

MODULE

# *Maternal Bleeding*

Degree Program  
For the Ethiopian Health Center Team



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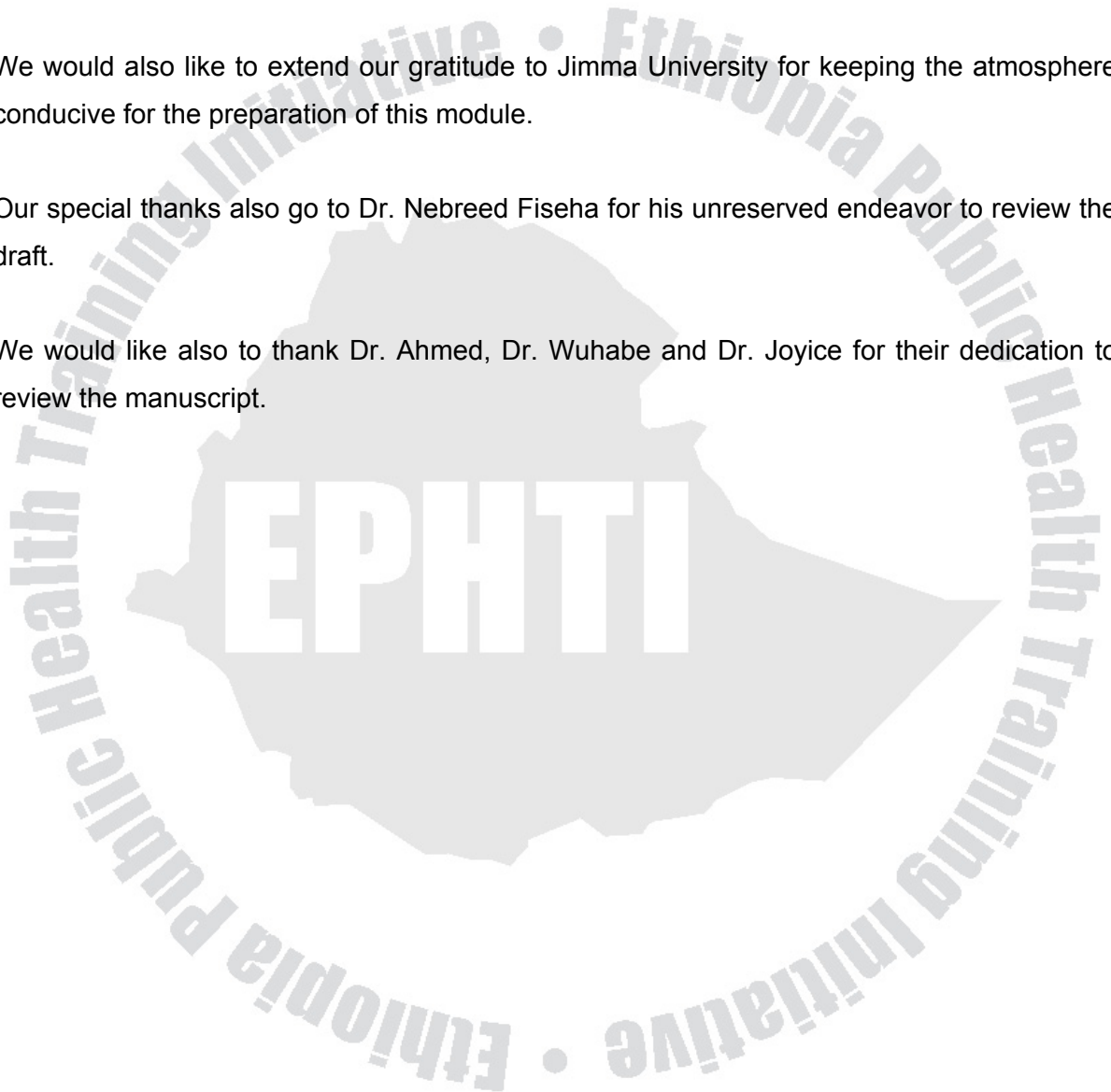
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# UNIT ONE

## INTRODUCTION

### 1.1 Purpose and Use of this Module

This module is designed for Ethiopian health center teams who are expected to work at the district where there is no adequate facility for investigation and specialized professional for consultation. Therefore the information contained in this module will benefit the health professional who needs to review or improve their knowledge and skill as well as the inexperienced professional who needs refresher information to become capable in helping patients.

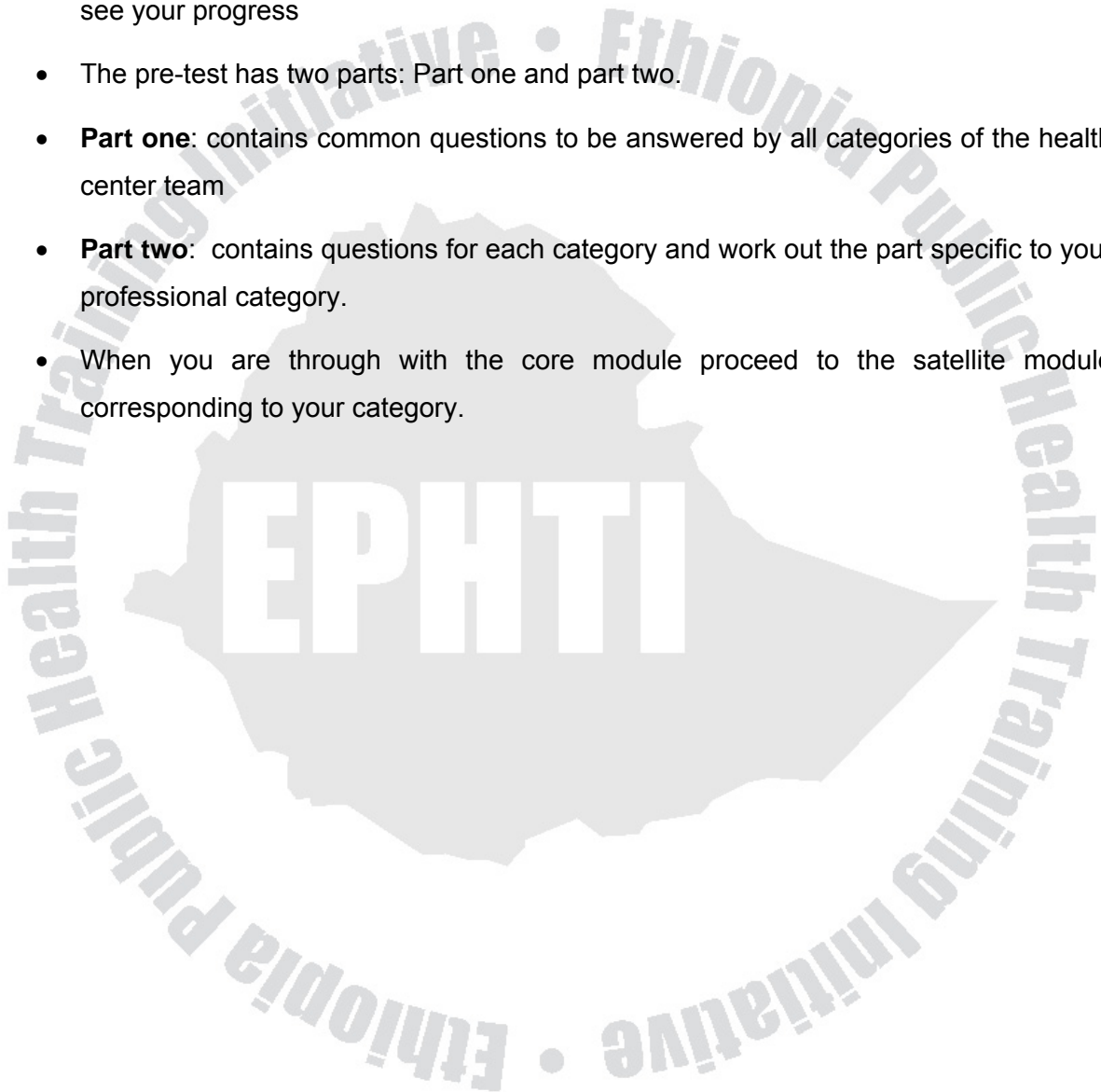
The goal of this self learning module is to provide the midlevel health professional with the knowledge and essential skills required to care a patient with maternal bleeding and recognize the severity of its potential problems.

In addition the module provides a basic foundation for understanding the key concept of maternal bleeding. The module is not intended to provide complete instruction. Thus, the team is expected to read further to pertaining to this broad topic to acquire and maintain adequate skills and enrich knowledge.

## 1.2 Direction for using the module:

Before starting to read this module, please follow the directions given below:

- Use a separate sheet of paper to write your answers and label it 'pre-test' answers.
- Try answering the questions twice, before and after going through the module and see your progress
- The pre-test has two parts: Part one and part two.
- **Part one:** contains common questions to be answered by all categories of the health center team
- **Part two:** contains questions for each category and work out the part specific to your professional category.
- When you are through with the core module proceed to the satellite module corresponding to your category.



## UNIT TWO

### CORE MODULE

#### 2.1 Pre-tests for all categories

First attempt all the questions again after going through the module and then check your answers against the keys

##### 2.1.1 Pre-test for all categories of Health center Team

Read the following and answer Yes or No

1. Maternal bleeding is a minor public health problem in Ethiopia.  
A. Yes            B. No
2. The laboratory test that should be performed in case of maternal bleeding is only ABO and RH determination:  
A. Yes            B. No
3. The most common type of ectopic pregnancy is abdominal.  
A. Yes            B. No
4. Vaginal bleeding during pregnancy (after 28 completed weeks of gestation) is mainly due to placenta previa.  
A. Yes            B. No
5. The commonest cause of induced abortion in our-set-up is congenital anomaly of the fetus  
A. Yes            B. No
6. Hematuria is one of the laboratory markers of maternal bleeding.  
A. Yes            B. No
7. The commonest cause of postpartum haemorrhage (PPH) is genital - injury during birth.  
A. Yes            B. No
8. Ante partum hemorrhage (APH) is a risk factor for postpartum hemorrhage  
A. Yes            B. No
9. If a pregnant mother delivers an alive healthy fetus and Expelled placenta, there is no need of further follow up.  
A. Yes            B. No

10. Active management of third stage of labor includes use of uterotonic drugs and controlled cord traction with out awaiting signs of placental separation.

A. Yes      B. No

### 2.1.2 Pre-test for Health Officers

Write True or False to each choice for the questions given below.

1. Management of Septic first trimester inevitable abortion includes:-

- a) Evacuation & curettage
- b) Culture & sensitivity of vaginal discharge
- c) Antibiotics
- d) Oxytocin to facilitate expulsion
- e) Progesterone therapy

2. Investigation for ectopic pregnancy include/s:

- a) HCG determination
- b) Dilatation and curettage
- c) Ultrasound examination of the pelvis
- d) Laparoscopy
- e) Colpotomy

3. Placenta Previa

- a) Cesarean section is the best mode of delivery
- b) Part of the placenta could be on the upper uterine segment
- c) The bleeding is usually painless, causeless, recurring and bright red.
- d) it is common in breech presentation and transverse lie.
- e) Vaginal examination is done under double set-up at any time after admission.

4. A patient with severe placental abruption and a dead fetus should be:

- a) given a liberal blood transfusion
- b) Given analgesics
- c) admitted and followed for a spontaneous onset of labour.
- d) need fore waters rupturing(Aminiotomy)
- e) kept on an intravenous oxytocin infusion.



5. Predisposing factors for ruptured uterus include(s):

- a) Past history of uterine perforation
- b) Previous cesarean section
- c) Chorioamionitis
- d) Myomectomy that had endometrial cavity entry

6. Vaginal tear

- a) May leads to postpartum haemorrhage.
- b) All tears should be sutured.
- c) Craniotomy may lead to such a tear.
- d) Paravaginal hematoma may lead to considerable pain & collapse.
- e) Occurs in the second stage of labour.

7. Postpartum haemorrhage is associated with:

- a) History of trauma in pregnancy
- b) Chorioamionitis
- c) Operative vaginal deliveries
- d) Cardiac disease
- e) Pre-eclampsia

8. Which of the following is not true about Active management of third stage of labour?

- a) Is indicated in distended uterus, multigravidity, APH & prolonged labour cases only.
- b) Oxytocic drug is given Iv with the delivery of the anterior shoulder.
- c) Controlled cord traction is started once uterine contraction occurs
- d) There is a risk of retention of the placenta but Postpartum haemorrhage due to traumatic cause is decreased
- e) Manual removal of the placenta should be done to prevent retention of the placenta.

9. Complications of cephalopelvic disproportion include:

- a) Ruptured uterus
- b) Vesicovaginal fistula (VVF)
- c) Rectovaginal fistula (RVF)
- d) Obstructed labour
- e) Intrauterine fetal growth retardation

10. Obstructed labour:

- a) is due to mismangement of labour
- b) is due to bandle'sring
- c) Some patients need augumentation of labour
- d) In primigravidas, secondary uterine atonia is common
- e) Clinically, severe moulding in face presentation is diagnostic

11. Which one of the following is/are the cause/s/ of maternal bleeding at early pregnancy

- A. Ectopic pregnancy
- B. Placenta previa
- C. Pre mature labour
- D. All

12. Vaginal bleeding can be diagnosed by

- A. Pelvic examination
- B. Ultra sound
- C. Pregnancy test in early pregnancy
- D. All

### 2.1.3 Pre-test for BSc Nurses

**Chose the best answer for the following questions**

1. Which one of the following sign is a late sign of obstructed labour?

- A. Fetal heart rate will be 140/minute
- B. Bandl's ring.
- C. Maternal pulse rate of 80/minute
- D. Clear amniotic fluid.

2. Unsafe abortion becomes one of the major causes of maternal death, however, it can be prevented and break its cycle by the following ways, **except**.

- A. Information and provision of the available Family planning (FP) methods
- B Providing post abortion counseling
- C. Informing clients that fertility will return after 45 days.
- D. Reminding clients that ovulation will occur shortly after abortion.

3. W/o Alemitu has a history of amenorrhea for the last 3 months; eventually she started to have vaginal bleeding, and backache. On vaginal examination the cervix was 3 Cms dilated. The possible diagnosis will be:-
- A. Missed abortion
  - B. Inevitable abortion
  - C. Threatened abortion
  - D. Complete abortion
4. All of the followings are the nursing management of unclassified abortion at H/C **except:-**
- A. Put on IV drip in case of severe bleeding
  - B. Assess V/S and FHB
  - C. Check cervical dilatation.
  - D. Check the pads to assess the amount of blood loss.
5. Which one of the following **is not** an indication for active management of 3<sup>rd</sup> stage of labour?
- A. Multiple pregnancies
  - B. Polyhydramnios
  - C. Cardiac cases
  - D. None of the above
6. What would be the priority nursing management in a case of PPH?
- A. Remove the placenta manually.
  - B. Massage the uterus.
  - C. Give ergometrine 0.5 mg IM.
  - D. Shout for help.
7. All of the following could be the causes of bleeding before 28<sup>th</sup> weeks of pregnancy **except:-**
- A. Uterine atony
  - B. Abortion
  - C. Ectopic Pregnancy.
  - D. Cancer of the cervix
8. A Women's death from unsafe abortion is considered as a double failure of the health system and a tragedy, this is because of the following reasons, **except: -**
- A. Failure to prevent unprotected sex.
  - B. Failure to prevent unplanned pregnancy.
  - C. Failure to avoid sexual intercourse completely.
  - D. Failure to manage the complications of unsafe abortion.

9. All are the complications of obstructed labour, except:

- A. Spontaneous rupture of the uterus
- B. VVF/RVF
- C. Still birth
- D. None of the above

10. All of the followings used in the preventions of obstructed labour and uterine rupture, **except:**

- A. Constant and careful antenatal checkups
- B. Teach the community to ban early teenage marriage
- C. Monitor the rate and the dose of pitocin in induction/ augmentation.
- D Allow women with previous C/s to deliver at health center.

#### **2.1.4 Pre-test for BSc Laboratory personnel**

1. Mention at least three laboratory markers of maternal bleeding?
2. What are the possible laboratory tests that may be performed during maternal bleeding?
3. What are the different techniques that could be used for measuring hemoglobin?
4. What is the most commonly used procedure (method) in the diagnosis and follow up of syphilis?
5. All are clinical uses of hemoglobin and/Hct determination except
  - A. To detect anemia
  - B. To determine the severity of anemia
  - C. To know the prognosis for anemia
  - D. To follow the response to treatment for anemia
  - E. None
6. Which of the following is the advantage of performing hematocrit over hemoglobin (by sahli hellige method) in assessing anemia
  - A. It helps to monitor its treatment
  - B. It is simple and most accurate test methods
  - C. It is suitable for screening large clinic population
  - D. B and C
  - E. All of the above

7. Which of the following is/are treponemal specific serologic tests for screening syphilis
- A. Treponema palladium hemagglutination (TPHA) test
  - B. Fluorescent antibody absorption (FTA-AB) test
  - C. RPR (Rapid plasma regain) test
  - D. Enzyme immuno assay (EIA)
  - E. A and D
  - F. A and B
8. Urinary tract infection is the commonest complication of pregnancy in the second trimester. Thus laboratory investigation can reveal.
- A. Urine testing positive for nitrite
  - B. Urine positive for leukocytes (WBCs)
  - C. Urine positive for protein
  - D. All of the above
  - E. A and B only
9. For selection of suitable blood for a patient or mother, pretransfusion tests should include
- A. ABO and Rh (D) blood grouping
  - B. Cross – matching
  - C. ELISA for HIV
  - D. VDRL
  - E. All of the above
  - F. A and B only
10. The reverse ABO blood grouping is performed
- A. By mixing red blood cells containing known antigen with unknown serum
  - B. By mixing unknown red cells with serum containing known antibody
  - C. By mixing unknown serum with red cells containing unknown antigen
  - D. By mixing serum containing known antibody with red cells containing known antigen

## 2.2. Significance and brief description of maternal bleeding

According to the 1995 WHO report more than half a million (585,000) women dies yearly in the world due to pregnancy related complications that corresponds to a death of one woman for every minute of a day. Ninety nine percent of these deaths are estimated to occur in developing countries. Furthermore for every woman who survive those deaths 40 others suffer long-lasting disabilities or “social death”

Maternal bleeding defined as bleeding that occurs in the ante partum, intra-partum, or postpartum period. It is one of the major causes of maternal death in both developing and developed countries. As a result of poor health care system in the developing countries, maternal bleeding has more disastrous impact on maternal mortality and morbidity than that of developed countries.

Similar to other developing countries, Ethiopia has one of the high MMR, estimated to be more than 870 per 100,000 live births. Maternal bleeding due to abortion (mainly unsafely induced), uterine rupture and postpartum hemorrhage (PPH) ...etc, contribute significantly as a direct cause of maternal deaths and to the related sequels of morbidities.

Like other causes of maternal deaths, maternal death due to maternal bleeding is preventable if locally available resources and appropriate techniques are used effectively during pregnancy, labour /delivery and postpartum care of a woman.

Thus, based on the above mentioned facts, this module is intended to help, the health team working at the rural areas, where most cases of maternal deaths occur, to acquire the basic knowledge and skills about causes & strategic Interventions to control and prevent maternal bleeding that contributes significantly in the effort done to reduce the prevailing high rate of maternal mortality and morbidity in the nation.

## 2.3 Learning Objectives:

Upon completion of this module, the health center team members will be able to:

- Define maternal bleeding.
- Identify the magnitude of maternal bleeding.
- List the clinical presentations of different etiologies of maternal bleeding
- Describe the initial essential management of common causes maternal bleeding.
- Explain the preventive and control strategies of maternal bleeding

## 2.4 Definition of crucial terms

- **Induced abortion:-** Termination of unwanted pregnancy before viability
- **Unsafe abortion:-** Is a procedure for terminating pregnancy either by person(s) lacking the necessary skills or in an environment lacking the minimum medical standards or both.
- **Post abortion Care:-** is an approach of reducing mortality and morbidity from incomplete and unsafe abortion and resulting complication for improving women's sexual and reproductive health and lives.
- **Active Management of third stage of labor:-** Consists an interventions designed to speed the delivery of the Placenta by increasing uterine contraction and to prevent post partum hemorrhage by averting uterine atony.
- **Standards of care:** - define as a specific level of performance based on state- of the art practices supported by current scientific knowledge.
- **Maternal mortality** is death of pregnant women during pregnancy, labour or postpartum due to condition related to or aggravated by Pregnancy.
- **Anemia:-** red cell disorder, which occurs when the concentration of hemoglobin falls below what is normal for a person's age, gender, environment, resulting in low oxygen-carrying capacity
- **Hematuria:-** The presence of large no of intact RBCs in the urine.
- **Hemoglobinuria:-** The occurrence of free hemoglobin in the urine specimen
- **Bacteriuria:-** The presence of significantly large number of bacteria in urine specimen
- **Pyuria:-** The presence of large no of puscells (WBCs) in urine specimen
- **Syphilis:-** is an infectious venereal disease caused by treponema pallidum
- **Hemoglobin:-** A red pigment in RBC which helps to transport oxygen from the lung to tissues and carbon dioxide from tissues to the lung.
- **Hematocrit (HCT):-** is the proportion of whole blood occupied by red blood cells
- **Cross matching:-** the test between the recipient blood and the donor's blood

## 2.5 Epidemiology

Maternal bleeding is important cause mortality and Morbidity In Both developed and developing Countries. Abortion alone constitutes one of the five leading causes of maternal death in the developing world. Globally unsafe abortion claims the lives of 200 women daily. or 78,000 women yearly of these 34,000 are women African accounting 44% of the global figure. One community- based study done in Ethiopia revealed that abortion accounts for 32% of direct cause of maternal mortality. Besides, postpartum hemorrhage (PPH) accounts for 30% of direct cause of maternal mortality in developing countries.

### Incidence of common causes of maternal bleeding

- Ectopic pregnancy:- one in 50 to 200 pregnancies.
- Spontaneous abortion:- 10-20% of all pregnancies.
- Molar pregnancy:- Varies and overall ranges between 1 in 1000 to 1 in 5000 pregnancies.
- Ante partum hemorrhage (APH): - 2-4% of all pregnancies
- Postpartum hemorrhage (PPH): - 3.9% of vaginal deliveries.  
- 6.49%. of C/S deliveries



## 2.6 Etiologies of maternal bleeding

Etiologies are broadly divided in to three:

A) **Bleeding in early pregnancy** (conception up to gestational age of less than 28 wks)

- i) **Ectopic pregnancy:** is one in which implantation occurs outside the uterine cavity. The most common site is fallopian tube (in greater than 90% of cases)
- ii) **Abortion:** It is a uterine bleeding before fetal viability, i.e, before 28 weeks of pregnancy.
  - It could be spontaneous or induced abortion Induced abortion is divided as safe or unsafe abortion.

### Types of Abortion

1. **Inevitable:** abortion with cervical dilatation but with out expulsion of products of conception (including amniotic fluid)
  2. **Incomplete:** Abortion with partial expulsion of conceptus materials.
  3. **Complete:** Abortion with complete expulsion of conceptus materials
  4. **Threatened:** Abortion with out cervical dilatation.
  5. **Missed:** when a dead fetus retained in the uterus at least for another one month.
  6. **Habitual (recurrent):** is diagnosed if there is three or more consecutives spontaneous expulsion of conceptus.
- iii) **Molar Pregnancy:** is characterized by abnormal proliferations of chorionic villi, and Vaginal bleeding with expulsion of conceptus tissue that have grape-like appearance.

### B) Bleeding in late pregnancy and labor

- i) **Heavy show:** - is Blood-stained mucus that herald onset of labor.
- ii) **Antepartum Hemorrhage (APH):-** is bleeding from the genital tract of pregnant mother after the fetus reached the age of viability, i.e, 28 Completed weeks or fetal weight of  $\geq$  1000 grams and before delivery.

- **Incidence:** 2 –4% all pregnancies

✓ **Etiologies of Antepartum haemorrhage**

**1. Placental**

- 1.1 Abruptio placenta
- 1.2 Placenta previa
- 1.3 Marginal or sinus bleeding
- 1.4 Miscellaneous: Vasa previae, placenta membranious, sercumvallet placenta

**2. Non Placental**

- 2.1 Local causes: Cervicitis , Cervical polyp , eversion , varices , infection , trauma , malignancies
- 2.2 Decidual bleeding
- 2.3 Heavy show
- 2.4 Ruptured uterus
- 2.5. Systemic illness leading to bleeding e.g. CLD, DIC ...etc
- 2.6. Unknown Causes:- In many of cases no causes is found clinically or by investigation.

**C) Bleeding after child birth (Postpartum hemorrhage)**

**Postpartum hemorrhage (PPH):** - is defined as bleeding in excess of 500ml after vaginal birth or over 1000ml following c/s delivery.

- **Incidence:** 10% of all deliveries

**Types:**

- Immediate (primary) PPH: - Occur within 24 Hours of delivery.
- Late (Secondary) PPH: bleeding that occur after 24 hrs of delivery until 6 Wks of postpartum

✓ **Common etiologies of immediate PPH.**

1. Atonic Uterus:- bleeding occur due to failure of contraction and retraction of the uterus.  
Is the commonest & severe type of PPH.
2. Tears of Cervix, Vagina or perineum that occurred during difficult vaginal delivery.
3. Retained placenta is diagnosed if placenta is not delivered within 30 minutes after delivery of term fetus.
4. Retained products of concepts (RPC) - usually portion of maternal surface of placenta or torn membranes with vessels retained in the uterus.
5. Inverted uterus:- uterus is said to be inverted if uterine fundus is it turns Inside - out of cervical canal during delivery.
6. Others: - Systemic or hematologic disorders such as DIC...etc.

✓ **Common etiologies of late PPH**

1. Severe anemia: - Hgb less than 7g/dl or Hct <20%
2. Genital tract infections: - endometritis is the commonest.
3. Retained large clots or/and Placental fragments
4. Trophoblastic tumors:- such as gestational choriocarcinoma
5. Others: - Infections, systemic or malignant conditions.

## 2.7 Clinical Feature

Clinical manifestation of maternal bleeding depends on:

- ✓ the etiologies:
- ✓ Amount of blood loss (volume)
- ✓ Rate of blood Loss
- ✓ Intervention done

### **Clinical features of some common causes of maternal bleeding.**

#### **a. Clinical features of APH**

**Placenta praevia:** is due to abnormally lower uterine segment placenta attachment.

Bleeding after 28 weeks of gestation that may be precipitated by Intercourse, relaxed uterus, lower uterine pole feel empty, bleeding May be light or heavy but painless, shock, fetal condition depends on the severity of maternal bleeding.

**Placenta abruption:** is due to premature separation of normally implanted placenta.

Bleeding occur after 28 weeks, and it is usually dark oozing Vaginally or may be retained in the uterus, Intermittent or constant abdominal pain, Tense /tender uterus Fetal movement decreased or absent Fetal distress or absent fetal heart sound.

#### **b. Clinical features of immediate or primary PPH**

Usual presentation is heavy vaginal bleeding that can quickly lead to signs and symptoms of hypovolemic shock, that reflects the combination of high uterine flow (blood) and uterine atony (most common cause of PPH). Sometimes, a significant amount of blood can be retained in the uterus behind a partially separated placenta /membrane or blood may collect in an atonic uterus. Thus, strict monitoring of uterine size and tone is crucial following delivery of placenta.

If the cause of bleeding is not uterine atony, then blood loss may be slower and clinical features of hypovolemia may develop over a longer time frame.

Two important facts worth bearing in mind are;

1. Caregivers usually underestimate visible blood loss by as much as 50%
2. Symptoms of hypovolemia may not develop until a large volume of blood has been lost due to; most women giving birth are healthy and compensate for blood loss very well

Most common birthing position (semi-recumbent) with the leg elevated masks the actual loss.

Thus, rapid recognition and diagnosis of PPH is essential for successful management. The major factor in the adverse outcomes associated with severe hemorrhage is a delay in initiating appropriate management.

N.B. The clinical findings in hypovolemia are listed in the core module.

**Degree of blood loss is divided into 4 (four) classes depending on the amount of volume deficit.**

**Class- I**

Blood loss of less than or equal to 900 ml

Or Volume deficit of less than or equal to 15 % is asymptomatic.

**Class II**

Blood loss of 1200 ml up to 1500 ml or Volume deficit of 20 to 25%.

Clinically, Manifested by

- Rapid pulse rate & respiratory rate
- Delayed refilling
- Narrow Pulse pressure

**Class III**

Blood loss of 1800ml up to 2000 ml or Volume deficit of 30 to 35%.

Clinically, manifested by

- Overt Hypotension
- Marked tachycardia (120-160 bpm)
- Marked tachypnea (30-35 / minute)
- Cold and clammy skin

**Class IV**

Blood loss of more than or equal to 2400ml or Volume deficit of more than or equal to 40%, manifested by:

- Weak or absent Bp and PR
- Oliguria/ anuria

- Cardiovascular collapse
- Cardiac arrest
- Death

## 2.8. Complications of maternal bleeding

a) Immediate

- I) Related to Bleeding - Hemorrhagic shock /sever anemia/
- Acute renal failure (ARF)
  - Adult respiratory distress syndrome (ARDS)
  - Infection
  - Intra –abdominal organ Injury
  - Death

II) Related to resuscitation & blood Transfusion

- Infection (HBV, HIV)
- Hemolytic anemia
- Fluid over load - pulmonary edema
- Acute lung Injury

b) Late: - Infertility secondary to amenorrhea (sheen syndrome)

## 2.9 Management of maternal bleeding

Improved standards of obstetric care have dramatically reduced mortality from hemorrhage due to largely to the readily availability of transfusion services and a more integrated team approach.

To engender an orderly and disciplined approach to management a mnemonic is offered as an “aide de memoir” called “REACT” that has a temporal pattern of therapeutic measures though in practice must be applied concurrently.

**REACT: R = Resuscitation**

**E = Evaluation**

**A = Arrest bleeding**

**C = Consult**

**T = Treat Complications**

### **i) Resuscitation**

- is done successfully as a teamwork
- ✓ Air way and breathing:- the most important Initial step is to ensure adequate O<sub>2</sub> delivery
- If conscious and spontaneously breathing: 100% O<sub>2</sub> (oxygen) at the rate of 6 to 8 L/minute via closed mask or nasal cannula.
- If adequate spontaneous ventilation is in doubt: prompt referral to perform endotracheal intubation and institute mechanical ventilation.
- ✓ Intravenous Fluids and Blood component Therapy
- Secure two large bore cannulas (14-16 gauge)
- The Initial maneuver is to elevate patients' legs 30 degrees up ward.
- Draw blood for grouping, cross- matching & relevant coagulation studies, Hgb, and biochemical tests.
- Maintain circulatory volume with crystalloid or colloid
- Volume replacement with crystalloids (lactated Ringer's solution and 0.9% normal saline).
- **Volume replacement better exceeded their premorbid norm by 500 to 1000ml.**
- Give blood as soon as possible of there is an indication for.
- Fresh whole blood or stored whole blood is preferable

### **ii) Evaluation**

- Close follow up of vital signs – maintain systolic Bp > 90 mm/Hg
- Urine output (maintain at 30-60 m/hr or 1ml/kg/hr)
- Continuous monitoring of the fetus is essential if alive

### **iii) Arrest hemorrhage**

- Ascertain cause and treat or refer accordingly

Example - retained placenta - Manual removal with standard precautions

- Evacuation (MVA/E&C) - for incomplete abortion
- Uterine massage /compression/uterotonic drugs for uterine atony...etc

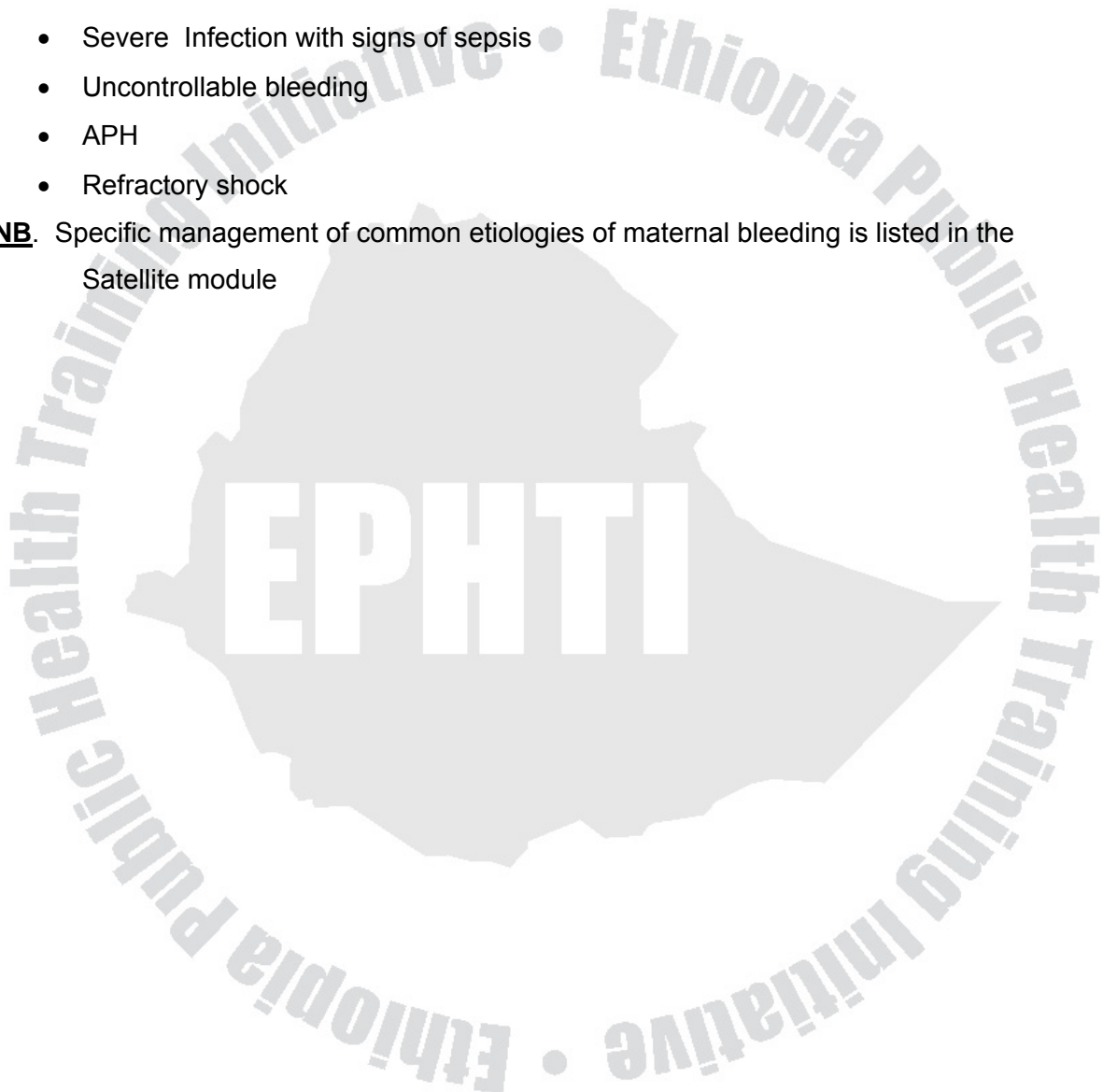
Patient must be cared until hemodynamic, respiratory and renal status appear to be satisfactory.

iv) Refer to hospital if there is indication for referral after securing I.V line,  
& **keeping** indwelling urinary catheter with attending health personnel.

**Complications such as the following warrants referral:**

- Acute renal failure: -
- Adult Respiratory distress syndrome (ARDS):
- DIC
- Severe Infection with signs of sepsis
- Uncontrollable bleeding
- APH
- Refractory shock

**NB.** Specific management of common etiologies of maternal bleeding is listed in the  
Satellite module



# UNIT THREE

## SATELLITE MODULES

### 3.1 Satellite Module for Health officers

#### 3.1.1. Directions for using this module

Before coming to this part of the module make sure that you have covered the pre test and the core module presented at the beginning.

#### 3.1.2. Learning objectives

Up on the completion of this module, a health Officer Student will be able to:-

- ✓ Define Maternal bleeding
- ✓ List the various types of bleeding during pregnancy
- ✓ differentiate the types by its clinical manifestation (sign and symptoms)
- ✓ Identify the complications of bleeding during pregnancy
- ✓ Describe the management of maternal bleeding and identify cases for prompt referral
- ✓ Mention the control and prevention methods of maternal bleeding

#### 3.1.3. Case – Study (Learning activity)

- i) A 32 years old GVII mother came with history of 3 days labour associated with a distended abdomen and abdominal pain. On physical examination the pertinent findings were: - dehydrated and ketosis

V/s – B/P 40/20, pulse rate 130/min, Respiratory rate. 34 /Min, T- 38 °Centigrade. Abdomen – grossly distended and tender and easily palpable fetal part. FHB – absent, Contraction - absent GUS – On digital pelvic examination (PV) cervix is fully dilated, Station -0 and excessive molding and caput, blood - stained liquor and edematous vulva.

1. Outline the initial management required.
  2. Give possible differential diagnoses of the case
  3. Describe the definitive management of the case.
- ii) A 32 yrs old Gravida II lady admitted to labour ward in active 1<sup>st</sup> stage of labor came and gave history of labour of 10 hours and leakage of liquor of 14 hours duration.



On physical examination, the pertinent findings were;

Generally - She is in labour pain

- V/s – With in normal limit
- Abdomen- Uterus of term size, longitudinal lie, cephalic presentation, contraction 2/10<sup>1</sup> /20-30<sup>11</sup> /, descent 2/5 , FHB-140 bpm
- GUS- PV Cx-5cms dilated, station -0, no caput or molding

Because of poor progress of labour she was augmented with pitocin according to the standard protocol and delivered 5 hours later to alive male neonate who weighs 3.5kg with APGAR score of 8&9 at 1<sup>st</sup> & 5<sup>th</sup> minutes, placenta expelled completely within 5 minutes of delivery using controlled cord traction. Then 45 minutes later she started to bleed per vaginum profusely and went to shock.

1. What initial resuscitation measures does she required?
2. Give account on the possible clinical differential diagnoses of the problem.
3. Outline definitive management for the most likely diagnosis (dx).

### **3.1.4. Alternative Names for maternal bleeding**

Bleeding during pregnancy, maternal blood loss, and maternal hemorrhage. Definition Maternal bleeding generally refers to bleeding that happens at any time during pregnancy, labour and with in 42 days post partum.

#### **What are the signs and symptoms of the condition?**

There are many causes of vaginal bleeding in pregnancy Women may experience vaginal bleeding or spotting, with or without cramping, backache, or labor pains. The bleeding can range from bright red and heavy to small amounts of dark blood clots, or can be even concealed.

#### **What are the causes and risks of the condition?**

##### **Common causes of bleeding in early pregnancy includes**

- Abnormal implantation of the fertilized egg into the wall of the uterus. This usually occurs in the very early days of pregnancy.
- Trauma to the cervix, which may occur after sex or an injury.
- Inflammation of the cervix.
- Miscarriage, or loss of the fetus in the first half of pregnancy.

- Ectopic pregnancy. This is when the fetus grows outside the normal uterine cavity. This is a obstetric emergency that may cause heavy internal bleeding, shock and even death.
- A tumor or cancer. Rarely, the fetal tissue itself can actually become a tumor. This unusual condition is called a molar pregnancy.

**Common causes of bleeding in late pregnancy include:**

- The placenta detaching from the wall of the uterus before or during labor. This causes severe abdominal pain, bleeding usually concealed or per vaginum and possible lead to death of the mother and fetus. This condition occurs in 10% of pregnancies. It is associated with maternal smoking, cocaine use, high blood pressure, and trauma to the abdomen.

A placenta abnormally located in the lower uterine segment, blocking the birth canal. This can cause heavy vaginal bleeding as the cervix opens. Serious maternal and fetal problems may occur if normal delivery is attempted in this setting.

- Labor. Late in pregnancy, spotting may be a normal sign of labor as the cervix opens. This spotting or bleeding is usually mixed with mucus and is known as the "bloody show."
- Other warning signs may include vaginal discharge, pelvic or lower abdominal pressure, tightening of the uterus, abdominal cramps, and diarrhea.

**What can be done to prevent the condition?**

Prevention depends upon the cause. Early prenatal care will allow the practitioner to screen for risk factors of miscarriage, premature labor, and other problems. Eating a balanced diet rich in folate may prevent miscarriages due to genetic problems. Avoiding cigarettes, cocaine and trauma may decrease the risk of the placenta detaching. Practicing safer sex methods can help prevent sexually transmitted diseases. These are a common cause of ectopic pregnancy.

**How is the condition diagnosed?**

The cause of vaginal bleeding may be discovered using:

- Pelvic examination. This will determine how much bleeding has occurred, if the cervix is opened, and whether or not fetal tissue is present in the vagina during a miscarriage

- Ultrasound, a special x-ray test that uses sound waves. This allows a doctor to see a possible ectopic pregnancy, fetal death, and molar pregnancy. It also helps to determine the location of the placenta or if the placental is detaching too early.
- Repeated testing of HCG levels, or pregnancy hormone levels, in early pregnancy.
- Blood tests to determine the amount of blood loss.

### **What are the treatments for the condition?**

Not all vaginal bleeding in pregnancy requires treatment. If bleeding occurs, but a miscarriage or early delivery does not occur, observation is all that is needed.

#### **Treatment for other causes include:**

- Scraping of the lining of the uterus, also called a "E and C." This is done to remove the dead fetus or placenta after a miscarriage or molar pregnancy.
- Surgery to remove a fetus that implants outside the uterus.
- Cesarean delivery, or c-section. This may need to be performed in the event of heavy bleeding that threatens the health of the mother or child.
- Medications designed to relax the uterus, such as ritodrine. These are often used in the event of premature labor.
- Transfusions, which may be life-saving for the mother and fetus in the event of severe blood loss.

### **What are the side effects of the treatments?**

All surgery is associated with a risk of bleeding, infection, and reactions to pain medication. Death may even occur in rare cases. Recovery from surgery may require 6 to 8 weeks of limited activity. Transfusions carry the risk of infection and allergic reactions. All medications have side effects, such as allergic reactions and stomach upset. Specific side effects depend on the drugs used.

### **What happens after treatment for the condition?**

Most cases of bleeding will end up turning into pregnancies that continue without further problems. In the event of a miscarriage, a woman should wait 3 to 4 months before attempting another pregnancy. Significant blood loss may occur in some cases. This may require treatment with iron and vitamin pills to increase the blood counts. If premature labor started, medications to relax the uterus may be given to extend the pregnancy beyond the 36<sup>th</sup> week.

The mother's blood type is determined. If a mother has what is called an Rh negative blood type, administration of Rh{0} (D) Immune globulin may be needed. This helps prevent a type of blood incompatibility problem between mother and fetus that can harm the baby in future pregnancies.

#### **How is the condition monitored?**

Monitoring depends on the cause of bleeding. It may consist of a "wait and see" approach. Repeat ultrasound exams or blood tests may be used. Any additional episodes of vaginal bleeding should be promptly evaluated by a practitioner.

### **3.1.5. Detail description of conditions that causes bleeding during Pregnancy, labour and with in 42 days post partum.**

#### **I. Abortion**

Abortion is uterine bleeding before viability i.e. before 28 weeks of pregnancy.

Abortion can occur: Spontaneously – also called miscarriage or – Induced

**Induced abortion:** - Artificial termination of pregnancy before reaching fetal viability.

**Unsafe abortion** is defined as a procedure used for terminating pregnancy either by person (s) lacking the necessary skills or in an environment lacking the minimum medical standards or both.

#### **Epidemiology of unsafe abortion**

**Globally** - 40-60 million induced abortion occur yearly, and more than a third are unsafe abortions of these 19 million occurred world wide yearly or 55,000 daily, among these cases 5 million (26.3%) are teenagers and 19 out of every 20 cases live in developing countries or 18 million (97.3% of the global figure). On the other side the estimated number of unsafe abortion in the developed countries is about 5000,000 per year.

- Globally unsafe abortion kills 78,000 women yearly or 200 daily. of these 34,000 are African women (44% of global figure)
- In Ethiopia it accounts for 32% of direct cause of maternal mortality. Besides, it's impact in maternal mortality; it leads to untold illness such as HIV/AIDS. In countries like Ethiopia, where abortion is illegal and inaccessible, abortion occurs mainly in clandestine conditions but tends to be under reported or reported as spontaneous abortion

## **Etiologies of Abortion**

Abortion could be: - spontaneous or induced

**i) Spontaneous abortions:** - causes per gestational ages (GAs)

**The commonest causes of 1<sup>st</sup> trimester abortion are:-**

- Fetal chromosomal anomalies and infections
  - ✓ Severe maternal illness such as HPN, DM...etc.
- **2<sup>nd</sup> trimester abortion**
  - ✓ Usually related to maternal factors, i.e.
    - congenital anomalies of the uterus
    - incompetent cervix and
    - Systemic illness.

**ii) Induced abortion**

Usually occurred as a consequence of unintended pregnancy - defined as pregnancy that happened unplanned or unwanted and in some cases due to Feto-maternal complications (therapeutic termination of pregnancy)

The core causes of unintended pregnancy are;

- High rate of “unmet” need for contraception
- Rarely, happened due to Method failure.

## **Clinical- features of abortion**

Depends on gestational age, stage or type of abortion and complications

Symptoms: Amenorrhea, Cramping type abdominal /lower pelvic pain, Vaginal bleeding (light or profuse)

Signs –V/s – depends on amount of blood loss, associated complications such as infections.....etc.

Gus- uterus usually large and softer than normal, Cervix could be closed or open, with /without active vaginal bleeding.

## **Differential diagnoses of abortions**

- Ectopic pregnancy
- Molar pregnancy (GTD)

- AUB/DUB / Abnormal uterine bleeding / Dysfunctional uterine bleeding /
- Non gynaecological cases:- pyelonephritis ,appendicitis...etc

### **Complications of abortion**

- ❖ Immediate
  - Haemorrhage
  - Infection that lead to sepsis or septic shock
  - Intra-abdominal viscus injury
  - Severe vaginal bleeding
  - Regret (psychotrauma) if it is induced abortion
- ❖ Late
  - Infections such PID, HIV /AIDS (direct or indirectly)
  - Ectopic pregnancy
  - Infertility
  - Chronic pelvic pain syndrome (CPPS)

### **Management of abortion**

Broadly called as post abortion care (PAC) which is defined as an approach for reducing morbidity and mortality from incomplete & unsafe abortion and resulting complications for improving women's sexual & reproductive health & lives.

### **Components of PAC are**

#### **1. Treatment of incomplete abortion and its complications**

##### **1.1. Incomplete abortion**

Management depends on gestation age (GAs) & associated complications

#### **Investigations:**

Baseline: Hgb (Hct), bg & Rh , Blood film if febrile urine analysis.

Others: usually available in hospitals done if there is an indication

A. Early incomplete abortion: - is defined as abortion at or before 12<sup>th</sup> weeks of pregnancy.

Evacuating content of the uterus using Manual vacuum aspiration (MVA) is a preferred method. But if MVA is not available Evacuation can be done by sharp metallic currett (E/C).

As mild or moderate pain is anticipated control of pain is essential and pain control can be done by:

- ❖ Analgesics (Po, IM or IV)  
    e.g. Paracetamol or Ibuprofen (Po) 30-60 minutes before the procedure.
- ❖ Anxiolytic (Po, IM or IV) is indicated if the woman has severe pain or anxiety.  
    eg. Diazepam 5-10 mg (IV) or 10mg (Po) 1 hour before the procedure.
- ❖ Local anaesthesia using lidocaine as paracervical block, rarely with caution.

**B. Late incomplete abortion:** is defined as abortion after the 14<sup>th</sup> weeks of pregnancy.

The management of such cases is stimulation or initiation of uterine contractions by pitocin drip (using Normal saline or ringer's lactate) that helps expulsion of the uterine contents. If patient expelled the products of conceptus completeness should be checked using MVA or sharp metallic curette.

**NB:** Failure of expulsion despite adequate pitocin dose is an indication to refer patient to hospital.

#### **Follow-up**

Every case of incomplete abortion should be followed their vital signs, input and output and for active vaginal bleeding or other complications after evacuation of products of conceptus is done, for certain time before being discharged.

#### **C. Complications**

If there is (are) associated complications such as those mentioned in the above, evacuation of the uterus should be deferred and an appropriate and prompt referral to hospital is mandatory.

### **2. Post abortion Family planning (PAFP) counseling & service**

After evacuation of incomplete abortion, patients should be counseled on:

- ✓ Options of available modern contraceptive methods
- ✓ On the need of starting modern contraception immediately as there is a risk of again being pregnant before commencement of her next menses (especially after 1<sup>st</sup> trimester abortion)

- ✓ The choice of methods types is decided by herself or it must be a informed consent

### **3. Counseling**

Is provision of health education on reproductive health such as?

- Risks of unprotected sex
- Risks of unintended pregnancy and unsafe abortion....etc.

### **4. Partnership between service provider and the community**

Establishing good communication such as sensitization meeting and provision of feed back to community health workers and community elders play a significant role on creation of community awareness on using modern contraception that prevent unintended pregnancy and unsafe abortion as well as on referring cases promptly to the health facilities.

### **5. Integration of PAC with other reproductive health services of the facility**

This implies that provision of different reproductive health (RH) services such as Family planning, STI screening & treatment ...etc with PAC at the same time and place by same or different health service providers. Thus, a patient will get a chance to get other services during her time of visit to health facility in seeking PAC service.

### **Prevention and control of abortion**

#### **- Prevention of unsafe abortion includes**

- I. prevention of the occurrence of unintended pregnancies by promoting health education to the community on;
  - ✓ Safe -sex practices
  - ✓ Danger of unprotected sexual- intercourse and unsafe abortion and
  - ✓ Methods of preventing unintended pregnancy, i.e. use of modern contraceptive methods with emphases on dual protection, condom.
- II. Making reproductive health services, such as modern contraceptive methods, accessible to all in-need, especially for those vulnerable to unsafe abortion e.g. Young people (both in & out of school), marginalized group of the population.. etc and this can be achieved by providing this service in a place, time and persons(s) accessible or preferable to different categories of the population.



## Spontaneous abortion

Prevention depends on identification of its cause (s) and treating, though in most cases the cause(s) is not known

## II. Antepartum Hemorrhage

I. **Definition.** Vaginal bleeding that occurs after 28 weeks of gestation before the delivery of the fetus.

II. **Differential Diagnosis.**

### A. Placenta previa.

1. **Incidence. Occurs** in 1 of 200 deliveries. The diagnosis of placenta previa is very common in the second trimester, but more than 95% of these do not have placenta previa at delivery.

2. **Classification** - Classification of placenta previa is based on the amount of placenta that covers the cervical os. The exact classification determines the risk factor for hemorrhage. There are four classifications of placenta previa.

I. Low laying placenta: The placenta will lie 2 to 5 cm from the cervical os.

II. Marginal placenta previa: the edge of the placenta is at the margin (2cm) of the internal cervical os.

III, Partial placenta previa: the internal os is partially covered by the placenta.

IV. Total/complete placenta previa: the internal os is covered completely by the placenta.

3. **Predisposing Factors** - Although the precise cause of placenta previa is unknown, there are several factors associated with its occurrence including;

- Maternal age over 35 years
- Multiparity
- Previous history of placenta previa
- Uterine scarring
- Endometritis
- A large placenta
- Multi fetal gestation

### 4. Diagnosing Placenta Previa

When a mother of more than 28 weeks of gestation complains of painless vaginal bleeding, placenta previa must be ruled out. The absence of abdominal pain and uterine contractions

is often stated as an important distinguishing feature between placenta previa and abruptio placenta. However, this distinction is sometimes incorrect. Abdominal pain does not always occur in abruptio placenta and in up to 10% of placenta previa cases there is a coexisting abruptio of the implanted placenta.

The number of placenta previa diagnoses has increased dramatically with the use of obstetrical ultrasound, especially using a vaginal transducer. Many placenta previas are diagnosed before there are any symptoms. A prenatal ultrasound can identify a placenta previa in about 95% of patients between 16 and 18 weeks, however, an ultrasound follow-up on asymptomatic patients in the third trimester reveals that 90% of the placentas were no longer previa. This is called placental migration. The term migration is a misnomer because the placentas that "migrated" most likely never had actual villi invasion.

When ultrasound is used there are certain factors that can influence accurate results. The most common reasons for missing placenta previa on ultrasound are positions of the fetal head that obscure the regions of the cervix and failure to scan the lateral uterine walls. An engaged cephalic presenting part would not allow the placenta's position to be revealed. Also if the placenta was implanted posteriorly or the mother is obese the placenta would be very difficult to identify. An over distended bladder that would compress the lower uterine segment could cause a false positive. The more advanced the gestation the more the growing fetus occupies a large part of the uterus and the more difficult it is to identify the placenta's edge. In addition, the presence of blood in the area of the cervix can create the illusion that amniotic fluid is present, falsely ruling out placenta previa.

An abdominal examination usually will reveal a soft, relaxed, non-tender uterus with normal tone. Leopold's Maneuver will reveal the lie of the fetus, which is especially important. In partial or complete placenta previa 35% of the fetuses are in a breech or transverse lie, and vertex presentation is high, above the pelvic brim. Under no circumstances should a vaginal or rectal examination be performed until placenta previa is ruled out. If a vaginal examination is performed, the fingers may puncture a hole in the placenta causing uncontrolled bleeding that would be detrimental to both the mother and the fetus.

If the ultrasound reports a normally placed placenta, a vaginal speculum exam is performed to rule out other causes of bleeding such as cervicitis, cervical polyps, heavy bloody show or cervical carcinoma. Occasionally there will be bleeding after intercourse and it is necessary to include this question in your assessment.

If ultrasound is not available or the report is inconclusive, an extremely careful vaginal speculum exam is performed by the practitioner to observe if the placenta is covering the cervical os. This examination must be done under a double set up. A double set up is when

the procedure is done in the operating room, the patient is prepped and draped, and all preparations for an emergency cesarean section are ready in the event of a severe hemorrhage. It must be remembered that the couple should also be prepared physiologically and psychologically for the possibility of emergency surgery. There is controversy associated with this type of examination. Some obstetricians feel that it is far too dangerous and the placenta may accidentally be punctured causing uncontrollable hemorrhage. Uncontrolled hemorrhage places both the mother and the fetus at higher risk for potential problems.

A double set-up has been considered the final diagnostic step in determining placenta previa. However, with the improved accuracy of diagnostic ultrasound, the indication for performing a double set-up examination is limited. A double set-up is indicated when the ultrasound evidence is inconclusive or when the patient presents with ongoing, but not life-threatening vaginal bleeding or if ultrasound is not available.

Other methods used for diagnoses include magnetic resonance imaging (MRI) and vaginal sonography. The advantages of magnetic resonance imaging (MRI) are better imaging of the soft tissue structure, better definition of the cervix and less potential error due to a distended bladder. Vaginal sonography appears to be a safe method to make a diagnosis especially between marginal and partial previas.

### **5. Medical (expectant) Management of Placenta Previa)**

Optimal outcome depends on prompt diagnosis, rapid blood product replacement and tocolysis of labor if maternal status allows. The goal of management for placenta previa is to obtain the maximum fetal maturation possible while minimizing the risk to both the fetus and the mother. Once the diagnosis is established, the clinician must decide whether the patient is a suitable candidate for expectant management. The expectation for success such as delivery of a live infant depends to some extent on the length of gestation at the first bleed and the degree of placenta previa. The expectant treatment for placenta previa is based on gestational age, fetal and maternal condition and severity of bleeding. The goal is to delay the delivery until the fetus is mature without increasing the risk to the mother.

Immediate delivery should be implemented in the following settings, regardless of gestational age:

- Persistent hemorrhage
- Persistent uterine contractions unresponsive to tocolysis
- A coagulation defect (DIC)
- Fetal distress with a viable fetus
- Fetal demise or has anomalies that are incompatible with life

### ❖ Summary for management of Placenta Previa

- If pregnancy 37 weeks or greater, or if fetal maturity has been documented, a cesarean section is indicated unless only a minimal degree of placenta previa is present.
- If bleeding is sufficient to jeopardize the mother or fetus despite transfusion, cesarean section may be indicated regardless of gestation.
- In the preterm gestation, expectant management is indicated in patients with no observed bleeding, reactive nonstress test and stable hematocrit, who are compliant with instructions.
- Most patients require inpatient observation. Physical activity is restricted. Nothing is allowed in the vagina, including examining fingers. The hematocrit is maintained at 30% or greater. Preterm labor can be managed with magnesium sulfate. Use of beta-adrenergic agents can cause tachycardia and mask the signs of bleeding. Once 36 to 37 weeks of gestation is reached with fetal maturity demonstrated by amniocentesis, the patient is readied for elective double-setup examination.
- Check for fetal bleeding: To 5 ml of tap water add 6 drops of 10% KOH in two test tubes. Add 3 drops of maternal blood to one tube and 3 drops of vaginal blood to the other. The maternal blood will turn green yellowish brown after 2 minutes. If fetal red blood cells are present, the solution will turn pink. Immediate delivery is indicated.
- Remember that placenta accreta may complicate placenta previa in women with history of previous C-section. Hemorrhage can necessitate hysterectomy.

During referral or admission the following condition should be fulfilled:

- Opening i.v line
- Drawing blood for x - match and grouping
- Inpatient care (surveillance)
- Heamatemics

### **B. Placental abruption.**

**1. Incidence.** Placental abruption occurs in 10% of all deliveries in the world, but not exactly known in our cases.

**2. Classification System for Abruption Placenta:** The Latin term, abruptio placenta means "rending asunder of the placenta." The severities of complications depend on the amount of bleeding, degree of separation and the size of the blood clot that forms on the

maternal placental surface. There are several systems for classifying the types and severity of abruption placenta.

### **First System**

Grade 0: The patient is asymptomatic, but a retroplacental clot is noted after delivery.

Grade 1: The patient has vaginal bleeding along with uterine tenderness. Neither mother nor baby shows signs of distress.

Grade 2: The patient experiences uterine tenderness and tetany with or without external evidence of bleeding. The mother is not in shock but there is some evidence of fetal distress.

Grade 3: Uterine tetany is severe; the mother is in shock and hemorrhaging (Usually >1000 cc). The bleeding may or may not be revealed and the fetus is probably dead.

### **Second System**

**Revealed:** Vaginal bleeding is evident, with the patient's symptoms consistent with the amount of blood lost. Uterine tenderness and tetany may or may not be present and are only minor.

**Concealed:** No bleeding is evident. Uterine tenderness and hypertonicity are present. Often fetal heart tones are not present or there is extreme fetal distress. Often called a retroplacental hemorrhage.

**Mixed:** Both bleeding and uterine tenderness and tetany are present.

**Moderate:** Approximately 1/6 to 2/3 of the placenta is separated from the uterus. Dark vaginal bleeding may be absent or present (<1000 ml). Uterine tenderness and tetany are present. The fetus will exhibit distress due to uteroplacental insufficiency.

**Severe:** More than 2/3 of the placenta is separated from the uterus causing continuous uterine tenderness and rigidity along with severe pain. Dark vaginal bleeding (>1000 ml), however bleeding may be absent. Fetal distress will develop and if the fetus is not delivered death of the fetus is inevitable. Entire separation of the placenta will cause maternal shock, fetal death, severe pain, and possible disseminated intravascular coagulation (DIC).

Concealed bleeding may occur in any of these classifications of abruption placenta. Concealed bleeding occurs when there is a central separation and the blood is trapped between the uterine wall and the placenta. This is termed a retroplacental clot. The third system is going to be used in this discussion of abruption placenta.

## **Pathophysiology**

In abruptio placenta, it is thought that abruption is caused by degenerative changes in the spiral arterioles that nourish the intervillous spaces and supply blood to the placenta. This process leads to decidual necrosis. When this happens, the blood vessels can rupture and bleeding occurs because the uterus is distended and cannot contract sufficiently to close off the opened blood vessels. Bleeding from the vessels form a retroplacental clot and increase the pressure behind the placenta causing further separation.

If the separation of the placenta is at the margin of the placenta or separates the membranes from the decidua, then vaginal bleeding is evident. Otherwise, the blood is hidden or concealed between the placenta and the decidua and pressure builds up forcing blood through the fetal membranes into the amniotic sac. This build-up of blood increases uterine tone, tenderness, and irritability.

Clotting occurs simultaneously with hemorrhage because the decidual tissue is rich in thromboplastin. Clotting leads to a subchorionic hematoma that releases large quantities of thromboplastin into the maternal circulation. This situation can lead to disseminated intravascular coagulation (DIC).

## **Predisposing Factors**

The etiology of abruptio placenta is unknown; however it has been proposed that abruption begins with degenerative changes in the small maternal arterioles that supply the intervillous spaces, resulting in thrombosis, degeneration of the decidua, and possible rupture of a vessel. Bleeding from the vessel forms a retroplacental clot. The bleeding causes increased pressure behind the placenta and results in further separation.

Although there is no solid evidence of the cause, there are certain conditions that are associated with abruptio placenta. The most common and consistent associated factor is pregnancy induced hypertension (PIH) or chronic hypertension (140/90mmHg). Hypertension causes vascular changes at the placental level that may cause the vessels to be necrotic and split from the decidua. (18) PIH and chronic hypertension is associated with a 50% occurrence of fetal demise with abruptio placenta. It is imperative that immediate evaluation is performed by a physician if a PIH or chronic hypertension patient complains of lack of fetal movement or severe abdominal pain.

Other factors include premature rupture of membranes < 34 weeks gestation, especially if oligohydraminous is present, maternal age over thirty five years, uterine anomaly or fibroids and vascular disease such as diabetes mellitus or collagen disorders. External trauma from

a blow, motor vehicle accident or a needle puncture from amniocentesis, twins, folate deficiency, polyhydramnios and supine hypotension has been documented to cause abruptio placenta. If the external trauma is forceful enough, the placenta will begin to detach from the uterus. Unfortunately, the physical evidence of the trauma may be minimal and still be associated with placental abruption that can progress from grade 1 to 3 within 24 hours. Behavioral risk factors include cigarette smoking, which causes vasoconstriction of the spiral arteriole and can lead to decidual necrosis.

### **Signs and Symptoms**

The signs and symptoms of abruptio placenta depend to a great extent on the amount of separation of the placenta and type of abruption. The classic symptom of abruptio placenta is acute, "knife like" abdominal pain, with or without vaginal bleeding. However, it must be emphasized that signs and symptoms of abruptio placenta can vary considerably. It is known that only 50% of patients with abruptio placenta will experience abdominal pain.

With mild abruption the mother may complain of "labor pains" and there may be only slight uterine irritation. With moderate abruption, pain can develop gradually or abruptly. In severe abruption pain can be sudden and described as knife-sharp. The pain can be both localized or diffused over the abdomen. Escalating abdominal pain indicates a concealed bleed. Uterine irritability and low back pain will occur in 2/3 of patient with abruption placenta. If a concealed bleed is present, the abdomen becomes enlarged and the uterus rigid.

The abdomen is described as "board-like." The degree of rigidity depends on the amount of concealed blood trapped behind the placenta. The cardiotocography will show signs of rising uterine tone and a change in the contraction pattern.

A Couvelaire uterus occurs when blood accumulates between the separated placenta and the uterine wall. A Couvelaire uterus is due to bleeding into the myometrium resulting in tissue damage, increased tonicity, and inability of the uterus to relax between contractions.

The uterus appears bluish, purplish and mottled due to the extravasation of blood into the uterine muscles. A Couvelaire uterus causes maternal shock. The treatment for Couvelaire uterus is delivery and intravenous Oxytocin. In extreme cases a hysterectomy may be necessary.

It should be remembered that vaginal bleeding may or may not be present. However, vaginal bleeding will occur in 80% of women. When vaginal bleeding is present it is dark red because the bleeding comes from the clot that was formed behind the placenta. If the blood loss is significant, signs of hypovolemic shock will be present.

Moderate and severe abruption interferes with fetal circulation and fetal distress will be evident with obvious reduced fetal activity and evidence of uteroplacental insufficiency (late decelerations). In some cases of moderate or severe abruption the fetus may be already dead.

### **Diagnoses**

Abruptio placenta should be considered when there is a sudden onset of abdominal pain with or without vaginal bleeding.

A medical diagnosis of abruption placenta is usually made on the basis of presenting symptoms and a physical assessment. It is important to thoroughly assess the patient using questions such as: when did the pain begin, how intense, any bleeding, what were you doing? A physical examination of the abdomen determines uterine tone, presence of rigidity and abdominal enlargement. Assess for the presence of vaginal bleeding and if present note the amount and color. Check fetal status. It is imperative that the fetal status be assessed with continuous fetal monitoring and not just with a Doppler.

Determine if there are any predisposing factors such as: PIH, previous abruptio, motor vehicle accident, or cocaine use. Check laboratory tests to note if there are any deviations from normal. This would include: fibrinogen level, prothrombin time (PT), thromboplastin (PTT), platelets, complete blood count (CBC), and anticoagulant factors. A Kleihauer-Betke stain measures the amount of fetal hemoglobin present in the mother's circulatory system. This would indicate fetal blood loss.

Severe or moderate abruptio placenta is easily diagnosed. Mild abruption is more difficult to diagnose and may be confused with placenta previa. An ultrasound will only rule out placenta previa and will not detect an abruption. Studies have shown that clinical diagnosis of abruption can be made by means of ultrasound in only 25% of affected women. Although, the ultrasound is unable to detect the degree of placental separation, it can identify a retroplacental clot. The ultrasound will also reveal a fluid/blood level, which would indicate an abruption.



### ❖ Management of Placental Abruption.

- Occasionally a small separation occurs without further problem. These patients have nouterine symptoms. Observation is required with fetal heart rate monitoring, serial labs and Ultrasound, but if no fetal distress occurs within the next 48 hours, the patient may be sent home.
- If placental abruption is mild and the fetus is immature, expectant management may be indicated, with fetal heart rate monitoring and serial laboratory and ultrasound examination.
- In all other cases, delivery is indicated. A vaginal delivery is preferred when fetal distress is not present or when the fetus is no longer viable. A C-section is indicated if fetal distress is present. A C-section is also performed when there is a threat to the mother's life or a failed trial of labor.
- Shock must be treated with adequate replacement of fluids and packed red blood cells; normal saline or ringer lactate should be used. Urine output must be maintained at 25 to 30 ml/hour. A central venous pressure line or Swan-Ganz catheter will assist in monitoring hemodynamic status. - Coagulopathy should be treated with fresh frozen plasma. One unit of FFP increases the fibrinogen concentration by 25 mg/dl. Platelet transfusion is required if the count is less than 50,000. Heparin is not used in DIC secondary to placental abruption.

### C. Vasa Previa

Vasa previa, or sometimes called velemensous insertion of the cord, is rare, occurring in less than 1 in 3000 births. Vasa previa is associated with a high incidence of fetal morbidity and mortality because of the potential for fetal exsanguination. Perinatal mortality rate is 50-69%.

Normally, the umbilical cord is covered in Wharton's jelly and protects vein and arteries from any injury. In vasa previa, some parts of the umbilical cord are not protected by Wharton's jelly and the exposed arteries and vein can be easily ruptured. This places the fetus at an enormous risk to bleed to death. The umbilical vessels insert on the chorioamniotic membranes rather than on the placental mass. This causes a segment of the umbilical cord to lose the protections of Wharton's jelly.

#### Cause

There is no known cause of vasa previa however, it is speculated that it may occur at the time of implantation. The most widely recognized theory is called trophotropism.

Trophotropism in the placental tissue can be compared to the tendency of a plant to lean towards the sun to get the light it needs to survive. The lower segment of the uterus is not as nourishing as the upper segment; therefore the placenta will grow upwards towards the well-vascularized uterine fundus.

### Signs

The traditional sign of a vasa previa is a sudden gush of bright red blood at the time the membranes have ruptured. This causes a sudden fetal bradycardia because of the sudden blood loss. A sinusoidal fetal heart rate pattern is highly suggested of vasa previa.

### Diagnosis

The diagnoses of vasa previa prior to delivery is usual. However, a vasa previa can be detected during the pregnancy as early as 16 weeks gestation with the use of a transvaginal sonography.

The diagnoses of vasa previa is made when the membranes rupture and there is a gush of bright red blood. Occasionally the umbilical blood vessels rupture during labor and fetal distress is observed on the fetal monitor. When the placenta is delivered the condition of vasa previa is evident. If the diagnosis detects a vasa previa, a cesarean section is performed.

**D. Uterine rupture.** May mimic severe abruption and diagnosis is clinical. An abdominal film may show free intraperitoneal air or an abnormal fetal position accompanied by persistent fetal bradycardia. Emergent C-section for imminent rupture and hysterectomy are required.

### III. Postpartum haemorrhage (PPH)

**Definition:** PPH is defined as blood loss of more than 500 ml following vaginal delivery or more than 1000ml following cesarean delivery.

Incidence:- industrialized countries – 5% of all deliveries

- Developing countries – 30% “

**NB.** Types and common etiologies is listed in the core module.

### Pathophysiology

Over the course of a pregnancy the following physiologic changes occur to fulfill the perfusion demands of the low resistance uteroplacental unit and to provide a reservoir for the blood loss that occurs at delivery. These changes are: Maternal - blood volume increase by approximately 50% and Plasma volume increases more than the total RBC ,thus

Hgb concentration & Hct value fall. At term, the estimated blood flow to the uterus is 500-800 ml/min. which constitutes 10-15% of cardiac output. The uterine vessels traverse through a wave of myometrial fibers also referred as the “living ligatures,” thus compressed and kinked, and normally blood flow is quickly occluded due to contraction of these muscle fibers.

During uterine atony (the most important cause of PPH), contraction and retraction of myometrial fibers fails and this leads to massive vaginal bleeding. Similarly trauma to the genital tract in pregnancy results in significantly more bleeding than would occur in the nonpregnant state because of increased blood supply to these tissues. The trauma specifically related to the delivery of the baby, either vaginally or by C/S delivery can also be substantial and can lead to significant disruption of soft tissue and tearing of blood vessels.

### **Clinical features of immediate (primary) PPH**

Usual presentation is heavy vaginal bleeding that can quickly lead to signs and symptoms of hypovolemic shock, that reflects the combination of high uterine flow (blood) and uterine atony (most common cause of PPH). Sometimes, a significant amount of blood can be retained in the uterus behind a partially separated placenta /membrane or blood may collect in an atonic uterus. Thus, strict monitoring of uterine size and tone is crucial following delivery of placenta.

- If the cause of bleeding is not uterine atony, then blood loss may be slower and clinical signs of hypovolemia may develop over a longer time frame.

Two important facts worth bearing in mind are;

1. Caregivers usually underestimate visible blood loss by as much as 50%
  2. Symptoms of hypovolemia may not develop until a large volume of blood has been lost due to; most women giving birth are healthy & compensate for blood loss very well
- Most common birthing position (semi-recumbent) with the leg elevated masks the actual loss.

Thus, rapid recognition and diagnosis of PPH is essential for successful management. The major factor in the adverse outcomes associated with severe hemorrhage is a delay in initiating appropriate management.

N.B. The clinical findings in hypovolemia are listed in the core module.

## **Management of PPH**

Shout for help! As it requires team work. One group works on resuscitation while the other in controlling the bleeding.

### **1. Resuscitation**

Establish an intravenous (IV) line and take blood for Hbg, Blood group & Rh and cross-matching; administer oxygen.

Raising the legs improves venous return and is consistent with positioning used to diagnose and treat the underlying causes of bleeding.

Perform the initial resuscitation with large volume of crystalloid solution, either normal saline (Ns) or Ringer lactate solution. Volume replacement better exceed their pre-morbid norm by 500 to 1000 ml.

Blood transfusion is considered if blood loss is ongoing and thought to be in excess of 2000 ml or if the patient's clinical status reflects developing shock despite aggressive resuscitation. Fresh whole blood or stored whole blood is preferable as it correct RBC loss in addition to volume replacement.

### **2. Control of primary PPH**

#### **2.1. If the placenta is delivered, undergo a diagnostic assessment.**

##### **a) Uterine atony**

Palpation and massaging the uterus serves to assess the uterine size and tone and to express any clots that have accumulated in the uterus or vagina. In atonic uterus, the uterus will be boggy and large in size that bled, on and off, a dark-red blood.

The initial management includes vigorous massage and administration of oxytocin as a 5u (IV) bolus, as 20u in 1L of Normal saline (IV) to run as fast as possible or as 10u direct in to the myometrium through the abdominal wall.

Emptying the bladder may aid in ongoing assessment and facilitate uterine contraction. If the uterus remains atonic, commence Bimanual massage, This aids to expel clots and decrease bleeding: promoting and sustaining contraction and in a decrease amount of bleeding even if the uterus remains relatively atonic. After bimanual compression is started, a further diagnostic assessment is essential which includes:

## **b) Traumatic condition of the cervix, vagina, & Perineum**

It is identified by visualization of these sites using good light, speculum and ovum forceps. In such cases, the bleeding is bright-red and the uterus is well contracted. Repairing of tears arrest bleeding.

## **c) Intrauterine retention of missed placental fragments, clots, inversion or uterine rupture**

If lower genital tract trauma excluded and the uterus does not remain contracted and bleeding persists despite all efforts, uterine exploration manually using gauze or using a big blunt curette (Hunter's) is necessary to remove RPC or clot; to reposition an inverted uterus or to detect any uterine defect; which should be performed under pethidine and diazepam.

## **d) Coagulopathy**

If the diagnostic assessment excludes genital tract trauma; uterine inversion or rupture; retained placental fragments, bleeding from a contracted uterus is commonly due to a defect in hemostasis. Such clinical suspicion can be made by a review of the history and risk factors along with the finding of minimal clot formation.

**The following conditions are examples of cases that warrant an immediate referral to hospitals where there are operative facilities, blood bank, and skilled physicians to manage cases.**

- Uterus failed to contract and bleeding persists despite all efforts.
- A clinical impression of coagulation defect manifested by bleeding that arises from a well- contracted uterus
- Retained placenta failed to be expelled by controlled cord traction (CCT)
- Other complications such as uterine rupture.....etc.

It must be remembered that when patients are referred to hospitals, there is a need to secure iv line and indwelling urinary catheter along with an attending health personnel.

Packing of the uterus may be an option till patient reach the appropriate place for better management. The uterus and vagina must be tightly packed with continuous, layered, gauze under direct visualization using a speculum and/or retractors.

### 3. Control of secondary PPH

If usually takes place 5-15 days postpartum. Bleeding on the 4-5 weeks could be due to resumption of menses or rarely due to choriocarcinoma.

Commonest etiologies are:

- a. Retained products of conceptus or blood clot
- b. Endometritis
- c. Subinvolution of the uterus
- d. Others: earlier undiagnosed tear or paravaginal haematoma, Necrotic fibroid Chronic inversion, gestational choriocarcinoma

#### Treatment of secondary PPH includes:

- a. Treatment of shock (resuscitation): it could be due to sepsis
- b. Commencement of antibiotics
- c. Evacuation of the uterus under pitocin (iv) drip. Ergometrin (po) may be continued for 3-5 days
- d. Treatment of Anaemia
- e. Rarely referral of cases is a need for further surgical or/and medical therapy.

### 4. Evaluation of response to management

While a patient is resuscitated and an effort is done to arrest bleeding, close follow up of patient's response is crucial. These, includes:

- level of consciousness
- Vital signs (v/s) : Blood pressure, Respiratory rate & Temperature Maintain systolic BP > 90 mm Hg
- Urine out put (maintain at 30-60 ml/hr or 1ml/kg/hr)
- Frequent auscultation of the lung fields help to detect pulmonary edema or ARDS.

### Prevention and control of PPH

- Proper utilization of family planning for spacing & to reduce parity
- Comprehensive MCH eg. antenatal treatment of anaemia
- Detection of significant risk factors that warrants delivery to be conduct in maternity units that have readily available resources.

- Proper management of labour
  - Use of partogram in all labouring mothers.
    - Universal application of active management of third stage labor (AMTSL)
    - AMTSL includes:
      - Administration of uterotonic (preferably oxytocin 10 IU) within one minute of delivery of the baby after excluding twin
      - Early cord clamp and cutting
      - Expulsion of placenta with controlled cord traction (CCT) and
      - Raising and massaging of the fundus of the uterus abdominally
      - Close monitoring of vital signs, vaginal bleeding, and status of uterus during fourth stage of labour.
      - Provision of good postnatal care.

### **Abnormal Placental Implantations**

In most deliveries, the placenta will spontaneously separate from the uterine wall, however, there may be an abnormal attachment. Abnormal adhesion of the placenta occurs for unknown reasons and is diagnosed in 1 out of every 12,000 births. The mother with an abnormal attached placenta is at risk for post partum hemorrhage, hypovolemic shock and infection.

### **Placenta Accreta**

Placenta accreta occurs when there is a lack of decidua basalis and the placenta is implanted directly into the myometrium or the uterine muscle, making separation from the muscle difficult.

### **Placenta Increta**

Placenta increta is the abnormal invasion of trophoblastic cells into the uterine myometrium.

## Placent Percerta

Placenta percerta occurs when the trophoblast cells penetrate the uterine muscle till serosal layer of the uterus. The diagnoses of these placentas are not made until after the delivery of the infant and the placenta will not readily separate. Manual extraction is attempted and if the placenta will not separate or not all cotledons are removed, immediate surgical intervention i.e., hysterectomy is indicated.

## Obstructed Labor

Def. Failure of decent of presenting part for mechanical reasons in spite of good uterine contraction.

Incidence

- ✓ Is associated with incidence of Cephalo Pelvic Disproportion (CPD), quality of antenatal and Intra partum care

## Common causes

- CPD - Fault in the fetus (Hydrocephalus mal presentation)
- Fault in the Pelvis (result of mal nutrition in child hood formative years trauma and genetics )

Clinically recognized by

- In vertex presentation with increasing molding of fetal head and failure of descent
- In multi gravid usually cervix goes to full dilatation delay in decent and increasing molding
- In primi uterus goes in to inertia when labor is obstructed

Complications

- ❖ In primi - Fetal distress, Asphyxia and death
  - ✓ Maternal
    - Vesico vaginal fistula (VVF)
    - Recto vaginal fistula (RVF)
    - Foot drop (due to nerve compression)



- Vaginal Scaring
- Rarely uterine rupture

❖ In Multi Gravida

- Fetal – Fetal distress and death
- Maternal – ruptured uterus , Shock , Death

**Management of obstructed labor**

Prevention

- ✓ Education on risks of early marriage
- ✓ Should not occur with optimal antenatal care and intra partum care
- ✓ When feasible hospital care
- ✓ Supervised delivery with easily run satellite clinics and these linked to base hospital

**Definitive treatment**

- The principles are
- Resuscitation
- Bladder decompression
- Definitive management

**Definitive management includes**

- C/S for a live baby (in this situation simpysiotomy is an option)
- Destructive operations for dead fetus (make sure always uterus is intact before attempting destructive delivery)

#### iv. Differential diagnoses (ddx) of maternal bleeding

##### ✓ Clinical diagnosis of vaginal bleeding in early pregnancy

Presenting symptoms & signs	Probable diagnoses
Light bleeding, abdominal pain, closed cervix, uterus softer & slightly larger than normal Fainting, amenorrhoea, tender adnexal mass & cervical motion tenderness.	Ectopic pregnancy
Amenorrhoe, cramping /lower abdominal pain, vaginal bleeding (light or heavy) uterus soft than normal that correspond or smaller than date. Cervix closed or opened	Abortion
Heavy Vaginal Bleeding with Partial expulsion of products of conception which resemble grapes, nausea/vomiting, cramping/ lower abdominal pain soft uterus, dilated cervix, ovarian cysts early on set of pre-eclampsia and no evidence of a fetus.	Molar pregnancy

##### ✓ Clinical diagnosis of bleeding in later Pregnancy and labour

Presenting symptoms & signs	Probable diagnoses
Bleeding after 28 wks of gestation that may be precipitated by intercourse, relaxed uterus, lower uterine segment feel empty, bleeding may be light or heavy but painless, shock, usually normal fetal condition	Placenta praevia
Bleeding after 28 wks, usually dark oozing vaginally or may be retained in the uterus, intermittent or constant abdominal pain, tense /tender uterus fetal movement decreased or absent fetal distress or absent fetal heart sound.	Abruption placenta
Bleeding (Intra-abdominal and/or Vaginal) sever abdominal pain, abdominal distension and free fluid, abnormal Uterine contour tender abdomen, easily palpable fetal Parts Fetal movement and heart sound absent deranged maternal vital signs	Ruptured uterus

✓ **Clinical diagnosis of Vaginal bleeding after Child birth**

Presenting symptoms & signs	Probable diagnoses
Immediate PPH, Uterus soft and not Contracted with /without shock	Atonic uterus
Immediate PPH, complete placenta & contracted uterus	Tears of Cervix, Vagina or perineum
Immediate PPH, Uterus Contracted, Placenta not delivered within 30 minutes after delivery	Retained placenta
Immediate PPH, Uterus Contracted. Portion of maternal surface of Placenta missing or torn membranes within Vessels.	Retained Placental fragments
Immediate PPH, Inverted uterus apparent at vulva , uterus fundus not felt on abdominal examination (palpation) and slight or intense Pain	Inverted uterus
Bleeding is variable (light or heavy, Continues or irregular), anemia, uterus softer and Larger than expected for elapse time (>24 hrs) since delivery.	Delayed PPH



## **3.2 Satellite Module for BSC Degree Nurses**

### **3.2.1 Introduction**

Maternal bleeding in pregnancy, labour and early postpartum period is a major contributing factor to maternal mortality worldwide. It is one of the gravest emergencies in obstetric practices. More than half a million mothers die each year worldwide. The most common causes are hemorrhage, including uterine rupture, obstructed labour, unsafe abortion, puerperal infection, and eclampsia. Underlying these medical causes are the socio-economic, geographic and cultural factors.

Health professionals including nurses often fail to take appropriate and timely action when there are actual or potential risks for maternal bleeding. This contributes to the associated morbidity and mortality.

This satellite module is designed to strengthen the contribution of the nursing students and other staff nurses in the management of maternal bleeding. The major points regarding maternal bleeding are described in the core module and, activities specifically geared to nursing are highlighted here. Effort was also made to incorporate the nursing assessment and nursing diagnosis for common causes of maternal bleeding. The socioeconomic, cultural and geographic factors contributing to maternal bleeding were incorporated with the hope that professional nurses will look at clients in a holistic manner and take these factors into account during the intervention. Case studies and study questions are incorporated in order to create an interactive learning approach.

### **3.2.2 Directions for using this satellite module:**

- Before going to this satellite module you need to go through the core module.
- In order to be informed and to appreciate what others categories in the team are doing, you also need to read the satellite modules of other team members.
- Attempt the case studies and study questions both before and after you read the module so you can see your progress.

- Identify the prevention and control measures of maternal bleeding.
- Record and report of necessary data related to maternal bleeding.

### **3.2.3 Learning objectives: at the end of reading this module the students/nurses should be able to:**

- List the common causes of maternal bleeding.
- Describe the contributing factors for maternal bleeding
- Demonstrate the role of nurses with the different causes of maternal bleeding

### **3.2.4 Case study: Learning activity.**

A 40 years old woman with six female children was brought by her family members and delivered a baby at H/C. The nurse who attended the labour congratulated the family and the family members were very happy to have a male baby. Suddenly in the middle of the night one of the daughters of the mother discovered that her mother's condition was deteriorating and asked the nurse to check her mother. The nurse discovered that the mother was in a pool of blood. The nurse then decided to refer the woman to hospital but by the time they arrived at the hospital it was too late; she had died on the way. This was a big tragedy for the family who were enjoying the birth of the male baby without thinking of the wellbeing of the mother. This can happen even in some hospitals and H/Cs, especially in the rural areas where health workers including nurses, left mothers unattended for the first few critical hours after delivery. Observation, particularly during the first hour after delivery, is very important. This is the most crucial time when mothers are more likely to bleed and go into shock. What lesson do you learn from this story?

### 3.2.5 Maternal Bleeding

Maternal bleeding/ vaginal bleeding in pregnancy, labour and early post partum period is a major contributing factor to maternal mortality and morbidity worldwide.

**Table 3.2.1: Estimated global maternal mortality from major obstetric complications**

Ser. No.	Complications	% Maternal deaths
1	• Hemorrhage	25
2	• Sepsis	15
3	• Hypertensive disorders	12
4	• Obstructed labour	8
5	• Unsafe abortion	13
6	• Other direct causes	8
7	• Indirect causes	20

#### 3.2.5.1 Common Causes of Vaginal Bleeding:

##### 3.2.5.1.1 Causes of vaginal Bleeding during pregnancy

- Abortion
- Ectopic pregnancy
- Undiagnosed cervical cancer
- Cervical polyps
- Cervical erosion
- Traumatic coitus
- Molar pregnancy
- Ante partum hemorrhage (placenta previa and abruptio)

### 3.2.5.1.2 Causes of bleeding during labour and postpartum

- Uterine rupture
- Postpartum hemorrhage

#### 3.2.5.1.1.1 Bleeding before 28<sup>th</sup> wks of pregnancy:

The major (95%) cause of bleeding during the first and second trimester of pregnancy is abortion. Other complications that can cause bleeding in the first half of pregnancy are:

- Cervical conditions (Cervical cancer, polyps, cervicitis and erosion).
- Hydatidiform mole.
- Implantation bleeding.

#### Abortion:

**Definition:** The death / expulsion of fetus before 28<sup>th</sup> weeks of gestation ((Before it is viable or less than 500 gm weight)

#### Causes:

- I. Chromosomal abnormalities
- ii. Uterine - Cervical incompetence
  - Congenital abnormality
  - Fibroids
- iii. Maternal - Febrile illness
  - Syphilis
  - Hypertension
  - Diabetes

#### Classifications of Abortion

##### 1. Spontaneous-Threatened



- Missed abortion
- May go to term
- Inevitable (either complete or incomplete) abortion
- Recurrent /habitual abortion

##### 2. Induced

- Therapeutic
- Non therapeutic (safe/ usually unsafe) → septic

### **Spontaneous abortion**

Is an abortion which has not been interfered /happens spontaneously. Many pregnancies end in the 1<sup>st</sup> trimester because of spontaneous abortion.

#### **Causes:**

- ◆ About 50 % of early spontaneous abortions are related to chromosomal abnormalities.
- ◆ Teratogenic drugs
- ◆ Faulty implantation due to abnormalities of the female reproductive tract,
- ◆ Weakened cervix, or placental abnormalities,
- ◆ Chronic maternal diseases, endocrine imbalances and maternal infections from the TORCH group (Toxoplasmosis, rubella, cytomegally virus and herpes virus).

### **Threatened abortion**

Threatened abortion is defined as bleeding of intrauterine origin occurring before 28 weeks of gestation, with or without uterine contractions, with out dilatation of the cervix, and without expulsion of the products of conception.

**S/S of threatened abortion** - Slight vaginal bleeding  
- Slight backache  
- Cervix closed.

#### **Nursing Management of threatened abortion at H/C include:**

- Provide quiet atmosphere.
- Encourage rest.
- Observation
- Discharge after 48 hrs if bleeding stopped.
- No sexual intercourse for 2-3 weeks.

Despite the above management if bleeding persists, it suggests an inevitable abortion. Inevitable abortion is when it is impossible to continue the pregnancy.



### **S/S of inevitable abortion**

- Severe backache and bleeding
- Cervix dilated.
- Membrane may be ruptured.

⇒ Outcome: either complete or incomplete abortion.

### **Emergency Nursing Management at H/C includes:**

- Ergometrine 0.5 Mg. IM to control bleeding
- Digital evacuation if the tissue is noted at the cervix
- Monitor V/S
- Refer her for MVA or D and C
- Put up IV drip.

### **If MVA or E and C service is available at the H/C**

- Oxytocin infusion
- Lie the patient flat
- Monitor V/S
- Prepare the patient for MVA or E and C

### **Missed abortion**

When fetus died and retained in the uterus for about 8 weeks. It is not known why the pregnancy is not expelled. It is possible that normal progesterone production by the placenta continues while the estrogen level falls, which may reduce uterine contractility.

### **S/S**

- Brownish vaginal discharge
- Pregnancy test negative.
- Uterus fails to enlarge.
- Other S/S of pregnancy will be reduced or vanished

### **Management:**

- Oxytocin infusion
- D and C or MVA.

### **Complication – DIC**

- sepsis

**Habitual Abortion:** when a woman has three or more consecutive abortion spontaneously.

**Cause** - Cervical incompetence due to weakness or repeated D & C

- Chromosomal abnormalities

**Management-** Shirodkar stitch and remove stitch at term (at 38 weeks of gestation)

### **Unsafe Abortion**

**Definition:** is an abortion procured by unskilled person or in an environment where aseptic technique is lacking. In our setup it is performed illegally mostly for the sake of benefits or favor.

- World literature shows that abortion contribute to about 15% of all maternal deaths.
- The majority of these deaths occur in Africa.
- Ethiopia has one of the highest maternal mortality rates in the world.
- According the 2000 DHS report maternal mortality in Ethiopia is 870 / 100,000 live births, of which 22-54 % are due to unsafe abortion.

### **Complications of unsafe abortion**

- Shock
- Severe vaginal bleeding.
- Sepsis
- Uterine perforation.
- Intra abdominal injury.

### **Management at H/C includes:**

- Open air way
- IV fluids.
- Triple antibiotic
- Monitor V/S and intake and output
- Administer TAT
- Refer her to hospital

### **General management of unsafe abortion includes:**

- ◆ Emergency treatment of complications
- ◆ Post abortion counseling and family planning.
- ◆ Link to other reproductive health services

### **Post Abortion counseling and Family planning, why?**

- To break the cycle of repeated abortion.
- Major cause of maternal morbidity and mortality
- Abortion reflects unmet need.
- The death due to abortion is ethically wrong.

### **\* Counsel the post abortion clients before discharge about:**

Return of fertility /it returns soon and instruct about contraception:

- Start soon if sex is inevitable.
- Methods available.
- When to start
- Where to go to get contraception.

### **\* *Never repeat unwanted pregnancy and unsafe abortion.***

### **Consequences of unsafe Abortion**

- Infection, hemorrhage and subsequent repeated abortions.
- Increases Burden to the family, country, hospital..etc.
- Detrimental for women's economical, social and psychological well being.  
Ex. In our setup it affects the girls' ability to continue their education.
- Infertility that can be devastating to women's well being especially in countries where women derive their status from child bearing.

### **\* *Die of unsafe abortion means a double failure of the health system, i.e.***

1. Because of failure to prevent unsafe and unplanned pregnancy.
2. Because of failure to manage the complications of unsafe abortion.

### **\**Isn't such a death a double tragedy?!***

### **Ectopic pregnancy**

**Definition:** Implantation outside the uterus (outside endometrial cavity), commonly in the fallopian tube but occasionally can be abdominal or ovarian.

**Causes** - PID

**S/S:**

- Amenorrhea
- Lower abdominal pain
- Pain precedes bleeding
- Adnexal tenderness and mass / only 30-50 % of the time can a mass be palpated./

### **Outcomes of Tubal pregnancy**

- Tubal mole
- Tubal abortion → abdominal pregnancy
- Tubal rupture.

### **S/S of ruptured ectopic pregnancy**

- Severe lower abdominal pain
- Referred pain to the shoulder.
- Shock
- Brownish vaginal bleeding

### **Management at H/C includes:**

- IV drip.
- Monitor V/S
- Lie flat
- Urgent referral to hospital

### **Dx at hospital**

- Pelvic Examination
- Pregnancy test
- Ultrasound if available
- Complete blood count to rule out infection
- Culdocentesis-Aspiration of non-clotted blood, using a syringe and needle through the posterior uterus and in to the cul-de-sac of the peritoneal cavity in case of ruptured ectopic pregnancy.
- Laparotomy to visualize the ectopic pregnancy

### **Management at hospital**

- Admission
- Resuscitation
- Laparotomy ⇒ salpigo-ophorectomy

\* Primary Abdominal pregnancy - when the ovum primarily fertilized and embedded in the abdomen.

\* Secondary abdominal pregnancy aborted through f/ tube and implanted in the abdomen.

### **Hydatidiform mole:**

**Definition;** it is a cystic degeneration of the chorionic villi (gross malformation of trophoblasts). Proliferated trophoblast become filled with fluids and collectively looks like a bunch of grapes; fetus dies and is absorbed inside the trophoblast but the villi continue to multiply that enlarges the uterus greater than the gestational age.

### **S/S**

- ◆ Vaginal bleeding
- ◆ HCG production increases and pregnancy test become strongly positive.
- ◆ Uterine size exceeds the gestational age
- ◆ Nausea and vomiting
- ◆ Unable to palpate the fetal parts
- ◆ Pre-eclampsia may develop, often earlier than usual

### **Diagnosis: at H/C**

- ◆ History and sign and symptoms
- ◆ Passage of vesicles per vagina (best criteria)
- ◆ Ultrasound at hospital

### **Management at H/C**

- ◆ Pitocin IV infusion
- ◆ Prompt removal of intrauterine contents
- ◆ Vacuum aspiration or E and C
- ◆ Refer to hospital for hysterectomy may be necessary.
- ◆ Follow up and subsequent management:
  - Chest X-ray to rule out malignant metastasis
  - Serum quantitative HCG until it becomes normal
  - Contraception during the follow up.

### **Complications:**

- ◆ DIC
- ◆ Bleeding and shock
- ◆ Choriocarcinoma

### 3.2.5.1.1.2 Common Causes of bleeding after 28<sup>th</sup> weeks of pregnancy Antepartum Hemorrhage (APH)

**Definition:** Any bleeding from the genital tract from the end of 28<sup>th</sup> weeks of gestation until the end of 2<sup>nd</sup> stage of labour.

#### **Causes of APH:**

1. Placenta praevia/unavoidable bleeding
2. Placenta Abruption/accidental hemorrhage
- 3 Other causes (cervical polyps, Cancer, erosion etc)

**\*NB: This text will be focusing on the placental causes of APH:**

#### **Nursing Management of unclassified APH at the level of H/C**

In general, the following nursing measures should be implemented for a mother being treated for bleeding disorder during pregnancy:

- Lie pt flat; check FHB
- IV infusion in case of severe bleeding.
- Assess B/P, P, R every 2 hours, and more frequently with active bleeding
- Observe level of consciousness and behaviors indicative of shock such as pallor, clammy skin, perspiration, dyspnea or restlessness.
- Carryout gentle abdominal examination when bleeding has stopped.
- Count pads to assess amount of bleeding over a given time period; save any tissue or clots expelled and provide fresh pads.
- Collect and organize all data, including antenatal history, onset of bleeding episode, lab studies (hemoglobin, hematocrit, and hormonal assays).
- Insert catheter and asses urine output hourly (It should not be less than 30 ml /hr)
- Assess if there are contraction: frequency, duration and intensity
- Assess uterine tenderness and DIC
- Prepare for a possible referral
- Assessing coping mechanisms of woman in crisis, give emotional support to enhance her coping abilities by:
  - Continuous, sustained presence,
  - Clear explanation of procedures, and
  - Communicating her status to her family.
  - Most important, prepare the woman for possible fetal loss.

- Assess her expressions of anger, denial, silence, guilt, depression, or self-blame.
- Observe and verify the family's ability to cope with the anxiety associated with an unknown outcome.
- Arrange blood donor and refer the patient with pertinent history

**Caution: Never do V/E or rectal examination.**

**Common Nursing diagnoses:**

- Fear related to possible pregnancy loss
- Anticipatory grieving related to expected loss of unborn child
- Fluid volume deficit related to hypovolemia secondary to excessive blood loss
- Altered tissue perfusion: high risk, related to blood loss secondary to uterine atony following birth.
- Impaired fetal gas exchange: high risk, related to decreased blood volume and hypotension.

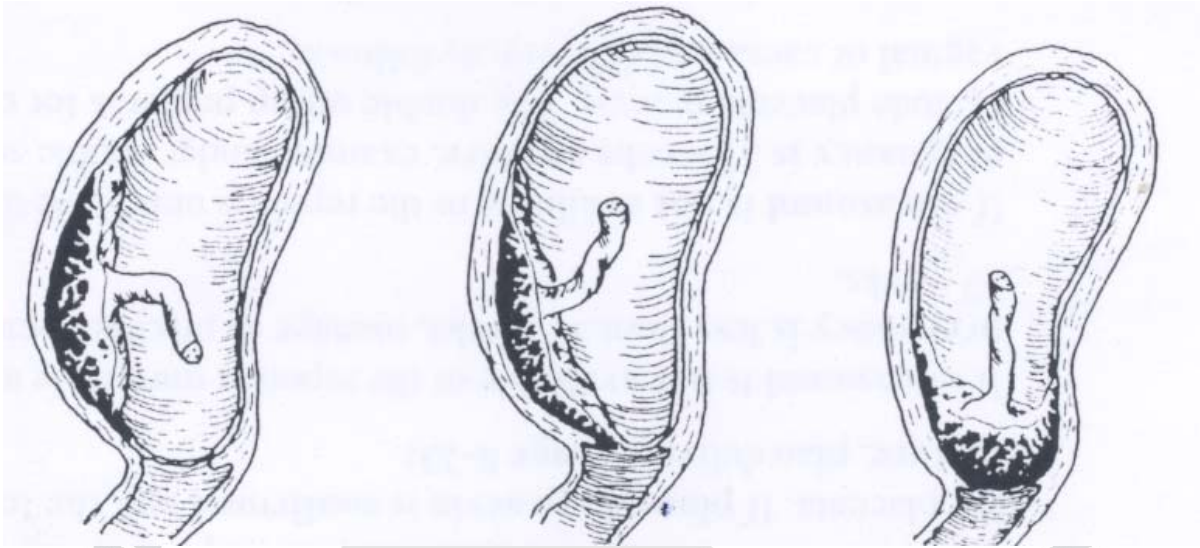
**Placenta praevia:**

**Definition-** It is an implantation of the placenta at or near the cervix and is bleeding from abnormally situated placenta. The placenta may be situated wholly or partly in the lower uterine segment and lies either anterior or posterior.

**NB:** *Placenta praevia is the most dangerous but placenta abruption is more common APH with dangerous complications.*

**Types of Placenta praevia:**

1. Low lying-the placenta is situated near the internal Os
2. Marginal: the edge of the placenta lies adjacent to internal Os
3. Partial-placenta extends across part of internal Os.
4. Complete-the placenta covers the Os completely even when it is fully dilated. It can also be classified as depicted below.

**A****B****C**

**Fig: 3.2.2** A=low lying placenta previa, B= partial placenta previa, and C=complete Placenta previa

#### **Diagnosis of the placenta previa**

- Painless, causeless bleeding that often occurs at rest.
- High head, malpresentations or oblique lie.
- Abdomen is soft and easy to palpate.
- FHB heard easily.
- Ultrasound examination at hospital can be done to localize the placenta
- Speculum examination is done by a Dr. when bleeding is stopped to exclude other causes of bleeding

#### **Management at the hospital**

- Admit and confine to bed.
- History taking and arranging blood donors.
- Blood group and x-matching.
- Monitor fetal well-being, FHB, Kick chart  
(At least 12kicks/12 hrs)
- Speculum examination can be done by a Dr. to exclude other causes of bleeding.



- Ultrasound examination- to localize the placenta.
- The objective of management is to prolong pregnancy and allow fetus to mature provided that it is safe.
- Double set- up examination is carried out in the OR around term or in serious cases to terminate pregnancy by induction or C/s.

**The decision to terminate pregnancy will be made if:**

1. The patient is at term.
2. She is in active labour.
3. IUFD or other obstetric complications.

**The management of mild type less than 38 weeks:**

- Admission and observation of fetomaternal condition.
- Ultrasound and speculum examination and she may go home if bleeding is stopped with advice on rest and follow-up.

**Active Management in the hospital**

- The pt will be taken to the OR with IV infusion **and**
- X-matched blood in readiness.
- Double set- up examination will be carried out and vaginal delivery will be attempted under induction.
- Commonly; Type-I and Type-II anterior are vaginal delivery with induction. Where as Type-II posterior,
- Type III, and Type-IV are delivered by C/s

**Complications:**

- PPH, shock and death
- Intrauterine hypoxia, LBW, IUFD and fetal abnormality.

**Placenta Abruption.**

**Definition:** is bleeding from premature separation of normally situated placenta.

**Etiology:-** Trauma circumstances such as; fall, injury, ECV, ICV

- Maternal hypertension, pre-eclampsia and eclampsia.
- Sudden decompression of the uterus in case of rupture of membrane in case of patient with polyhydramnios.

- Short cord
- Nutritional deficiency such as folic acid

**Classification:**

1. Revealed/mild, slight vaginal bleeding, fetus is alive and maternal condition is good.
2. **Concealed**, all bleeding retained behind the placenta/ retro placental clot, and some blood infiltrate between the uterine muscles causing bruise and edema; called couvelaire uterus or uterine apoplexy.
  - There is no vaginal bleeding
  - There are signs of shock
  - Uterus is tender and palpation is painful
  - Fetal distress and IUFD
3. Mixed: a combination of both where some bleeding retained and some escapes. Other S/S are the same as with concealed type.

**Complications-** PPH and shock, DIC, renal failure, postpartum pituitary necrosis (Sheehan's syndrome).

**The management of mild/revealed type** less than 38 weeks; ultrasound and speculum examination and she may go home if bleeding is stopped.

- If at term, induction and vaginal delivery
- If fetal distress is noted- C/S.

**Management of concealed and mixed type of placenta abruption at hospital:**

The aim will be to restore blood loss and deliver the baby as soon as possible to prevent complications

- IV infusion with blood transfusion to prevent shock and renal damage.
- Morphine / pethedine for pain relieve
- Induction with artificial rupture of membrane/ARM
- C/S if fetus is alive
- Strict v/s monitoring (every 15 mints)
- Catheterization and monitor intake and output
- Apply active management of 3<sup>rd</sup> stage to prevent PPH

**\*NB;** generally the obstetric management of abruptio placenta is induction and vaginal delivery and that placenta praevia is C/s

### 3.2.5.2 Causes of Bleeding during Labour and postpartum

#### Obstructed labour

**Definition:** -Failure of the descent of presenting part for mechanical reasons in spite of good uterine contraction.

**Causes:** CPD

- Fetal malformation such as hydrocephaly
- Pelvic tumor

**Signs:**

**Early signs:**

1. Presenting part doesn't enter the pelvic despite good contraction.
2. Cervix dilates slowly, and becomes edematous
3. The presenting part not well applied to the cervix
4. Early rupture of membrane.

**Late Signs:**

1. Maternal distress.
2. Fetal distress.
3. Abdomen is tense and hard to palpate.
4. Contractions are long, strong with little or no relaxation between.
5. Retraction ring of Bandy's ring is seen.
6. Lower uterine segment becomes very thin and ready to rupture.

**On V/E:** -The presenting part is stuck at the brim.

- Excessive caput and moulding
- Cervix hangs as an empty sleeve.
- Meconium stained amniotic fluid on fingers.

**Management of Obstructed labour at H/C**

- Resuscitation
- IV drips.
- Keep the bladder empty
- Urgent referral with accompany

### **Danger/ Complication**

- Rupture of uterus /abrupt Rapture
- VVF/RVF
- Still birth/Birth injuries
- Sepsis
- Shock
- Death.

**Rapture of uterus:** it is a tear on the wall of the uterus which can be complete or incomplete.

### **Risk factors:**

- Previous C/S scar /silent rupture
- Obstructed labour/abrupt rupture
- Operative manipulation (ECV, destructive deliveries)
- Unwise use of oxytocin
- Extension of old cervical scar

### **Signs of uterine Rupture**

1. Cessation of contractions
2. Fetal distress followed by cessation of FHB
3. Fetal part felt under the skin.
4. Maternal shock.

### **Nursing Management of ruptured uterus at H/C:**

- Lie flat
- IV drip
- Accompany to hospital

### **Management at Hospital:**

- Iv drip
- Input output measuring
- Blood group and X-match
- Inform OR staff to get ready for emergency surgery
- Get relative for consent when the mother can not do that
- Management is laparotomy and hysterectomy (sometimes repairing).
- Provide postoperative care.

## Complications

- ◆ Shock
- ◆ Peritonitis
- ◆ Paralytic ileus
- ◆ Pneumonia
- ◆ Venous thrombosis
- ◆ Adhesion
- ◆ Pulmonary edema
- ◆ Septic wound

## Preventions of obstructed labour and rupture of the uterus

- Constant and careful ANC checkups
- Screen high-risk pregnant cases for hospital delivery.
- Women *with* previous C/S must deliver at hospital.
- Monitor the dose and the rate of pitocin
- Refer cases of obstructed labour to hospital as soon as possible.
- Care should be taken during manipulation.
- Careful observation during labour using partograph.
- Pelvic assessment for all primigravida mothers at 38 weeks.
- Educate the community to avoid early marriage.

## Complications of 3<sup>rd</sup> stage:

1. Post partum hemorrhage (PPH)
2. Retained placenta.
3. Adherent placenta.
4. Inversion of the uterus.
5. Shock.
6. Hematoma

## Post partum hemorrhage

Definition: It is a bleeding from the genital tract during 3<sup>rd</sup> stage or with in 24 hours of delivery to the amount 500 ml or any amount that alters the maternal condition.

## Types of PPH

1. Primary PPH - within 24 hours of delivery
2. Secondary PPH - from 24 hours - 6 weeks. It is also said to be puerperal hemorrhage

## Common causes

1. Atonic PPH (common one)
2. Traumatic PPH.
3. Hypofibrinogenemia / coagulation defect (DIC)

## The difference between atonic and traumatic PPH

Atonic PPH	Traumatic PPH
<ul style="list-style-type: none"><li>• The uterus is lax</li></ul>	<ul style="list-style-type: none"><li>• The uterus is firm</li></ul>
<ul style="list-style-type: none"><li>• Bleeding starts after a few minutes and flows slowly</li></ul>	<ul style="list-style-type: none"><li>• Bleeding starts immediately after delivery and flows continuously.</li></ul>
<ul style="list-style-type: none"><li>• The color of bleeding is not bright red.</li></ul>	<ul style="list-style-type: none"><li>• Bright red bleeding</li></ul>

## Nursing Management of PPH

- ◆ Massage the uterus and shout for help
- ◆ Give ergometrine 0.5 mg IV
- ◆ Put up IV drip and call Dr.
- ◆ Empty the bladder.
- ◆ Try to expel the placenta with the contraction caused by ergometrine. If impossible perform manual removal of the placenta (to save life!)
- ◆ Examine the placenta for completeness.
- ◆ Pitocine can be added into the bag.
- ◆ If the uterus is still lax perform Bi-manual compression.
- ◆ If still the bleeding persists check for laceration.
- ◆ If no atony and trauma but bleeding continues anticipate the possibility of DIC and refer the mother urgently.

## The complications of PPH

- Shock
- Anemia
- Poor resistance
- Postpartum pituitary necrosis

### Preventions of PPH

- Careful history taking during ANC if she bled previously.
- Bring Hgb as high as possible during pregnancy.
- Treat anemia during pregnancy.
- Avoid prolonged labour.
- Apply active Management of 3<sup>rd</sup> stage when indicated such as:
  - Multiple pregnancy
  - Previous PPH
  - Current APH
  - Polyhydraminus etc

**NB:** It is advisable to practice active management of 3<sup>rd</sup> stage of labour for all deliveries, as PPH may not be predicted in significant number of cases.

### Procedure for active management of 3<sup>rd</sup> stage:

- ◆ Give ergometrine 0.5 Mg IV or oxytocin 5 IU IM after the anterior shoulder of the single fetus is delivered /after the anterior shoulder of the second fetus is delivered in case of twin pregnancy.
- ◆ Check the uterus for contractions and remove the placenta as soon as possible.

**Retained Placenta:** When the placenta left in the upper uterine *segment* and caught in the cervix for more than 30 minutes after the baby is delivered.

**Cause:** - Poor uterine contraction and / Hourglass contraction

**Management:** Manual removal

**Adherent placenta:** When the placenta is morbidly adhered to the endometrium and not left the upper uterine segment 30 minutes after delivery of the baby.

- ◆ Placenta accreta when the placenta attached to myometrium.
- ◆ Placenta increta: When the placenta penetrated myometrium deeply.
- ◆ The management is refer for hysterectomy

### Inversion of the uterus:

**Definition:** When the uterus turns inside out.

**Cause** - Mismanagement of 3<sup>rd</sup> stage as:

- Combined method of placental expulsion.
- Traction of the cord in an atonic uterus
- Polyps can cause chronic inversion

**Management:**

- Using your gloved fist of hand push the uterus back into place gently.
- Get your assistant to give ergometrine IV while your hand is still inside.
- Remove your hand when action of ergometrine starts.
- Don't try to expel the placenta.
- Keep the patient NPO and refer as soon as possible to hospital

**Hematomas:**

Hematomas are usually the results of injury to a blood vessel with out noticeable trauma of the superficial tissue. The most frequently observed hematomas are of the vagina and the vulva. The soft tissue in the area offers no resistance, and hematomas containing 250-500ml of blood may develop rapidly. Hematomas may also develop in the upper portion of the vagina or may occur upward in to the broad ligaments. Signs and symptoms vary with the type of hematoma.

Small vulval hematomas may be treated with the application of ice packs & continued observation. Large hematomas generally require surgical intervention to evacuate the clots.

**Nursing Assessment**

- Often the woman complains of severe vulval pain or of sever rectal pressure. On examination, the large humatoma appears as a unilateral, tense, fluctuant bulging mass of the enteroitus or with in the labia majora.
- With smaller hematomas the nurse may note unilateral bluish or reddish discoloration of the skin of the perineum. The area feels firm and is painful to the touch. The nurse should estimate the size of the hematoma so that increasing size will be quickly noted.
- Hemtomas in the upper vagina may cause difficulty of voiding because of pressure on the urethra or meatus. Diagnosis is confirmed through vaginal exam.
- Hematomas that occur up ward in the broad ligament may be mare difficult to detect. The woman may complain of sever lateral uterine pain, flank pain or abdominal distention. Occasionally the hematoma can be discovered with high rectal examination or



with abdominal palpation although these procedures may be quite uncomfortable for the woman.

- S/S of shock in the presence of a well-contracted uterus and no visible vaginal blood loss may alert the nurse to the possibility of a hematoma.

**Nursing diagnoses that may apply when a woman develops a hematoma post partially include:**

- High risk for injury related to tissue damage secondary to prolonged pressure from a large vaginal hematoma
- Pain related to tissue trauma secondary to hematoma formation

**Nursing implementations include:**

- Promote comfort and decrease the possibility of hematoma formation by applying ice pack to the woman's perineum during the first hour after birth and intermittently thereafter for the next 24 hours if birth was long or traumatic or if forceps or Vacuum extractor was used.
- If a hematoma develops, sitz baths will aid fluid absorption once the bleeding has been controlled and will promote comfort, as will the judicious use of analgesics.

**Subinvolution:**

Subinvolution of the uterus occurs when the uterus fails to follow the normal pattern of involution (decreases in size of about 1 cm/day). Retained placental fragments and infection are the most frequent causes. With subinvolution, the fundus is higher in the abdomen than expected. In addition, lochia often fails to progress from rubra to serosa to alba. Lochia may remain rubra or return to rubra several days post partum. Leucorrhoea and backache may occur if infection is the cause. Subinvolution is most commonly diagnosed during the routine post partal examination at 4-6 weeks. The woman may relate a history of irregular or excessive bleeding, or describe the symptoms listed previously. Diagnosis is made when an enlarged, softer than normal uterus is palpated with bimanual examination. Treatment involves oxytocics, antibiotics and/or curettage.

Individualized nursing care should be based on detailed history, thorough physical examination and lab results. The care should involve the mother & her family, and documentation should be always complete.

### **3.2.6 Underlying Socioeconomic, geographic and cultural factors contributing to death from maternal bleeding**

- Lack of decision making power
- Lack of access to medical facilities
- Lack of quality obstetric care
- Lack of access to medical facilities

Due to lack of transport facilities in the villages, maternal mortality rates in the rural areas are higher than in urban areas. Distances between the primary H/Cs and the specialist centers are magnified by inadequate transportation and communication. Environmental factors are responsible for difficulty and delay in transportation of women living in remote rural areas. The means of transportation or communication are usually poor; the roads are rough and unusable during the rainy seasons of the year. Many patients die during transportation or arrived in morbid state.

Substantial evidence indicates that distance is a primary factor hindering the utilization of few available health care facilities in general. Nevertheless, distance may not always be the only reason. The road infrastructure in most developing countries including Ethiopia is very poor. There are many rural areas with no access by road. This is especially true in regions with difficult terrain like mountainous areas and islands. Access to these areas may only be by foot, or boat. Even where roads exist they may be only seasonal and often women in their desperation are obliged to be carried on chairs, beds or stretchers made of wood for long distances before reaching the roads. When they find vehicles they are quite expensive. The drivers are often skeptical about taking on half dead or bleeding women for fear of being involved with the police if these women happen to die in their vehicles. They also fear stigmatization from the communities if they claim money for transportation after the woman has died. They therefore ask that the full cost of transportation be paid in advance. This of course may be too high and if the family cannot afford it the woman with the complication dies without ever reaching the hospital.

#### **Socio-cultural and economic factors**

Most women in our country belong to the low socioeconomic class. It may not be because of ignorance that they do not go to hospital, but because they cannot afford it. On the other hand most of these women are ignorant about the consequences of vaginal bleeding.

It is important to note here that factors such as female circumcision, early marriage and consequently early childbirth contribute to hemorrhage in pregnancy. This increases the risks of poorly developed pelvis and prolonged labour, often followed by post-partum hemorrhage. The tears that quite often result from the circumcision or de-circumcision, if not rapidly repaired, can also lead to hemorrhage.

Anemia is a difficult problem where food taboos are strong. In most regions of Ethiopia pregnant women are not allowed to eat eggs and other fatty and proteineous foods, because it is believed to result in big babies and complications during labour. There is also a strong preference for the male child, the female eats only what is left over, often not the protein and iron-rich foods. The female child may therefore grow up stunted and may already be anemic in adolescence.

In many parts of Ethiopia many pregnant women do not attend ANC because of advice from older women who claim that there is no need for it, as they had all their own children at home without ANC and complications. Furthermore, many relatives refuse to donate blood because of their religion.

In most parts of our country, women are also expected to have some degree of bleeding in the postpartum period. This is considered to help the uterus empty of 'bad blood'. Women therefore continue dying from severe postpartum hemorrhage due to ignorance and neglect. They are also discriminated against in all spheres of life, including education, nutrition and remain anemic while entering pregnancy and become a good candidate for post partum hemorrhage.

Lack of medical facilities is also an important factor in maternal mortality due to hemorrhage. In our country the health facilities are few and unequally distributed, with a high concentration of hospitals in the big cities and little or nothing in the rural areas. The few H/Cs that exist in rural areas are always understaffed or poorly equipped. Drugs are usually not available, referred as the '*out of stock syndrome*'; Lack of efficient facilities and competent health care providers, repellent attitude of health care providers towards clients and the absence of community involvement in maternal health matters makes the situation worse.

The problem of establishing blood banks in low-income countries including Ethiopia is very difficult. Other blood products or volume expanders like normal saline, plasma and colloid solutions are usually lacking.

### **3.2.6.1 Possible solutions to reduce maternal bleeding and death from its complications**

#### **Antenatal care:**

- ◆ Antenatal care is a preventive medicine that includes nutrition and health education. It helps to anticipate and prevent problems liable to occur during pregnancy and childbirth. It also helps to detect early and treat effectively complications that arise during pregnancy. The trained TBA who is aware of her limitations and capabilities can ascertain when complications arise and refer the patients at the right time and in good conditions.
- ◆ There is an urgent need to instill awareness of the importance of care during pregnancy and childbirth. This is also important for the husband, family, for pregnant women, community and media which can play a great role to raise the level of health consciousness. It is also important to upgrade the providers' technical competence attitude and availability of the supply
- ◆ Recently UNFPA suggested that given a choice women will use facilities and providers that offer what they perceive as the best care what women want from their providers includes, but not limited to:
  - Respect, friendliness, confidentiality and privacy.
  - Understanding on the part of providers of each woman's situations and needs.
  - Complete and accurate information
  - Technical competence
  - Access to continuity of care and medical supplies
  - Fairness and avoiding long waiting time.
- During pregnancy at ANC clinics the following high risk factors for hemorrhage related complications should be identified for referral and better management.
  - Grand multiparty
  - Anemia
  - Malpresentations
  - Multiple pregnancy

- Previous C/S
- Polyhydramnious
- Antepartum Hemorrhage
- Previous history of PPH

- **Family planning**

In Ethiopia, the contraceptive prevalence rate is 10.8%. Women start childbearing too early, have too many pregnancies, too close together, and continue to have them till late in their reproductive years. Fertility is uncontrolled and unregulated. The women at times are forced to bear children one after another in want of a male child, putting her life at risk for the welfare of the family. Not only do women lack access to contraceptive services but due to social and cultural inhibitions are reluctant to use them even when available.

Family planning services should be made available at all primary health care centers and corner shops. The family planning clinics should be integrated with the existing maternal and child health services.

- **Community Involvement**

Community involvement is in the heart and sole of PHC activity. Community support may be in terms of labour, money or voluntary cooperation. The community must recognize its own problems. Health workers must gain the confidence of the community, respect their cultures and create awareness. Emphasis should be given on strengthening community involvement in the managerial process and adapt the culture of '**bottom up planning**' and '**top down**' support. The community rely more on TBAs' than health workers, thus it is important to train them and create an effective link between H/C staff and TTBA's.

**The role of the traditional birth attendants**

TBAs should be trained to conduct **clean and safe** deliveries, and midwives/nurses should provide them with technical support and guidance and frequent supervision.

The trained TBAs should be able to:

- Recognize the signs of pregnancy.
- Register pregnant women at the primary H/C.
- Promote the concept of antenatal care and encourage women to attend antenatal clinics for regular check-ups.
- Provide health education

- Teach pregnant women and the community at large about the danger signs of pregnancy, e.g. bleeding during pregnancy; visual disturbance; headache.
- Identify and refer high risk women to the hospital for better care.
- Advise pregnant women to take iron, folic acid and anti-malarial drugs as prophylaxis as per the Doctors prescription.
- Identify the signs of onset of labour.
- Recognize the signs of prolonged labour.
- Avoid the injudicious use of oxytocin.
- Perform safe and clean delivery.
- Understand the signs of post-partum hemorrhage.
- Take emergency measures if post-partum hemorrhage occurs. These include massaging the uterus, abdominal aortic compression during transportation to the hospital putting the mother in shock position, let her emptying the bladder, and immediate referral to the nearest health facility.
- Proper management of third stage of labour.
- Recognize the signs of separation of the placenta, such as; gush of blood; lengthening of the cord; hard and movable uterus.
- Be aware of the referral system if the placenta is retained.
- Motivate the women to obtain family planning

The ministry of health should provide the following to the local governments:

- ◆ An adequate blood banking system at district level
- ◆ Community-wide health education program.
- ◆ Information about the advantages of blood donation
- ◆ Cultural and religious beliefs about blood transfusion should be clarified
- ◆ The ministry of health and the government should make it possible for all blood that is transfused to be screened for HIV, syphilis and hepatitis B by making sure that reagent supplies are quickly replenished. Screened blood should be readily available in these blood banks to save the lives of women who have hemorrhage in pregnancy. Nurses and other health care staff should be careful not to mix up blood when they are transfusing a patient because; the use of a wrong pint of blood can be disastrous. The quantities of blood should be carefully calculated to avoid the risk of overload and eventual heart failure. The correct type of blood components, whole blood or packed cells, must be given. Alternatives to blood such as volume expanders, colloid solutions, saline and fresh frozen plasma should always be available.

### **Improvement of medical facilities**

We should encourage better and regularly paid salaries for all medical staff. Staff in rural areas should be given incentives so that they will work in these areas for longer periods. They should be provided with good housing, water supply, and regular supplies of essential drugs. They should have regular opportunities for refresher courses and further training.

We should encourage the building of maternity waiting homes for those who are identified as being at risk of hemorrhage, either antepartum or postpartum.

### **3.2.7 Summary and conclusion**

Maternal bleeding in pregnancy, labour and early post partum period is a major contributing factor to maternal mortality worldwide. The most common causes are hemorrhage, including uterine rupture, obstructed labour, unsafe abortion, puerperal infection, and eclampsia. Underlying these medical causes are the socio-economic, geographic and cultural factors. Nurses should consider both obstetric factors as well as the underlying factors upon intervention and should play a bold role in the H/C team towards the management of such devastating problem.

The health care worker, even at the primary level, should be taught how to remove placenta manually. Every person who is allowed to do a delivery should be trained in this procedure. The woman in labour must be having a partograph to avoid prolonged or obstructed labour, which may result in hemorrhage. Oxytocin should be given intramuscularly when the baby has been delivered.

When bleeding occurs, start an intravenous infusion using at least an 18-gauge canula. Give oxygen by mask. Draw blood for hemoglobin and packed cell volume; type and cross match blood for transfusion. Recognize that women in good physical condition can tolerate blood loss to a greater degree than women in poor health. Give intravenous blood expanders. Identify the cause of hemorrhage and treat accordingly. The uterus may be packed with sterile gauze if bleeding is uncontrollable.

The treatment in cases of incomplete abortion is immediate uterine evacuation. In case of ectopic pregnancy, laparotomy should be rapidly performed. Major degrees of placenta previa should be treated by caesarean section so refer them rapidly to a unit able to handle such emergencies. Repairs of episiotomies and tears should be rapid to avoid unnecessary blood loss.





## 3.3 Satellite module for BSc Medical Laboratory personnel

### 3.3.1 Learning objectives

Up on completion of the activities in this module, you will be able to:

- Name, describe and perform specific laboratory tests that could be undertaken during maternal bleeding.
- Carry out calibration for cyanmethemoglobin method of hemoglobin determination
- Know the normal hemoglobin and hematocrit values in different age groups
- Define packed cell volume
- Discuss the clinical significance of hemoglobin and Hematocrit determination
- List and describe the methods used for diagnosis sexually transmitted infections
- Perform ABO, Rh blood grouping and cross matching using different methods.
- Explain how to report and interpretate the result.
- Describe the purpose of anti human globulin (AHG) test
- Know the principle behind and how to carry out the AHG procedure
- Be able to perform different coagulation tests.

### 3.3.2. Laboratory markers of maternal bleeding

- Hematuria /blood
- Normochromic normocytic red blood cells
- Hypochromic Microcytic red blood cells
- Thrombocytopenia

### 3.3.3. Diagnostic Laboratory tests that may be performed Include

- Hemoglobin or Hematocrit (Decreased hemoglobin or hematocrit values)
- Peripheral red blood cell morphology (Normocytic norm chromic red cells and Hypochromic Microcytic red blood cells)
- Complete blood count (CBC)
- Urinalysis (Urine testing): - to detect bacteriuria by using reagent strip test for nitrite together with leukocytes, protein and blood, Since bacteruria is more common in pregnancy and urinary tract Infection is the commonest complication

of pregnancy in the middle trimester which may lead to premature birth→  
Placental incomplete adherent→Leading to blood lose

➤ Screening sexually Transmitted Infections

- Syphilis screen - Non treponemal test
    - Such as (VDRL,RPR,ART,EIA)
    - treponemal –specific tests
    - E.g TPHA, FTA-AB
    - Dark field Microscopy
- serologic tests

• screening other sexually transmitted infections

- Gram stain smear
  - Wet (saline) mount preparation
  - Culture
- ABO and Rhesus (Rh) blood Grouping
- Cross matching
- Coomb's test
- Pregnancy test for HCG
- Pap-smear examination
- Coagulation tests - Prothrombin time (PT)
- Activated partial thromboplastin time (APTT)
- Thrombin time (TT) test
- Clotting /Clot retraction time
- Bleeding time
- Fibrinogen level

### 3.3.3.1. Hemoglobin Determination

• **Explanation of Test**

The hemoglobin determination test is used to

- Screen for anemia
- Determine the severity of anemia
- Follow the response to treatment for anemia

**Different techniques have been suggested for measuring Hemoglobin and assessing anemia**

- I. Cyanmethemoglobin (Hemoglobin cyanide HicN) photometric method
- II. Acid Hematin (sahli-Hellige)
- III. The "Hemocue" method
- IV. Oxyhemoglobin method

**Note:** method III and IV may not be routinely practicable in our set up as some of these techniques are expensive and difficult to prepare their standard.

**I. HAEMIGLOBIN CYANIDE (HICN) TECHNIQUE**

**Principle of test**

Whole blood is diluted 1 in 251 in a drabkins solution which contains potassium ferricyanide and Potassium cyanide. The red cells are hemolyzed and the hemoglobin is oxidized by the ferricyanide to methamoglobin. This is converted by the cyanide to stable haemiglobincyanide (HicN). Absorbance of the HicN solution is read in a spectrophotometer at wave length 540 nm or a filter colorimeter using a yellow-green filter. The absorbance obtained is compared with that of a reference HicN standard solution

**Advantage** -convenient method

- Readily available and stable standard solution
- All forms of hemoglobin except sulfhemoglobin (SHb) are readily converted to HicN

**Reagent:** The diluents is detergent modified drabkin's solution

- Materials**
- Spectrophotometer or colorimeter
  - Micropipet or sahli pipet
  - Test tubes or small bottles with stopper

**Procedure:**

1. measure Carefully 20 $\mu$  l (0.02ml) of capillary blood or well-mixed venous blood and dispense it in to 4 ml diluents (Drabkin's fluid)
2. Stopper the tube, mix and leave the diluted blood at room temperature, protected from sunlight, for 4-5 mints.
3. Place a yellow green filter (e.g 11 ford 605) in the colorimeter or set the wavelength at 540 nm.

4. Zero the colorimeter with drabkin's fluid and read the absorbance of the patients sample.
5. using the table prepared from the calibration graph, read of the patients Hemoglobin value

$$\text{Hb (g/dl)} = \frac{\text{At} \times \text{cst} \times \text{Df}}{\text{Ast} \times 1000}$$

At = absorbance of test

Cst = Conc. of standard

DF = Dilution factor, 251

Ast = Absorbance of standard

1000= factor to convert mg/dl to g/l

**Calibration:** cyanmethaemoglobin standard (Hemoglobin standard)

is offered as a dry vial containing standardized amount of met hemoglobin prepared from Human hemoglobin. Reconstituting the standard (diluted cyanmethaemoglobin standards) are equivalent to the hemoglobin values (18 g/s). Dilutions of the cyanmethaemoglobin standard solution with Drabkin's solution are used to prepare a calibration curve as follows.

1. Preparation of working standards by pipeting & mixing thoroughly the solutions indicated below.

Tube N <sup>o</sup>	Cyanmethalmoglobin standard solution (m l)	Drabkin's solution (m l)	Hemoglobin level (g/dl)
1	0.0	6.0	0.0
2	2.0	4.0	6
3	4.0	2.0	12
4	6.0	0.0	18

2. Zero the colorimeter /spectrophotomer with Drabkin's fluid
3. Read the absorbance of tubes of each standard at a wave length of 540 nm
4. Take a sheet of graph paper & plot the absorbance of each standard (vertical axis) against it is concentration in g/dl (horizontal axis calibration curve), the curve is linear, passing through the origin.

5. The hemoglobin conc. in a sample can be read from the calibration curve.

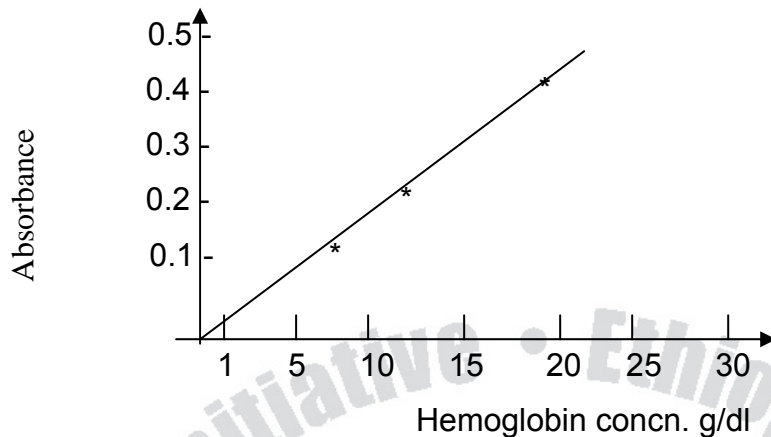


Fig. Example of an HicN hemoglobin calibration Graph using commercially. produced HicN standards: 6 g/dl, 12g/dl, 18 g/dl

**Note:**

- Drabkin's fluid must be stored in a light opaque container, e.g. brown glass bottle. It is a pale yellow clear fluid and must not be used if it loses its color or becomes turbid.
- Hemoglobin standard solutions are stable for long period (2 years or longer) when stored tightly capped and refrigerated (2-6°C)

**Reference Values:**

Adult women: 12-16 g/dl or 1.86 – 2.48 nmol/L

Adult men: 13-5-17.5 g/dl or 2.09 –2.71 nmol/L

New born (both genders): 14 – 20 g/dl

**3.3.3.2. Determination of Packed cell volume (PCV) or Hematocrit (Hct)**

**Principle of test:** The PCV is the proportion of whole blood occupied by red cells. Anticoagulated blood is placed in a glass capillary's of specified length, bore size, and wall thickness is centrifuged in a micro hematocrit centrifuge at relative centrifugal force 12000-15000 xg for 5 minutes to obtain Constant packing of the red cells. The PCV value is read from the scale of dividing the height of the red cell column by the height of the total column of blood.

**Specimen:** To measure the PCV either well mixed well oxygenated EDTA anticoagulated blood or capillary blood collected in to a heparinized capillary can be used.

## Materials

- Microrhematocrit centrifuge
- Reading device, it can be a ruler or micrhematocrit reader
- Heparinized or plain capillary tubes
- Sealant (wax or plastic clay)

There are two methods of determination

1. The microhematocrit method
2. Macrohematocrit (wintrobe) method

Although recommended by the ICSH as an alternative method, it is no longer in routine use because of technical problems and centrifugation time required (30 mint) to achieve maximal packing of cells.

## Microhaematocrit determination

### Test procedure

1. Fill about three quarters of the tube by capillarity (if anticoagulated venous blood, adequate mixing is mandatory)
2. Seal the unfilled end, preferably using a sealant material. If unavailable, Heat-seal the capillary using a small flame from a spirit lamp or pilot flame of a Bunsen burner, rotating the end of the capillary in the flame.
3. Place the filled capillary in one of the numbered blots of the microhematocrit rotor with the sealed end against the rim gasket (to prevent breakage).
4. Centrifuge for 5 minutes (RCF 12000 – 15000 xg),

Note: If the PCV is more than 0.50, centrifuge for a further 5 Minutes to ensure Complete packing of the red cells

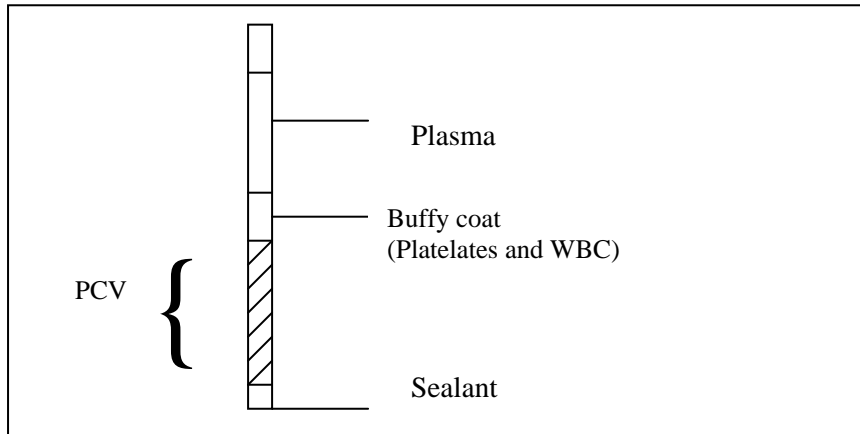
5. Immediately after centrifuging, read the PCV

To read the PCV in a hand –held microhematocrit reader, align the base of the red cell column (above the sealant) on the 0 line and the top of the plasma column of the 100 Line. Read off the PCV from the scale. The reading point is the top of the Red cell column just below the buffy coat layer (consisting of WBCand platetates).

When no reader is available: use a Ruler to measure the length of the total column of blood in mm and the length of the red cell column (base To below buffy coat layer).

Calculate the PCV as follows:

$$\text{PCV} = \frac{\text{Length of red cell column (mm)}}{\text{Length of total column (mm)}}$$



### **PVC (Hct) reference range**

- Adult men .....0.40 – 0.54
- Adult Women .....0.36 – 0.46
- Children 6-12years.....0.35 – 0.45
- Children 2-5Years.....0.34 – 0.40
- Children at birth.....0.44 - 0.54

### **Value of test**

- PCV is used to screen for anemia when it is not possible to measure haemoglobin & to diagnose polycyemic vera
- To monitor treatment against anemia
- Suitable for screening large clinic population, e.g. antenatal clinics.
- It is one of the simplest, most accurate test . It is of greater reliability & usefulness than RBC count that is performed manually & Hgb- estimation.

### **3.3.3.3. LABORATORY DIAGNOSIS OF SYPHILIS**

1. Serologic tests for syphilis
  - Non specific (Non-treponemal)
  - Treponemal specific tests
2. Dark-field microscopy examination of treponema pallidum.
  - performed on serous fluid rigorously scraped from lesion to detect T. pallidum

## Serology

**Principles** : - infection of humans with *T. pallidum* provokes in the host a complex antibody response. Serologic tests for syphilis are based on the detection of one or more of these antibodies. Host antibodies are of two known types:

1. non-treponemal antibodies, or reagin which react with lipid antigen
2. treponemal antibodies which react with *T. pallidum* & closely related strains.

- Serologic testing is the most commonly used procedure in the diagnosis & is useful in follow up of syphilis
- Sensitivity & specificity of serologic tests vary depending on the type of test performed and the stage of the disease
- Serologic testing is the only method for detecting latent and tertiary syphilis
- Amplified nucleic acid tests (e.g, PCR) may be available in some laboratories.
- There are two types of serologic tests carried out: non-treponemal tests & treponemal-specific tests

## Specimens

- Serum
- CSF
- Serous fluid of the lesion

## *Non-treponemal tests*

- First line tests used for screening, detect antigens that are not specific to treponemes. Tests include: Venereal Disease Research Laboratory test (VDRL), Rapid Plasma Reagin test (RPR), Automated Reagin Test (ART), Toluidin Red Unheated Serum Test (TRUST), Reagin Screening Test (RST) and Enzyme Immune Assay (EIA)

### **Advantage:**

- Rapid & technically simple
- VDRL test is useful for evaluation of CSF

### **Disadvantages:**

- A delay of 1 to 4 weeks between time of development of the primary chancre and detection of antibodies
- False-positive results owing to non-specific cross reactivity
- False-negative results in up to 40% of cases of primary syphilis and 25% cases of untreated late latent syphilis.



### Treponemal - specific tests

- Supplemental tests used for confirming non- treponemal test results: measure antibodies to cellular components of treponemes. Tests include: Treponema Palladium Hemagglutination test (TPHA), Fluorescent treponemal antibody absorption test (FTA – ABS).

#### **Advantage:**

- confirmation of non-treponemal test results
- FTA-ABS is highly sensitive & the first serologic test to give a Positive result in infectious syphilis

#### **Disadvantages:**

- cross reaction with non-venereal treponematoses (i.e yaws, pinta & non-venereal syphilis)
- Not beneficial in the evaluation of CSF
- Not Useful for assessing response to treatment

### ➤ **VDRL QUALITATIVE TEST ON SERUM**

#### **Materials:**

- Mechanical rotator (adjustable at 180 rpm)
- Slides
- 18-,19-, and 23 –gauge hypodermic needles with syringe
- 30ml, round, glass \_ stoppered, narrow-mouthed bottles

#### **Reagents:**

- VDRL antigen : containing 0.03% cardiolipin, 0.9% cholesterol lecithin → to produce standard Reactivity (0.21%)
- 1.0% buffered saline solution
- 0.9% saline

#### **Preparation of Antigen Suspension**

1. Pipette 0.4ml of buffered saline to the round glass (bottle)
2. Add 0.5 ml of antigen & rotate the mixture gently & continuously.
3. continue the rotation of the bottle for 10 seconds
4. Add 4.1 mL of buffered saline from a 5. ml pipette
5. place the top on the bottle & shake from the bottom to the top

6. The antigen suspension is now ready for use & may be kept for 1 day. When ever the suspension is used, it should be mixed gently.

#### **Preparation of specimen (serum)**

1. Heat clear serum in a 56°C water bath for 30 mints before testing (to destroy complement)
2. Examine the serum when it is removed from the water bath.
3. If serum is allowed to remain untested for 4 hrs or more after original heating, you need to reheat for 10 Mints at 56°C before testing
4. When tested, the serum must be at room temp.

#### **Procedure:**

1. Pipette 0.05 ml of heated serum in to ringed slide
2. Add one drop of antigen suspension on to each serum with 18- gauge needle & syringe.
3. Rotate the slides for 4 mints on a mechanical rotaton adjusted at 180 rpm.
4. Read tests microscopically with 10x ocular & a 10x objective immediately after rotation.

#### **Reading and reporting of results:**

No clumping (slight roughness): **Non-reactive**

Small clumps: **Weakly reactive**

Medium or large clumps: **Reactive**

**Note:** A prozone reaction is occasionally encountered. This type of reaction is demonstrated when complete or partial inhibition of reactivity occurs with undiluted serum; maximum reactivity is obtained only with diluted serum. This prozone reaction may be so pronounced that only on weakly reactive (or “rough” non reactive) result.

#### ➤ **RAPID PLASMA REAGIN (RPR) CARD TEST ON SERUM**

##### **Materials:**

- 20 guage needle
- plastic dispensing bottle
- plastic coated cards
- Dispenser (0.05m/per drop)
- Capillary pipettes (0.05 m L capacity)
- Stirrers

- Rotating machine (adjustable at 100 rpm)
- Cardioliipin, charcoal ⇒ allows the result to be read macroscopically.
- Humidifier cover (to cover the card during) rotation
- Reagent
- RPR test antigen: contain cardioliipin, charcoal

### **Preliminary Testing Antigen suspension**

#### **Suspense**

- Attach the needle hub to the tapered fitting on a plastic dispensing bottle
- Shake the antigen ampoule to resuspend the antigen particle
- Test the control sera of graded reactivity each day.
- Use only those suspensions that have given the designated reactions with the controls.

#### **Specimen**

- Unheated serum

#### **Procedure**

1. Place 0.5ml of unheated serum on the test card
2. Spread The serum with a stirrer to fill the entire circle
3. Add exactly one drop of the RPR card test antigen suspension to each test area containing serum. Do not stir
4. place the card On the rotator, and covered with the humidifier cover.
5. Rotate for 8 minutes at 100 rpm
6. Read the tests immediately after rotation
7. Report the results as follows:
  - Small to large clumps: **Reactive (R)**
  - No clump (slight roughness): **Non reactive (N)**

### **3.3.3.4. LABORATORY DIAGNOSIS OF OTHER STIs**

- Gram stained smear
  - To detect Gram negative diplococi in pus cells (Gonorrhoea)
    - Note:** puscells with out intracellular diplococci indicate non gonococcal Arethretis
  - To detect Yeast cells or C.albicans (Candidiasis )
  - To detect epithelial cells with adhering Polymorphic bacteria (clue cells ) (Bacterial vaginosis)
- Wet mount preparations to detect motile Trichomonas vaginalis (Trichomoniasis)

- There are expensive laboratory technologies that helps to diagnose other STIs  
E.g. Tissue culture, ELISA or PCR are usually required to diagnose urogenital chlamydia infections (chlamydia trachomatis)

**Specimens:**

- Cervical swabs
- Vaginal swabs

Note:- Possible pathogens in cervical swab from women with sepsis or septic abortion are:-

- Streptococci (particularly S.pyogens and other  $\beta$ -hemolytic streptococci)
- Gram-ve rods like E.col: proteus etc...

- Gram staining technique

**Reagents required:** - Crystal (Gentian) violet stain

- Lugol's iodine

- Acetone – alcohol decolorize (95% v/v ethanol, or absolute Acetone)

- Safranin or neutral red.

***Method***

1. Fix the dried smear with methanol or heat for 1-2 minutes (avoid damaging Pus cells)
2. Cover The fixed smear with crystal violet stain for 30-60seconds
3. Rapidly wash off the stain with clean water
4. Tip off all the water, and cover the smear with Lugol'.s iodine for 30-60 seconds
5. Wash off the iodine with clean water.
6. Decolorize rapidly (few seconds) with acetone alcohol. Wash immediately with clean water.
7. Cover the smear with safranin for 2 minutes.
8. Wash off the stain with clean water
9. Wipe the back of the slide clean, and place it in a draining rack for the smear to air-dry.
10. Examine the smear microscopically, first with the 40X objective to check the staining and to see the distribution of material, and then with oil Immersion objective to report the bacteria and cells.

**Results:**

Gram-positive bacteria -----Dark purple

Yeast cells-----Dark purple

Gram negative bacteria -----Pale to dark red

Nuclei of pus cells -----Red

Epithelial cells -----Pale red

**Reporting Gram smears**

The report should include the following information:

- Numbers of bacteria present, whether many, moderate, few, or scanty
- Gram reaction of the bacteria, whether Gram positive or Gram negative
- Morphology of Bacteria: cocci, diplococci, streptococci, rods, or coccobacilli:
- Presence and number of pus cells
- Presence of yeast cells and epithelial cells.

**3.3.3.5. Laboratory aspects of blood transfusion**

For selection of suitable blood for a patient or mother requiring transfusion, the following tests should be performed:

- I. ABO and Rh (D) blood grouping
- II. Cross Matching and antibody screening of the patient or mother.

**Note:-** pretransfusion tests also include screening blood for transfusion transmitted infections, such as

- Human immunodeficiency virus (HIV) 1 and 2
- Hepatitis B Virus (HBV)
- Hepatitis C Virus (HCV)
- Treponemal palladium (agent of syphilis)
- Plasmodium species (agent of malaria)

**I. ABO Grouping Techniques**

A Patient or a donor of unknown ABO blood group is usually tested by forward (cell) grouping and reverse (serum) grouping. The forward grouping is accomplished by mixing unknown red cells with serum containing known antibody whereas the reverse grouping is accomplished by mixing unknown serum with red cells containing known antigen.

**The cell Grouping is performed by:**

- A) Slide method and
- B) Test tube method

Both test tube and slide methods are recommended. The serum grouping is performed by the test tube method only, the slide method is not usually recommended because of the presence of weak antibodies in the unknown serum so that result is easily overlooked or difficult to read. When we use the test tube method there is a chance or possibility of shaking and centrifugation, which facilitate the agglutination reaction and so the result is less likely overlooked.

**NB:** Do not rely on reverse grouping alone to decide the blood group. It is done to check or double check the forward grouping.

**Rapid cell ABO grouping**

**A) Slide method**

- 1. Label a glass slide as follows:

Anti –A	Anti – B
---------	----------

- 2. Pipette into each division as follows

- Anti –A      1 drop anti –A serum  
                  1 drop donor’s capillary blood
- Anti – B     1 drop anti – B serum  
                  1 drop donor’s capillary blood

- 3. Mix the contents of each division using a clear piece of stick for each.
- 4. Tilting the slide from side to side, look for agglutination and record the results after 2 Minutes.

**Important:** Allow a full 2 minutes before recording the results to avoid missing weak reactions

5. Interpret the result as follows:

Anti – A	Anti – B	Group*
+	-	A
-	+	B
+	+	AB
-	-	O

\* Confirm by tube cell and serum grouping

### B. Test Tube method

#### Materials:

- Normal saline sol. 0.9% or 0.85%
  - Wash bottle
  - Chemically clean & dry test tube (10x15mm)
  - Droppers
  - Electrical centrifuge
  - Markers
  - Optical (hand lens or microscope)
1. Prepare about a 2-5% suspension of fresh red Cells in saline.
  2. Label two test tubes as A and B
  3. Add a drop of anti.-A to tube labeled A and a drop of anti-B to tube labeled B
  4. Add 2 drops of unknown 2-5% RBC suspension to each tube
  5. Centrifuge at 1000-2000 rpm for 1min. or leave at room temperature for 1 hour.
  6. Examine for agglutination. Readings may be checked by using a hand lens or low power of a microscope.

#### Interpretation

The same as the slide method

#### Source of error

- Drying on a slide
- Examining longer than 2min
- Technical and clerical errors

### **Specimen could be**

- Whole Blood
- From finger prick
- Washed blood

## **II. Rh Typing**

There are three methods of Rh- typing

- A) slide test method
- B) saline tube test method
- C) Modified tube test

### **A) Slide method**

1. prepare a 40-50% suspension of cells in their own serum or use whole Blood, finger puncture or coagulated blood
2. Label two slides as C and T
3. Place one drop of reagent anti-Rho (D) on slide labeled as T.
4. Place one drop of albumin or other control Medium on another slide labeled as C.
5. To each slide add 2 drops of well mixed (40-50% suspension of cells) in plasma or serum
6. Thoroughly mix the cell suspension & spread evenly the mixture over most of the slide.
7. Place both slide on a viewing box surface which is lighted and tilt gently and continuously
8. Observe for agglutination

**NB:** C - Refers to control  
T - Refers to test

### **Interpretation**

Agglutination of red cells → **Rh -positive.**

No red cell agglutination → **Rh- negative**

A smooth suspension of cell must be observed in the control.

**Note:** Check negative reaction microscopically.

## **III. The Cross Match**

The test between the recipient blood and the donor's blood is called cross match or compatibility test. It is performed prior to actual blood transfusion to show that the recipient's and donor's blood are compatible (able to match with out bad effects such as agglutination



or hemolysis). The recipient is typed for ABO and Rh factors then donors blood is selected that is of the same type as that of the recipient.

**There are two types of compatibility testing (X-matching) procedures:**

1. The major compatibility testing (major cross-match)
2. The minor compatibility testing (minor cross-match)

The major compatibility testing procedure consists of mixing the patient's serum and the donor's cells. As the name imply this test is much more critical for assuring safe transfusion than minor testing.

The cross match be it major or minor, it should be performed in a tube. Although slide method is used in many places this is not the best procedure because the recipient may have a weak antibody in his serum which could easily be missed on the slide such a weak antibody could cause a transfusion reaction.

There are 2 general procedures for doing a cross match

- Tube method
- Slide method.

**Slide major cross match**

**Method:-**

- Add a drop of recipients serum with equal volume of donor red cells on the slide,
- Mix it with a stirrer or applicator stick
- Observe under low power (10x) objective of microscope

**Interpretation:** If red blood cells agglutinate (clumping): **Incompatible**

No red blood cell agglutination: **compatible**

**The Anti-Globulin Test (coomb's Test)**

THE ANTI-GLOBULIN TEST: - It is a sensisitive technique to detect incomplete antibodies that are sensitive but which fail to agglutinate red cells suspended in saline at room T<sup>0</sup>, mainly IgG. These antibodies are agglutinated by the anti IgG antiglobulin serum through linking of the IgG molecules on neighboring red cells.

There are two kinds of anti globulin tests:-

- the direct anti globulin test (DAT)&
- The Indirect “ “ (IAT)

#### **A) The Direct Anti globulin Test (DAT)**

- Used to show whether red cells have been sensitized (coated) with antibody or complement in vivo, as in case of hemolytic disease of the newborn(HDN), autoimmune hemolytic anemia, or transfusion reactions.

**Principle:** Patients erythrocytes are washed to remove free plasma proteins & directly mixed with AHG, if incomplete antibodies are present, agglutination occurs.

#### **B) The Indirect Anti globulin Test (IAT)**

It is used for the detection of antibodies that may cause red cell sensitization in vitro. The sensitized RBCs or complement act as the antigen for the anti globulin reagent.

- IAT is used in cross-matching, to detect antibodies that might reduce the survival of transfused red cells.

**Principle:** The serum containing antibodies is incubated with erythrocytes containing antigens that adsorb the incomplete antibodies after washing to dilute the excess antibody in the serum; the addition of anti globulin serum produces agglutination in the presence of incomplete antibodies.

#### **Procedure (IAT)**

1. Put 2-4 drops of serum in a test tube
2. Add a drop of 5% red cell suspension
3. Mix & incubate at 37°C for 15-30 mins
4. centrifuge at 3400 rpm, for 15 seconds & examine for agglutination or hemolysis
5. wash 3-4 times, decanting the supernatant
6. Add 1 or 2 drops & antiglobulin reagent
7. mix and centrifuge at 3400 rpm, for 15 seconds
8. Examine for agglutination or hemolysis

**Note.** There are two types of antiglobulin reagents that can be used in the laboratory Procedure. broad spectrum (polyspecific sera) & monospecific sera.

**Polyspecific sera:** Prepared by combining anti IgG & anti-complement. The reagent also contain antibodies, such as anti- IgM, anti- Complement

**Monospecific:** contain only a single antibody: anti –IgG or only anti –complement.

### **Laboratory investigation of bleeding disorders.**

There are three commonly used coagulation tests. These are basic or first-line screening tests of hemostasis and are generally used as the first step in investigation of an acute bleeding patients, a person with a suspected bleeding tendency or as a precaution before an invasive procedure is carried out

1. Prothrombin time (PT)
2. Activated partial thromboplastin time (APTT)
3. Thrombin time (TT) test

#### • **Prothrombin Time**

**Principle:** The test measures the clotting time of plasma in the presence of tissue extract (thromboplastin)

“Or”

Citrated plasma +Thromboplastin +CaCl<sub>2</sub> → time to clot

- Thromboplastin (a lipoprotein) = phospholipid + tissue factor (activates FVII)
- Evaluates the Extrinsic clotting system (VII,X,V,II & fibrinogen)

- Method**
1. Deliver 0.1 ml of plasma into a glass tube placed in a water bath
  2. Add 0.1ml of thromboplastin wait 1-3 min to allow the mixture to warm
  3. Add 0.1 ml of warmed CaCl<sub>2</sub> &mix the contents of the tube
  4. Start the stop watch & record the end point
  5. Carry out the test in duplicate on the time basis.
  6. Finally the results are expressed as the mean of the duplicate readings.

#### **Normal values**

- The normal range of prothrombin time is between 11 to 16 seconds
- Each laboratory should establish its own normal ranges

#### • **Activated partial Thromboplastin Time**

##### **Principle:-**

Citrated plasma +partial thromboplastin + Activator+CaCl<sub>2</sub> → time to clot

- partial thromboplastin= a phospholipids-that does not contain tissue factor

- Activator= a negatively charged surface (kaolin, glass,) – activates Factor-XII
- Evaluates the Intrinsic clotting system (XII, XI, VIII, X, V, II and fibrinogen)

**Method:-**

1. Mix equal volume of the phospholipid reagent and the kaolin suspension & leave in a glass tube in the water bath at 37<sup>o</sup>c
2. Place 0.1ml of plasma into a new glass tube
3. Add 0.2 ml of kaolin-phospholipid solution, mix the contents and start the stop watch simultaneously. Leave at 37<sup>o</sup>c for 10 mints with occasional shaking.
4. At exactly 10min, add 0.1 ml of pre warmed cacl<sub>2</sub> & start a second stop watch.
5. Record the time taken for the mixture to clot.

**Normal range:** 30-40 seconds

• **Thrombin Time**

**Principle:** Thrombin is added to plasma and the clotting time is measured “or”

Citrated plasma + dilute thrombin → time to clot

-The thrombin time is affected by the concentration & reaction of fibrinogen

**Method**

1. Add 100µl thrombin sol<sup>n</sup> to 200µl of control plasma in a glass tube at 37<sup>o</sup>C &
2. Start the stop watch
3. Measure the clotting time

**Normal range:** 15-19 seconds

**Interpretation of Abnormal (prolonged) coagulation tests**

Prothrombin Time (PT)	Partial thromboplastin Time ( a PTT)	Thrombin Time (TT)
<ul style="list-style-type: none"> <li>- Deficiency of factors prothrombin,V,X,VII&amp; fibrinogen</li> <li>- Warfarin anticoagulation</li> <li>- Excessive heparin</li> <li>- Liver disease</li> <li>- Mild to sever vitamin K deficiency</li> <li>- DIC</li> </ul>	<ul style="list-style-type: none"> <li>-Intrinsic Factors deficiency</li> <li>-Heparin treatment (most common cause of a long aPTT)</li> <li>-Profound vitamin K deficiency</li> <li>- Liver disease</li> <li>-Excessive warfarin therapy</li> </ul>	<ul style="list-style-type: none"> <li>- Low or abscent fibrinogen</li> <li>-Heparin (much more sensitive to heparin than a PTT)</li> <li>- Uremia</li> <li>- Interference with fibrin polymerization</li> </ul>

**N.B.** Acquired coagulation disorder can be associated with infections, obstructive complications (septic abortion, eclampsia, ruptured uterus) and haemorrhagic disease of the new born.

**NOTE:** Most procedures for each method are not included in this module. Thus if the need arise please refer any book related to the topic.



## UNIT 4

### ANNEXES

#### 4.1 Annex-I: Bibliography /References

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## 4.2 Annex-II: Key for pre-test questions

S.No	Category			
	All category	Health officers	BSc Nurses	BSc Medical Lab
1	B	T,F,T,F, F,	B	- hematuria, hemoglobinuria, Normocytic normochroic red blood cells
2	D	T,F,T,T,F	C	- CBC, VDRL/ RPR, Gram stain, ABO and Rh- blood grouping, PAP-smear examination, pregnancy test etc..
3	B	T,F,T,T,F	B	- Acid hematin (sahli hellige), Cyanmethamoglobin method, Hemocue method, Oxyhemoglobin method.
4	B	T,T,T,T,F	C	- Serology
5	B	T,T,F,F,T	C	D
6	A	T,F,T,T,F	B	D
7	B	T,T,T,F,F	A	F
8	A	F,T,T,F,F	C	D
9	B	T,T,T,T,F	D	E
10	B	T,F,F,T,F	D	A
11		A		
12		D		



### 4.3 Annex-III: Abbreviations

HC - Health Center

IV - Intravenous

FHB - Fetal Heart Beat

C/s - Cesarean Section

EHW – Extension Health Workers

APH – Antepartum haemorrhage

PPH – Postpartum Haemorrhage

GAS – Gestational age (in weeks)

CLD- Chronic Liver Disease

DIC – Disseminated Intravascular coagulation

HPN – Hypertension

DM – Diabetes mellitus

V/S – Vital signs

S/S – Symptoms and signs

RL – Ringer’s lactate

NS – Normal Saline

VVF – Vesico Vaginal Fistula

RVF – Recto vaginal fistula

MVA – Manual Vacuum Aspiration

WHO – World Health Organization

LB – Live birth

MMR- Maternal mortality ration

VDRL - Venereal disease research laboratory

RPR - Rapid plasma regain

ART - Automated reagin test

EIA - Enzyme Immuno Assay

TPHA - Treponema pallidum hemagglutination

FTA-AB - Fluorescent antibody absorption

PCV - Packed cell volume

ICSH - International Community of Standard Hematology

PPH - Post partum hemorrhage

Hgb - hemoglobin

FHB - fetal heart beat

C/P - Clinical picture

V/E - Vaginal examination

