specific sign to pregnancy as it may be as a result of other causes such as tumors and infections of reproductive tract.
- Braxton hick's contraction (at 16 weeks)- irregular painless contractions that may be felt upon palpation. They prepare the uterus for labor as well as facilitating circulation of blood to and fro the placenta. However, these may be confused with intestinal movements.

c) Positive signs.

These are signs that confirms existence of pregnancy. It means there is no any other alternative diagnosis in presence of these signs. They include:

- Visualization of foetus through Ultrasound or X-ray
- Presence of foetal heart sounds through ultrasound or fetoscope
- Palpable or visible foetal movements

- Palpable foetal parts.

Estimation of gestational age

Gestational age can be estimated through: -

- Fundal Height-This is the measurement of foetal growth taken from the pubic bone to the top of the uterus. It is done in centimeters and centimeters are used then used to determine foetal growth in terms of weeks.
- Use of LMP to calculate EDD. This method is referred to as Naegele's Rule orNaegele's Formula. In this, you take the first day of normal last menstrual period, add 7 to the dates and 9 to the months. However, this method is based on a normal 28 days' menstrual cycle. For example, if the LMP is 12/01/2020 then EDD would be 19/10/2020.
- Use of radiological tests such as Ultrasound or X-rays.

Physiological Changes of Pregnancy and Minor disorders in pregnancy

Learning objectives

By the end of the lesson the student will be able to;

a) Describe the physiological changes that mimic or mask pregnancy.

b) Explain minor disorders associated with pregnancy and their management.

Introduction.

There are physiological biochemical and anatomical changes that occur during pregnancy. These changes may be systemic or local.

Most of the systemic changes return to pre pregnancy status 6 weeks after delivery. These changes occur during pregnancy to maintain a healthy environment for the fetus without compromising the mother's health as well as preparing for the process of delivery and care of the newborn. Understanding of the normal changes helps to understand coincidental disease processes.

Pregnancy is a critical period for both the woman and her unborn child. It is, therefore, very important for you to understand the physiological changes that occur during pregnancy in order to appreciate the effect they may have on the pregnant woman and to be able to manage her pregnancy appropriately.

This topic will discuss changes in the following systems and organs:

a) The reproductive organs
b) The cardiovascular system
c) The respiratory system
d) The renal system
e) The gastrointestinal system
f) Maternal weight
g) Musculoskeletal system
h) The skin

1. **Changes in the Reproductive Organs**

a) **Changes in the Uterus**

The uterine muscle fibre increases in size (hypertrophy) and in number (hyperplasia). The uterus continues to grow this way for the first 20 weeks, thereafter, it stretches to accommodate its contents. It increases in size from 60 grams - 900 grams.

By the eighth week of gestation it begins to generate small waves of contractions known as Braxton Hicks contractions, which are painless and continue throughout pregnancy. The blood supply to the uterus increases to keep pace with its growth and also to meet the needs of the placenta.

In early pregnancy the uterus becomes globular in shape to accommodate the fetal growth, liquor amnii and placental tissue. This causes pressure on other pelvic organs.

Uterus – Upper part fundus and body change in to upper uterine segment

b) **Changes in the Cervix**

The cervix acts as an effective barrier against infection. It also protects the pregnancy.

Under the influence of progesterone, the endo-cervical cells secrete mucus, which becomes a cervical plug known as operculum.

This plug provides protection from ascending infection. In late pregnancy, the cervix softens in response to increasing painless contractions.

Prostaglandins are thought to have a role in cervical softening in readiness for the onset of labour.

Lower part cervix and isthmus change in to lower uterine segment

c) **Changes in the Vagina**

Estrogen causes the vagina to become more elastic. These changes will allow dilatation during the second stage of labour to receive the descending fetal head.

There is an increased amount of the normal white vaginal discharge called leucorrhoea.

The vaginal PH becomes more acidic to provide protection to some micro-organisms but also increases susceptibility to others such as candida albicans.

2. **Changes in the Cardiovascular System**

a) **Position and Size of Heart**

As the uterus enlarges and the diaphragm becomes elevated the heart is displaced upward and somewhat to the left with rotation on its long axis, so that the apex beat is moved laterally.

Cardiac capacity increases by 70-80mL; this may be due to increased volume or hypertrophy of cardiac muscle. The size of the heart appears to increase by about 12%

b) **Cardiac Output**

Cardiac output increases approximately 40% during pregnancy, reaching its maximum at 20-24 weeks gestation and continuing at this level until term.

The increase in output can be as much as1.5L/min over the non pregnant level and is higher in multiple pregnancy.

The cardiac output increases from 5L to 7L/min by late pregnancy. This is caused by an increase in resting heart rate of about 15 beats per minute by the end of pregnancy and an increase in blood volume.

Cardiac output is very sensitive to changes in body position. This sensitivity increases with advancing gestation.

In a pregnant woman lying flat on her back, the uterus impinges upon the inferior vena cava, thereby decreasing venous return to the heart leading to supine hypotension syndrome.

Clients in advanced pregnancy are therefore discouraged from lying in this position.

c) **Blood Pressure**

Systemic blood pressure declines slightly during pregnancy. There is a little change in systolic blood pressure, but diastolic pressure is reduced (5-10mmHg) from about 12-26 weeks.

Diastolic pressure increases thereafter to pre-pregnancy levels by about 36 weeks. (It is important to know the pre-pregnancy diastolic BP in order to accurately diagnose hypertensive disease in pregnancy).

The elevated venous pressure returns toward normal if the woman lies in the lateral recumbent position.

The obstruction posed by the uterus on the inferior vena cava and the pressure of the fetal presenting part on the common iliac vein can result in decreased venous return to the heart. This decreases cardiac output, leads to a fall in blood pressure, and contributes to edema in the lower limbs

d) Venous pressure

There is no change in the upper body but venous return tends to increase in the lower extremities. There is decrease in venous return to the heart increases pressure and this results in edema.

e) **Peripheral Resistance.**

Peripheral resistance declines because of decreased blood pressure and increased cardiac output.

The red cell mass increases by about 18% by the end of the pregnancy. The plasma volume increases from the 10^{th} week of pregnancy and reaches its maximum level of 50% above non-pregnant values by the 32^{nd} to 34^{th} week, and maintains this until term.

As the plasma increase is greater than that of the red cell mass, there is hemo-dilution effect. This results in lowered hemoglobin level. This effect is referred to as physiological anemia. The mean acceptable HB level in pregnancy is 10 - 12 g/dl of blood.

f) **Effects of the Labour on the Cardiovascular System**

When a patient is in supine position, uterine contractions can cause a 25% increase in maternal cardiac output, a 15% decrease in heart rate, and a resultant 33% increase in stroke volume.

However when the laboring patient is in the lateral recumbent position, the hemodynamic parameters stabilize, with only a 7.6% increase in cardiac output, a 0.7% decrease in heart rate, and a 7.7% increase in stroke volume.

These significant differences are attributable to inferior vena cava occlusion caused by the gravid uterus.

During contractions, pulse pressure increases 26% in the supine position but only 6% in the lateral recumbent position.

Central venous pressure increases in direct relationship to the intensity of uterine contraction and increased intra-abdominal pressure.

Additionally, cardiopulmonary blood volume increases 300-500mL during contractions. At the time of delivery, hemodynamic alterations vary with the anesthetic used.

3. **Changes in the Respiratory System**

a) **Anatomic and Physiologic Changes**

Pregnancy produces anatomic and physiologic changes that affect respiratory performance. Early in pregnancy, capillary dilatation occurs throughout the respiratory tract, leading to engorgement of the nasopharynx, larynx, trachea and bronchi.

This causes the voice to change and makes breathing though the nose difficult. Respiratory infections and preeclampsia aggravate these symptoms. Chest X-rays reveal increased vascular makings in the lungs.

As the uterus enlarges, the diaphragm is elevated as much as 4cm, and the rib cage is displaced upward and widens, increasing the lower thoracic diameter by 2cm and the thoracic circumference by up to 6cm.

Elevation of the diaphragm does not impede its movement. Abdominal muscles have less tone and are less active during the pregnancy, causing respiration to be mainly diaphragmatic.

b) **Volumes and Capacities**

Alterations occurring in lung volumes and capacities during pregnancy include the following:

i. Dead volume increases owing to relaxation of the musculature of conducting airways.
ii. Tidal volume increases gradually (35-50%) as pregnancy progresses. Total lung capacity is reduced (4-5%) by the elevation of the diaphragm.
iii. Functional residual capacity, residual volume, and respiratory reserve volume all decrease by about 20%.
iv. Functional respiratory changes include a slight increase in respiratory rate, a 50% increase in minute ventilation, a 40% increase in tidal volume, and a progressive increase in oxygen consumption of up to 15-20% above non pregnant levels by term. With the increase in respiratory tidal volume associated with a normal respiratory rate, there is an increase in respiratory minute volume of approximately 26%.
v. Larger tidal volume and smaller residual volume cause increased alveolar ventilation (about 65%) during pregnancy. Inspiratory capacity increases by 5-10%.
vi. As the respiratory minute volume increases, "**hyperventilation of pregnancy** "occurs, causing a decrease in alveolar CO2.
vii. This decrease lowers the maternal blood CO2 tension; however alveolar oxygen tension is maintained within normal limits.
viii. Maternal hyperventilation is considered a protective measure that prevents the fetus from the exposure to excessive levels of CO2.

c) **Effects of Labour on the Pulmonary System**

There is a further decrease in functional residual capacity (FRC) during the early phase of each uterine contraction, resulting from redistribution of blood from the uterus to the central venous pool.

Because this decrease in functional residual capacity (FRC) occurs without a concomitant change in dead space, there is little residual dilution and, therefore, presumably more efficient gas exchange.

Capillary dilatation occurs in the respiratory route (Nasopharynx, larynx, trachea, bronchi) and this make breathing difficult through nose, enlarged Uterus pushes the diaphragm and the lungs as well.

d) Summary of Pulmonary changes

i. Changes to volume
ii. Tidal volume increase by 35-50%
iii. Residual volume decreased by 20%
iv. Expiratory reserve volume decrease by 20%
v. So increase Tidal volume and decrease Residual volume leading to increased alveolar ventilation by 65%.

4. **Changes in the Gastrointestinal Tract**

a) Introduction.

There is increased **salivation.** Women often experience changes in their sense of taste, leading to dietary changes and food cravings. **Craving for substances** such as bricks/soil is known as pica. Excessive secretion of saliva during pregnancy is called **ptyalism gravidarum.**

Progesterone relaxes the smooth muscles. Gastric emptying and peristalsis are reduced in order to maximize the absorption of nutrients. **Heartburn** is common and is associated with gastric reflux due to relaxation of the cardiac sphincter.

C**onstipation** is also common due to sluggish gut motility. **Nausea and vomiting** occur mainly during early pregnancy as a result of raised hormonal levels.

As the fetus and placenta grow and place increasing demands on the mother, phenomenal alterations in metabolism occur. The most obvious physical changes are **weight gain and altered body shape**.

Weight gain is due not only to the uterus and its contents but also to increase breast tissue, blood and water volume in the form of extra vascular and extracellular fluid.

Deposition of fat and protein and increased cellular water are added to the maternal stores.

The expected weight gain is approximately 2kg in the first 20 weeks followed by an average of 0.5 kg per week until term leading to 12 kg in total.

During normal pregnancy, approximately 1000g of weight gain is attributable to protein. Half of this is found in the fetus and the placenta, with the rest being distributed as uterine contractile protein, breast glandular tissue, plasma protein, and hemoglobin.

Total body fat increases during pregnancy, but the amount varies with total weight gain.

During the second half of pregnancy, plasma lipids increase, but triglycerides, cholesterol and lipoproteins decrease soon after delivery.

The ratio of low density lipoproteins to high density lipoproteins increases during pregnancy.

b) **Oral Cavity:**

Salivation may seem to increase due to difficulty in swallowing associated with nausea. This is prevalent mainly in the first trimester and should reduce with time.

Tooth decay during pregnancy, is not due to lack of calcium in the teeth. Indeed, dental calcium is stable and not mobilized during pregnancy as is bone calcium. If the pH of the oral cavity increases, tooth decay may occur. Pregnant women are therefore encouraged to maintain good oral hygiene.

The gums may become hypertrophic hyperaemic and friable; this maybe due to increased systemic estrogen. Vitamin C deficiency can also cause tenderness and bleeding of the gums. The gums should return to normal in the early puerperium

Gums becomes hypertrophic and hyperemic easily bleed (20 to increased systemic estrogen)

Gastrointestinal mobility May be reduced due to increased progesterone (w/c decreased the hormone motilin stimulate smooth muscles in GII) hence gastric emptying is slowed.

Similarly, in other part of GIT constipation (due to increased water absorption) Stomach Production of gastrin increase increased gastric volume and decreases PH, mucous production increased

c) **Gastrointestinal Motility**

Gastrointestinal motility may be reduced during pregnancy due to increased levels of progesterone, which in turn decrease the production of motilin, a hormonal peptide that is known to stimulate smooth muscle in the gut.

This leads to a feeling of bloatedness which is common among pregnant women. Transit time of food throughout the gastrointestinal tract may be so much slower that more water than normal is reabsorbed, leading to constipation.

d) **Stomach and esophagus**

Gastric production of hydrochloric acid may be increased leading to hyperacidity (heart burn).

Esophageal peristalsis is decreased, accompanied by gastric reflux because of the slower emptying time and dilatation or relaxation of the gastro- esophageal sphincter.

Gastric reflux is more prevalent in later pregnancy owing to elevation of the stomach by the enlarged uterus.

These alterations as well as lying in the supine position, make the use of anesthesia more hazardous because of the increased possibility of regurgitation and aspiration.

e) **Small and Large Bowel and Appendix**

During pregnancy, the large and small bowels are displaced upward and laterally, the appendix is displaced superiorly in the right flank area.

These organs return to the normal positions in the early puerperium. As noted previously, motility and gastrointestinal tone are decreased.

f) **Gallbladder**

Gallbladder function is also altered during pregnancy because of the hypotonia of the smooth muscle wall.

Emptying time is slowed and often incomplete. Progesterone decreased motility leading to decreased empting time of bile hence causing stasis predisposing pregnant women to stone formation and infection.

Bile can become thick, and bile stasis may lead to gallstone formation.

g) **Liver**

There are no apparent morphologic changes in the liver during normal pregnancy, but there are functional alterations.

Serum alkaline phosphatase activity can double, probably because of increased placental alkaline phosphatase isoenzymes.

Thus, a decrease in the albumin/globulin ratio occurs normally in pregnancy. This needs to be taken into consideration when interpreting LFT results.

5. **Kidneys and Urinary Tract**

Progesterone relaxes the walls of the ureters and allows dilation and kinking. This tends to result in a slowing down or stasis of urinary flow, making infection a greater possibility.

a) **Renal Dilatation.**

During pregnancy, each kidney increases in length by 1-1,5cm, with a concomitant increase in weight. The renal pelvis usually dilates. The ureters dilate, elongate, widen, and become more curved. Thus there is an increase in urinary stasis; this may lead to infection and may make tests of renal function difficult to interpret.

b) **Renal Function**

The glomerular filtration rate (GFR) increases during pregnancy by about 50% .The renal plasma flow rate increases by as much as 25-50%. Urinary flow and sodium excretion rates in late pregnancy can be altered by posture, being twice as great in the lateral recumbent position as in the supine position.

Even though the GFR increases dramatically during pregnancy, the volume of the urine passed each day does not increase. Consequently, the serum urea and creatinine levels are reduced.

The increase in GFR coupled with the impairment of tubular reabsorption capacity for filtered glucose leads to glycosuria. Increased levels of urinary glucose also contribute to increased susceptibility to urinary tract infection (UTI).

Normally there is little change in Proteinuria during pregnancy; and therefore if more than 500mg/24h is lost, a disease process should be suspected e.g. pre-eclampsia/ eclampsia.

Renal function Change occur due to increased maternal and placental hormones (ACTH, ADH, cortisole, etc.) and increase in plasma volume.

Glomerular Filtration Rate increase by 50% (begins early and last up to term)

Renal blood flow rate increase by 20-25% (early to midtrimester) after the end of 2nd trimester remain constant.

Urine volume dose not increase although glomerular filtration rate increase because of reabsorption.

Creatinine and BUN decrease because of increased clearance rate

Proteinuria shows little changes during pregnancy.

c) **Water Retention**

Fluid retention, swelling or 'edema' affects about 65% of healthy pregnant women with a normal blood pressure.

While it can occur at any time in the pregnancy, it more commonly happens in the last 3 months of the pregnancy.

This is because by about 32 weeks, the blood circulating in the woman's body has increased by up to 50%.

It typically involves the lower extremities but occasionally appears as swelling or puffiness in the face or hands.

d) **Edema.**

The most common cause of edema in pregnancy is Physiologic edema. This is due to an increase in the total amount of body fluid and a lower concentration of protein to keep the fluid in the blood vessels.

It may also result from hormone-induced sodium retention.

Pedal edema may also occur when the enlarged uterus intermittently compresses the inferior vena cava during recumbency, obstructing outflow from both femoral veins.

Physiological edema is a diagnosis of exclusion. (Physical examination aims to rule out the pathologic causes). Physiologic edema tends to worsen during the day especially when the patient is ambulant.

It is reduced by lying in the left lateral decubitus position, elevating the lower extremities, and using compression stockings. Pathological edema on the other hand, usually persists, even after elevating the feet.

Pathological causes of edema are less common but often dangerous. They include deep venous thrombosis (DVT), preeclampsia, renal disease and cardiac disease in pregnancy. Extensive, cellulitis, which usually causes focal erythema, may resemble general edema.

e) **Bladder**

As the uterus enlarges; the urinary bladder is displaced upward and is flattened in the anterior-posterior diameter.

Bladder vascularity increases and muscle tone decreases, thereby increasing its capacity up to 1500ml.

Pressure from the uterus leads to increase in urinary frequency. This effect increases as pregnancy advances.

6. **Hematologic System**

a) **Blood Volume** `

The blood volume increases progressively until term by about 45-50% and is higher in multiple pregnancies.

The reason for increase in blood volume are:

i. More blood is required for extra blood flow to the uterus.
ii. Need for extra metabolic needs of fetus and the mother.
iii. Increased perfusion of other organs, especially kidneys.
iv. The increased volume also compensates for maternal blood loss during delivery.

b) **Red Blood Cells**

The red blood cell mass increases by about 33%, however the plasma volume increases earlier and faster than red blood cell volume. This leads to physiologic anemia in pregnancy.

The hematocrit (PCV) then stabilizes or may increase slightly near term.

c) **Iron**

With the increase in red blood cells, the need for iron for the production of hemoglobin naturally increases. If supplemental iron is not added to the diet, iron deficiency anemia will result.

Maternal requirements can reach 5-6mg/d in the latter half of pregnancy. If iron is not readily available, the fetus uses iron from maternal stores.

Thus, the production of fetal hemoglobin is usually adequate even if the mother is severely iron deficient; and therefore anemia in the newborn is rarely a problem.

Instead, maternal iron deficiency more commonly may cause preterm labour and late spontaneous abortion, increasing the incidence of fetal wastage and maternal morbidity.

d) **White Blood Cells**

The total blood leukocyte counts increases during pregnancy from a pre-pregnancy level of 4300-4500/ml to 5000-12000/ml in the last trimester.

The polymorphonuclear leucocytes are the main contributors to this increase.

Lymphocyte and monocyte numbers stay essentially the same throughout pregnancy.

This should be taken into account when interpreting results of WBC counts in pregnancy.

e) **Clotting Factors**

During pregnancy, levels of several essential coagulation factors increase. There are marked increases in fibrinogen and factor VIII. Factors VII, IX, X, and XII also increased but to a lesser extent.

There is a decrease in factors- XI and XIII

Fibrinolytic activity is depressed during pregnancy and labour, although the precise mechanism is unknown.

Plasminogen levels increase concomitantly with fibrinogens levels, causing equilibrium of clotting and lysing activity.

Understanding these physiologic changes is necessary to manage two of the more serious problems of pregnancy – (that is hemorrhage and thromboembolic disease both caused by disorders in the mechanism of hemostasis).

7. Changes in the Breast

Breast increases in size with enlargement of the nipple and increased vascularity and pigmentation of areola.

8. Change in Skin

Hyperpigmentation over some part of the body Face (forehead, cheek) known as chloasma
In the abdomen the sub-umbilical midline dark purplish pigmentation known as linea nigra
There is development of Stretch marks called Striae gravidarum
There is also Enlargement of abdomen as a result of stretch on collagen fibers of the skin and effect of ACTH.

MINOR DISORDERS OF PREGNANCY

Minor disorders are only disorders that occur during pregnancy and are not life threatening.

1. Digestive system

a) **Nausea and vomiting**

This presents between 4 and 12 weeks' gestation. Hormonal influences are listed as the most likely causes this are HCG, oestrogen and progesterone. It is usually occurring in the morning but can occur any time during the day, aggravated by smelling of food.

Management:

i. Reassure the mother
ii. Small frequent meals (dry meals)
iii. Reduce fatty and fried containing foods.
iv. Rest
v. Eat small meals frequently, every two to three hours; do not skip meals; avoid hunger.
vi. Have a snack before bedtime or during the night.
vii. Try eating a piece of bread or a few crackers before getting up in the morning to quell nausea.
viii. Get out of bed slowly; avoid sudden movements.
ix. Avoid high fat and fried foods; eat lower-fat meats, poultry and fish; use skim or low-fat milk products; try carbohydrate-rich foods such as fruit, fruit juice, breads, cereals, rice, potatoes.
x. Drink fluids between rather than with meals to avoid stomach fullness at meal times.
xi. Avoid strong food smells and cooking odours by eating cold foods, opening windows to freshen the air, avoiding coffee, garlic and other spices and having others cook when possible.
xii. Avoid highly seasoned foods.
xiii. Avoid brushing your teeth immediately after eating; avoid brushing your tongue.
xiv. Keep well rested; avoid fatigue.
xv. Avoid cigarette smoking**.**

b) **Heartburn**:

It is a burning sensation in the mid chest region. Progesterone relaxes the cardiac sphincter of the stomach and allows reflex of gastric contents into esophagus. Heart burn is most troublesome at 30-40 weeks gestation because at this stage is under pressure from the growing uterus.
Relief from heartburn is often achieved through simple dietary and lifestyle changes.

Management:

i. Eat small, lower-fat meals frequently. Dietary fat lowers the oesophageal sphincter tone, already reduced or relaxed by the hormonal changes associated with pregnancy.
ii. Eat slowly, chew food well, avoid tension while eating
iii. Drink fluids between meals rather than with meals to avoid stomach fullness
iv. Avoid spicy foods that seem to exacerbate heartburn
v. Avoid lying down for at least one to two hours after eating to minimize reflux
vi. Elevate the head of the bed
vii. Avoid bending and stooping after eating
viii. Avoid eating and drinking, except for water, before bedtime
ix. Wear loose-fitting clothing
x. Do not take antacids without consulting a physician

c) Excessive Salivation (pytalism)

Occurs from the 8th week of gestation and is thought to be caused by hormones of pregnancy

d) **Pica**:

This is the term used when mother craves certain foods of unnatural substances such as coal, soil...etc. The cause is unknown but hormones and changes in metabolism are blamed.

Management:

i. Seek medical advice if the substance craved is potentially harmful to the unborn baby.
ii. Ask pregnant women if they have cravings for non-food items such as dirt or clay.
iii. Advice women you suspect may be eating non-food substances of the potential risks.
iv. If the behaviour persists, monitor iron status, maternal health and foetal development carefully.

e) Constipation

Constipation affects 11 to 38 percent of pregnant women. Constipation during pregnancy is linked to several physiological changes associated with pregnancy as well as an eating pattern low in fibre and liquids.
Hormonal changes relax the gastrointestinal tract, decreasing motility and increasing the transit time of waste through the colon.
Increases in progesterone levels also promote increased absorption of water from the colon, a factor linked to constipation.
The enlarging uterus contributes to constipation by putting pressure on the colon, sometimes displacing it and making bowel movements more difficult. Decreased physical activity, extra bed

rest and iron supplements may also contribute to this common discomfort. Dietary and lifestyle changes usually correct it.

Management:

i. Increase the intake of water, fresh fruit, vegetables and ruphages in the diet
ii. Exercise is helpful especially walking
iii. Increase fibre intake by eating more whole grain breads and cereals; vegetables; and fruit and legumes such as beans, split peas and lentils.
iv. Drink between 8 and 12 cups of fluid every day in the form of water, milk and juice. Warm or hot fluids may be particularly helpful.
v. Maintain an active lifestyle, for example, by walking or swimming regularly.
vi. Avoid all laxatives unless one is recommended by a physician. Some types of laxatives are contraindicated during pregnancy.

f) Lack of appetite

This is a common condition in pregnancy which can lead to inadequate intake of food at a time of increased nutrient need.

Management:

i. Eat small frequent meals spaced throughout the day (5-6 meals per day)
ii. Schedule a regular eating time
iii. Eat protein from animal or plant source with snacks and meals whenever possible
iv. Drink plenty of liquids, preferable in between meals
v. Take walks before meals to stimulate appetite
vi. Choose and prepare food that look and smell good for you
vii. Use spices such as onions, garlic, cinnamon, and ginger to stimulate appetite, improve flavour and digestion

2. Musculoskeletal system

a) Backache

The hormones sometime soften the segments to such a degree that some support is needed.

Management:

i. Advice the mother to sleep on firm bed.
ii. Advice support mechanisms of the back.

b) Muscle cramps

The cause of leg cramps in pregnancy is unknown, it may be due to ischaemia or results from changes in PH or electrolyte status

Management

i. Advise to dorsoflex the foot, hold the knees straight and then stretches the calf muscles by pulling the foot upwards while in the sitting position
ii. Alternatively standing firmly on the affected leg and striding forward with the other leg will stretch the calf muscles

3. Circulatory system

a) Fainting:

In early pregnancy fainting may be due to the vasodilation occuring under the influence of progesterone before there has been a compensatory increase in blood volume. The weight of the uterine contents presses on the inferior venacava and slows the return of blood to the heart.

Management:

i. Avoid long period of standing
ii. Sit or lie down when she feels slight dizziness
iii. She would be wise not to lie on her back except during abdominal examination

b) Varicosities

Progesterone relaxes the smooth muscles of the veins and result in sluggish circulation. The valves of the dilated veins become insufficient and varicosities result. It occurs in legs, anus (hemorrhoids) and vulva.

Management:

i. Exercising the calf muscles by rising on the toes
ii. Elevate the leg and rest on the table
iii. Support thighs and legs
iv. Anal region: Avoid constipation and advise adequate fluid intake.
v. Vulva: Sanitary pad give support for vulva varicosities

4. The nervous system

a) Carpal tunnel syndrome

The mother complains of numbness 'pins and needles' in her fingers and hands, it usually happens in the morning but it can occur at any time of the day, it is caused by fluid retention which creates edema and pressure of the medial nerve

Management

i. Wearing a splint at night with hand resting high on 2 or 3 pillows may bring relief
ii. Reassure her that the condition will resolve after delivery
iii. Sometimes the doctor may prescribe antidiuretics but the conservative approach is more favored

b) Insomnia

Inability to fall asleep or to remain asleep for an adequate length of time

Although it is grouped under minor discomfort, it must never be dismissed lightly, it may be caused by nocturia and the discomfort in bed due to the growing fetus, the increased blood supply to the uterus on lying down sometimes causes the baby to move a lot

Management

i. Reassurance and advice to go to bed early with hope that the fetus being active earlier and sleep after sometime
ii. Talk with the woman about fear and anxiety of pregnancy
iii. Encourage those who can, to sleep in the afternoon when sleep can easily come

5. Genitourinary system

a) Frequency of micturition

Occurs in early weeks of pregnancy when the growing fetus is still situated within the pelvis and competes for space reuired by the bladder, later the problem becomes apparent when the fetal head has entered the pelvis and reduces the space that is available

Management

i. After excluding other causes of bladder irritability e.g infection, the midwife need to reassure the mother that it is a short time problem that will be over after 12 weeks, for late pregnancy it will be over after birth

b) Leucorrhea

It is a term used for the increased non-irritant vaginal discharge in pregnancy

Management

i. After excluding infections e.g thrush or trichomonalis then explain to the mother that it is normal, encourage her that she washes her vulva with plain water daily, she should wear cotton under pants and avoid tights.

NB:

Minor disorders can develop into a more serious complication of pregnancy. In case these disorders deteriorate into more serious disorders **immediate** and prompt actions should be commenced. (Review on Danger signals of pregnancy as discussed in our previous lessons)

Antenatal care

Definition of antenatal care

Antenatal care (ANC) is health care given to a pregnant woman from the time conception is confirmed to the onset of labour.

The midwife should provide a personalized care approach that is centered on the woman's needs by sharing information with the woman to help her make informed choices.

Aim of antenatal care

The main aim of antenatal care is to monitor progress of pregnancy in order to ensure the mother reaches the end of pregnancy both physically and psychologically healthy and that she delivers a healthy baby.

Antenatal care furthers ensures that good obstetrical outcomes are achieved for the mother and baby and prevent any complications that may occur in pregnancy, labour, delivery and the post-partum period

A quality antenatal care should entail: -

- Accurate Diagnosis of pregnancy.
- Regular blood pressure checks, testing for oedema, and urine examination

- Regular abdominal examination.
- The recognition of high risk cases and their referral for special mothers
- Immunization against tetanus to both the mother and unborn baby
- Treating of minor complications during pregnancy.
- Health education eg. On nutrition, ANC visits, danger signs etc

During Antenatal clinic visits, the midwife should: -

- ✓ Ensure that the mother understands the benefits Antenatal Care.
- ✓ Educate the mother on how to look after herself and her baby (diet, hygiene, e.t.c)
- ✓ Prepare the mother psychologically and physically for delivery.
- ✓ Provide prophylactic treatment against anemia and vaccination against tetanus.
- ✓ Identify mothers high risk women who might have problems during pregnancy or labour, and correct the abnormalities or refer to hospital for management of the pregnancy or delivery.
- ✓ Help a mother to draw an Individual Birth Plan (IBP).

The midwife should also be aware that successful outcomes of pregnancy depends on various factors such as: -

- Reproductive efficiency of the mother.
- The parity of the mother
- The age of the mother
- Physique and stature of the mother
- General health state of the mother
- Quality of obstetric care.

The midwife should therefore be aware of these factors and should evaluate how they might influence the outcome of pregnancy.

FANC: Focused antenatal care

Definition of FANC.

Focused Antenatal Care is a personalized(individualized) care provided to a pregnant woman which emphasizes on woman's overall health, her preparedness for childbirth and her readiness for complications.

Focused Antenatal Care (or targeted Antenatal care) can also refer to a minimum number of four comprehensive personalized antenatal visits, each of which has specific items of client assessment,

education and care to ensure prevention or early detection and prompt management of complications.

FANC categorizes pregnant women into two groups, namely;

a) Those eligible to receive routine antenatal care (Basic component).
b) Those who need special care based on the specific pregnancy related risk factor (High risk pregnancies) such as previous history of still birth, spontaneous miscarriage, low birth weight or macrocosmic baby, hypertension in pregnancy or current pregnancy factors such as multiple pregnancy, Rh^- mothers, pelvic abnormalities, per vaginal bleeding and mothers with medical conditions.

Focused Antenatal care should be:

- Timely
- Friendly
- Simple
- Safe
- Accessible.

Care provider should be aware that women are more likely to seek and return for services if they feel cared for and respected. This therefore requires that care providers should use excellent interpersonal skills and should respect clients' right to dignity, privacy, confidentiality, full and accurate information.

Aim of Focused Antenatal Care.

The aim of Focused Antenatal Care is to achieve a good outcome for the mother and baby and prevent any complications that may occur in pregnancy, labour, delivery and post-partum.

Objectives of focused antenatal(FANC).

Objectives of FANC are: -

i. Early detection and treatment of problems
ii. Prevention of complications using safe, simple and cost-effective interventions
iii. Birth preparedness and complication readiness
iv. Health promotion using health messages and counseling
v. Provision of care by a skilled attendant

Early detection and treatment of problems.

- Health care providers should aim at detecting and preventing health problems such as severe anemia, per vaginal bleeding, malaria, TB, STIs, Decreased or absent foetal movement, etc.
- Every pregnancy should be considered as a risky pregnancy and every pregnant woman should be prepared for the possibility of complications.

Prevention of complications using safe, simple and cost-effective interventions.

- Service providers should ensure prevention of complications. This can be achieved through preventive services such as:
  - ✓ Tetanus Toxoid to prevent maternal and neonatal tetanus
  - ✓ Iron/Folate(IFAS) supplementation to prevent anemia and foetal malformations.
  - ✓ Use of IPT and LLITNs to prevent malaria/anemia.
  - ✓ Environmental hygiene to prevent intestinal worms.
  - ✓ Use of Mebendazole after first trimester to prevent intestinal worms
  - ✓ Cessation of smoking and drug use during pregnancy.
  - ✓ Proper nutrition during pregnancy.
  - ✓ Elimination of mother to child transmission of HIV(eMTCT).

National guidelines for Tetanus Toxoid

Dose of TT	When to give
1	At first contact or as early as possible in pregnancy
2	At least 4 weeks after TT1
3	At least 6 months after TT2 or during subsequent pregnancy
4	At least 1 year after TT3 or during subsequent pregnancy
5	At least 1 year after TT4 or during subsequent pregnancy

Birth preparedness and complication readiness.

- Health care provider need to discuss components of an individualized birth plan(IBP) with the woman and assist her to draw one. Components of Individualized birth plan includes: -
  - ✓ Place of birth

- ✓ Emergency funds
- ✓ Birth companion
- ✓ Transportation
- ✓ Decision maker
- ✓ Skilled attendant
- ✓ Blood donor
- ✓ Knowledge on danger signs
- ✓ Accurate calculation of EDD

Health promotion using health messages and counseling.

- Service provider should use health messages to promote the following: -
  - ✓ Proper nutrition
  - ✓ Rest and hygiene
  - ✓ Use of IPT and LLITNs
  - ✓ Drug compliance
  - ✓ Safe sex
  - ✓ Family planning and spacing of pregnancy.
  - ✓ Early and exclusive breast feeding.
  - ✓ Newborn care.

Provision of care by a skilled attendant.

- A skilled birth attendant refers to a health professional (such as midwife, doctor, clinical officer or a nurse) who has been educated and trained to proficiency in the skills needed to manage pregnancies, child birth and immediate post-natal period and should be able to identify, manage and refer women and newborns with complications.
- FANC provides an opportunity to increase skilled care.

Element of Focused Antenatal Care(FANC).

Elements (Components) of FANC are: -

a) History taking
b) Physical examination
c) Health promotion (Through health education and counselling)
d) Provision of preventive services
e) Early detection and treatment of problems
f) Birth preparedness and emergency preparedness.

g) Counselling on danger signs
h) Skilled birth attendant
i) ANC profile
j) Partner(Male) involvement.

FANC Schedule of Visits

- It is recommended that the pregnant woman should attend a **minimum of four** comprehensive personalized antenatal visits spread out during the entire pregnancy during which specific focused activities are carried out. The FANC schedule is as follows: -
    a) **First** visit less than 16 weeks
    b) **Second** visit 16 - 28 weeks
    c) **Third** visit 28-32 weeks
    d) **Fourth** visit 32 – 40 weeks
- ***NB: Depending on individual need, some women will require additional visits.***

The first visit

- The first FANC visit should take place as early as possible, if possible during the first trimester. This visit provides the midwife with an opportunity to obtain baseline data such as weight, blood pressure etc. These baseline data are important because they forms a basis for comparison during subsequent visits.

Specific activities of the first FANC visit include:

- Registration
- Height and weight measurement
- History taking
- Physical examination
- Laboratory examination (ANC Profile)
- Management of complaints
- Immunization
- Health Education
- Advice on Individualized Birth Plan

a) Obtain information on:

Personal history

- Name
- Age (date of birth)
- Physical address and telephone number
- Marital status
- Educational level: primary, secondary, university
- Economic resources: employed? Type of work, position of patient and husband/guardian
- Tobacco use (smoking or chewing habit) or use of other harmful substances?

History of present (Current)pregnancy /Present obstetric history.

- Obtain information on date of last menstrual period (LMP). Focus on the certainty of dates, that is, by regularity, accuracy of recall and other relevant information including contraceptive history.
- Accurately determine the expected date of delivery(EDD) based on LMP and all other relevant information. EDD can be calculated by adding seven days to the first day of the last normal menstrual period and subtracting three months from that month. For example, if her last period started on 18th June, 18 plus 7 gives you 25. Then June minus three months, (6-3) will give March. So the EDD is March 25th of the following year.
- Obtain information on quickening if applicable.
- Check for any associated complication (pain, vaginal bleeding, calf muscle pain)
- Social habits: smoking/chewing tobacco, alcohol, drugs (frequency and quantity)

Previous Obstetric history.

- Number of previous pregnancies (Gravida and Parity)
- Date (month, year) and outcome of each event (live birth, stillbirth, neonatal death, abortion, ectopic, hydatidiform mole)
- Number of ANC attendance.
- Type of deliveries
- Duration of labour.
- Birth weight.
- Sex
- Puerperium
- Specify type and gestation of any abortion, and management if possible (MVA, D&C)

- Birth weight of previous pregnancies (if known)
- Periods of exclusive breast-feeding: when? For how long?
- Special maternal complications and events in previous pregnancies; Specify which pregnancy, validate by records (if possible), Recurrent early abortion, Induced abortion and any associated complications, Thrombosis, Embolus, Breech Or Transverse Presentation. Take history on any **Obstetrical operations:** Caesarean section (indication, if known) , Forceps or vacuum extraction , Manual removal of the placenta ,Destructive procedures (craniotomy, decapitation). Also obtain information on: twins pregnancy, low birth weight: <2500g , intrauterine growth restriction ,Rhesus-antibody (hydrops) ,malformed or chromosomally abnormal child ,macrocosmic (>4500g) newborn ,resuscitation or other treatment of newborn ,perinatal, neonatal or infant death (also: later death).

Medical-Surgical history

- Specific diseases and conditions:

✓ tuberculosis, heart disease, chronic renal disease, epilepsy, diabetes mellitus

✓ RTIs

✓ HIV status, if known

✓ Other specific conditions depending on prevalence in the region, e.g. hepatitis, malaria, sickle cell trait

✓ Operations other than caesarean section

✓ Blood transfusions

✓ Rhesus D negative antibodies

✓ Current use of medicines: specify

✓ Period of infertility: when? duration, cause(s)

- Any other diseases, past or chronic; allergy

Gynecological History.

- Obtain information relating to menarche, menstrual history, gynecological disorders, reproductive tract infections etc

Family Planning History.

- Inquire on previous use of contraception if any, frequency, duration of use, reason for stopping etc

Family History.

- On this part, obtain information on any known hereditary condition in the family, significant illness in the family such as diabetes.

Social History

- Obtain data on occupation, diet, exercise, smoking, alcohol, marital status, level of education etc

b) Perform physical examination

- A thorough examination is made at the first visit. This is divided into a general examination and an obstetric examination.
- The aims of physical examination on a pregnant woman is to:-
    a) To diagnose pregnancy
    b) To identify high risk pregnancy
    c) To give advice for pregnant mother
- The general examination should include:
    - ✓ General appearance, namely the nutritional status, whether weak or sick looking. Note the gait and if she walks with a limp.
    - ✓ Height, noting that any woman below 150cms in height is likely to have cephalo-pelvic disproportion.
    - ✓ Weight, that is, a pregnant woman on average gains 2kg every month. The total weight gain by the end of pregnancy is about 10-20kg. Excessive weight gain indicates accumulation of fluid in the tissues (oedema). Lack of increase in weight or loss may mean malnutrition. Obesity may lead to an increased risk of gestational diabetes.
    - ✓ Blood pressure, which is taken in order to ascertain the normal and provide a baseline for comparison. A pressure of 140/90mm/Hg at booking is indicative of hypertension and could cause damage to the placenta.
    - ✓ Pulse, temperature
    - ✓ Signs of anaemia in conjunctiva, hands and tongue pale complexion, fingernails, conjunctiva, oral mucosa, tip of tongue and shortness of breath
    - ✓ Check for oedema of face, hands and ankles
    - ✓ Observe type of breathing and chest generally for abnormalities
    - ✓ FGM status: - If type III discuss the possibility of de-infibulation (opening up either antenatal or during labour)
    - ✓ Varicosities, warts, discharge

Breast Examination

- Palpate gently with the flat of the hand to feel for any lumps.
- Check if the nipple is protractile.
- Educate the woman on how to examine the breasts by herself.
- For further reference on breast examination, refer to Nursing Council Procedure Mannual

Abdominal Examination.

An abdominal examination on a pregnant woman aims at:

1. Observing for signs of pregnancy
2. Assessing foetal size and growth
3. Assessing foetal health
4. Diagnosing the location of foetal parts
5. Detecting any deviation from normal

Steps for Abdominal Examination

1. Inspection
2. Palpation
3. Auscultation

Inspection (5s)

On inspection, you can apply the approach of 5s, that is:

a) Shape: -
   - Note contour -is it round, oval, irregular or pendulous?
   - Longtudinal, ovoid in primigravida
   - Rround in multipara.
   - Broad in transuerse lie.

b) **Size:-** Should correspond with the supposed period of gestation

c) **Skin: -** The dark line of pigmentation which is linea nigra is seen any rash?

d) Striae gravidarum

e) **Scar -** Any operation scar(c/s)

Palpation:

On palpation, use the Leopold's Maneuver. There are four steps in Leopold's Maneuver

1. **Fundal height and fundal palpation (1st Leopoled Maneuver). During this examine:**

a) Fundal Height

- ✓ At about 12 to 14 weeks of pregnancy, the uterus is palpated above the symphysis pubis as a firm globular sphere; it reaches the umbilicus at 20 to 22 weeks, the xiphoidal process at 36 weeks, and then often returns to about 4 cm below the xiphoid due to "**lightening"** at 40 weeks.
- ✓ **Method:** Measure distance of fundus with points on abdomen and assessing the fundal height in finger breadth below the xiphisternum or measure by centimeter.

b) Fundal Palpation

- ✓ **Purpose-** To know lie and presentation**.**
- ✓ **Method: -** Use 2 hands using palms of hands palpate on either side of the fundus. Fingers held close together, palpate the upper pole of then uterus and feel that as it is hard or soft or irregular.

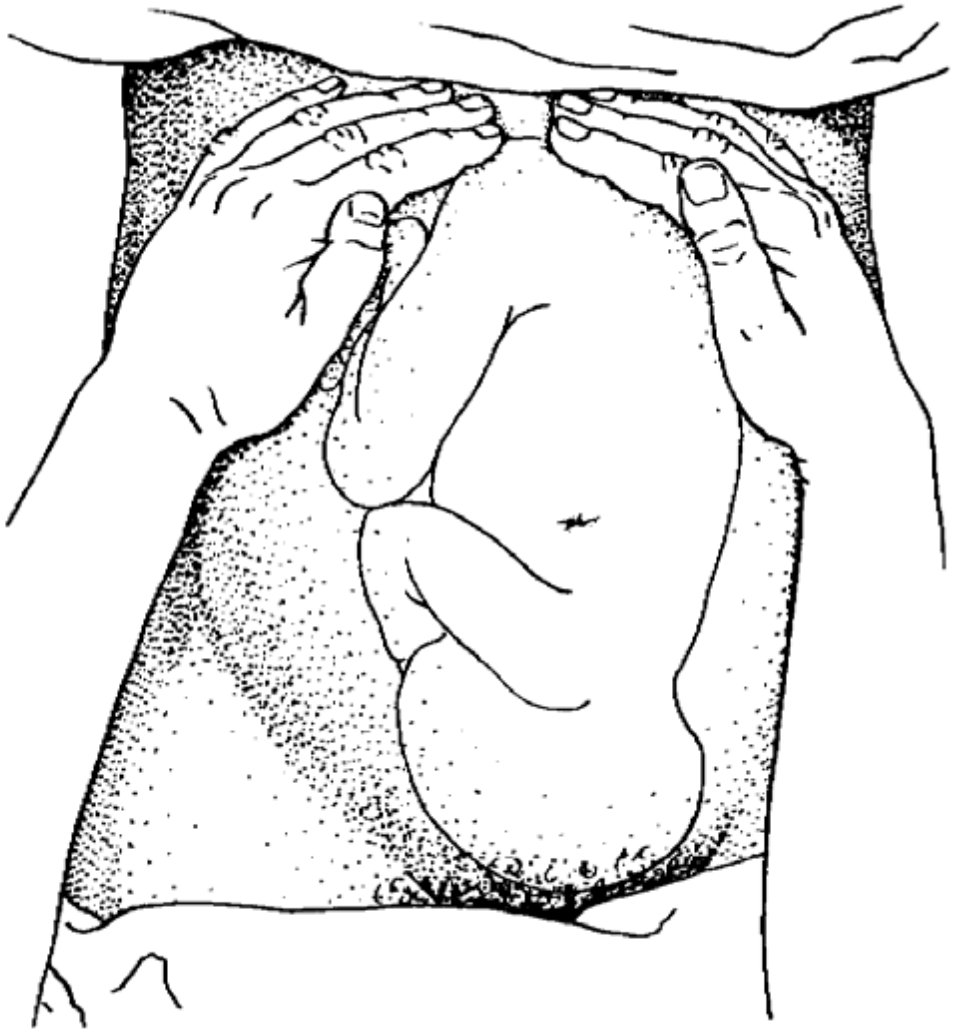


Figure: Fundal palpation

2. **Lateral Palpation: (2nd Leopled maneuver)**
   - ✓ **Purpose-**To know lie and position
   - ✓ **Method: -** always facing the mother, fix the hand on the center of the abdomen, fix the right hand and palpate with left hand and vice versa. Note the regularity; the regular side is the back

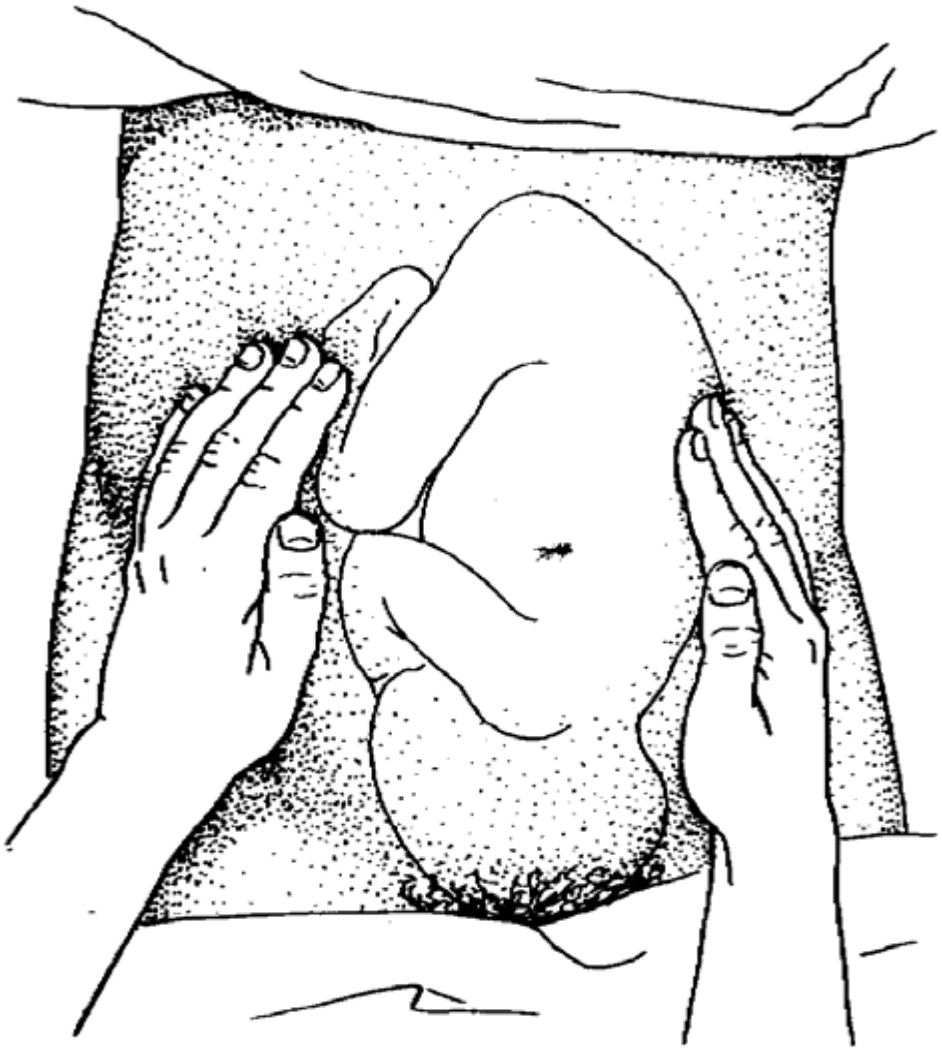


Figure : Lateral palpation.

3. **Deep pelvic Palpation: (3rd Leopoled Maneuver)**
   - ✓ **Purpose** -To Know Presentation & Attitude
   - ✓ **Method: -** Feel presenting part, is it hard or soft while
   - ✓ Palpating for the presenting part feel for eminences on back side.

Figure : Deep pelvic palpation

4. **Pawlick's Grip: (4th Leopard Maneuver)**
   - ✓ The lower pole of the uterus is grasped with the right hand the midwife facing the women's head, feel the occiput and sinciput, note which is lower.

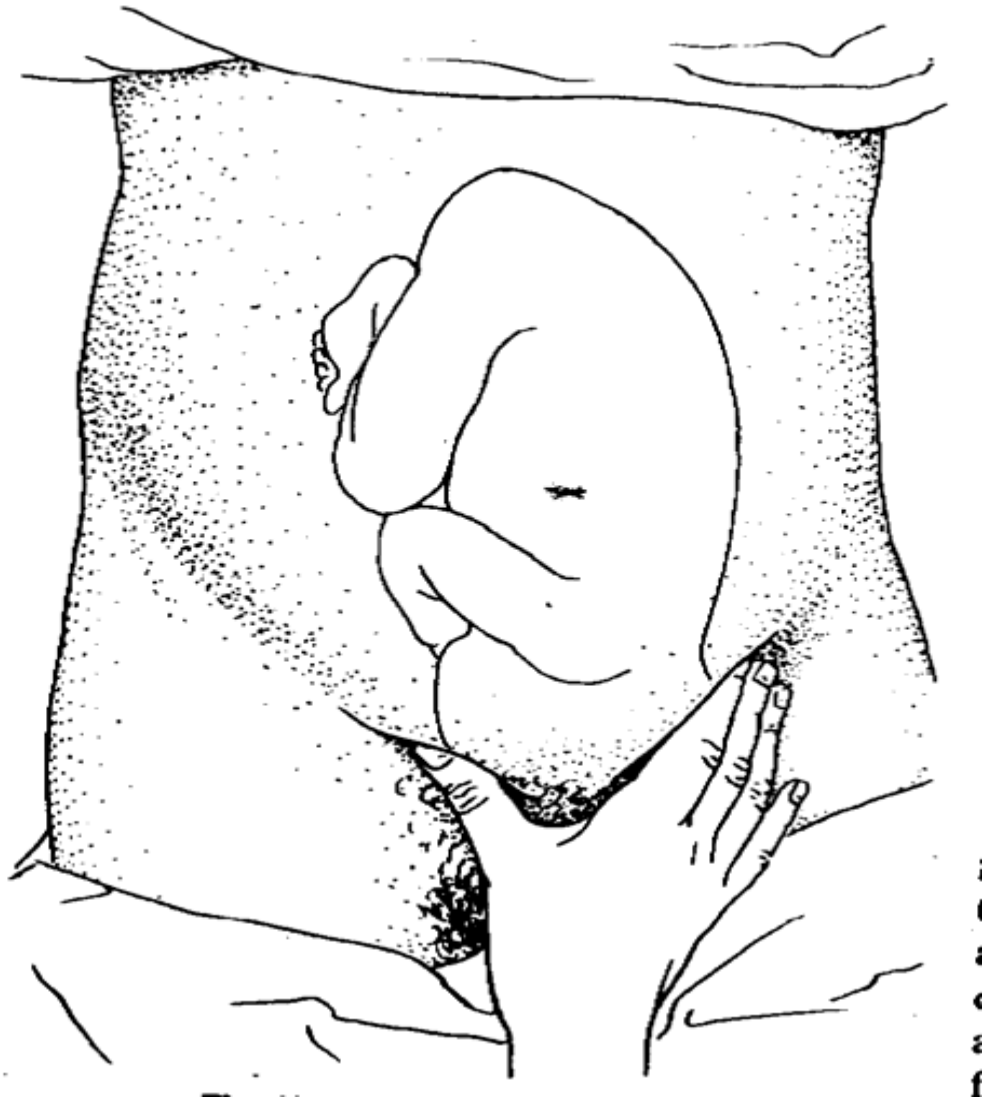


Figure : Pwlick's grip

Auscultation

On auscultation:-

- ✓ Check Fetal heart, rate and rhythm, count for
- ✓ one minute if regular.
- ✓ Method: Use Pinards stethoscope. Hand should not touch it while listening. Ear must be in close from contact with stethoscope,

Remember that during abdominal examination: -

- ✓ The client is asked to empty her bladder and then to lie on her back on a couch with the arms by her sides.
- ✓ Inspect the abdomen for the shape, size, scars and foetal movements. Any abnormality detected is referred for further investigations.
- ✓ Estimate the height of the fundus and compare it with the calculated EDD. This helps you to assess foetal growth and detect any deviations from the normal.
- ✓ Check for varicosities at the back of the leg. Ask the woman to remove any tight clothing at the leg. At this time, it is also important to check for phlebitis by looking for any reddened areas.
- ✓ Palpate the sides of the abdomen to locate the foetal back in order to determine the position. You do this by facing the patient and then supporting the uterus with your right hand. Keep pushing the foetus with your left hand towards the right. Reverse the order to feel the left side of the uterus.
- ✓ Palpate the lower pole of the uterus, just above the pelvic brim.
- ✓ Ask the mother to bend her knees slightly in order to relax the abdominal muscles and ask her to breath steadily with her mouth open.
- ✓ Facing the foot of the bed, mark the brim of the pelvis with your hands and cup what presents between them. If the head is presenting, a smooth surface will be felt.
- ✓ If you do not find the head in the pelvic brim or at the fundus, suspect a transverse lie. This will be significant only after the 36th week of gestation.
- ✓ The foetal heart sounds are listened to last, so as to assess the foetal wellbeing. The Pinard's foetal stethoscope is commonly used to hear the foetal heart.
- ✓ As you perform the physical examination, talk to the mother and check her facial reaction as you palpate the abdomen. When you complete the procedure reassure the mother.

Findings of Abdominal Examinations

All these are recorded upon completion of the exercise and they include:

- Gestational age, which is estimated as per the size of the fundus.- **fundal height**
- **Lie**, which refers to the relationship between the long axis of the foetus and that of the mother and can either be longitudinal, transverse or oblique.
- **Attitude**, which refers to the relationship of the foetal head and limbs to its trunk. It is most commonly flexion.

- **Presentation,** which means the foetal part that is lying at the pelvic brim or in the lower pole of the uterus and can either be vertex, breach, face, shoulder or brow. The most common is the vertex. Note that vertex/brow/face all refer to head presentation.
- **Denominator** is the name given to the presenting part for example, occiput for vertex, sacrum for breech and mentum for face.
- **Position**, which refers to the relationship between the denominator of the presentation and the landmarks of the pelvic brim.

Other components of physical examination include:

a) Pelvic assessment

Can be achieved through:

- By x-ray of the pelvis
- Clinical (assessing sign of contracted pelvis)
- Head fitting

b) Genito-Urinary System

Check on:

- Frequency of micturition
- For abnormal discharge

c) Circulatory System

- **Varicosities**: - Varicose veins may occur in the legs, anus (hemorrhoids) and vulva. Vulval varicosities are rare and very painful.

d) The Vulva

Check on:

- Vulval warts
- Purulent irritating discharge

e) The Lower Limbs

- Examine for bones alignment and deformities.
- Check pitting edema in the lower limbs by applying fingertip pressure for 10 seconds over the tibial bone.

Laboratory test

All pregnant women should do ANC Profile (Basic laboratory tests)

These tests include: -

- Urinalysis (For Protein, glucose and ketones)
- Hemoglobin levels
- V.D.R.L.(for syphilis)

- Rhesus factor
- Blood group
- Bs/Mps(Malaria test)
- TB Screening.

Share health messages with the mother on:

- The advantages of antenatal visits
- Use of LLITNs
- Drug compliance.
- Use of tetanus toxoid vaccine.
- Rest and exercise
- Clothing should be comfortable
- Breast care.
- Diet and nutrition - Rich in Iron and protein
- Individualized birth plan.
- Counsel for HIV

Educate the mother on danger signs during pregnancy.

Educate the mother on the following danger signs during pregnancy:

- Per Vaginal bleeding.
- Convulsions/fits
- Reduced fetal movements
- Persistent Frontal or recurring headaches
- Severe abdominal pain.
- Pain at the calf muscles.
- Sudden swelling
- Rupture of the membranes
- Premature onset of contractions.
- Foul smelling vaginal discharge
- Blurred vision.
- Excessive nausea and vomiting.
- Fever (38^0C and above)
- Edema

Other services provided during first FANC visit include:

- ✓ Advice on individualized birth plan.
- ✓ Give Tetanus Toxoid.
- ✓ Give IFAS
- ✓ Give SP if more than 16 weeks.
- ✓ Screen for TB
- ✓ Refer if necessary.

Second FANC Visit.

On second FANC Visit:

- Take history
- Perform physical examination
- Check on individualized birth plan
- Give IFAS
- Give SP
- Auscultate for foetal heart sound.
- Counsel and educate the mother.
- Refer if necessary.

Third FANC Visit.

On third FANC visit:

- Take history
- Perform physical examination
- Check on individualized birth plan
- Give IFAS
- Give SP (Given Under D.O.T Directly observed therapy)
- Give Tetanus Toxoid if 4 weeks from 1st dose.
- Auscultate for foetal heart sound.
- Counsel and educate the mother.
- Refer if necessary.

Fourth FANC Visit.

On fourth FANC Visit:

- Take history
- Perform physical examination
- Update on individualized birth plan
- Give IFAS
- Look for anemia
- Check foetal presentation
- Do vaginal Examination
- Auscultate for foetal heart sound.
- Counsel and educate the mother.
- Refer if necessary.

Elimination of Mother to Child Transmission of HIV(eMTCT).

Overview and biology of HIV.

HIV (Human Immunodeficiency Virus) is a retrovirus in the family of Lentivirus.

Its genetic material consists of a single-stranded ribonucleic acid (RNA)

The viral particle is spherical in shape with a diameter of 80-100 nanometers (nm).

There are two types of HIV, namely:

a) **HIV – 1**

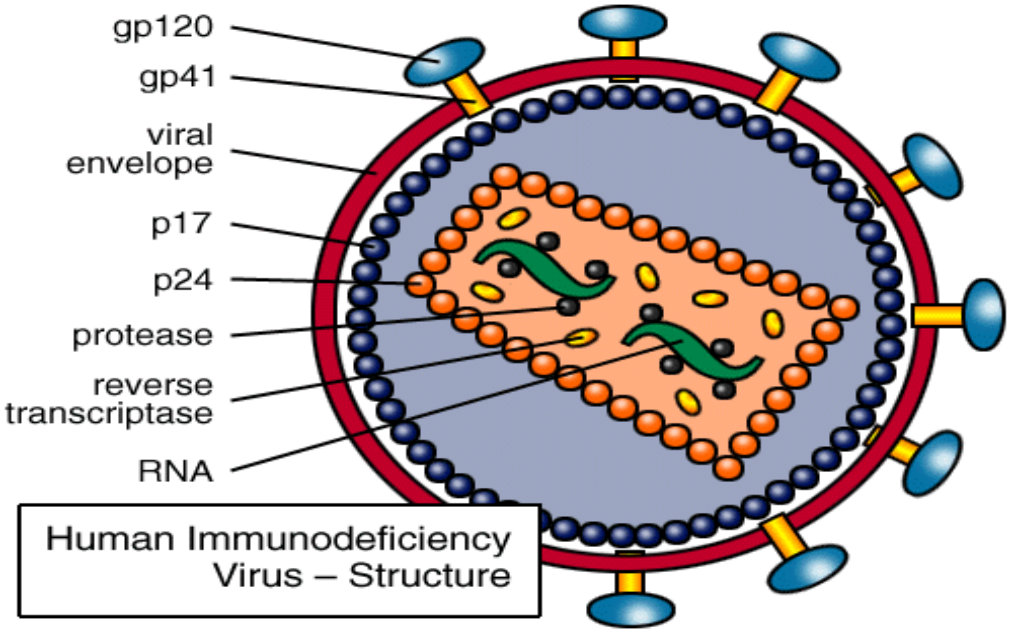
- It is found worldwide
- It is the main cause of the worldwide pandemic
- HIV-1 has many subtypes: A-K
- A-E are the predominant subtypes
    - **A**: -W. Africa, E. Africa, Central Africa East Europe & Middle East
    - **B**: -N. America, Europe, Middle East, E. Asia, Latin America
    - **C**:- S. Africa, S. Asia, Ethiopia
    - **D**:- E. Africa
    - **E**:- S. E. Asia

b) **HIV – 2**

- It is mainly found in West Africa, Mozambique and Angola.
- It causes a similar illness to HIV – 1
- It is less efficiently transmissible rarely causing vertical transmission
- Less aggressive with slower disease progression

Structure Of Human Immunodeficiency Virus

- ✓ Has an outer double lipid membrane, (derived from the host membrane).
- ✓ The lipid membrane is lined by a matrix protein.
- ✓ The lipid membrane is studded with the surface glycoprotein (gp) 120 and the transmembrane gp 41 protein.
- ✓ These glycoprotein spikes surround the cone-shaped protein core.
- ✓ HIV Glycoproteins: that is, gp120 and gp41 mediate the entry of virus into the host cells.
- ✓ The core (capsid) is made up of several proteins with P_{24} being the main protein. Within the capsid are two identical single strands of RNA (the viral genetic material) and viral enzymes



- ✓ **HIV Viral Enzymes are:-**

    a) Most important: Reverse Transcriptase (RT), Protease and Integrase.

    b) RT converts viral single-stranded RNA into a double stranded deoxyribonucleic acid (DNA). DNA is incorporated into host nucleus as the proviral DNA.

    c) Integrase facilitates integration of the DNA into the host's chromosomal DNA.

    d) Protease enzyme splits generated macro-proteins into smaller viral proteins (core, envelope & regulatory proteins and enzymes) which go into forming new viral particles.

HIV life cycle

HIV life cycle has the following stages: -

a) Binding, Fusion and Entry

b) Transcription

c) Integration & Replication

d) Budding

e) Maturation

Binding:

- Glycoprotein GP 120 binds to the host cell surface receptor (CD4 molecule) and co-receptor (CCR5/CXCR4) for successful entry.

- Can also bind to CXCR2, CXCR3 and hitch ride on B-cells to lymph nodes.

Fusion and Entry:

- Viral binding to host cell triggers fusion of the viral and host cell membranes. This mediated by gp41
- Allows entry of virus core into host cell cytoplasm
- Core protein dissolved by host enzymes releasing viral RNA and enzymes

Transcription & Integration

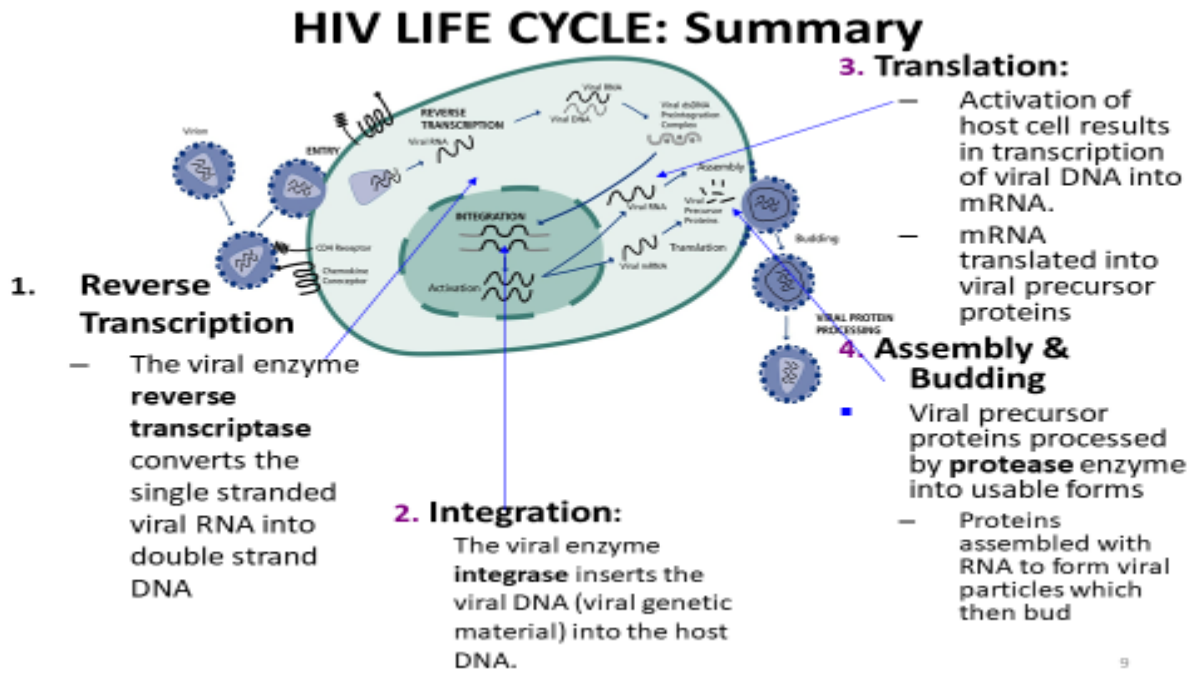
- Reverse transcriptase converts the viral RNA into a single strand of DNA
- RT also acts as a DNA polymerase to produce a partner strand of DNA to match the original template resulting in a double stranded DNA (dsDNA) but no proof-reading ability
- The DNA enters the host cell nucleus
- Integrase catalyses the process of integration of the viral DNA into the host cell's DNA to form provirus

Replication

- Integrated viral DNA turns the host cell into a "factory" for manufacturing more virus.
- Viral proteins are produced as a single multi-protein molecule. Viral proteins cleaved by protease enzyme

Budding and Maturation:

- Viral proteins together with RNA gather at the membrane of the CD4+ cells
- Viral particles are formed which bud off the cell and enter the bloodstream
- The CD4 cells are often destroyed by HIV virus infection and replication resulting in profound immunodeficiency.



Natural History of HIV Infection.

The natural history of HIV infection has the following stages: -

a) **Primary infection(sero-conversion)**- On exposure, there is a 2-4 week period of intense viral replication and widespread dissemination of virus characterized by

- ✓ High plasma viral load (RNA)
- ✓ Rapid decline in CD4 count
- ✓ In some cases an acute illness occurs. Lasts from 1-2 weeks, but it is rarely diagnosed. Symptoms if present resemble those of other viral illnesses; requires high index of suspicion.
- ✓ Symptom resolution with reduction in plasma viremia due to development of an immune response and antibodies to the virus

b) Asymptomatic Disease (Latency) stage.

- ✓ Patients then enter a stage of asymptomatic disease phase lasting on average 2-10 years (clinical latency)
- ✓ Characterized by gradual decline in CD4 count. Rate depends on viral load

c) Symptomatic stage.

- ✓ Viral load continues to rise causing:
    - Increased demands on immune system as production of CD4 cells cannot match destruction
    - Increased susceptibility to common infections (URTI, pneumonia, skin etc)

d) Progression of HIV infection to AIDS.

- This is Late-stage of HIV progression characterized by markedly reduction in CD4 count and the development of opportunistic infections, selected tumors, wasting, and neurological complications.
- It signals progression of HIV infection to Acquired Immune deficiency syndrome.

WHO Clinical Staging of HIV infection.

World Health Organization(WHO) developed criteria for staging HIV infection as follows: -

Clinical Stage	**Selected Symptoms**
Primary HIV Infection	1. Unrecognized Acute retroviral syndrome 2. Acute febrile illness 2-4 wks post-exposure often with lymphadenopathy and skin manifestations
Stage I	1. Asymptomatic 2. Persistent generalized lymphadenopathy
Stage II	1. Moderate unexplained weight loss (<10% of presumed or measured body weight) 2. Recurrent upper respiratory tract infections (sinusitis, bronchitis, otitis media, pharyngitis) 3. Herpes zoster (past or current episodes in last 2 years) 4. Angular cheilitis 5. Recurrent oral ulcerations (2 or more episodes in 6 months) 6. Papular pruritic eruptions; Seborrhoeic dermatitis; Fungal nail infections of fingers
Stage III	***Conditions where a presumptive diagnosis can be made using clinical signs or simple investigations*** ▪ Severe weight loss (>10% presumed or measured body weight) ▪ Unexplained chronic diarrhea for > 1 month ▪ Unexplained persistent fever (intermittent or constant for > 1month)

	▪ Oral candidiasis ▪ Oral hairy leucoplakia ▪ Pulmonary tuberculosis (diagnosed in last 2 years) ▪ Severe presumed bacterial infections (e.g. pneumonia, empyema, pyomyositis, bone or joint infection, meningitis, bacteremia) ▪ Acute necrotizing ulcerative stomatitis, gingivitis or periodontitis ***Conditions where confirmatory diagnostic testing is necessary*** ▪ Unexplained anemia (<8gm/dl), neutropenia (<1,000/mm3) or thrombocytopenia (<30,000/ mm3) for > 1 month
Stage IV	***Conditions where a presumptive diagnosis can be made using clinical signs or simple investigations:*** ▪ HIV wasting syndrome ▪ Pneumocystis carinii pneumonia (PCP) ▪ Recurrent severe bacterial pneumonia ▪ Cryptococcal meningitis ▪ Toxoplasmosis of the brain ▪ Chronic orolabial, genital or anorectal herpes simplex infection for > 1month ▪ Kaposi's sarcoma (KS) ▪ HIV encephalopathy ▪ Extrapulmonary tuberculosis ▪ Cryptosporidiosis, with diarrhea >1 month ▪ Isosporiasis *Conditions where confirmatory diagnostic testing is necessary* ▪ Candidiasis of the esophagus or airways ▪ Cytomegalovirus (CMV) retinitis or disease of organs (other than liver, spleen, or lymph nodes) ▪ Non-typhoid salmonella septicemia (NTS) ▪ Lymphoma cerebral or B cell NHL ▪ Invasive cervical carcinoma ▪ Visceral Leishmaniasis ▪ Cryptococcosis (extrapulmonary) ▪ Disseminated non tuberculous mycobacterial infection ▪ Progressive multifocal leukoencephalopathy ▪ Any disseminated endemic mycosis (e.g. histoplasmosis)

HIV testing.

The importance of HIV testing includes: -

a) Diagnosis of HIV.

b) To enable Staging of HIV disease (especially through CD4 T cell analysis)

c) To determine the prognosis of HIV infection (mainly through CD4 T cell analysis and viral load)

d) To determine when to initiate preventive therapies and ART(CD4 T cell analysis)

e) To assess response to ART (CD4 T cell analysis/viral load)

f) To evaluate patients for toxicity to ARVs (RFT/LFT)

Approaches in HIV testing.

The following approaches are applied in HIV Testing.

1. Voluntary counseling and testing
2. Diagnostic HIV testing
3. Provider initiated counseling and testing
4. Mandatory HIV testing and screening

Types of HIV tests.

Types of HIV tests are classified into two, namely:

a) **Antibody based test**.

   i. Enzyme Immunosorbent Assay (ELISA)

   ii. Western Blot

   iii. Rapid Tests

b) **Viral detection methods/ antigen based tests**

   i. PCR

For the purpose of this lesson, we will discuss Rapid test in diagnosing HIV. The learner should read further on other types of HIV tests.

Rapid HIV tests. (RDTs)

- They were developed in the late 1980s
- They can be performed in less than 20 minutes
- It can be performed easily without sophisticated instruments.
- Results are available immediately.
- Examples – Determine, First response and Oraquick.
- The learner should note that HIV testing approaches is highly dynamic hence one should keep updated from time to time.
- Oraquick is designed for self-testing.

Elimination of Mother to Child Transmission of HIV(eMTCT).

eMTCT can be defined as measures and interventions put in place to avert transmission of HIV from the mother to the baby.

It was formerly referred as PMTCT (Prevention of Mother to Child Transmission of HIV), However it changed to eMTCT that endeavours to achieve zero transmission of HIV to babies.

Mother to Child Transmission occurs when the HIV virus is passed from the mother to the baby. This happens as follows.

- During pregnancy5-10%
- During labour and delivery 10-20%
- During breastfeeding 5-20%

BENEFITS OF Emtct

Benefits of eMTCT includes:

- Improved child health and child survival
- Decreased burden to the health care system
- Increased public understanding of the HIV/AIDS epidemic
- Help increase acceptance of people living with HIV/AIDS

FOUR PILLARS OF W.H.O TO REDUCE MTCT

1. Preventing of unintended pregnancy in HIV+ women through family planning.
2. Prevention of HIV infection in women through use of ABCD
3. eMTCT in pregnancy: testing and counselling to identify HIV+ women; provide ARVS to mother and baby; use of infection prevention practices.
4. Care and support o those living with HIV/AIDS.

Four Pronged approach to eMTCT.

The four prongs of eMTCT are:

1) Primary prevention of HIV infection in women.
2) Prevention of unintended pregnancies among HIV-infected women.
3) Interventions to reduce transmission from HIV infected and lactating women to their children.
4) Care and support of women, children and families infected and affected by HIV and AIDS(eMTCT-Plus).

Effects of pregnancy on HIV-AIDS

Effects of pregnancy on HIV-AIDS includes:

- Immune response is suppressed
- CD4 counts decline more rapidly compared to non-pregnant women
- At increased risk of UTI
- It may accelerate the progress to full blown AIDS or quicker deterioration if the final stage of AIDS.

Effects of HIV-AIDS on the pregnancy

Effects of HIV/AIDS on the pregnancy includes: -

- Associated with other STIs
- They are more likely to have candidal vaginitis
- Increase of other infections e.g UTIs
- Rate of ectopic pregnancy is 4 times higher in HIV +ve women.
- Higher rates of abortions and stillbirths have been reported in some African studies
- Preterm labour and PPROM
- Higher rate of abruptio placenta in HIV +ve women.
- Chorio-amniotis is more common in women with HIV infection.
- HIV is a major cause of anaemia in pregnancy.

Risk factor for Mother To Child Transmission OF HIV.

Risk factor for Mother To Child Transmission OF HIV can be classified as:-

a) Viral factor

- Clinical stage of infection: new and advanced infections
- High viral load in blood and genital tract

b) Maternal factors

- Low maternal CD4 count (the number of cells per cubic millimetre of blood)
- Vitamin A Deficiency
- Unprotected sex with multiple and infected partners
- STIs and othe co infections
- Mother not taking ARV agents
- Malaria infection in pregnant women.
- Breast infections or disorders.

c) Obstetric and gynaecological factors

- Invasive foetal monitoring procedures
- Duration of membrane rupture
- Routine episiotomy
- Placental disruption
- Vaginal delivery
- Prolonged labour.

d) Infant factors

- Breastfeeding (longer duration of breastfeeding)
- Preterm delivery
- Neonatal birth injuries
- Vigorous naso-gastric tube suction
- Infections eg oral ulcers or thrush.

HIV Testing and Counselling in eMTCT.

Definition of terms.

a) **HIV testing:** process of determining if client is infected with HIV

b) **HIV counselling:** confidential dialogue between an individual or a couple and a healthcare worker (HCW) to help clients examine their risk of acquiring or transmitting HIV. HIV counselling should be tailored to the risk behaviour, circumstances and special needs of the client

HIV Testing and Counselling in eMTCT provides: -

- Information about HIV status

- Opportunity to identify women with HIV and empower them to make decisions to prevent MTCT
- Opportunity to identify women who are HIV negative and empower them to remain negative

HIV testing and counselling should be anchored on the following three principles:

1) Confidentiality
2) Informed consent
3) Post-test support and services

Main approaches applied in HIV testing and Counselling in eMTCT.

There are two main approaches utilized in eMTCT, they are:

1. Provider-initiated
2. Client-initiated

- Both approaches include :
  - Basic information about providing HIV testing
  - Risks and benefits of testing

Steps in HIV Testing and Counselling.

There are three key stages in HIV Testing and Counselling as described below.

a) Pre-test Information and Counselling.

- The purpose of the pre-test session in eMTCT settings is to provide the woman or couple with adequate information to make an informed decision about HIV testing.
- Pre-test session models can be:
  - Group counselling.
  - Individual counselling
  - Couple counselling

b) Testing.

- Testing of HIV in eMTCT is commonly done using Rapid Diagnostic Tests (Rapid test).
- Rapid HIV tests detect antibodies associated with HIV in whole blood or saliva.

- Blood is the most common used specimen in HIV testing
- Rapid HIV tests
  - ✓ Accurate results within 20-40 minutes
  - ✓ Can be done in the clinic setting
  - ✓ Accurate when performed correctly
  - ✓ Usually performed on serum or whole blood (by fingerprick or venous sample); some rapid HIV tests use saliva eg oraquick.
  - ✓ HCWs can be trained to perform the tests
  - ✓ Usually do not require special equipment, electricity or refrigeration
- Benefits of rapid HIV testing include:
  - ✓ On-site testing and same day results
  - ✓ Lower risk of administrative error
  - ✓ Accepted by clients
  - ✓ Fewer resources required: Human resources, Resources at the facility, Financial resources
  - ✓ Lower risk of occupational exposure
- Interpreting results.
  - ✓ The care provider should educate and explain to the client on how to interpret results.
  - ✓ The client should understand that:
    - A positive HIV test means that antibodies to HIV are present. It does not mean that the client has AIDS
    - A negative HIV test can mean: The person is not infected with HIV, or The person is infected with the virus but is in the window period

Steps in HIV Testing can be summarized as follows:

1. A specimen is obtained
2. The specimen is processed
3. Test is conducted by a HCW or laboratory technician
4. The client is told their result
5. HCW provides post-test counselling, support and appropriate referrals

When performing HIV testing, you are required to observe the following points: -

- Infection control and Standard Precautions
- Proper labelling
- Proper specimen collection procedures

- Required volume per test
- Proper reagents per test
- Correct timing per test
- Interpretation of results
- Proper record-keeping
- Proper disposal procedures

Factors that can affect test results.

- Storage and handling of test kits
- Changes in the environment
- Accuracy of equipment (external and internal controls)
- Shelf-life of the chemicals for the tests (reagents)
- Technique for sample collection
- Quality of sample
- Use of equipment

c) Post-test Counselling.

- All HIV test results, whether positive or negative, must be given in person, privately *(as a single client or couple)*
- Put the client or couple at ease
- Remember that client can either turn negative or positive.
- **When Client Tests HIV-negative**
  - ✓ Provide HIV test result and assess understanding of result
  - ✓ Identify and address client questions
  - ✓ Discuss:
    - ➢ Partner HIV testing and disclosure
    - ➢ Safer sex and risk reduction
    - ➢ Exclusive breastfeeding
    - ➢ Antenatal care, post-delivery care
    - ➢ Importance of delivering in a healthcare facility
    - ➢ Infant care
  - ✓ Provide referrals, take-home information

- **When Client Tests HIV-positive**

  - ✓ Client reactions to results can range from acceptance to disbelief
  - ✓ Remain non-judgemental, supportive and confident throughout the counselling process
  - ✓ Provide all key eMTCT messages during the initial post-test counselling session
  - ✓ Encourage client to return for her ANC visits and follow-up HIV post-test counselling
  - ✓ Discuss:
    - ➢ ARV therapy or prophylaxis
    - ➢ Infant feeding options
    - ➢ Treatment and support services for client and family
    - ➢ Disclosure of HIV Status. Clients who disclose are in a better position to:
      - – Encourage partner(s) to be tested
      - – Prevent transmission of HIV to partner(s)
      - – Access PMTCT interventions

- Receive support from partner(s) and family

Management of HIV positive clients during pregnancy.

As discussed earlier during FANC, the midwife should:

- Provide Primary prevention services during pregnancy such as, Education about safer sex with use of condoms for mother and father, Early treatment of STIs, Safer sex during pregnancy and lactation
- Ensure VCT services are offered to all pregnant women.
- Understand that Antenatal visits are vital opportunities for eMTCT for both HIV-positive and HIV-negative women.
- Every pregnant woman should be offered HIV testing.
- HIV testing should be voluntary.
- eMTCT depends on being able to identify women who can benefit from interventions.

Care of HIV Positive women in FANC

- Initial assessment should be conducted on HIV positive pregnant women, and should include:
  - ✓ Duration of known HIV+ status
  - ✓ Past history of HIV-related illness and HAART
  - ✓ WHO Staging
  - ✓ Status of other children, partner, and partner disclosure and referral
  - ✓ Any medications taken for HIV-related illness since beginning of pregnancy
- Women with HIV should have medical care during pregnancy
  - ✓ Look for and treat other infections such as malaria, anemia etc
  - ✓ Nutritional counselling and supplements
  - ✓ Monitor the HIV infection
  - ✓ Counselling about infant feeding, other infections, danger signs etc
  - ✓ Counsel the mother on birth preparedness.
  - ✓ Early detection of opportunistic infections.

- ✓ Provide prophylactic(preventive) intervention such IFAS, Tetanus Toxoid, use of LLITNs, cotrimozaxole(Septrin) prophylaxis.

- **Antiretroviral treatment**.

  - All pregnant women irrespective of CD4 Count or Viral load should be initiated on HAART immediately.

  - HAART (Highly Active Antiretroviral Therapy) is a treatment regimen comprising of a combination of three or more antiretroviral drugs. This co-administration of different drugs helps in suppressing viral replication through several mechanisms.

  - The current HAART regimen used in Kenya is a combination of tdf(tenofovir)+3tc(Lamivudine)+efv (efavirenz).

  - All HIV positive pregnant women should be started on Cotrimoxazole (Septrin) prophylaxis to protect the mother from bacterial opportunistic infections.

Management during labour

Management during labour and delivery should include:

- **Antiretroviral therapy**
  - ✓ The mother should continue with HAART and ctx as prescribed.
- **The following procedures should be avoided in order to prevent injury to the foetus.**
  - ✓ Artificial rupture of membranes
  - ✓ Scalp electrodes
  - ✓ Amnioinfusion
  - ✓ Amniocentesis
  - ✓ Forceps and vacuum delivery
  - ✓ Oropharngeal suctioning of the new-born to prevent injury to the mucosa
- **Prevention of contamination with maternal blood and fluids**
  - ✓ Perineal trauma and episiotomies should be avoided
  - ✓ Baby should be wiped immediately after birth.
  - ✓ Perform immediate clamping and cutting of the cord.
- **Prevention of intrauterine contamination with vaginal secretion**
  - ✓ Shorten length of ruptured membranes to less than 4 hours

- ✓ Limit the number of vagina examination (Avoid too many unnecessary Vaginal examinations.

- **Prevent and treat other infections and complications.**
  - ✓ Check for and manage UTIs at the start of labour
- **Monitor labour carefully using partograph.**
  - ✓ Using a partograph will enable the midwife to detect any complication during labour.
- **Caesarean section**
  - ✓ Evaluate and consider Caesarean Section. Available evidence shows that Caesarean Section reduces incidence of HIV transmission to the baby.

Management during postpartum

- During post-natal period, the care now focusses both to the mother and the baby.
- In additional to immediate maternal care after delivery, the mother should: -
  - ✓ Continue and Adhere to HAART and ctx
  - ✓ Advised and counsel of appropriate contraception and child spacing.
  - ✓ Advised on feeding options:
  - ✓ **Exclusive breastfeeding** reduces the chance of HIV transmission to the baby. Breastfeeding should be exclusive for 6 months, if breastfeeding is chosen teach the mother good breastfeeding technique to avoid cracked nipples and mastitis which can increase MTCT. Mixed feeding, presence of mastitis and cracked nipples increases the risk of HIV transmission.
  - ✓ **Formula feeding**. AFASS criteria to see if mother is able to follow exclusive formula feeding(EFF) is used:
    - Acceptability: is EFF acceptable for the mother
    - Feasibility: is the mother able to begin EFF correctly for the required period
    - Affordability: is the mother able to afford the cost of EFF
    - Sustainability: will the mother be able to continue the recommended EFF standards for the required period
    - Safety: will the mother be able to practice EFF safely

In addition to essential new-born care, care of HIV-Exposed Infant(HEI) should also include:-

- ✓ Initiation of Nevirapine at birth up to 12 weeks as per the baby's weight.

- Nevirapine should be issued to the HIV positive mother at the first point of contact for the baby in case she delivers before reaching the hospital.
- Nevirapine therapy to the baby should be started at birth or at the first contact with the exposed infant.
- Infant prophylaxis with Nevirapine syrup should up to 12 weeks from birth for mothers on HAART
- Infant prophylaxis with Nevirapine syrup should up to one week after cessation of breast feeding for mothers not on HAART.

✓ Initiation of Zidovudine (Syrup) at birth up to six weeks.
✓ After 12 weeks Nevirapine is stopped.
✓ The baby is put on Cotrimoxazole (Septrin) syrup from 6 weeks up to 18 months.
✓ Infant PCR testing (Using Dry Blood Spots technique) is done at 6 weeks after birth, then 6 months after birth, the third is done at one year after birth and fourth and the last is done at 18 months after birth.
✓ PCR result at 18 months is considered final.
✓ Immunization schedule of HIV Exposed Infant (HEI) is similar to the national immunization schedule, however these infants receives a booster measles vaccine at 6 months in their life.

Diagram showing a flow chart on infant HIV testing protocol

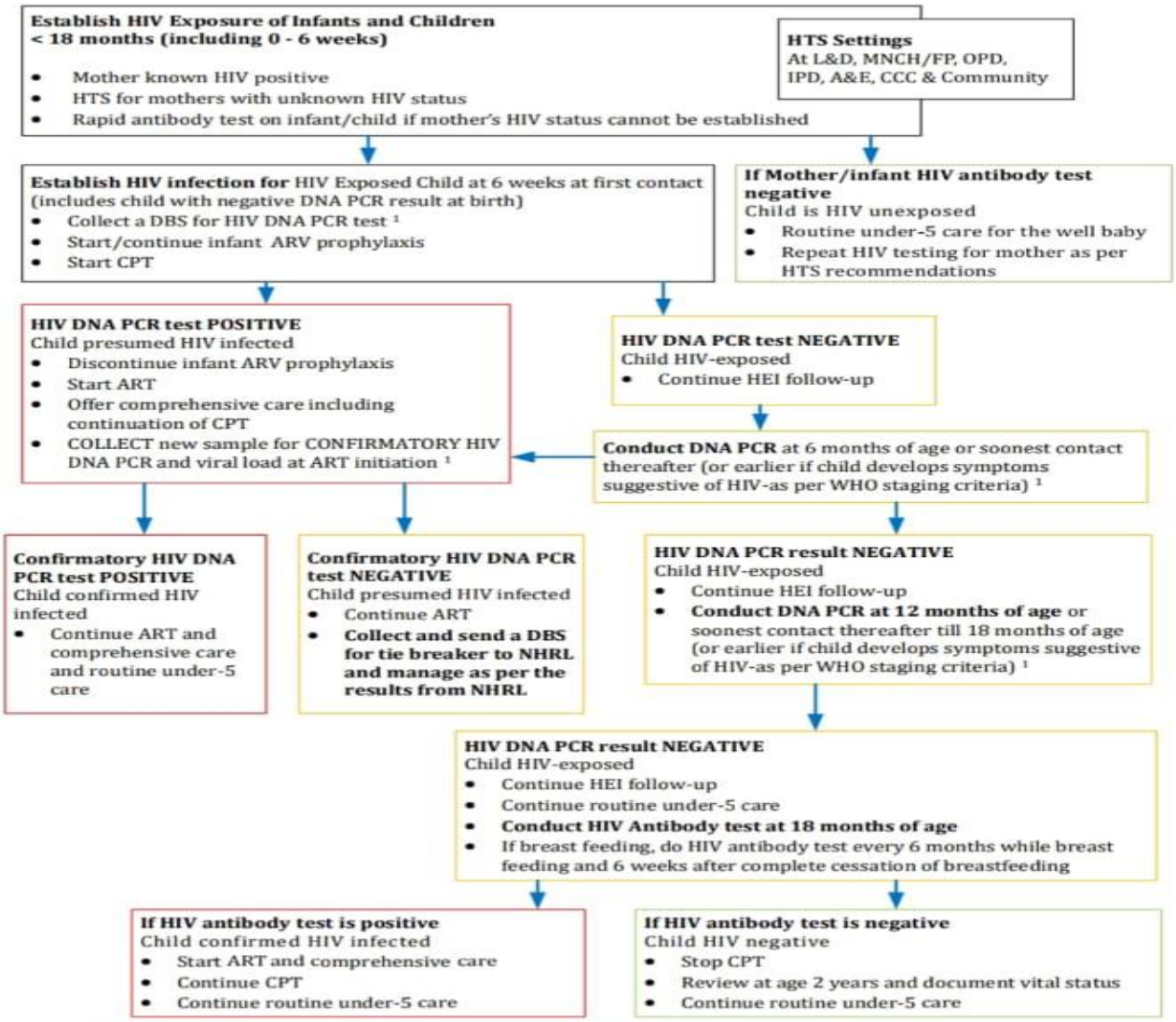


Figure 2.1 Algorithm for Early Infant Diagnosis in Infants and Children < 18 months of age

Summary of infant Nevirapine prophylaxis.

Age	**NVP Dose**
0-6 weeks	Birth weight <2500gm-10mg (1ml)- OD Birth weight >2500gm-15mg (1.5 mls)- OD
6-14 weeks	20mg (2mls)- OD
14wks-6months	25mg (2.5mls)- OD
6-9 months	30mg (3mls)- OD
9-12 months	40mg (4mls)- OD
>12 months	50mg (5mls)- OD

Summary of HIV Exposed Infant Cotrimoxazole prophylaxis.

Weight (Kgs)	**Suspension 240mg/5mls**	**Single strength tab 480mg**	**Double strength tab 960mg**
1-4	2.5 mls	¼	
5-8	5.0 mls	½	¼
9-16	10 mls	1	½
17-30	15 mls	2	1
>30		2	1

NB

- AZT(10mg/kg) BD if the infant weight is <2500g or 15mg/kg BD if the infant weight is >2500g is an alternative for infants on TB treatment of Nevirapine toxicity.
- 3TC (2mg/kg) BD if the baby is below 4 weeks of age and 4mg/kg BD if the infant is over 4 weeks of age is an alternative for infant with severe Nevirapine toxicity or if the baby is on TB treatment with Rifampicin containing regimen.
- Mothers who were not tested for HIV during antenatal period can be counselled and tested during labour and postpartum period.
- In the event the baby turns negative at 18 months, the mother and the baby maybe discharged from eMTCT program and continue with Comprehensive care services (CCC).

Normal labour.

Learning objectives

By the end of the unit, the learner should be able:

a) To Define normal labour

b) to differentiate between true and false labour.

c) To discuss management of a mother in labour.

d) To Explain the physiology of the onset of labour

e) To describe mechanisms of labour

f) To describe the stages of labour

g) To describe the physiological changes that occur during labour

h) To describe the management of normal labour and use of partograph

Introduction.

Definition of labour.

Labour is a physiological process, characterized by rhythmic regular uterine contractions increasing in frequency and intensity, accompanied by progressive cervical effacement and dilatation, and descent of the presenting part.

Labour may be spontaneous or induced

Definition of normal labour.

Physiological process, which commences spontaneously at term (37 completed weeks) with rhythmic regular uterine contractions of increasing intensity and frequency, accompanied by progressive cervical effacement and dilatation, and descent of the presenting part (preferably cephalic/Vertex), resulting in expulsion of a healthy foetus, a complete placenta and membranes and a healthy mother.

Characteristics of normal labour.

a) It is spontaneous

b) It occurs at term(38-40 weeks) with regular uterine contractions

c) Completed within 18 hours

d) The presentation is vertex

e) No complications to the mother and the baby

f) Newborn requires minimal or no resuscitation.

g) expulsion of a healthy single foetus, a complete placenta and membranes

Causes of onset of labour

1. Associated factors include:

a) Hormonal factors: fetal cortisol, prostaglandin, oxytocin, estrogen and relaxin

- Oxytocin increases
- Progesterone decrease
- Oestrogen increases
- Prostanglandins increases
- Relaxin increases
- Fetal cortisol increases

b) Mechanical stimulation:

- Foetal engagement
- Overstretching of uterus
- Rupture of membranes
- General fluid pressure
- Fetal axis pressure

Mechanisms of labour.

These are series of movements the foetus maneuvers during delivery. These mechanisms of labour are:-

a) Engagement and Descent

b) Flexion

c) Internal rotation of head

d) Extension of the head

e) Restitution

f) Internal rotation of shoulders/ External rotation of the head

g) Lateral flexion

h) Expulsion

Engagement

- It occurs when the fetal presenting passes through the pelvic inlet /pelvic brim

Descent

- It is the progressive downward movement of fetal presenting part through the pelvic cavity.
- Descent is aided by uterine contractions and ambulation.
- The progressive movement of the fetal head into the pelvis
- The fetal head is divided into 5parts

    a) When the whole head is above the brim, descent is 5/5-the sinciput and occiput above the brim

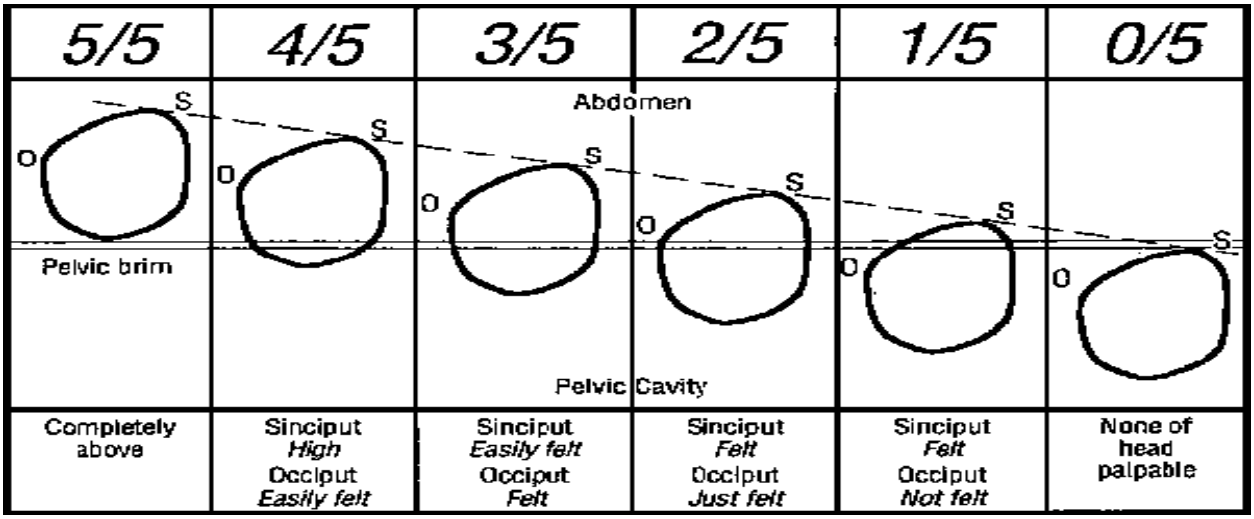
    b) 4/5 sinciput prominent and occiput descending

    c) 3/5 sinciput rising, occiput can be tipped per vagina

    d) 2/5 sinciput not so prominent

    e) 1/5 sinciput and occiput not felt

    f) 0/5 Head on pelvic floor



Flexion

- When the fetal head touches the bony pelvis, there is flexion of the fetal head.
- This helps in ensuring that the head engages in sub-occipital bregmatic (SOB) diameter.

Internal rotation of the head

- After flexion , the head rotate $1/8^{th}$ of a circle and the occiput presents in anterior position.
- This is aided by uterine contractions.

Crowning

- This occurs when the nape of the neck has passed the pelvic outlet and its firmly held against the pubic arch and it does not recede even after cessation of contractions.
- The parietal eminences pass through the bony outlet. At this stage the head no longer recedes
  between contractions.

Extension of the head

- Once the occiput has escaped from under the symphysis pubis, the head extends forward.
- Further extension allows the sinciput, face and chin to escape the perineum and the head is born by extension.
- Extension is the result of action from two forces.
  a) The abdominal and thoracic muscles exert downward pressure.
  b) The pelvic floor and perineum resist this pressure and push the head forward and upward through the weak area, which is the vagina.

Restitution

- The head turns 1/8 of the circle to the left, back to where it was before.
- This takes place to undo the twist, which occurred during the previous internal rotation.

Internal rotation of the shoulders

- When the head is passing through the level of the ischial spines and the outlet in anterior posterior position, the shoulders enters in the oblique diameter of the pelvis.
- As the restitution is taking place, the shoulders which were in oblique diameter to the pelvis, rotate forward 1/8 of a circle and now engages in the anterior posterior diameter of the outlet.

Lateral flexion

- Following these movements, the body bends sideways to follow the curve of the birth canal.
  The anterior shoulder escapes under the symphysis pubis and the posterior shoulder sweeps the perineum.
- The body of the baby is born by lateral flexion.

Expulsion

- The effects of uterine contractions enable expulsion of the other parts of the baby's body.

Principles common to all mechanisms of labour

There are three principles common to all mechanisms of labour which are:-

1. Descent takes place
2. Whichever part leads and first meets the resistance of the pelvic floor will rotate forward until it comes under the symphysis pubis
3. Whatever that emerges from the pelvis will pivot around the pubic bone.

Admitting a mother in labour ward.

Admitting a mother in labour ward is an integral part in management of labour. Purpose of admitting a mother into labour ward includes: -

a) To ensure the safety of the mother and fetus during labour
b) To plan accurately for the course of labour and birth
c) To promote a rewarding experience for the entire birthing family.

As a midwife you should ensure the following activities are carried out during admission, namely: -

- Greet and create a rapport with the mother.
- Ask for ANC card/booklet from the mother
- Information that can be obtained from ANC Card/booklet include: -

a) Number of ANC attendance
b) Findings of previous physical examination
c) ANC profile (blood group and Rhesus factor, etc)

d) LMP and Expected date of delivery

e) Services provided during ANC visits

f) Any special care required.

g) Treatment of any infection or condition during pregnancy

h) Risk factors identified during ANC clinic

- History taking (Biodata, chief complaints, history of presenting illness, past obstetric history, current obstetric history, past medical-surgical history, gynecological history, socio-economic history, family history and family planning history.
- History of current pregnancy should focus on:-

a) LMP and EDD

b) Presence of show

c) Presence or absence of uterine contractions

d) Onset of the uterine contractions

e) Characteristics of the contractions

f) Rupture of membranes

g) Food and drugs taken for the last four hours

In past obstetric history you can use the format shown below

Pregnancy order	**Year**	**Number of ANC attendance**	**Place of delivery**	**Maturity**	**Duration of labour**	**Type of delivery**	**Birth weight**	**Sex**	**Outcome**	**puerperium**

- Take observations and measurements:
    a) Temperature, pulse, blood pressure
    b) Weight and height
- Thorough physical examination: General physical examination, breast examination, abdominal, pelvic examination, vaginal examination.
- Request for laboratory investigations-If the mother was attending ANC clinic you can obtain some form the records. If she has not been attending ANC clinic request for all the tests. Urinalysis should be done to all mothers in labour.
- Inform the mother about the findings, Record and interpret the findings.
- Findings of abdominal examination may include: -
    a) Size and shape of the abdomen
    b) Contours and scars
    c) Skin colour and marks eg linea nigra, striae gravidurum.
    d) Foetal movement
    e) Fundal height
    f) Presentation
    g) Lie
    h) Contractions
    i) Foetal heart rate
- Indication of a V.E in labour include:-
    a) To check cervical effacement and dilatation
    b) To check the presenting part
    c) To check the state of the membranes
    d) To rule out cord prolapse and cord presentation
    e) To check moulding
    f) To assess the liquor amni
    g) To assess engagement
    h) To assess for station
    i) To determine the position
    j) To assess progress of labour.
- Key assessment during general physical examinations may include: -
    a) Assessing for anemia
    b) Assessing for oedema
    c) Assessing for lymphadenopathy
    d) Assessing for any swelling and scars
- After performing all this you need to establish whether the mother is in labour and which stage of labour.
- Admit the mother in first stage room

- Management will depend with the stage of labour. (Now we will discuss labour according to stages of labour)

4" P" s that influence the outcome of labour

a) **Power**-Refers to the characteristics of uterine contractions

b) **Passage**-Refers to the size, shape and resistance of birth canal including bony pelvis, cervix, vagina and pelvic floor.

c) **Passenger**- This refers to the size, lie and presentation of the fetus, as well as the placenta and membranes

d) **Psyche**-This refers to the emotional preparedness of the mother. The mother's perception of the process of birth is influenced by her self-confidence, her patterns of coping with uncertainty and stress, her own attitude and expectation about labour. Adrenaline released during fear reduces oxytocin production thus prolonging labour

True versus false labour.

Differences between True and False labour are:

Features	True labour	False labour
Contraction	**Regular**	**Irregular**
Interval between pains	**Gradually shorten**	**Remain long**
Intensity	**Increases**	**Remain the same**
Cervical dilation /effacement	**Present and progressive**	**Absent**
Bulging membranes	**Present**	**Absent**
Sedation and analgesics	**Pain not stopped**	**Pain relieved**

Descent of presenting part	**Present and progressive**	**Absent**
Location of pain	**Lower abdomen and radiate to the back**	**Remains at lower abdomen**

Premonitory signs of labour

These are changes that occurs 2-3 weeks prior to the onset of labour.

They include: -

a) Lightening

b) Frequency of Micturition

c) Taking up of the cervix

d) Braxton Hicks contractions

e) Increased vaginal secretions

f) sudden rush of energy: due to change in levels of estrogen and progesterone

g) Increased backache and sacroiliac pressure

h) Bloody show

Pain during labour occurs as a result of:-

a) Hypoxia of the contracted myometrium

b) Compression of the nerve ganglia in the cervix and lower uterus

c) Stretching of the cervix during dilatation

d) Stretching of the peritoneum underlying the fundus.

FIRST STAGE OF LABOUR

- First stage is divided into two phases, namely: -
  a) Latent- 0-4 cm dilatation.
  b) Active-Begins from 4 cm to full cervical dilatation.
- Length varies depending on parity, birth interval, psychological state, presentation, position, pelvic shape and size, characteristics of uterine contractions.

- The duration of first stage of labor determines the duration of labor because it takes the most time.

Physiology of first Stage of labour.

Physiological changes that takes place during first stage of labour includes: -

a) Fundal dominance-contraction starts and stays longer at fundus. Contractions begins at the fundus and spread downwards lasting at the fundus where it is most intense but the peak is reached simultaneously over the whole uterus and fades from all parts together. This permits cervical dilatation and allows strongly contracting fundus to expel the fetus.

b) Polarity-neuromuscular harmony between the segments. The term used to describe the neuromuscular harmony that exist between the upper and lower uterine segments. The upper uterine segment contracts strongly and retracts to expel the fetus while lower segment contracts slightly and dilates to allow expulsion of the fetus.

c) Contraction and retraction(shortening). The uterus contracts and retracts in labor. The contractions do not fade completely but muscle fibers retain some of the shortening of contraction and therefore do not relax completely. Retraction occurs when uterine muscles do not get back to their position after a contraction leading to effacement and cervical dilatation. During contractions, the upper segment becomes thicker and shorter; the cavity diminishes gradually while the lower segment becomes thinner. Uterine contractions usually increase in intensity, duration and frequency of contractions.

d) Formation of upper and lower uterine segment (Upper uterine segment becomes thicker and Lower uterine segment becomes thinner). A physiological Retraction ring/ridge if formed between the two segment. When this ring becomes pathological and visible during labour it is called bandl's ring.

e) Cervical effacement and dilation-taking up of cervix and enlargement of uterine os. Cervical dilatation is brought about by the upward traction exerted by the retracted muscle fibers of the upper segment. It is also aided by the pressure from a well-fitting presenting part.

f) Show-blood stained mucoid discharge. This is the blood stained mucous discharge that is seen within few hours after the labor starts. This is the mucous that was forming the cervical plug. The blood is from the ruptured capillaries as the chorion detaches from the decidua and effects of descending foetal presenting part.

Management of First stage of labour.

a) Provide woman-centered individualized care.

b) Preform Abdominal examination (Review previous lesson on the indication of abdominal examination in labour).
c) Vaginal examination (Review previous lesson on the indication of vaginal examination during labour).
d) Determine if the mother is in true labour
e) Assess progress of labour.
f) Remember to:
   i. Palpate uterine contractions
   ii. Assessment of the cervix dilatation
   iii. Determine effacement of the cervix: thinning of the cervix (%)
   iv. Assess Consistency of the cervix: soft vs. hard. During labor the cervix becomes soft.
   v. Determine Position of the cervix: posterior vs. anterior. During labor the cervix changes from posterior to anterior.
   vi. Check if Membrane is intact or ruptured: assessed by fluid collection in the vagina
g) Encourage the woman to:

   i. Empty her bladder regularly and do urinalysis 2hrly (Encourage the woman to empty her bladder every 1-2 hours, If the woman is not able to visit the toilet, offer privacy and provide with a bed pan, A catheter is passed if the woman is unable to empty the bladder completely.

   ii. Freely move about if membranes un ruptured to facilitate descent

   iii. Encourage the mother to lie of left-lateral position

   iv. Maintain oral intake of fluids and food as required

   v. Provide emotional support

   vi. Exercise breathing techniques

   vii. Observe personal hygiene

   viii. Have a chosen companion with her.

h) Monitor the following: -

   i. Foetal movements –FHR half hourly, membranes-clear/meconium liquor

   ii. Maternal conditions-pulse ½ hourly, BP 4 hrly, resp 4hrly, temperature 2 hrly

   iii. Progress of labour-contractions, intensity, regular, frequency, duration; descent

   iv. Lab findings –urinalysis proteins, sugars Investigations, Hematology (Hematocrit , Hemoglobin ,Blood Group, Rh, cross- match) Urine analysis, Protein (Albumin) ,Sugar ,Ketone)Enhance good communication and support

i) Maintain vulva hygiene

j) Educate the mother on the expectations of second stage

k) Practice universal infection prevention and control protocols:-

i. Admit the woman in a clean environment.

ii. Control the no number of visitors in a birthing unit.

iii. Clean beds and rooms thoroughly after use.

iv. Encourage the woman to bathe and wash as she wishes.

v. Wash your hands before and after attending the client.

vi. Wear gloves when handling used sanitary pads, blood stained linen or body fluid.

vii. Invasive procedures should be kept to the minimum

viii. Artificial rupture of membranes should be avoided unless there is a good indication of the same.

ix. Observe the aseptic technique every time you are doing a sterile procedure

x. Avoid unnecessary frequent vaginal examinations.

l) Use partograph as appropriate for monitoring labour:

i. Observations about the condition of the pregnant woman, her unborn baby and progress of labor should be monitored regularly.

ii. Partograph should only be started when the mother is in active labor, ie cervical dilatation of 4cm has been achieved. The following observations are done: -

iii. Pulse rate:-recorded every 30 minutes when the woman is in active labor. Pulse rate of above 100b/m are indicative of anxiety, infections, ketosis or hemorrhage.

iv. Temperatures:- should be recorded every 4 hours. Pyrexia is indicative of infections or hypoglycemia.

v. Blood pressure:- measured every four hours, unless it is abnormal. Hypotension may be due to supine position, shock or epidural anaesthesia.

vi. Blood pressures may be further aggravated by labor on women who had hypertensive disorders in pregnancy.

vii. Urinalysis:- urine is tested for glucose, ketones and proteins. The volume of the urine is also measured.

viii. Contractions:- assessed ½ hrly

ix. Descent of the presenting part:- assessed 4 hourly

x. Cervical dilatation:- assessed 4 hourly

xi. Fetal heart rate:- to assess fetal well being its assessed ½ hourly

xii. Amniotic fluid:- It also determines the fetal reaction to labour and its assessed 4 hourly

m) Provide emotional support:

i. Listen to, encourage, support and reassure the woman continually

ii. Encourage the birth companion to support the woman emotionally during labor.

iii. Explain the process of labor to the woman and lay down expectations to relieve anxiety.

iv. Keep on encouraging the woman.

v. Express care and dependability to the client to boost her confidence.

vi. As a midwife, display tolerant non-judgmental attitude in provision of care

n) Promote nutrition during labour:

i. Offer the woman light foods rich in carbohydrates to provide energy during labor eg. Biscuits, toast, yoghurt, breakfast cereal, fruit juice, tea etc.

ii. Fluids intake will reduce the risk of dehydration during labor.

o) Control of pain may be achieved by non-pharmacological methods such as:

i. Change of position/ moving around,

ii. Touch and back massage from a companion

iii. Breathing techniques

iv. Verbal coaching and relaxation to help draw her attention away from labour pain

v. Warm bath or shower

p) Control of pain may be achieved by pharmacological methods such as:

i. Use of pharmacological agents e.g. tramadol 100mg 1M or slow IV 6-8 hourly, pethidine 50-100 mg 1M or IV slowly 6-8 hourly, inhalational nitrous oxide combined with 50% oxygen (Entonox) or epidural analgesia where available.

ii. Note that these drugs may depress foetal respiratory centres.

iii. NSAIDS (Such diclofenac, Ibuprofen) are not advised as they may suppress (inhibit) labour by interfering with prostaglandins production.

iv. Drugs that suppresses or inhibit labour are called tocolytics or Betamimetics.

q) Ensure privacy and confidentiality

r) Make arrangements to accommodate the birth companion or male partner

s) Anticipate the need for neonatal resuscitation and prepare for it

t) Prepare for management for the 2nd stages of labour

i. Environment-keep warm and close windows

ii. Equipment's-sterile pack and other accessories

iii. Staff-being prepared to conduct the delivery

iv. Supplies-should be adequate.

v. Resuscitative equipment in working conditions-sucker, oxygen, warmers /heaters

vi. Observe for signs of 2nd stage of labour: -

- Strong expulsive uterine contraction.
- A trickle of blood
- Full cervical dilation
- Pouting and gaping of the anus
- Gaping of the vulva in primigravida. The vulva of multiparous will gape even in premature pushing
- Tenseness between the anus and coccyx
- Bulging of the perineum usually means delivery is imminent

SECOND STAGE OF LABOUR.

Definition:

It is the stage from full dilatation of the cervix (i.e no cervix felt on V.E) until the Baby is born: -

Duration:

a) Primigravida 45 min – 1 hour, as long as 2 hrs
b) Multigravida 1/2 hour can be as little as 5 minutes.

N.B. there should always be advance or descent in this stage

Signs of second stage of labour: -

a) Presumptive signs
    i. Dilatation and Gaping of the anus
    ii. Rupture of the forewaters
    iii. Show, appearance of the presenting part
    iv. Strong expulsive uterine contraction.
    v. A trickle of blood
    vi. Pouting and gaping of the anus
    vii. Gaping of the vulva in primigravida. The vulva of multiparous will gape even in premature pushing
    viii. Tenseness between the anus and coccyx
    ix. Bulging of the perineum usually means delivery is imminent
    x. Visualization of fetal presenting part at the vulva
b) Confirmatory signs
    i. No cervix felt on Vaginal examination

Physiology of second stage of labour.

Physiology of second stage of labour includes: -

a) Expulsive contractions

b) Urge to push

c) Secondary powers become active

d) Displacement of pelvic floor and soft tissue

e) Rectum compressed against sacrocurve

f) Fetal expulsion

g) Bulging of vulva and perineum

Management of second stage of labour.

a) Once the patient is in the second stage the midwife must not LEAVE HER, and a constant and careful supervision must be kept on her:

- General condition, pulse, uterine contractions & Vulva
- Bladder should be empty

- Fetal heart more frequently (after every contraction)
- Descent of the presenting part and progress.
- Membrane should be ruptured

b) Transfer the mother to second stage room/couch

c) Ensure you have sterile delivery pack and other supplies

d) Support and explain to the mother expectations of second stage

e) Ask the assistant to open the sterile pack.

f) Gown and don gloves

g) Drape the mother procedurally

h) Perform vagina swab (procedurally)

i) Perform a V.E to confirm second stage

j) Encouraged her to bear down only during contractions and relax in between

k) Support perineum with a pad firmly at crowning (avoid obstructing the presenting part and allow foetal head to extend the perineum

l) Ask the assistant to monitor FHR after every contraction

m) Encourage the mother to breath through the mouth after a contraction.

n) Avoid routine episiotomy

o) **Delivery of the head:**

- Control birth of the foetal head by placing the fingers of one hand against the baby's head to keep it flexed.
- Continue to support the perineum gently as the baby's head is born.
- After the head is delivered, check for the cord around the neck. If present but loose, slip it over the baby's head.
- If the cord is tight around the neck doubly clamp and cut it before unwinding it from the head.
- Allow the baby's head to turn spontaneously(Restitution).
- Once the head is delivered ask the patient not to push. Clear the airway of the newborn gently with sterile swab

p) **Delivery of the body**

- Deliver one shoulder at a time.
- With a hand on each side of the baby's head, move the head posteriorly to deliver the anterior shoulder and vice versa.
- Place the baby on the mother's abdomen and congratulate the mother.

q) Perform APGAR scoring and show the baby to the mother.

r) Show the mother the baby and Let her confirm the sex of the baby.

s) Clamp and cut the cord (DO NOT MILK THE CORD)

t) Hand over the baby to the assistant and give instructions.

u) ***NB***: If there is difficulty in delivering the shoulders suspect shoulder dystocia. DO NOT USE FORCE. Support the baby's body as it slides out and place the baby on the mother's abdomen.

Immediate care of the newborn.

a) Thoroughly but gently dry the baby

b) Keep the baby warm

c) Check breathing (Baby should be crying or breathing quietly and easily)

d) Vitamin K. 1mg (for a term baby)

e) Encourage breastfeeding and routine newborn care.

f) Anticipate the need for neonatal resuscitation and prepare in advance for it.

g) Apply an identification tag and wrap baby in warm soft, dry towels and give to the mother to initiate breastfeeding within the first one hour of life.

h) Once stable, perform 1st examination of the newborn.

i) To prevent ophthalmia neonatorum, apply 1% tetracycline eye ointment.

THIRD STAGE OF LABOUR

Definition.

Third stage of labour begins immediately after the baby is born, until the placenta is delivered. The third stage lasts between 5-15 minutes but any period up to 1 hour is normal. If it lasts more than 1 hr it is considered as retained placenta.

Physiology of third stage of labour.

Physiology of third stage of labour include: -

1. Separation of the placenta
2. Descent of the placenta
3. Expulsion of the placenta
4. Control of bleeding

Separation of the placenta

Separation of placenta is brought about by: -

a) Mechanical factors (It is brought by the contraction and retraction of the uterine muscles, the uterine contractions detach the placenta from the uterus and the placenta forced out of the upper uterine segment into the lower uterine segment.

   In summary, the following mechanical factors come into play during the third stage of labour: -

   - The uterus reduces in size 2.5cm below the umbilicus, or 15cm above the symphysis pubis after the expulsion of the foetus
   - The contraction and retraction of the uterine muscles continues
   - The placental site is reduced to half
   - Since the placenta is inelastic, it does not contract, so it detaches from the shrinking uterine wall
   - The placenta is pushed further to the lower uterine segment by the weight of the retro-placental clot. This is the accumulated blood from the separated placenta
   - With the next contraction the placenta is pushed into the vagina and expelled

b) Haemostatic factors. At the area of the separation the blood sinuses are torn across. 30to 60ml of blood is connected between maternal surface of the placenta and the decidual basalis. This blood clots further assisting in separation of placenta.

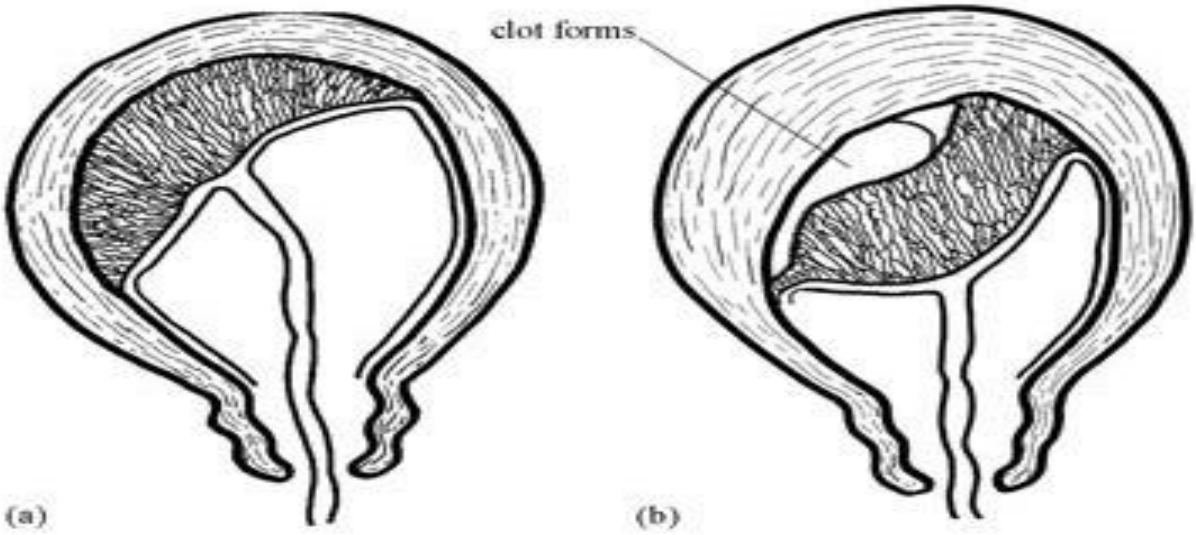
There are two main methods of placental separation:

a) Central (Schultze) separation

b) Marginal (Mathews Duncan) separation

Schultze (Central) Separation

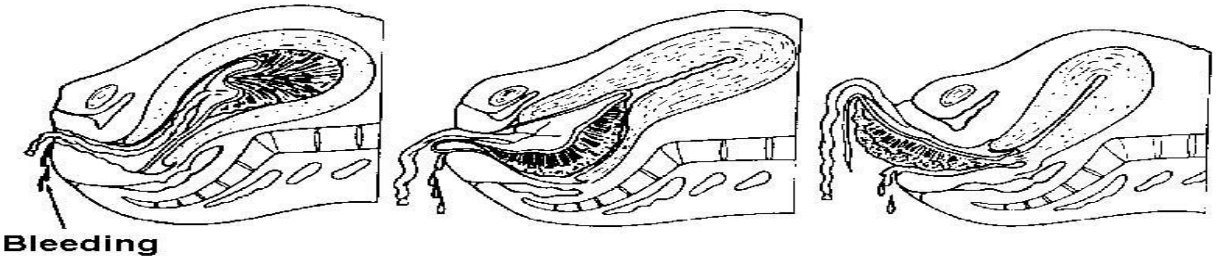
- Separation begins at the center of the placenta and at the area of separation there is formation of retro-placental clots that aids in separation of the placenta by exerting pressure at the midpoint of placental attachment.
- It is associated with minimal blood loss.
- Placenta is expelled with foetal side exposed.



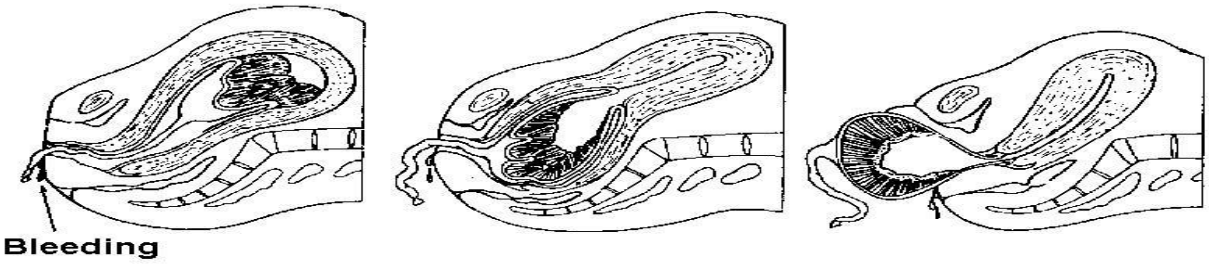
Marginal (Mathews Duncan) separation

- Separation starts at the lower edge of placenta (asymmetrical/lateral border separates)
- There is bleeding associated with this method because there is no formation of retro-placental clots.
- Placenta is expelled with maternal side exposed.

Duncan mechanism



Schultze mechanism



Signs of placental separation

Signs of placental separation are: -

a) Elongation of the cord

b) The cord doesn't recede with pressure on the symphysis pubis

c) A gush of blood

d) Visualization of the placenta on birth canal

e) Uterus contracts and becomes globular (like a cricket ball)

f) Fundus rises at the level of umbilicus.

Descent of the placenta

When the placenta has completely separated the following mechanisms pushes the placenta down(descent) into the lower uterine segment and into the vagina: -

a) Uterine contraction and retraction (contracting uterus pushes it down into the lower uterine segment and into the vagina)

b) Weight of the placenta.

Signs of placental descent may include: -

a) The uterus becomes hard and movable

b) The fundus rises to the level of the umbilicus

c) Cord does not recede with suprapubic pressure

d) Placenta can be felt On vaginal examination or can be visualized at the vulva.

Expulsion of the placenta.

- This is the expulsion of the placenta from the uterus.
- It can occur through the following ways: -

a) Controlled cord traction

- An oxytocic drug is given (10 I.U IM), if pregnancy is not multiple as soon as anterior shoulder is delivered.
- The cord is clamped and cut, wait for contraction.
- Do not wait for the sign of placental separation and descent
- As soon as the uterus contracts the left hand is placed above the symphysis pubis push and the uterus upwards towards the umbilicus. At the same time the right hand grasps the umbilical cord and apply traction in "a down ward direction" and then deliver the placenta.

b) Maternal effort

c) Fundal pressure

d) Gravity and intra-abdominal pressure (Traditional method)

NB-Each student to read more on the other three methods of placental expulsion.

Control of bleeding.

- Processes that control bleeding during third stage of labour include: -

a) Contraction & relaxation of uterine muscles

b) The actions of living ligatures

c) Extra clotting power in the blood.

d) Activation of coagulation mechanisms and Fibrinolysis system.

- Contraction and retraction of uterine muscles causes the placental site to reduce into half and this causes Criss-cross fibres to control bleeding by compressing the blood vessels. There is also retraction of the oblique muscle fibres in upper segment which further helps in stopping bleeding. Living ligatures" The oblique muscles fibers of the uterus run in and out between the blood vessels when the uterus is contracted they clump the blood vessels very securely and the bleeding stops.

- Clotting of blood takes place in the sinuses sealing the bleeding points a few hours later when uterine contractions are less vigorous. This will lead to activation of: Coagulation pathway and Fibrinolysis system. This leads to Achievement of hemostasis. The mother has extra clothing power in her blood at this time the clotting mechanism is very powerful.

- The midwife should be aware that the third stage is the shortest and easiest but the most dangerous stage.

- At the end of the third stage:

    a) The uterus should be hard, round and movable

    b) The uterus should be mid-way between the umbilicus and symphysis pubis

    c) There should be no excessive bleeding

    d) The bladder should be empty

Clamping and cutting of the umbilical cord

There are two approaches in clamping and cutting the umbilical cord during delivery, namely:

a) Early/immediate cord clamping

b) Delayed cord clamping.

NB: Each student to read more on each approach

Active Management of the Third Stage of Labour (AMTSL)

- Palpate the abdomen to rule out the presence of an additional baby before initiating AMSTL
- AMTSL includes:
    a) Prophylactic use of oxytocin (Uterotonins or Oxytocic drugs)
    b) Controlled cord traction for delivery of the placenta
    c) Uterine massage
- Use of Uterotonins or Oxytocic drugs during third stage of labour helps in:
    a) Speeding up the delivery of the placenta
    b) Lessening the blood loss
    c) Contracting the uterus

- Oxytocin is preferred because: -
    a) It is potent and easy to titrate
    b) It has a short half-life (one to five minutes)
    c) It is generally well tolerated

Examination of the placenta.

It is important for the midwife to examine placenta. Examination of placenta helps in determining:

1) Completeness of the placenta

2) Possibility of a missing or extra lobe

3) To detect any placental abnormalities

During examination of the placenta, the midwife should be able inspect: -

a) Maternal surface and fetal surfaces

b) Cord – B/vessels, insertion, length, knots,

c) Membrane-chorion and amnion

d) Weigh

e) Blood loss estimation

f) Placental abnormalities such as:

- Structural –succenturiate lobe, circumvallate, bipartite and tripartite, battledore and velamentous insertion of cord.
- Disease related abnormalities- infarcts, syphilitic, oedematous, calcification,tumours.
- Placental implantation:Placenta praevia, placenta accreta, increta,percreta,vasa praevia.

The midwife should ensure proper documentation and feedback of the findings.

The midwife should remember the following properties of a placenta:

a) Circular in shape, approx. 20 cm diameter, and 2.5 cm thick.

b) It weighs about 500g and is dark red in colour.

c) Develops from 14^{th} day -16^{th} wk

d) Its divided into 15 to 20 lobes by deep grooves.

e) The umbilical cord has two arteries and one vein

FOURTH STAGE OF LABOUR

Immediate Care of Mother:

a) The mother and the baby has to remain in the delivery room for an hour after delivery.

b) Give oxytocin 5-10 iu, massage the uterus and expel the clots.

c) The vulva is swabbed and a sterile pad placed in position

d) Buttocks should be dry and any wet sheet is removed the sterile towel is removed over the lower abdomen and thighs and cover with warm blanket.

e) Careful observation: Check the maternal pulse (60-70) minute is the normal range, take body temperature – subnormal due to loss of body heat, as high as 37.2°c due to reactions of prolonged labour, Blood pressure is taken ½ hourly

f) Encourage her to pass urine /Frequent emptying of the bladder.

g) Give her a hot drink and place the baby on the breast

h) Perform Physical examination

i) Examination of birth canal for tears

j) Carefully examine the cervix, vagina and perineum and repair any tears present as appropriate. Repair the episiotomy and tears. Explain all procedures to the mother.

k) Observe the mother every 15 minutes for vital signs and vaginal bleeding.

l) Perform Mental status assessment

m) Assess lochia and blood loss

n) Breast examination for establishment of lactation

o) Pain management

p) Treat or refer if any complications are detected.

q) Check for calf tenderness

r) Educate the mother to report any bleeding

Immediate care of baby:

a) Keep the baby warm

b) Thoroughly but gently dry the baby

c) Check breathing (Baby should be crying or breathing quietly and easily)

d) Observe he general wellbeing of the baby

e) Monitor the newborn's condition for bleeding from the cord, maintenance of body temperature and where appropriate, encourage initiation of breastfeeding

f) Check the security of the cord clamp

g) Check APGAR score

h) Promote bonding and breast feeding

i) Put on ID (identification) band

j) Check weight, height, head circumference and any drug (s) given to the baby

k) Vitamin K. 1mg (for a term baby)

l) Apply an identification tag and wrap baby in warm soft, dry towels and give to the mother to initiate breastfeeding within the first one hour of life.

m) Once stable, perform 1st examination of the newborn.

n) To prevent ophthalmia neonatorum, apply 1% tetracycline eye ointment.

Educate the mother on:-

a) Postnatal HIV counseling and testing.

b) Exclusive breastfeeding

c) Family planning

d) Post natal danger signs

e) Personal hygiene

f) Proper nutrition

g) Exercises

h) Care of the perineum

i) Use of LLITNs

j) Immunization

k) Bonding

l) Kangaroo care (In case of a preterm baby).

m) Return date and FANC visits

Proper documentation and Record keeping: -

Record your observations during labour to include:

a) Method of delivery- spontaneous or accelerated, forceps, cesarean section or vacuum.

b) Anaesthetic – General, epidural, local

c) Blood loss- amount

d) Placenta and membranes- complete, incomplete

e) Perineum- laceration, episiotomy

f) Drugs given for the mother

g) Baby – Sex, weight, APGAR score, alive or stillbirth. Date and time of delivery

N. B. **The** *chart should present a clear, concise, reliable record.*

h) The legal aspect of record keeping is also important during labour.

PARTOGRAPH

Definition.

- It is the graphical analysis of labour for clinical evaluation of the progress of labour
- It's a graphic presentation, which outlines the progress of a woman in active labour including the foetal and maternal condition.
- It serves as a management tool used for the detection of abnormal progress of labour.
- Used for assessment of:
    a) Fetal well being
    b) Maternal well being
    c) Progress of labor
- It has two important line: -
    a) Alert line
    b) Action line

- Partograph begins to be plotted at four centimeter dilatation.
- Alert line begins at 4cm and extend to full dilatation.
- Action line is an important line as it guides a midwife on when labour is progressing poorly and an intervention is required.

Advantages of using partograph.

1. It helps in estimating expected time of delivery
2. It can detect any impending problem/danger during labour
3. It helps in detecting delayed labour
4. It ensures continued care and monitoring of mothers in labour
5. Can be used in giving report during change of shift
6. It simplifies transfer of clients to higher health facilities
7. It is useful in statistical analysis of labour
8. It can be used as training tool.

Information recorded on the partograph

Information recorded on the partograph includes:

1) **Patient information:**

   a) Full Name, age, gravidity, parity, hospital number, date and time of admission and time of rupture of the membranes in hours

2) **Foetal Condition:**

   a) The Foetal heart rate observed ½ hourly and plotted with a dot (.).

   b) The normal foetal heart rate is between 120 - 160 beats per minute.

3) **Amniotic fluid and membranes**

Record the state of the membranes and/or amniotic fluid /liquor on the partograph in the area provided as follows:

   a) I - Intact membranes

   b) C - Clear liquor on ruptured membranes

   c) M - Meconium stained liquor

d) A - Absent liquor if membranes are ruptured

e) B - Blood stained liquor.

This observation is made at each vaginal examination. If there is thick meconium at any time or absent liquor at the time of membrane rupture, rule out other signs of foetal distress and take appropriate action.

4) **Moulding of the foetal skull bones**

An indication of how adequately the pelvis can accommodate the foetal head. Increasing moulding with the head high in the pelvis is a sign of cephalopelvic disproportion.

Moulding is observed 4 hourly in the row indicated **moulding:**

a) 0 If bones are separated and the sutures can be felt easily

b) + If sutures are apposed but no overlap i.e. the bones are just touching each other

c) ++ If there is overlapping of the sutures but it is reducible

d) +++ If the sutures overlap but not reducible

5) **Cervical dilation**
   a) Assessed at every vaginal examination and is plotted with an (**X).**
   b) The first vaginal examination, on admission, includes a pelvic assessment. Thereafter, vaginal examinations are done every 4 hours, unless contraindicated or as indicated e.g. if 2nd stage is imminent or there is evidence of rapid progress of labour as may occur in multiparous patients.

6) **Descent of the foetal head**

   a) Measured by abdominal palpation and is expressed in terms of fifths palpable above the pelvic brim.

   b) Its plotted with an **(O)**

7) **Hours:**

   a) This refers to the time elapsed since onset of active phase of labour (observed or extrapolated)

8) **Time:**

   a) This refers to actual time

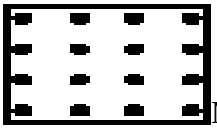
9) **Uterine Contractions**

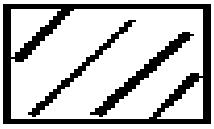
In normal labour the uterine contractions increase in frequency and intensity. The number of the uterine contractions is assessed and recorded *every half-hour in the active phase of labour.*

b) **The frequency:** How often are they felt (i.e. the number of contractions palpated in ten minutes.)
c) **The duration:** How long do they last (in seconds); the duration must also be palpated not just estimated by observation. Duration are expressed as follows:
    i. Less than 20 seconds: Mild
    ii. Between 20 and 40 seconds: Moderate
    iii. More than 40 seconds: Strong

Shading of uterine contraction duration on a partograph.

Contractions on a partograph are shaded as follows:

1.  Mild contractions

2.  Moderate Contractions

3.  Strong contractions

10) **Maternal Condition**

Entered at the foot of the partograph, below the recording of the uterine contractions and include:

a) **Oxytocin regime**: Indicates the amount of oxytocin per volume intravenous fluid as well as the rate of administration in drops per minute.

b) **Drugs and IV fluids**: Record here any additional drugs administered during labour

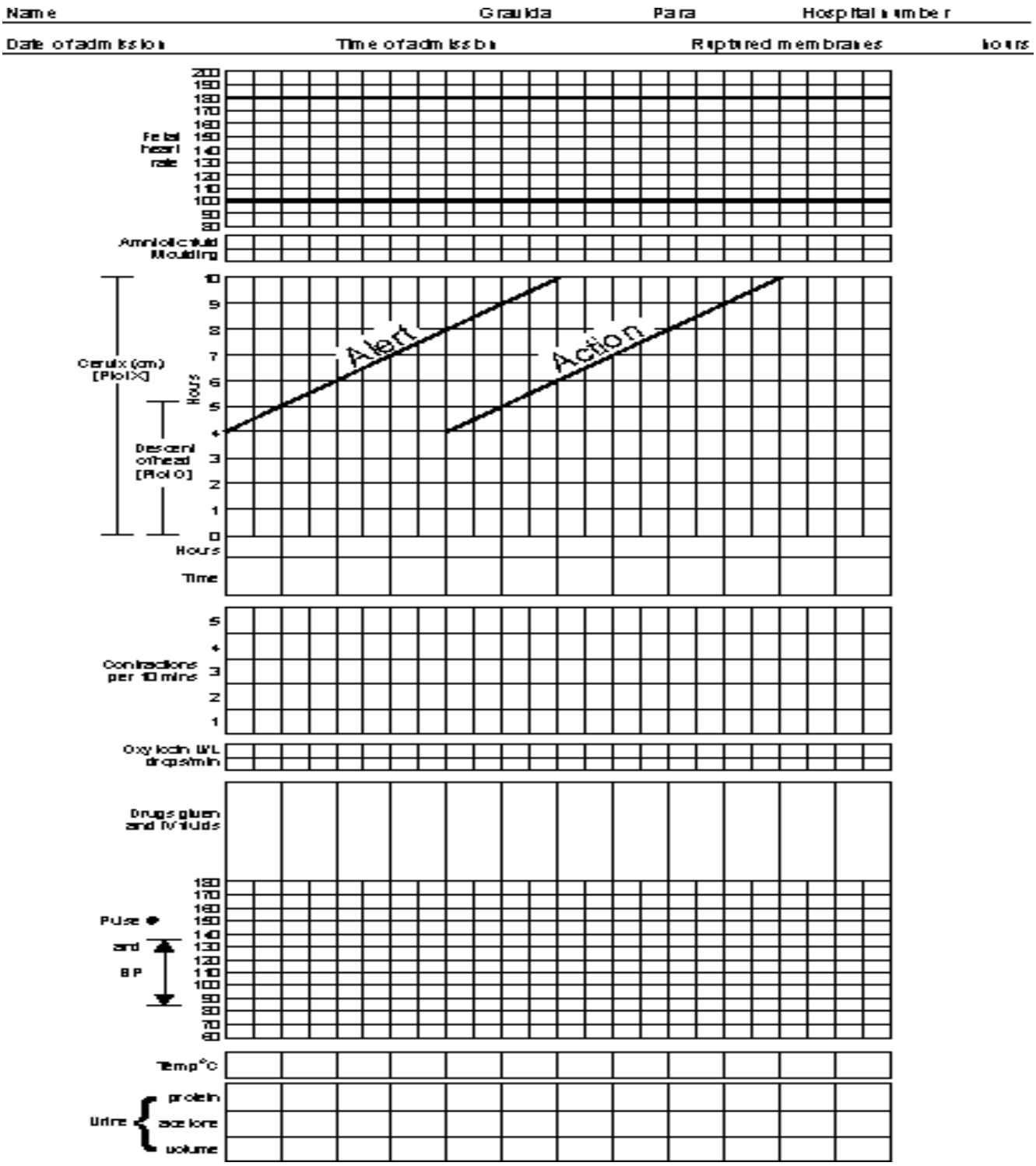
c) **Pulse rate:** Maternal pulse rate is observed every half hourly and marked with a dot (·)

d) **Blood Pressure**: This is taken once every 4 hours and indicated with arrows for diastolic and systolic reading joined with a dotted line

e) **Temperature**: Ideally the temperature in C should be taken every 2 hours and recorded in the space provided

f) **Urine**: Encourage the woman to pass urine every 2-4 hours. Measure the volume of urine passed and check it for protein and acetone. Record in the space provided at the bottom of the partograph

Sample of a Partograph.



Summary of Labour

- **1st Stage: Induction of labour: YES/NO Duration _____hrs No of VEs _____**
- **2nd Stage Mode of delivery_____; Duration _____min;**
- **3rd Stage: AMTSL: Y / N Uterotonic: Oxytocin / other_____;**
- Placenta complete/ incomplete, Placental Wt _____g, Blood loss _____ml; Perineal tear/ episiotomy; Repair Y /N;
- Mother's BP _____ Pulse _____ Temp _____ RR _____
- **Baby: Alive / SB; Sex: M / F; HC ____cm; Apgar score 1min ____, 5min _____; Birth weight: _____g; Baby length _____**
- Head Circumference_____m; Resuscitation: Y / N Drugs given: Vit. K / other drugs _____
- Delivered by _____; Date of delivery _____; Time of delivery _____

PUERPERIUM

Learning objectives.

By the end of the lesson, the learner should be able to: -

1. Define puerperium.
2. Explain psychological changes during puerperium
3. Outline danger signs during puerperium
4. Explain physiology of lactation
5. Discuss physiological changes during puerperium

Definitions.

Puerperium is defined as the time from the delivery of the placenta through the first six (6) weeks after the delivery.

It is expected that by the sixth week after delivery, most of the changes of pregnancy, labor, and delivery have resolved and the body has reverted to the non-pregnant state.

In the puerperium period, various physiological and psychological changes occur, namely:

a) Reproductive organs return to the non-gravid state. Eg. uterus shrinks and shed its linings. Her cervix closes, her vagina returns to normal size, breast produce milk.
b) Previous physiological changes which occurred during pregnancy are revered.
c) Bonding between the newborn and parents is established.
d) The mother recovers from stresses of pregnancy and delivery.
e) Initiation of lactation begins.

Post-partum period is the interval between the birth of the placenta and the return of the reproductive organs to their normal no pregnant state

The Psychology of the Mother during Puerperium

During the puerperium the mother is subjected to emotional turmoil and you must be supportive and observant. She should be allowed to cuddle her baby and express her love as she wishes. This maternal instinct is at times delayed.

The midwife should be kind, patient, and compassionate towards the mother and give her the necessary education concerning her and the baby. Each mother should be taken as an individual based on her maternal experience, educational background, maturity and parity. Mothers should be given all the information necessary to ensure they know how to care for their babies.

Rooming is the term given when a hospital plans for the mother to stay with the baby for most of the 24 hours in a day. It is highly recommended because it has been seen to have great psychological advantages for both mother and baby. Bonding commences immediately and

demand breast-feeding can be successfully practised. Most baby-friendly hospitals in this country encourage rooming in.

Physiology of Puerperium.

Involution – This is the process by which genital organs return to their pre-gravida state.

Sub-involution – Refers to a delay in the return of genital organs especially the uterus to their pre-gravida state.

Involution of uterus

a) The size of the pregnant uterus is 30 x 22 x 20cm and it weighs 100gms at the end of labour.

b) It is 15 x 11 x 7.5cm by the end of puerperium.

c) Involution takes place, by which point it measures 7.5 x 5 x 2.5cm and weighs 60gms.

d) Normal weight of the uterus is big and after pregnancy it weighs up to 907grams.

e) Since the uterus has to attain its weight, it will lose 50% of its weight during the 1st week and the 50% is lost gradually until the end of puerperium.

WEEKS	WEIGHT OF THE UTERUS	DIAMETER OF PLACENTAL SITE	CERVIX
End of labour	900g	12.5cm	Soft, flabby
End of 1wk	450g	7.5cm	2cm
End of 2wks	200g	5.0cm	1cm
End of 6wks	60g	2.cm	A slit

Processes leading to involution of the uterus.

Involution of the uterus occurs as a result of two mechanisms, namely: -

a) **Autolysis** is a process by which muscle fibres are digested by the proteolytic hormone. The muscle fibres have to dissolve a large amount of their protein in order to achieve this reduction in size. This means that a great deal of nitrogen is excreted by the body in the urine together with the excess fluid retained during pregnancy. This explains why a lot of urine containing large amounts of nitrogen is excreted during the first few days after delivery. Loss of lochia further assist in reduction of the uterus.
b) **Ischaemia** is localised anaemia of the uterus,which occurs when the placenta is expelled. Blood vessels are constricted, which results in the reduction of the blood supply to the uterus.

How to promote involution

a) Promote good health and nutrition to the mother during puerperium
b) Early ambulation and exercises (eg Kegel's exercise).
c) Preventing infection by observing universal infection prevention protocols.
d) Encourage exclusive breastfeeding

Ways of knowing involution of the uterus is taking place:

a) Taking the measurements of the fundal height which supposed to be reduced by 1cm daily as shown in the above diagram.
b) The rectum and bladder should be emptied before examination because when they are full they displace the uterus upwards. The measurement is done from the level of the symphysis pubis to the fundus.
c) Observation of the normal lochia loss persistent red lochia indicates sub involutions of the uterus.

Changes in the Uterus.

a) There is reduction in uterine size mainly as evidenced by:
    - The uterus sinks into the pelvis and the fundus is felt midway between the umbilicus and symphysis
    - One week after completion of labour, the fundus is approximately 7.5cm above the symphsis pubis.
    - In 10-12 days after labour the fundus is not usually palpable
b) There is endometrial regeneration. Endometrial Regeneration takes place within 2 or 3 days after delivery, the remaining decidua becomes differentiated into two layers : superficial layer becomes necrotic, and it is sloughed in the lochia and the basal layer adjacent to the myometrium remains intact and is the source of new endometrium Endometrial regeneration

is rapid, except at the placental site which within a week or so, becomes covered by epithelium, and the entire endometrium is restored during the third week.

c) Placental Site Involution. Complete extrusion of the placental site takes up to 6 weeks. When this process is defective, late puerperal hemorrhage may ensue. Immediately after delivery, the placental site is about the size of the palm of the hand, but it rapidly decreases thereafter. By the end of the second week, it is 3 to 4 cm in diameter. Within hours of delivery, the placental site normally consists of many thrombosed vessels that ultimately undergo the typical organization of a thrombus.

d) Changes in the Uterine Vessels**:** After delivery, the caliber of extra-uterine vessels decreases. Within the puerperal uterus, blood vessels are obliterated by hyaline changes, and vessels that are smaller replace them.

e) Lochia: Discharge form the uterus during puerperium, it is alkaline in nature in which microorganisms can flourish more rapidly than in the normally acid situation of the vagina. It has a heavy but non offensive odour, it undergoes sequential changes s the involution of the uterus progresses. There are three types of lochia, namely:

   i. Lochai Rubra. Occurs from 1^{st} 3- 4^{th} day. Immediately after delivery, a large amount of red blood flows from the uterus until the contraction phase occurs. Thereafter, the volume of vaginal discharge (lochia) rapidly decreases. Usually consist of blood from placental site, debris arising from the decidua and chorion

   ii. Lochia Serosa. Occurs from 5^{th} -9^{th} day. The red discharge progressively changes to brownish red, with a waterier consistency. It is pink in colour, has less blood and more serum also contains leucocytes from the placental site.

   iii. Lochia alba. It occurs from 10^{th} day to 2-3 weeks. Over a period of weeks, the discharge continues to decrease in amount and color and eventually changes to yellow. period of time the lochia can last varies, although it averages approximately 5 weeks. Contains leucocytes, cervical mucus, and debris from healing tissues

Changes in the Cervix

a) After delivery, the cervix appears soft and edematous and has little tone.

b) The cervix constricts rapidly and regains its shape by the end of the first week. Then, it is firm and thicker.

c) The external os is contracted, only about one cm dilated. The cervix is healed by the fourth to sixth week after delivery.
d) The external os assumes a typical transverse slit of a parous woman.
e) Immediately after delivery, the cervix is soft and vascular and may be seen protruding in the vagina. It admits 2-3fingers.
f) It usually loses its vascularity to hardness with 2-4days.
g) By the 4th week after delivery, cervix has completely closed.
h) The form of the cervix after delivery depends on the number of pregnancies the woman had and whether the woman had any lacerations during delivery.
i) During delivery, lacerations in the cervix and the vagina heal well spontaneously unless infected.
j) The cervix also begins to rapidly revert to a non-pregnant state, but it never returns to the nulliparous state. By the end of the first week, the external os closes such that a finger cannot be easily introduced.

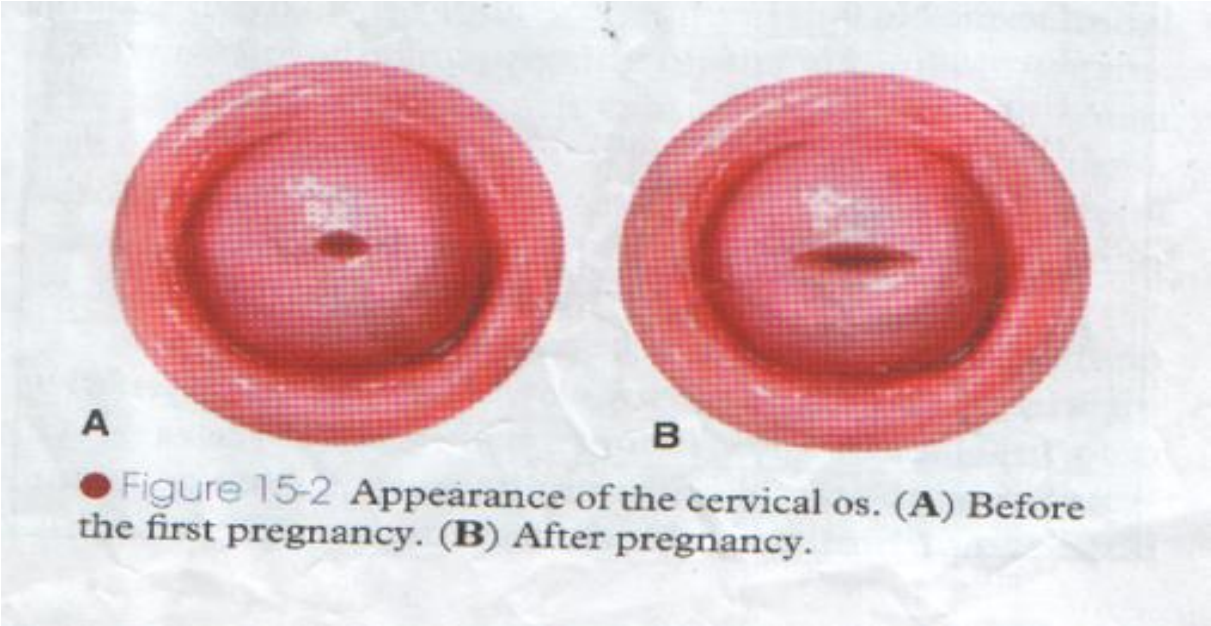


Figure 15-2 Appearance of the cervical os. (**A**) Before the first pregnancy. (**B**) After pregnancy.

Changes in the Vagina

a) The vagina also regresses but it does not completely return to its prepregnant size. Resolution of the increased vascularity and edema occurs by 3 weeks, and the rugae of the vagina begin to reappear in women who are not breastfeeding. At this time, the vaginal

epithelium appears atrophic on smear. This is restored by weeks 6-10; however, it is further delayed in breastfeeding mothers because of persistently decreased estrogen levels.

b) The woman's vagina is stretched, smooth and swollen and has very little muscle tone after delivery.
c) Within one to two days, the swelling decreases and the vagina starts to return to its normal shape.
d) Exercises can improve the muscle tone of the vagina
e) The mucosa remains atrophic in lactating woman at least until menstruation begins again.
f) Thickening of vaginal mucosa occurs with the return of ovarian function.
g) The reduced estrogen levels also responsible for causing a decreased amount of vaginal lubrication, so localized dryness and dyspareunia may persist until ovarian function returns and menstruation resumes.

Changes in the Perineum

a) The perineum has been stretched and traumatized, and sometimes torn or cut, during the process of labor and delivery.
b) The swollen and engorged vulva rapidly resolves within 1-2 weeks.
c) Most of the muscle tone is regained by 6 weeks, with more improvement over the following few months.
d) The muscle tone may or may not return to normal, depending on the extent of injury to muscle, nerve, and connecting tissues.

Changes in the Abdominal wall

a) The abdominal wall remains soft and poorly toned for many weeks.
b) The return to a prepregnant state depends greatly on maternal exercise.
c) Abdominal muscles protrude during the first days after birth.
d) During the first 2 weeks after birth the abdominal wall is relaxed and it takes approximately 6 weeks to return almost to its nonpregnant state
e) The skin regains most of its previous elasticity, but some striae may present
f) The return of muscle tone depends on previous tone, proper exercise, and the amount of adipose tissue.

Changes in the Ovaries.

a) The resumption of normal function by the ovaries is highly variable and is greatly influenced by breastfeeding the infant.
b) The woman who breastfeeds her infant has a longer period of amenorrhea and anovulation than the mother who chooses to bottle-feed.
c) The mother who does not breastfeed may ovulate as early as 27 days after delivery. Most women have a menstrual period by 12 weeks; the mean time to first menses is 7-9 weeks.
d) In the breastfeeding woman, the resumption of menses is highly variable and depends on a number of factors, including how much and how often the baby is fed and whether the baby's food is supplemented with formula.
e) The delay in the return to normal ovarian function in the lactating mother is caused by the suppression of ovulation due to the elevation in prolactin.
f) Half to three fourths of women who breastfeed return to periods within 36 weeks of delivery.

Changes in the Breasts and lactation.

a) The changes to the breasts that prepare the body for breastfeeding occur throughout pregnancy. If delivery ensues, lactation can be established as early as 16 weeks' gestation.
b) Lactogenesis is initially triggered by the delivery of the placenta, which results in falling levels of estrogen and progesterone, with the continued presence of prolactin.
c) If the mother is not breastfeeding, the prolactin levels decrease and return to normal within 2-3 weeks.
d) The colostrum is the liquid that is initially released by the breasts during the first 2-4 days after delivery.
e) High in protein content, this liquid is protective for the newborn.
f) The colostrum, which the baby receives in the first few days postpartum, is already present in the breasts, and suckling by the newborn triggers its release.
g) The process, which begins as an endocrine process, switches to an autocrine process; the removal of milk from the breast stimulates more milk production.
h) Over the first 7 days, the milk matures and contains all necessary nutrients in the neonatal period. The milk continues to change throughout the period of breastfeeding to meet the changing demands of the baby.
i) The actual secretion of milk starts from the 2nd day puerperium because the oestrogen level in blood circulation is still high and they reduce gradually. This is because prolactin which is responsible for production of breast milk acts on the lower levels of oestrogen.

j) The human breast milk is white and rich in sugar (lactose) which is more than any other milk.

Changes in the Endocrine system.

a) Placental hormones. Expulsion of the placenta results in dramatic decreases of hormones produced by placenta. The placental enzyme insulinaze causes the diabetogenic effects of pregnancy to be reversed, resulting in significantly lower blood sugar levels in the immediate postpartum period.
b) Estrogen and progesterone levels decrease markedly after expulsion of the placenta, reaching their lowest levels 1 week into the postpartum period. Decreased estrogen level associated with; breast engorgement, and diuresis of excess extracellular fluid that has accumulated during pregnancy.
c) The estrogen levels in nonlactating women begin to increase by 2 weeks after birth, and higher by postpartum day 17.
d) Pituitary hormones and ovarian function: -Lactating and nonlactating women differ in the time of the first ovulation. The persistence of elevated serum prolactin levels in breast feeding women appears to the responsible for suppressing ovulation. Prolactin levels decline in nonlactating women, reaching the prepregnant range by third week About 70% of nonlactating women resume menstruation by 3 months after birth.

Changes in the kidney and renal system.

a) The diminishing steroids levels after birth may explain the reduced renal function that occurs during the puerperium.
b) Urine components BUN level increases during pueperium as autolysis of the involuting uterus occurs. This breakdown of excess protein in the uterine muscle cells results in a mild (+1) proteinurea for 1-2 days after childbirth.
c) Postpartal diuresis
d) Within 12 hours of birth, women begin to lose the excess tissue fluid that has accumulated during pregnancy.
e) One mechanism responsible for reducing these retained fluids is the profuse diaphoresis that often occurs for the first 2-3 days after childbirth.

f) The fluid loss through increased urinary output accounts for weight loss of approximately 2.25kg during the puerperium.

Changes in Urethra and bladder.

a) If trauma to the urethra and bladder occur during the birth process, the bladder wall becomes hyperemic and edematous, often with small areas of hemorrhage.
b) Birth-induced trauma increased bladder capacity and the effects of conduction anesthesia combine to cause a decrease in the urge to void. In addition to pelvic soreness from the forces of labor, vaginal laceration, or an episiotomy which may reduce the voiding reflex.
c) Decreased voiding, along with postpartal diuresis may result in bladder distention.
d) Distended bladder pushes the uterus up and to the side and this prevents the uterus from firmly contracting which may cause excessive bleeding.
e) Bladder tone is usually restored 5-7days after childbirth

Changes in Gastrointestinal system.

a) Appetite. The mother is usually hungry shortly after giving birth.
b) Bowel evacuation. A spontaneous bowel evacuation may be delayed until 2-3 days after childbirth. This can be explained by decreased muscle tone of the intestines during labor and the immediate puerperium, prelabor diarrhea, lack of food, or dehydration
c) GI tone and motility decreases in the early postpartum period, commonly causing constipation.
d) Normal bowel function returns approximately 2 to 3 days postpartum.

Changes in the Hepatic system.

a) Liver function returns to normal approximately 10 to 14 days postpartum.
b) Gall bladder contractility increases to normal, allowing for expulsion of small gallstones

Changes in Cardiovascular function.

a) Cardiac output decreases rapidly and returns to normal by 2 to 3 weeks postpartum
b) Hematocrit increases and increased red blood cell (RBC) production stops

c) Leukocytosis with increased white blood cells (WBCs) common during the first postpartum week.
d) The blood volume which increase during pregnancy is eliminated within the first 2 weeks after birth, with return to nonpregnant values by 6 weeks postpartum.
e) Immediately after the birth, the pulse rate, stroke volume and cardiac output remain elevated or increase for 30 to 60 minutes as the blood that shunted through uteroplacental circuit suddenly returns to the maternal systemic venous circulation

Changes in the Respiratory Function.

a) Returns to normal by approximately 6 to 8 weeks postpartum
b) Basal metabolic rate increases for 7 to 14 days postpartum, secondary to mild anemia, lactation, and psychological changes.

Neurological Function changes.

a) Frontal and bilateral headaches are common and are caused by fluid shifts in the first week postpartum
b) The elimination of physiologic edema through the diuresis that occurs after childbirth relieves carpal tunnel syndrome by easing the compression of the median nerve.

Musculoskeletal changes.

a) Generalized fatigue and weakness is common
b) Decreased abdominal tone is common
c) Diastasis recti abdominis heals and resolves by the 4th to 6th week postpartum.
d) Until healing is complete, abdominal exercises are contraindicated

Skin changes.

a) Chloasma of pregnancy usually disappears at the end of pregnancy.
b) Hyperpigmentation of the darken of the areola and linea nigra may not regress completely after childbirth, and it may be permanent in some women.
c) Stretch marks on breasts, abdomen, hips, and thighs may fade but usually do not disappear
d) - Hair growth slows during postpartum period, and some women may actually experience hair loss.

Weight loss during puerperium.

a) Average weight loss 5.5kgs. [infant & placenta]

b) 2.5kgs- diuresis and diaphoresis in week following delivery

c) Lochial flow - 900-1300g.

d) Total approximate weight loss. 8.5-10kgs. {depends on total wt. gain}

e) At 6 wks. weight may still be above pre-pregnancy weight.

Common puerperal problems.

a) Perineum:

- If the perineum has been damaged and repaired it may cause considerable pain, requiring analgesics, and women may prefer to sit on a rubber ring.
- If the perineum is painful, it is important to check the sutures and check for any signs of infection. Occasionally sutures may need to be removed.

b) Micturition:

- May be difficult in first 24 hours and may occasionally require catheterisation.
- Around 1 in 10 women have urinary incontinence and this usually takes the form of stress incontinence. For most women this has resolved after a few weeks. Pelvic floor exercises should be taught and encouraged.

c) Bowel problems:

- Constipation may be a problem for a short time and stool softeners may be useful.
- Haemorrhoids may be more painful after the birth than before. These can occasionally appear for the first time perinatally and these normally disappear within a few weeks.

d) Mastitis:

- May be due to failure to express milk from one part of the breast; can treat by ensuring all milk is expressed and cold compresses.
- May be complicated by infection with *Staphylococcus aureus* and require treatment with flucloxacillin.
- Very occasionally a breast abscess develops and requires incision and drainage.

e) Backache:

- This may persist after the birth and affects approx. a quarter of women - 50% of these women suffered backache before pregnancy.
- Pain may be considerable and last for several months.

f) Psychological problems:

- Post-natal blues on days 3-5, a large proportion of women become temporarily sad and emotional; approximately 10% of women suffer from postnatal depression which may present at any time during the first year after delivery.
- The precise cause of this is unknown and may involve hormonal changes, reaction to excitement of childbirth and doubts by the mother about her ability to care for the child.
- Management consists of talking to the mother and explaining what is happening.

Management of Normal Puerperium

a) The aim of managing the puerperium is to:

i. Maintain the mother's good health.
ii. Aid involution of the pelvic area
iii. Promote breast-feeding
iv. Prevent infection and other puerperium complications

b) Immediate management of the mother: -

- Immediate management starts immediately after delivery.
- Make the mother comfortable and leave her to rest for 1 hour.
- Observe her constantly and note and deterioration.
- Inform the patient to report immediately any excessive bleeding.
- Check the uterus if it is well contracted which should be felt hard and normal.
- Ensure the bladder is empty.
- Check the lochia loss which should be scanty.
- Do post delivery vital signs observation, pulse, respiration and BP ¼ hourly.
- Provide her with hot drinks.

c) **Admission to the postnatal ward**

- Patient and baby is accompanied by the midwifes to the postnatal ward.
- The postnatal midwife has to welcome the mother to the new ward and admit in a comfortable warm bed and cot.
- Check the babies cord if there is any bleeding and if there is any, litigate with another ligatures.
- The postnatal midwife should receive the report from labour ward midwife and patient's notes and should be corrected where necessary with nurse escorted the mother.
- Confirm the sex of the baby in the notes.
- Ensure that the uterus is well contracted and lochia loss should be minimal (scanty).
- Ensure that the bladder is empty to hasten the involution of the uterus and encourage to pass urine frequently if possible.
- Observe the vital signs observation to rule out any abnormality like postpartum eclampsia.
- Finally, leave her to rest and sleep comfortably and instructed to call the midwife or ring the bell if she starts bleeding.

d) **Subsequent management in the postnatal ward**

- **Rest** – Ensure that the mother has adequate rest and sleep by making her comfortable and provide food atmosphere to initiate lactation. One hour in the morning and afternoon rest should be encouraged or any period defined in the day. The mother should have 8 hours sleep at night. Mild sedatives may be given for 1st few days at night to ensure sleep. If the mother has some discomfort like after pains, then administer analgesics.
- **Ambulation** – encourage the mother to get up six to 12 hours after delivery to give: A feel of wellbeing: Promote good circulation, Drainage of lochia, Participate in the care and management of her baby. Postnatal exercises should commence on the 3rd day to increase the muscle tone.
- **Diet** – The food for a postnatal mother should be nourishing and well balanced. It should be rich in iron, proteins, vitamins and mineral to promote good lactation. Encourage the mother to take adequate fluid in form of beverages. Protein is for repairing worn out cells and for milk production. Iron and vitamins to counteract anaemia. Plenty fruits and vegetables are for successful lactation.

- **Personal hygiene:** Advise the mother to maintain personal hygiene for comfort and to prevent infection. The mother is prone to infection especially during the 1st week because: Lochia (lochia rubra) which is a good culture media for micro-organisms). Raw placental site which can easily be infected. Lacerated, bruisy areas on the puerperium and vagina are also prone to infection. Low body resistance to infection during puerperium.
- **Standardized personal hygiene can be achieved during puerperium by:**
  i. Advising the mother to take bathe twice a day.
  ii. Do vulval toilet twice a day.
  iii. Bowel and bladder should be empty.
  iv. Frequent changing of pads when over-soiled but not leave in the vulva for 4 hours.
  v. Frequent changing of bed linen
  vi. Proper scrubbing of hands before taking meals and after visiting the toilet.
  vii. Advise the mother to clean herself from front ward after visiting the toilet to avoid contaminating the bruises, laceration and episiotomy site in the vagina.
- **Care of the bladder and bowels:** Encourage regular emptying of the bowels and bladder to: Prevent post-partum hemorrhage, Sub involution of the uterus , Urinary tract infection avoid constipation as it may contribute to sub involution of the uterus. Advise the patient to take food rich in roughage, adequate fluids and fruits.
- Take observation: observations of vital signs is done daily to; Assess the progress
- Detect any deviation from normal, Bp is taken daily and more frequently if there is hx of hypertension, Temperature should not exceed 37.30c., Daily physical examination from head to toe is done systematically to: Assess the general physical and emotional health of the mother, detect early any complications and manage as appropriate, to share relevant health message
- **Promotion of Exclusive breast feeding:** Breasts should be clean and supported well.
- **Encourage on follow-up clinics**: - Child welfare clinic and post-natal clinic.
- **Involve the mother on discharge plan.** The mother must be given discharge instructions. The most important information is who and where to call if she has problems or questions. She also needs details about resuming her normal activity. Instructions vary, depending on whether the mother has had a vaginal or a cesarean delivery.
- **Provide health education on**: -
  i. Danger signs
  ii. Essential newborn care. (Breastfeeding, APGAR Score, warm chain, cord care etc)
  iii. Diet.
  iv. Rest and exercises.
  v. Immunization.
  vi. Family planning after six weeks
  vii. Care of episiotomy, tear or incisional site in case of C/S
  viii. Sexual intercourse (Sexual intercourse may resume when bright red bleeding ceases, the vagina and vulva are healed, and the woman is physically comfortable and emotionally ready. Physical readiness usually takes about 3 weeks. Birth control is

important to protect against pregnancy because the first ovulation is very unpredictable).

- **Measure the fundal height and record the measurement daily.** Assess whether the involution is taking place satisfactory. The fundal height should reduce by 0.5 - 1 centimeter daily.
- **Check on lochia loss, noting the colour**. This should change as per the schedule we noted earlier. If there is persistent red lochia, this points to the need for further investigation. Offensive lochia odour denotes infection.
- **Take note of any pain and administer analgesics.** Ask the mother to report if lochia is heavy. Also, encourage her to pass urine when her bladder is full. Encourage her to continuously check on the baby's cord and to report any bleeding, especially in the first 12 hours.
- **The mother must be counseled about birth control options** before she leaves the hospital. She may not be ready to decide about a method, but she needs to know the options. Her decision will be based on a number of factors, including her motivation in using a particular method, how many children she has, and whether she is breastfeeding.
- **Postnatal HIV counseling and testing.**
- **Assess daily needs** eg physical and emotional wellbeing, tiredness and fatigue, uterus, lochia, perineum, vulva, legs, anus, genital area etc
- **Assist the mother in birth** notification and enter the information in the postnatal register
- **Pain management.** Assess and manage pain
- **Advice the mother on return date.**
- **Danger signs during postnatal period include: -**
    a. Profuse vaginal bleeding.
    b. Fever (38^0c)
    c. Foul smelling vaginal discharge
    d. Convulsions
    e. Calf tenderness.
    f. Discharge from incision site or episiotomy.
    g. Severe headache.
    h. Excessive tiredness (Anemia)
    i. Blurred vision.
    j. Anxiety and depression.
    k. Urinary or fecal incontinence.
    l. Lower abdominal pain.
    m. Breast problems: Engorgement, sore, cracked bleeding or inverted nipples

Targeted post-natal care.

Postnatal care this is care given to both the mother and the baby from birth in order to reduce the incidence of complications and deaths as well as to promote the health of the mother and baby

The post-partum period for the mother starts after the expulsion of the placenta up to 42 days (6 weeks) after delivery.

Introduction of Targeted Post-natal care was aimed at equipping service providers with knowledge and skills on targeted postnatal care and it is one of the pillars of safe motherhood.

Targeted post-natal care is an individualized care given to both the mother and the baby with the first six (6) weeks after delivery in order to reduce complications as well as promote wellbeing of the mother and the baby.

The main reasons on why we should focus on targeted postnatal care is because: -

a. Kenya still register high maternal mortality
b. Kenya register high neonatal deaths.
c. Majority of these deaths occur during post-partum period.
d. Provides a continuum of care from ANC, delivery, Post-partum period and beyond results in reduced maternal and neonatal morbidity and mortality.

Targeted post-natal care: -

a. Describes a comprehensive postnatal package which is a key strategy in reducing maternal and neonatal deaths
b. Focuses on supporting and maintaining maternal and newborn/infant wellbeing throughout the postnatal period
c. It is goal oriented, timely, friendly and simple
d. It comprises four focused personalized(Individualized) visits or assessments after the birth to at least 6 months postnatal
e. Should be given to every mother and her newborn baby

Elements of targeted post-natal care.

Elements of targeted post-natal care includes:

a. Assisting the mother and family to develop a personalized postnatal care plan
b. Provision of care to mother and baby by skilled attendant.
c. Emergency preparedness and Complication readiness for the mother and baby
d. Early detection and treatment of problems such as TB, Eclampsia, hemorrhage etc; and referral as necessary
e. Counselling for HIV and testing; Family planning, Breast feeding, personal hygiene, nutrition; etc
f. Health promotion using health messages

Postnatal plan.

A post-natal should be reviewed with mother and her partner during each Post-natal clinic visits. The post-natal plan should ensure that the client is able to: -

a. Identify danger signs in the mother and baby and action to take
b. Identify a health facility in case of an emergency
c. Identify a decision-maker in case of an emergency
d. Have money set aside to use in case of an emergency
e. Has a transport plan in case of emergency.
f. Identify a blood donor.
g. Knows that Birth Registration for the baby is a child's right.

Targeted post-natal visits (Assessment) schedule.

There are four targeted post-natal visits or assessment schedule as shown in the table below: -

Schedule (Assessment)	**Time**
First schedule	Within 48 hours after birth
Second schedule	Within 1-2 weeks
Third schedule	Within 4-6 weeks
Fourth schedule.	Within 4- 6 months

Specific services provided in each schedule.

First schedule

Mother	**Newborn**
Check and perform the following: - • Mental status • Pallor, BP, temperature, pulse rate • Lochia loss- (colour, amount,smell) • Assess for calf tenderness • Infection /pus from C/S site or perineal wound • Breast condition	Check and perform the following: - • Growth monitoring; chart weight • Head to toe examination • Assess for danger signs for baby • Check eyes for discharge • Immunisation status • Observe a breast feed

• Uterine involution • Observe a breast feed • Record in PNC register and Mother • Child booklet	• Record in PNC register and Mother Child booklet

Second schedule

Mother	Newborn
Provide: - • Vitamin A supplementation (if not yet given) • Haematinics • LLITN (if not yet given) • Treatment for any complications detected • Referral as appropriate Counsel on: - • Counselling and Testing for HIV • Danger signs for mother • Family Planning. • Maternal Nutrition • Personal hygiene and hand washing for caregiver • Breast care and Exclusive breast feeding • Harmful practices • Cervical cancer screening • Return date	Provide: - • Vitamin A if not yet given • Immunisations if not yet started • INH prophylaxis as appropriate • Treatment of any complications detected • Referral as appropriate • Birth registration if not yet done Counsel on: - • Danger signs for Baby • Exclusive breast feeding • Hand washing for caregiver • Keeping baby warm • Cord care • Adherence to ARV prophylaxis as appropriate • Return date

Third schedule.

Mother	Newborn
Check on: - • General condition of mother • Mental status • BP, Weight, temperature • Uterine involution • Lochia (amount /colour) • Observe a breast feed	Check on:- • Growth monitoring; chart weight • Head to toe examination • Assess for danger signs for baby • Immunisation status • Record in Integrated register and Mother Child booklet

• Record in PNC register and Mother Child booklet Provide: - • FP method of choice • Counselling and Testing for HIV • Screening for cervical • Clinical breast examination • Screening for STI/ RTI • Screen for TB • Treatment for any complications detected • Referral as appropriate Counsel on: - • Danger signs for the mother • Exclusive breast feeding and Breast care • Family Planning • Maternal nutrition • Harmful practices • Personal hygiene and hand washing for the caregiver • Return date	Provide: - • Immunizations as per schedule • INH prophylaxis as appropriate • Treatment of any complications • detected • Referral as appropriate • Early infant diagnosis (EID) for HIV • Management of HIV positive infant • Birth registration if not yet done Counsel on: - • Danger signs for Baby • Exclusive breast feeding • Hand washing for caregiver • Hygiene • Return date

Fourth schedule.

Mother	**Newborn**
Check: - • General health of mother Provide: - • FP method of choice • Screening for RTI /STI • Screening for cervical cancer –if not done • Screening for TB	Check: - • Growth monitoring; chart weight • Head to toe examination • Assess for danger signs for baby • Immunization status Provide: - • Vitamin A supplementation • Immunizations as per schedule • INH prophylaxis as appropriate • Treatment of any complications detected • Referral as appropriate • Birth registration if not yet done

• Clinical Breast examination • Counselling and Testing for HIV • Treat any complications that are detected • Refer as appropriate • Record in PNC register and Mother Child booklet Counsel on: - • Continued breast feeding • Complimentary feeding • Maternal Nutrition • Harmful practices • Family Planning • Hygiene and hand washing for the caregiver	• Record in Integrated Register and Mother Child booklet Counsel on: - • Danger signs for Baby • Hand washing for caregiver • Continued breast feeding • Complementary feeding • Treatment adherence for HIV positive infant

Opportunities available for increasing demand for targeted postnatal care include: -

a) Focused Antenatal Care
b) During Labour and Childbirth
c) Community involvement/male support
d) Supportive policies and management
e) Supportive health system
f) IEC materials available for mothers to take home

Advantages of breast milk to a newborn

a) Normal growth and development
b) Less taxing to the mother
c) Complete nutrient for the infant
d) Breast milk is clean, while powdered milk usually gets contaminated by the water used to mix it or by being put into a dirty bottle. This may lead to diarrhea and death.
e) Breast milk is a balanced food for the baby, while powdered milk often results in fat or thin babies.
f) Breast milk is always available while powdered milk is imported and expensive. Thus, breast milk is cheaper.
g) Breast milk contains protective antibodies while powdered milk, if badly handled, will contain bacteria.

h) Breastfeeding brings close body contact between mother and baby. There is psychological satisfaction and the mother and baby develop a strong relationship, which leads to good social adjustment later in life. Tell the mother to put the baby to the breast immediately after birth.

i) Breast milk is at the right temperature all the time.

j) Breast milk contains a substance that promotes absorption of iron from the baby's gut.

NB: Each student to read and make short notes on:

a) Return to fertility after delivery
b) Examination of a postnatal mother immediately after delivery
c) Examination of a postnatal mother at six weeks after delivery

NORMAL NEONATE (NORMAL BABAY

Definition.

A normal neonate is a baby born after 38-40 weeks of gestation with no complications or requires minimal resuscitation.

Neonate refers to period of life within the first 28 days of life.

Characteristics of a normal neonate (Baby)

Characteristics of a normal neonate includes: -

a) **Appearance:** The normal term baby weighs 2500 – 3500 gms, has average height of 50cm from the crown of the head to the heels with an approximate occipital-frontal circumference of 33-35cm. Most of the babies are plump and have prominent abdomen. They lie in an attitude of flexion with arms extended, their fingers reach upper thigh level.

b) **The skin** of a mature newborn is then delicate and easily traumatized by friction pressure. On the skin appear downy with hair called lanugo, which is often fond over the face, shoulders, upper arms and thighs. The general colour of the skin depends on the baby's ethnic origin ranging from pink and white to olive or dark brown. Pigmentation of nipples and genitalia is deeper in babies with dark skins. A mature baby has may skin creases on palms of the hands and soles of the feet. Nails are fully formed and adherent to the lip of

fingers. The eyebrows and eye lashes present a similar variation. The cartilage of the ears is well formed.

c) Respiration. The normal baby has a shallow erratic and diaphragmatic breathing pattern, with resting respiratory rate ranging between 35-40 breaths per minute with chest and abdomen rising and falling synchronously.

d) **Cardiovascular system**: The heart rate varies between 120-160 beats per minute and fluctuates in accordance with baby's respiratory function and activity, blood pressure average in full term baby ranges from 50-55 MmHg systolic and 25MMHg – 30 mmHg diastolic

e) **Temperature regulation:** A normal baby's axillary temperature ranges between 36.50c – 37.20c. A healthy clothed term baby will maintain the body temperature satisfactorily provided that the environmental temperature is sustained between 180c – 210c, nutrition is adequate and movements are not restricted.

f) **Reproductive System(Genitalia): Boys-**Testes are descended into scrotum, which has plentiful rugae. The urethral meatus opens at the tip of the penis and the prepuce adherent to the glans. **Girls-**born at term the labia majora normally covers the labia minora, the hymen and clitoris may appear disproportionately large. Withdrawal of Maternal Oestrogen in both sexes result into breast engorgement, sometimes accompanied by secretion of milk by the 4^{th} or 5^{th} day. Girls may develop pseudo-menstruation for the same reason. Both sexes have a nodule of breast tissue around the nipple.

g) **Reflexes:** mature infant has all the reflexes developed to include moro, walking sucking, rooting, grasping, swallowing and sneezing.

Changes occurring during extra-uterine life.

Intrauterine and extra uterine environments are markedly different from each other. The intrauterine environment is entirely life sustaining in oxygen, nutrition, excretion and thermoregulation. The transition from intra-uterine life to extra-uterine life is dramatic and demands effective physiological adaptations by the new-born for survival. Therefore, expected changes following birth includes: -

A. Changes in the Lungs

The onset of respiration in a newborn confirms life. The start of pulmonary respiration is due to physiological and mechanical reasons. Lack of oxygen and high levels of carbon dioxide in the

circulation occur when placental circulation ceases. This stimulates the respiratory centre in the medulla to initiate normal respiration.

Mechanically, respiration is stimulated when the chest wall, which was compressed during the passage of the baby in the birth canal, allows the fluid to drain from the lungs. Consequently, the cool air on the baby's face and handling during birth will stimulate the baby to cry as soon as they are born. After the baby takes in their first breath, the blood vessels in the lungs expand to initiate respiration.

At first the baby's breathing may be rapid and irregular. It is mainly abnormal at a rate of 40 - 50 respirations per minute.

Pulmonary adaptation to extra-uterine life can be summarized as:

- The onset of respiration immediately after birth of a newborn confirms life. The start of pulmonary respiration is due to physiological and mechanical factors.Lack of oxygen and high level of carbon dioxide in the circulation when placental circulation ceases. This stimulates the respiratory centre respiratory centre in the brain (medulla) to initiate normal breathing. Mechanically, respiration is initiated when the chest wall which was compressed during passage of the baby through the birth canal. Cool air on the baby's face and handling of the baby during birth stimulate the baby to cry as soon as they are born. During this first cry, the baby takes in the first breath, this leads to the expansion of blood vessels in the lungs and respiration is initiated.

B. Circulatory Changes

After birth:

a) Foetal type of circulation ceases as the respiration commences
b) Normal circulation starts when the temporary structures stop functioning
c) As the placental circulation ceases soon after birth when the umbilical cord is ligated, the blood flow to the right side of the heart decreases and the blood on the left side increases causing the foreman ovale to close.
d) With the establishment of pulmonary respiration, the ductus arteries close. Complete closure happens within eight to ten hours of birth.
e) The cessation of placental circulation will result in the collapse and subsequently drying of the umbilical veins, the ductus venosus and the hypogastric arteries.

f) Anatomical closure by fibrous tissue occurs within two to three months, resulting in the formation of the ligamentum teres, ligamentum venosum and obliterated hypogastric arteries.

g) Cardiopulmonary adaptations, which take place at birth, are interdependent. This means that failure to establish respiration and satisfactory tissue oxygenation presents a life threatening situation to the neonate.

h) In summary, cardiopulmonary adaptation can be summarized as follows: -

- Immediately after separation of the placenta, the baby's circulatory system must divert deoxygenated blood to the lungs for oxygenation.
- This involves several mechanisms influenced by the umbilical cord clamping and the lowered resistance in the pulmonary vascular bed.
- At birth lung expansion and lowered pulmonary vascular bed, leads to all the cardiac output being sent to the lungs.
- Oxygenated blood returning to the heart from the lungs, increases the pressure within the left atrium
- At almost the same time pressure in the right atrium is lowered as blood flow via the cord stops. This leads to the functional closure of foramen ovale.
- In the first few days of life, this closure is reversible-especially if pulmonary resistance is high; eg during crying leading to transient cyanotic episodes in the baby.
- Differences in pressure and oxygen concentration in heart chambers normally facilitates closure of temporally structures of foetal circulation.

C. Thermal (Heat) Regulation

a) The neonate leaves a thermo constant environment of 37.1 degrees Celsius, where they have survived for nine months and enters a much cooler atmosphere at delivery. This leads to rapid cooling of the baby as amniotic fluid evaporates from the skin.

b) Baby's large surface area-body mass ratio potentiates heat loss especially from the head (comprises 25% of body mass).

c) Firstly, heat regulation in the neonate is poor because of their inefficient heat regulating centre. The subcutaneous fat layer of the neonate is thin and provides poor insulation, allowing the transfer of core heat to the environment and also cooling of the baby's blood.

In addition to evaporation, further heat will be lost by conduction when the baby is in contact with cold surfaces, by radiation to cold objects in the environment and by convection caused by currents of cool air passing over the surface of their body. Incidences of the latter may be substantially increased by air conditioning systems in some of our modern delivery rooms. Since the neonate's temperature regulating centres are not very efficient, there is a risk of either overheating or chilling. Means through which neonate loss heat can be summarized as:

i. Evaporation – wet surface exposed to air
ii. Conduction – direct contact with cool objects
iii. Convection- surrounding cool air - drafts
iv. Radiation – transfer of heat to cooler objects not in direct contact with infant

D. Changes in the Liver Function

a) Physiological jaundice is usually seen in 50% of normal neonates from the third to the sixth day of life. This is due to excessive break down of red blood cells resulting from a high haemoglobin level (Hb of 14 - 18mgs/100mls).
b) The process of breaking down red blood cells leads to formation of bilirubin. The liver is not able to conjugate the excess bilirubin to enable its secretion through the kidneys. This leads to jaundice

E. Changes in the Digestion and GIT system

a) The neonate is capable of passing the first stool, known as meconium, within the first two to three days of life. This is because the foetus swallows liquor amnii in utero. Thus, their sucking and swallowing reflexes are usually present at birth.
b) The colour of the meconium is dark greenish and later changes to a mustard (yellowish) colour. The bowels may be opened three to five times daily.
c) Hydrochloric acid is present in the stomach in high concentration within the first day of life
d) Enzymes such as amylase from saliva and pancreas are present in low quantities and hence the poor digestion of carbohydrates in the early weeks in life.
e) Trypsin and lipase are present from intrauterine life.
f) Population of the gut by microorganisms (normal flora) is important for synthesis of some vitamins i.e. vitamin K which is important for formation of clotting factors

g) Feeding must start early to allow the colonization of the gut.

F. Immunological Adaptation.

a) At birth the new-born is susceptible-to infections, especially those gaining entry the mucosa of the respiratory and GIT systems. Localization of infection is poor and minor infections have the potential to become generalized very easily.

b) Some immunoglobulins are present at birth but no learnt immune response to specific antigens due to sheltered intrauterine life. There are three main. Immunoglobulins-IgG, IgA and IgM and among the three only IgG is small enough to cross the placental barrier-offers immunity to specific viral infections.

c) Levels of IgG at birth are usually equal or slightly higher than mother's, providing passive immunity for the first few months of life. IgM and IgA are manufactured by the fetus. Levels of IgM at term are at 20% of adult's, takes 2 years to reach adult levels. (High IgM levels at birth is suggestive of intrauterine infection). Low levels of IgM at birth thought to predispose baby to enteric infections.

d) IgA are usually very low at birth and increase slowly but secretory salivary levels reach adult values within 2 months. IgA protects against infections of the respiratory, gastrointestinal tracts and eyes.

e) Breast milk esp. colostrum provides passive immunity in the form of *Lactobacillus bifidus*, lactoferrin, lysozyme and secretory IgA among others. The thymus gland where lymphocytes are produce is relatively large at birth and continues to grow until 8 years of age.

G. Weight Changes

- The average normal birth weight ranges from 2.5 - 3.5 kilograms. During the first three days of life, the baby loses approximately 10 - 20% of their birth weight but regains it again within one to two weeks. Reasons for weight loss includes**: -**
    a) Due to tissue fluid loss during the heat loss when the baby is born
    b) When the baby opens their bowels, the meconium which was present in the gut is lost, leading to weight reduction
    c) Poor sucking on the breast due to tiredness incurred during the baby's passage through the birth canal during labour will affect the baby's weight since they are not getting enough fluid intake

H. Changes in the Skin

a) The skin of a newborn is covered with vernix caseosa in utero to protect and help retain heat and also act as a lubricant during delivery.
b) The sebaceous glands cease to produce vernix after birth, which may lead to dryness of the skin. The vernix caseosa will peel off within three days of delivery if left alone. There is also plenty of fine hair (lanugo) on the skin which falls off in the first month of life.

I. Changes in musculo-skeletal system.

a) The muscles are complete with subsequent growth occurring by hypertrophy rather than hyperplasia.

b) The long bones are incompletely ossified to facilitate growth at the epiphyses. The bones of the skull also reveal lack of ossification. This is essential for growth of the brain and facilitates moulding during labour-moulding resolves a few days after birth.

c) The posterior fontanelle closes at 6-8weeks with anterior remaining open until 18moths of age. This makes assessment of dehydration and intracranial pressure possible by palpation of fontanelle tension.

NB: In a normal neonate, all senses (vision, smell and taste, hearing and touch) are present and functional at birth.

Management of a Normal Neonate (Baby).

The principles of management of the neonate include:

a) Maintenance of the established respiration
b) Provision of nutrition
c) Prevention from infection
d) Provision of warmth
e) Protection from injury
f) Assessment of the progress of the baby
g) Education of the mother as to the further care and management of the baby

1) Immediate care of the baby

a) **The baby is laid across the mother's abdomen as the cord is clamped**, ligated and cut. The timing of the clamping of the cord is not crucial unless asphyxia, prematurity or rhesus incompatibility.

b) **Airway:** As soon as the baby is born, airway is cleared to allow him/her breath well by removing any mucus that would cause obstruction for air entry. During this time the baby is put in supine position with the head turned and tilted to the side. The airway may be cleared using suction apparatus which should have been prepared ready before hand. During the delivery of the baby's head, excess mucus may be wiped gently from the mouth. Immediately the baby is born, they should be held slanting with the head at a lower angle for a short period to allow drainage of mucus and liquor amnii, which may have been swallowed.

c) **Stimulate the baby to cry**. The baby is stimulated to cry in order to take its first breath is present.

d) **Keeping the baby warm:** As soon as the baby is born, he/ she should be covered warm by use of linen and should be handled gently to reduce heat loss hence hypothermia. The delivery room should be at a temperature ranging between 180c – 210c and any baby with difficulty in controlling temperature should be taken to incubator to have the temperature controlled. Wrap the baby with a towel and place them in a warm cot with their head to one side. The head should be lower than the body in order for the secretions to drain and not block the airway. Ensure that the baby has an identification wristlet, which should be put on before the baby leaves the delivery couch/bed. Note that cold stress in a newborn can lead to :- Increased oxygen demand, Decreased surfactant production, Respiratory distress, Hypoglycemia, Metabolic acidosis, and Jaundice

e) **Provide the baby to rest** for an hour in order to recuperate from the strain of labour and birth. Frequent observations should be made during this period to ensure that the baby's respiration is normal, and that they are not bleeding or hemorrhaging from the cord.

f) **Perform an APGAR score** within the first minute, then after five minutes and lastly at ten minutes after birth. This baby's condition should be scored using APGAR scored method at 1minute and 5minutes to be able to assess the condition and decide on the care to be given to this baby.

g) **Encourage Early breast feeding:** The baby should be put on the mother's breast as soon as it is convenient to allow early feeding and prevention of hypoglycemia and also establishment of lactation earlier enough.

h) **Weigh the baby** and tell the mother the weight of the baby.

i) **Identification:** Ensure that the baby has an identification wristlet, which should be put on before the baby leaves the delivery couch/bed.

j) **Show the mother** the baby and let the mother identify the sex of the baby

k) **Apply T.E.O** to prevent Opthalmia neonatorum (Congenital conjunctivitis)

l) **Administer Vitamin K**. 1mg I.M on the Vastus Lateralis (For term baby)

2) **Subsequent management:**

After an hour or so following the birth, the following subsequent care is provided: -

a) **Perform 1st examination of the newborn**: to rule out any congenital malformation and to rule out any birth injury and finally to confirm the gestation of the baby in relation to gestation by date, this will be done daily to assess the progress of the baby.

b) **Maintenance of the Established Respiration**: A normal baby should continue to breathe and maintain a good skin colour without medical intervention, The head of the cot should also be lowered in such circumstances, Measures should be taken to avoid suffocation from the pillow, clothes covering the baby or mother lying over the baby.

c) **Observations:** The baby is observed twice a day to assess the condition and rule out any complications which would be either minor, major and or both are taken for appropriate action. The colour of urine and stool should also be done with energy passage for colour, amount and frequency to not deviation from normal

m) **Personal hygiene**: The baby is done top tailing daily to keep him/her clean and the umbilical cord is cleaned using methylated spirit to reduce chances of infection through this route.

n) **Breast Feeding and nutrition:** The baby should be put on the breast with the assistant of the nurse. The breast feeding therefore continues on demand and the mother should also be advised to bathe twice a day and wash hands every after visiting the toilet.

o) **Mother to baby bounding:** The midwife will encourage the mother to core of the baby very closely and carefully especially while breast feeding to allow the bondage to take place, and also to assist new mother to have the confidence in the care of the baby through education and demonstration.

p) **Protection from Injury and Infection**: The midwife should instruct the mother on how to handle her baby, and teach the mother not to use appliances that can cause injuries to the baby. Infection, especially cross infection, can be minimized by encouraging mothers to handle their own babies. Anybody in contact with the child should be encouraged to wash their hands before handling the baby. Immunization should be administered to protect the neonate from certain preventable diseases

q) **Skin Care**: The neonate's skin is fragile and easily bruised. Therefore, irritants such as antiseptics, fabric softeners are discouraged.

r) Educate the mother on: -

- Personal hygiene.
- Care of the new-born
- Exclusive breastfeeding.
- Immunization
- Cord care.
- Post-natal clinic.

APGAR SCORE

- APGAR score is a rating criteria that is used to assess newborn's health status at birth. It is usually done within the first minute following birth, then five minutes and ten minutes.
- It was designed in 1953 by Dr Virginia Apgar when she designed a chart which gives an index of the infant's degree of depression (if any) at birth, determining their need for help through five easily observed signs: namely
    a) Appearance.
    b) Pulse(heart rate)
    c) Grimace.
    d) Activity.
    e) Respiration

The table below, summarizes APGAR Scoring.

Sign	**Score 0**	**Score 1**	**Score 2**
Appearance	Blue, pale	Body pink, extremities bluish	Pink all over
Pulse/heart rate	Absent	< 100/min	> 100/min
Grimace	None	Grimace	Cry
Activity	Limb	Some flexion	Spontaneous movements
Respiration	Absent	Hypoventilation/gasping	Vigorous crying

Examination of a newborn.

There are two types of newborn examination, namely: -

a) First examination of the newborn.
b) Daily (Routine) examination of the newborn.

First examination of the newborn.

First examination of the newborn is performed within 24 hours following birth.

1) **Objectives of First examination of the newborn are: -**
    a) To detect any congenital abnormalities
    b) To detect any birth injuries

c) To rule out prematurity.

d) To ascertain presence of normal reflexes

e) To detect any variations in the baby's vital signs

2) **Preparations of room**

a) Warm and well ventilated room

b) Clean baby cot

c) Control movement of people in the examination room

d) Well lit room

3) **Requirements**

a) Tape measure

b) Stethoscope

c) Thermometer

d) Baby Cot

e) Cotton Wool Swabs

f) Spirit Swabs

g) Linen(Extra Baby Clothing)

h) Soap/ Detergent

i) Hand Towels

4) Role of the nurse

a) Explain the procedure to the mother

b) Make adequate preparation of the room where the examinations is to be done.

c) Prepare self-i.e. hand washing and drying of hands

d) Assemble the necessary equipment for the procedure

e) Perform a head to toe examination

f) Expose only the part being examined

g) Pay more attention to the umbilical stamp for any bleeding

h) Apply infection prevention and control measures/ guidelines to prevent cross- infection

i) After the procedure, thank the mother

j) Clear the equipment and environment after the procedure

k) Do proper documentation and let the mother know the finding from the procedure.

l) Proper documentation of the findings.

The following daily observations should be recorded in order to determine the baby's health status:

- General appearance and activity
- Exclude any discharge from the eyes and ears which may be an indicator of infection
- The skin should be checked to detect the presence of jaundice, pallor or cyanosis, septic spots or sore buttocks
- Check the mouth to exclude oral thrush
- The umbilical cord should be examined to ensure that it is drying up and is not septic
- Weigh the baby to determine weight gain

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Daily Examination

Procedure of performing daily (Routine) examination is similar to first examination only that objectives differ. Objectives of daily examination of the new-born include: -

a) Monitor growth and any other changes in the baby

b) Rule out infections

c) Rule out anaemia

Reflexes elicited during examination of the newborn.

a) **Moro Reflex:** Support the baby's head and body in supine position about a centimetre from the cot. Allow the head to drop back. Look at the baby's response. The baby throws out his arms extending the elbows and fingers with embracing movements of the arms

b) **Tonic Neck Reflex**: A fencing position is assumed, that is, the baby lies on the back, head rotated to one side with one arm and leg partially or completely extended

c) **Rooting Reflex**: To test for the rooting reflex, gently touch the corner of the baby's mouth with clean fingers. The baby will open his mouth turning towards the stimulus in anticipation of the mother's nipple.

d) **Stepping Reflex**: Hold the infant up, with the feet touching a surface. The infant will attempt to make some steps or pressing movements.

e) **Grasping Reflex**: At birth, the grasping reflex of both hands and feet is present. The infant will grasp any object you place in their hand, and then let it go

f) **Protective Reflex** Other reflexes include protective reflexes such as:

- The blinking reflex, which protects the eyes from bright light
- Sneezing and coughing reflexes used to clear the infant's throat
- The yawn reflex, which draws additional oxygen
- Cry reflex, which helps to withdraw from painful stimuli
- Swallowing reflex.

g) Other reflexes include: -

- Babinski or plantar
- Pupillary reflex
- Galant reflex
- Prone crawl reflex
- Glabellar reflex
- Startle reflex
- Doll's eye reflex

NB:

1. ***Each student to read and make short notes on procedure on examination of the new-born(Head-toe) Refer to Nursing council procedure manual. (NCK, 2009, manual of clinical procedures (3rd Ed.) Nairobi: Nursing Council of Kenya.***