

MODULE

Maternal Bleeding

Diploma Program
For the Ethiopian Health Center Team



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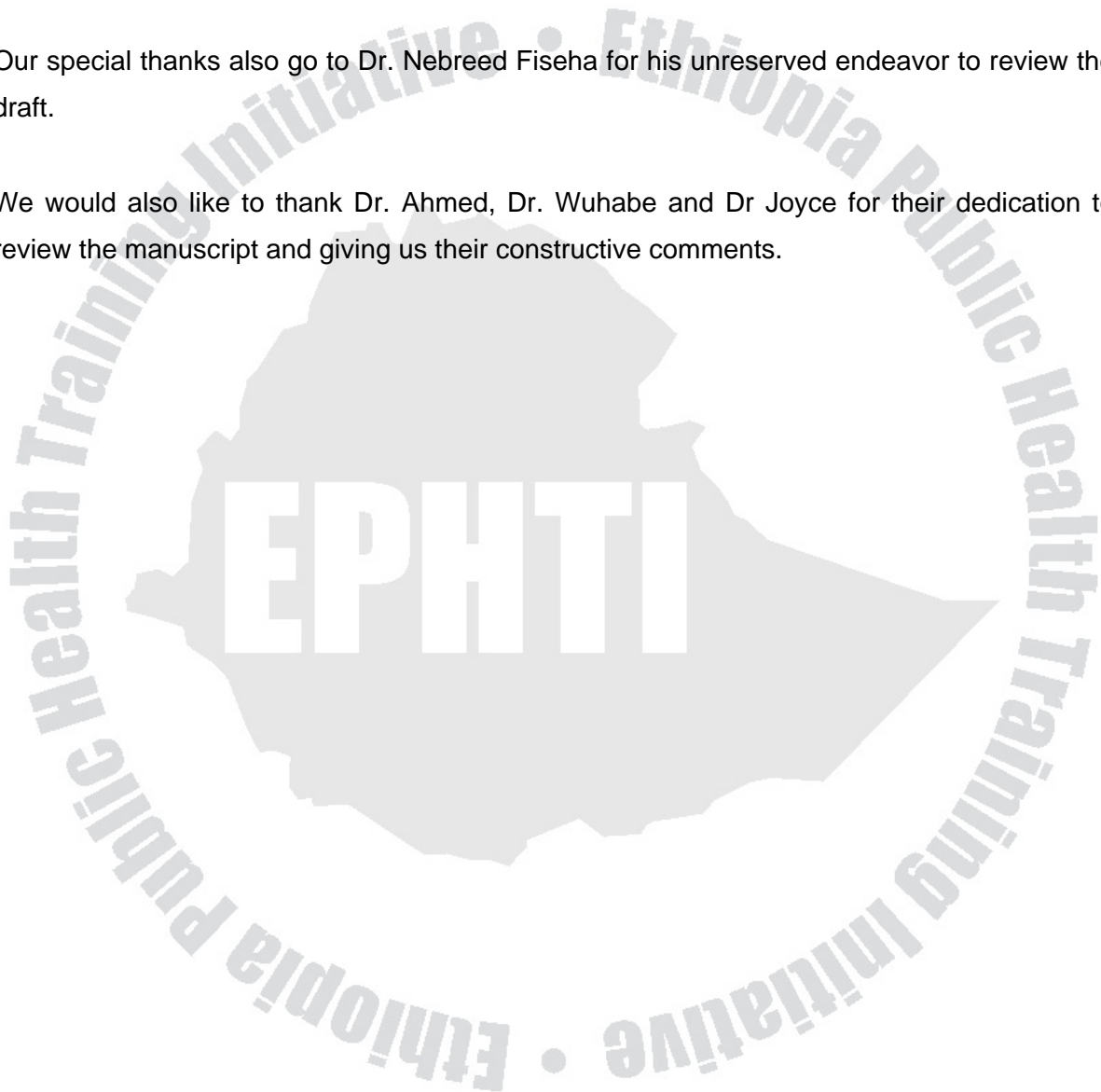


TABLE OF CONTENTS

Contents	Page
Acknowledgement.....	i
Table of contents	ii
UNIT ONE: Introduction	
1.1 Purpose and use of the module.....	1
1.2 Direction for using the module	1
UNIT TWO: Core Module	
2.1 Pre-tests	3
2.2 Significance and brief description	6
2.3 Learning Objectives	7
2.4 Definition of crucial terms	7
2.5 Epidemiology of maternal bleeding.....	8
2.6 Etiologies with some highlight.....	9
2.7 Clinical feature	11
2.8 Complications of maternal bleeding.....	13
2.9 Management of maternal bleeding	15
UNIT THREE: Satellite Modules	
3.1 Satellite Module for diploma nurses	16
3.2 Satellite module for health extension workers.....	38
3.3 Satellite Module for diploma laboratory personnel	54
UNIT FOUR: Annexes	
4.1 Annex-I.....	71
4.2 Annex-II.....	73
4.3 Annex-III.....	74

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
- **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 both before and after going through the module, and then check your answers against the keys

2.1.1 Pre-test for all categories

Instruction: Read the following and choose 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 hemorrhage (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

2.1.3 Pre-test for diploma 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 APH 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. Collect the pads to assess the amount of blood loss.

5. All of the followings pregnant mothers are at risk of PPH during 3rd stage, except:
- A. Multiple pregnancies
 - B. Polyhydramnious
 - C. Primi mothers
 - D. Anemic mother
6. What would be the first procedure in nursing management of a mother with 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 28th 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 health extension workers

Instruction: Say true or false.

1. Abortion is not a common cause of maternal bleeding in Ethiopia.
2. Abortion can happen spontaneously.
3. Pregnancy may continue after bleeding from the gravid uterus
4. It is possible to be pregnant few days after abortion.
5. A mother with APH cannot encounter shock without excessive, visible vaginal bleeding.
6. The health extension worker decides whether to refer a mother with APH or not after doing vaginal examination.
7. If the labour is not difficult and the placenta is removed, there is always no risk of bleeding for the mother post partally.
8. If the fetus is expelled, there is no need to refer a mother with abortion to a health center.
9. Antenatal care can prevent significant proportion of maternal bleeding.
10. All mothers that may bleed after or during delivery can be identified during antenatal follow up.

2.2. Significance and brief description of maternal bleeding

According to the 1995 WHO report more than half a million (585,000) women die 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 is 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 highest 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.

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 consecutive 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 labour

- 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 and before delivery.

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

Etiologies of Antepartum hemorrhage

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 eg. CLD, DIC ...etc
- 2.6. Unknown Causes:- In many of cases no causes is found clinically or by investigation.

C) Bleeding after childbirth (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 occurs 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 because most women giving birth are healthy and compensate for blood loss very well
 - Most common delivery 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 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 O₂ delivery
- If conscious and spontaneously breathing: 100% O₂ (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**
- Two large bore cannulas should be secured (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 pre morbid norm by 500 to 1000ml.**

- Give blood as soon as possible if there is an indication for.
- Fresh whole blood or stored whole blood is preferable

iii) Evaluation

- Close follow up of vital signs – maintain systolic Bp > 90 mm/Hg
- Urine output (maintain at 30-60 ml/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, & indwelling urinary catheter with attending health personnel.

Complications such as the following warrant 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 Diploma Nurses

3.1.1 INTRODUCTION

Maternal bleeding in pregnancy, labour and early post partum 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.

However, health professionals including nurses often fail to take appropriate and timely action when there are actual or potential risks of maternal bleeding. This again makes it difficult to reduce the mortality and morbidity from this major problem.

This satellite module is designed to strengthen the contribution of 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. Case studies and study questions are also incorporated in order to create an interactive learning approach.

3.1.2 Directions for using this satellite module:

- Before going to this satellite module you need to go through the core module.
- In order to become informed and appreciate what other members of the team are doing, you also need to read their 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.

3.1.3 Learning objectives:

At the end of reading this module the students/nurses should be able to:

- List the common causes of maternal bleeding.
- Demonstrate the role of nurses in different causes of maternal bleeding
- Identify the prevention and control measures of maternal bleeding.
- Record and report of necessary data regarding maternal bleeding.

3.1.4 Maternal Bleeding

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

3.1.4.1 Common Causes of Vaginal Bleeding:

3.1.4.1.1 Causes of vaginal Bleeding during pregnancy

- Abortion
- Ectopic pregnancy
- Undiagnosed cervical cancer
- Cervical polyps
- Cervical erosion
- Traumatic coitus
- Molar pregnancy
- Antepartum hemorrhage

3.1.4.1.2 Causes of Bleeding during Labour and postpartum

- Obstructed labour and uterine rupture
- Postpartum hemorrhage

Bleeding before 28th 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 Ca, polyps, cervicitis and erosion).
- Hydatidiform mole.
- Implantation bleeding.

Abortion:

Definition: The death or expulsion of fetus before 28th weeks of gestation
(Before it is viable or less than 500 gm wt)

- 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 abortion (may be either complete or incomplete)
- Recurrent /habitual abortion

2. Induced

- Therapeutic
- Non- therapeutic (safe/ usually unsafe, leading to septic abortion)

Spontaneous abortion

Is an abortion which has not been interfered /happens spontaneously. Many pregnancies end in the 1st 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, without dilatation of the cervix, and with out expulsion of the products of conception.

S/S of threatened abortion include:

- Slight vaginal bleeding
- Slight backache
- Cervix closed.

Nursing Management of threatened abortion at H/C includes:

- Provide quiet atmosphere.
- Encourage rest.
- Observation
- Discharge her after 48 hrs if bleeding stopped and condition of mother and fetus is stable.
- No sexual intercourse for 2-3 weeks.

Despite the above management if bleeding persists it suggests inevitable abortion.

Inevitable abortion is when it is impossible to continue pregnancy.

S/S of inevitable abortion

- Severe backache and bleeding
- Cervix dilated. (Marker of inevitable abortion)
- Membranes ruptured.

⇒ Outcome: either complete or incomplete abortion.

Emergency Nursing Management inevitable abortion at H/C:

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

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

- Prepare oxytocin infusion
- Lie the patient flat
- Monitor V/S
- Provide psychological support
- Prepare the patient for MVA or E and C (both physically and psychologically)

Missed abortion.

When fetus is dead and retained in the uterus for about eight weeks.

S/S - brownish vaginal discharge

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

Obstetric Management

- oxytocin infusion
- D & C / MVA.

Complication - DIC

- Sepsis

Habitual Abortion: when a woman has 3 or more consecutive abortion spontaneously.

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

- It can also be caused by chromosomal abnormalities

Obstetric Management- Shirodkar stitch. The stitch should be removed 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 usually performed illegally 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 in the world.
- According the 2000 DHS report maternal mortality rate in Ethiopia is 870 / 100,000 live births of which unsafe abortion contribute about 22-54%.

Complications of unsafe abortion

- Shock (hypovolemic, septic)
- Severe vaginal bleeding.
- Sepsis
- Uterine perforation.
- Intra abdominal injury.

Management at H/C:

- Open air way
- IV fluid.
- Triple antibiotic
- Monitor V/S, and intake & 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 RH services

Post Abortion counseling and Family planning, why?

- To break the cycle of repeated abortion, which is one of the major causes of Maternal morbidity and mortality
- Abortion reflects unmet need of FP.
- It is ethically wrong (for the providers).

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

- Return of fertility; that fertility returns soon. Thus start contraception soon if sex is inevitable.
- About contraception:
 - Methods Available.
 - When to start
 - Where to go to get the contraception.

NB: Never repeat unwanted pregnancy and unsafe abortion.

Consequences of unsafe Abortion

- Infection, hemorrhage and repeated abortion
- 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,

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

Ectopic pregnancy

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

* 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.

Cause - PID

S/S - Amenorrhea

- Lower abdominal pain
- Pain precedes bleeding
- Adnexial tenderness and mass (only to 30-50 %)

Outcomes of Tubal pregnancy

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

S/S of ruptured ectopic pregnancy

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

Management at H/C

- 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 through the posterior cervix and in to the Cul- de-Sac of the peritoneal cavity in case of ruptured ectopic.
- Laparotomy to visualize the ectopic

Management at hospital

- Admission
- Resuscitation
- Laparotomy ⇒ salpigo-ophorectomy

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 signs and symptoms
- ◆ Passage of vesicles per vagina (best Dx)
- ◆ Ultrasound at hospital

Management at H/C

- ◆ Prompt removal of intrauterine contents
- ◆ Pitocine IV infusion
- ◆ Uterine evacuation by D 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

Common Causes of bleeding after 28th weeks of pregnancy

Antepartum Hemorrhage/APH

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

Causes of APH:

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

****However, 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 disorders 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 is 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, on set of bleeding episode, lab studies (hemoglobin, hematocrit, and hormonal assays).
- Insert catheter and assess urine output hourly (It should not be less than 30 ml /hr)

- Assess if there are contractions: frequency, duration & 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 pt with pertinent history.
- **Caution:** never do V/E or rectal examination.

Common Nursing diagnosis:

- 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 is 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.

Diagnosis of the placenta praevia

- A 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.
- Hx 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 an expert to exclude other causes of bleeding.
- Ultrasound examination- to localize the placenta.
- The objective of management is to prolong pregnancy and allow fetus to get mature.
- Examination under anesthesia /EUA 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 or
2. She is in active labour or
3. IUFD/ 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 at hospital

- The pt will be taken to the OR with IV infusion **and**
- **X**-matched blood in readiness.
- EUA 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 Abruptio.

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

Etiology:

1. Trauma like fall, injury, ECV, ICV
2. Maternal hypertension, including pre-eclampsia and eclampsia.
3. Sudden decompression of the uterus in case of rupture of membranes in a patient with polyhydramnios.
4. Short cord
5. 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 b/n the uterine muscles causing bruise and edematous; 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

signs and symptoms are the same as with concealed type.

Complications- PPH, shock, DIC, Renal failure, and 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.
- C/S if fetus is alive
- Strict v/s monitoring (every 15 mints)
- Catheterization to monitor intake and output
- Apply active management. of 3rd stage to prevent PPH

**NB: generally the obstetric management of abruptio placenta is induction and Vaginal delivery and that placenta praevia is C/s*

3.1.4.2 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 contractive.
2. Cervix dilates slowly, edematous
3. The presenting part not well applied to the cervix.

3. Early rupture of membrane.

Late Signs

- ◆ Maternal distress.
- ◆ Fetal distress.
- ◆ Abdomen is tense and hard to palpate.
- ◆ Contractions are long, strong with little or no relaxation between.
- ◆ Retraction ring of Bandyl's ring is seen.
- ◆ 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|Complications

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

Rupture 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

- ◆ Cessation of contractions.
- ◆ Fetal distress followed by cessation of FHB
- ◆ Fetal part felt under the skin.
- ◆ Maternal shock.

Nursing Management of ruptured uterus at H/C:

- Lie flat
- IV drip
- Accompany to hospital
- Psychological support

Management at Hospital:

- IV drip
- Blood group and X-match
- Inform OR staff to get ready for emergency surgery.
- Get relative for consent
- Management is laparotomy and hysterectomy.
- 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 primi gravidas at 38 weeks.
- Educate the community to avoid early marriage.

Complications of 3rd stage:

- Postpartum hemorrhage (PPH)
- Retained placenta.
- Adherent placenta.
- Inversion of the uterus.
- Shock.
- Hematoma

Postpartum hemorrhage

Definition: - It is a bleeding from the genital tract during 3rd stage or postpartum period to the amount 500 ml or any amount that alters the maternal condition.

Types of PPH:

1. Primary PPH -with in 24 hours
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 defects (DIC)

The difference between atonic and traumatic PPH:

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

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.
- ◆ Give prescribed pitocin into the bag.
- ◆ If the uterus is still lax perform bimanual 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 urgent for hysterectomy

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 3rd stage when indicated such as:
 - Multiple pregnancy

- Previous PPH
- Current APH
- Polyhydramnius etc

NB: It is advisable to practice active management of third stage of labour for all deliveries, as PPH may not be predicted in significant number of cases.

Procedure for active management of 3rd 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 soon by CCT.
- Manage all stages of labour carefully.

Retained Placenta

Definition: When the placenta is 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 acreta when the placenta attached to myometrium.
- Placenta increta: When the placenta penetrated myometrium deeply.

Management: refer for hysterectomy

Inversion of the uterus:

Definition: When the uterus turns inside out.

Cause-Mismanagement of 3rd stage as:

- Combined method of placental expulsion.
- Traction of the cord with an atonic uterus
- Polyps (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 into the broad ligaments. Signs and symptoms vary with the type of hematoma.

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

Nursing Assessment.

- Often the woman complains of severe vulval pain or of severe rectal pressure. On examination, the large hematoma appears as a unilateral, tense, fluctuant bulging mass at the introitus or within 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.
- Hematomas in the upper vagina may cause difficulty with 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 more difficult to detect. The woman may complain of severe 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 un -comfortable 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 cause. 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 postpartal 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 and her family, and documentation should be always complete.

3.1.4.3 Preventions of maternal bleeding and death from its complications

Proper Antenatal care

Antenatal care is a preventive medicine that includes nutrition and health education. The purpose of ANC is to promote good health throughout the course of pregnancy while screening for and managing any complication that will occur during pregnancy including:

- ◆ Provision of comprehensive RH services.
- ◆ Antenatal Health Education topics should include but not limited to:
 - Danger signals of pregnancy
 - Prevention and proper treatment of STIs and anemia (including hookworm and malaria).
- ◆ Proper management of all stages of labour including starting IV infusions when bleeding occurs.
- ◆ Refer the following high risk factors that increase the risk of hemorrhage:
 - Grand multiparty
 - Anemia
 - Malpresentations
 - Multiple pregnancy
 - Previous C/s
 - Polyhydramniotic
 - Antepartum Hemorrhage
 - Previous history of PPH

Training and supervising the TBAs

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 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 condition.

The role of the trained traditional birth attendants:

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.
- 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, 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

3.2. Satellite Module for Health Extension Workers

3.2.1 Introduction

The purpose of this satellite module:

This module is intended to be used by Health Extension Workers (HEW) so that they can be provided with the basic information on the common causes of maternal bleeding. Consequently, it will enable them to use this information for the prevention and management of maternal bleeding within their limitations. Study questions have also been incorporated in order to create an interactive learning atmosphere,

3.2.2 Directions for using this satellite module:

First try the pretest, next go through the material, then do the test again to see your own progress.

3.2.3 Learning objectives

At the end of reading this satellite module, the HEW should be able to:

- List the common causes of maternal bleeding.
- Demonstrate the role of HEPW in different causes of maternal bleeding
- Identify the preventive measures of maternal bleeding.
- Record and report of necessary data regarding maternal bleeding.

3.2.4 Maternal Bleeding

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

3.2.4.1 Common Causes of Vaginal Bleeding:

3.2.4.2 Common causes of vaginal bleeding during pregnancy

- Abortion/ Miscarriage
- Ectopic pregnancy
- Ante partum hemorrhage

3.2.4.3 Common causes of Bleeding during Labour and postpartum

- Obstructed labour and Uterine rupture
- Postpartum hemorrhage

3.2.4.3.1. Bleeding before 28th 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 tumors, cervicitis and erosion).

Abortion: The death / expulsion of fetus before 28th weeks of gestation (loss of a fetus before it is viable or less than 500 gm in wt.) (Miscarriage)

A miscarriage is a pregnancy that ends by itself before the baby is fully developed. It is often the body's way of ending a pregnancy when the unborn baby has a serious problem that would have kept it from developing well. Most miscarriages happen in the first 3 months of pregnancy. After a miscarriage, a woman can still become pregnant again and have a normal pregnancy and healthy baby.

The signs of miscarriage are pain and vaginal bleeding. The bleeding and pain usually begin like normal monthly bleeding and then get heavier and stronger. There may also be some tissue or clots with the blood.

If the bleeding and pain continue for more than a few days, if the bleeding is much heavier than normal monthly bleeding, or if a woman gets a fever or has a bad smelling fluid from her vagina, part of the pregnancy may still be inside the womb. This is called an incomplete miscarriage. It can lead to heavy blood loss, a dangerous infection, or even death. The woman should go to a H/C or hospital where a trained health worker can empty the womb. If a woman has strong, constant pain in her lower abdomen, she may have a pregnancy in the tube and this is very dangerous.

After a miscarriage a woman should rest and avoid heavy work or lifting for 2 weeks. She should not douche or wash inside her vagina. Also she should avoid sex until all bleeding stops because her womb is still open and could get infected.

Many women feel very sad after a miscarriage; some do not. This is all normal. Some women may find it helpful to talk with other women who have lost a pregnancy.

Classifications of Abortion

1. Spontaneous-Threatened



- Missed
- May go to term
- Inevitable (may be either complete or incomplete)
- Habitual /recurrent abortion

2. Induced

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

Spontaneous abortion

Is an abortion which has not been interfered/happens spontaneously and will be followed by threatened abortion. Many pregnancies end in the 1st 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, without dilatation of the cervix, and without the expulsion of the products of conception.

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

Management of threatened abortion at home

- Provide quiet atmosphere.
- Encourage rest.
- Observation of bleeding and contraction (back pain)

Despite the above management if bleeding persists

⇒ Inevitable abortion

Inevitable abortion is when it is impossible to continue pregnancy.

S/S - Severe backache and bleeding

- Cervix dilated.

- Membrane ruptured.

⇒ **Outcome:** either complete or incomplete abortion.

Emergency Management at Home:

- Monitor V/S
- Lie down the patient with the feet up.
- Refer her for MVA or E and C

Missed abortion

Definition: When fetus died and retained in the uterus at least for 8 weeks.

S/S - brownish vaginal discharge

-Pregnancy test is negative.

- Uterus fails to enlarge.

- Other S/S of pregnancy will be reduced or vanished

Management – Refer to H/C.

Habitual Abortion

Definition: When a woman has 3 or more consecutive abortions spontaneously.

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

Management- Refer her to hospital for Shirodkar stitch. The stitch should be removed 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. It is mostly performed illegally for the sake of benefits or favor.

Complications of unsafe abortion

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

Management at Home:

- Monitor V/Ss and urine output
- Refer her to health center immediately.

Be aware that early treatment of abortion complications prevents **illness, infertility, and death!**

A woman with any of the danger signs after abortion (heavy bleeding, severe pain in the abdomen, high fever, bad smelling vaginal discharge, fainting and confusion) needs medical help fast! She should go immediately to a H/C or hospital where she can get the care she needs. Most of the time the womb must be completely emptied using vacuum aspiration or E and C.

Management of heavy vaginal bleeding

Heavy bleeding is the most common problem during or after an abortion. It is usually caused by pieces of the pregnancy tissue that are left in the womb. The womb cannot squeeze itself shut and keeps bleeding. If the pieces are removed, often the bleeding will stop. Sometimes the bleeding is caused by a torn cervix, which must be stitched for the bleeding to stop.

A woman is bleeding too much if she soaks a pad, towel, or clothing with bright red blood in less than 30 minutes. A slow, trickle of bright red blood is also dangerous. When this occurs, a woman may quickly lose a dangerous amount of blood. If it is not possible to get medical help immediately, try to stop the bleeding.

Stop the bleeding

A woman who is bleeding too much is able to help her womb squeeze with massage. She can do this herself or have someone else do it. Rub or massage the lower belly very hard. If there are pieces of tissue stuck in the womb or cervix, push them out while she is squatting and bearing down as if passing stool or giving birth.

Even if these treatments seem to work, get medical help as soon as possible. The woman will need antibiotics and may still need to have her womb emptied

Emergency help for too much vaginal bleeding

Health workers and others trained in giving a woman a pelvic exam may be able to follow these steps to try and stop the bleeding until the womb can be emptied.

IMPORTANT: Because the entrance to the woman's womb is open, putting anything inside her vagina is very dangerous. She can get a serious infection. Only do this if the bleeding is so heavy the woman's life is in danger.

1. Have the woman lie on her back with her feet and knees apart. Help her relax.
2. Wash your hands and the woman's genitals with soap and clean water.
3. Put a clean latex or plastic glove or very clean plastic bag on one hand. *The gloved hand should not touch anything before it goes into the woman's Vagina.*
4. If you have a sterile speculum, put it into the vagina so you can see the opening of the womb. If you can see tissue or clots or lumps of blood there, try to get hold of them with sterile forceps or clamps and gently remove them.
5. If you do not have a speculum, reach inside the woman's vagina with your gloved hand first with one finger, and then with two fingers.
6. Feel for the cervix. It will feel more firm and smooth than the skin.
7. Move your finger across the opening and feel for bits of the pregnancy that may be sticking out of the opening. They will feel like soft meat. Gently try to remove them. If the pieces are too slippery, take your hand out and wrap 2 fingers with sterile gauze, or a clean cloth that has been boiled in water, and try again to remove them.
8. After you have removed the pieces, put your first and second finger of your gloved hand into the woman's vagina under the womb; with your other hand, rub or massage her belly to help stop the bleeding. Her womb should be between your two hands.
9. Give the woman one 0.2 mg pill of ergometrine, every 4 hours for 24 hours.
10. Give antibiotics for mild infection immediately to prevent infection. She is at high risk of infection because the womb is open to germs.
11. If she is awake, give her fluids to drink if she is unconscious refer immediately.

12. Take her to a hospital right away, even if you think you have removed the tissue and the bleeding has stopped. She still needs to have her womb emptied to prevent complications. If the bleeding does not stop, continue to rub or massage her lower belly while taking her to the hospital.

General management of unsafe abortion includes:

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

Post Abortion counseling and Family planning, why?

- To break the cycle of repeated abortion.
- Major cause of maternal mortality and morbidity.

Counsel the post abortion client:

- Fertility returns soon
- Start contraception soon if sex is inevitable.
- Methods available for family planning.
- Where to get the contraception.

Advice: Never repeat unwanted pregnancy and unsafe abortion!

Consequences of unsafe Abortion

- Increases Burden to the family, country, hospital..etc.
- Detrimental for women's economical, social and psychological well being.
Ex. It affects the girls' ability to continue their education.
- Infertility has a negative impact on women's future life.

Ectopic pregnancy

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

Cause - PID

S/S - Amenorrhea

- Lower abdominal pain
- Pain precedes bleeding

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 Home

- Monitor V/S
- Lie flat
- Urgent referral.

Management at hospital

- Admission
- Resuscitation
- Laparotomy ⇒ salpingo-oophorectomy

3.2.4.3.2 Common Causes of bleeding after 28th weeks of pregnancy

Antepartum Hemorrhage/APH

Definition: any bleeding from the genital tract from the end of 28th weeks of gestation until the end of 2nd stage of labour.

Common causes of APH:

1. Placenta praevia/unavoidable bleeding
2. Placenta Abruptio/accidental hemorrhage

Management of unclassified APH at Home level:

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

- Lie pt flat; check FHB
- Assess B/P, P. R every 2 hourly, and more frequently during active bleeding

- Count pads to assess amount of bleeding over a given time period, save any tissue or clots expelled and provide fresh pads/clean clothes.
- Assess if there are contractions.
- Prepare for urgent referral
- Arrange blood donor and refer the pt with pertinent history.
- (**Caution:** never do V/E or rectal examination).

Placenta praevia:

Definition. Is a bleeding from abnormally situated placenta/ situated wholly or partly in the lower uterine segment.

Diagnosis of the placenta praevia

- Painless, causeless bleeding that often occurs at rest.
- High head, malpresentations or oblique lie.
- Abdomen is soft and easy to palpate.
- FHB heard easily.

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

Placenta Abruptio.

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

Etiology:

1. Accidental circumstances such as: fall, injury, ECV, ICV
2. Any hypertension, including pre-clampsia and eclampsia.
3. Sudden decompression of the uterus in case of rupture of membrane in a patient with polyhydramnios..
4. Short cord
5. 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.
 - 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:** is the same as with concealed type.

Complications-PPH and shock,

The management of APH:

- Urgent referral.

3.2 4.4. 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

Early signs:

1. Presenting part doesn't enter the pelvic despite good contraction.
(Slow progress of labour)
2. Early rapture of membrane.

Late Signs

- Maternal distress.
- Fetal distress.
- Abdomen is tense and hard to palpate.
- Contractions are long, strong..
- Retraction ring of Bandy's ring is seen.

- On V/E:**
- The presenting part is stuck at the brim.
 - Excessive caput and moulding.
 - Cx hangs as an empty sleeve.
 - Meconium stained amniotic fluid on fingers.

Management of Obstructed labour at Home

- ◆ Keep the bladder empty
- ◆ Urgent referral and accompany her.

Danger|Complications

- Rupture of uterus |abrupt rupture
- VVF/RVF
- Still birth/Birth injuries
- Sepsis
- Shock to death.

Rupture of uterus

Definition: It is a tear on the wall of the uterus.

Cause:

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

Signs of uterine Rupture

- Cessation of contractions.
- Fetal distress followed by cessation of FHB
- Fetal part felt under the skin.
- Maternal shock.

Management of ruptured uterus at Home:

- Lie flat
- Urgent referral and accompany

Management at Hospital:

- Iv drip
- Blood group and X-match
- Inform OR staff to get ready
- Get relative for consent
- Management is laparotomy and hysterectomy.

➤ Provide postoperative care.

Complications:

- ◆ Shock
- ◆ Peritonitis
- ◆ Paralytic ileus
- ◆ Peritonitis
- ◆ Venous thrombosis
- ◆ Adhesions
- ◆ 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.
- Refer cases of obstructed labour to hospital as soon as possible.
- Careful observation during labour
- Have all primi gravidas specially young and old ones deliver at hospital.
- Educate the community to avoid early marriage.

Complications of 3rd stage:

- Post partum hemorrhage (PPH)
- Retained placenta.
- Adherent placenta.
- Inversion of the uterus.
- Shock.

Post partum hemorrhage

Definition: It is a bleeding from the genital tract during 3rd stage or postpartum to the amount 500 ml or any amount that alters the maternal condition.

Types of PPH:

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

Common causes

- ◆ Atonic PPH (commonest one)
- ◆ Traumatic PPH.
- ◆ Hypofibrinogenemia (DIC): is a condition where the clotting factor is disturbed and bleeding cannot be stopped.

The difference between atonic and traumatic PPH

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

Management at home:

- ◆ Massage the uterus
- ◆ Give ergometrine 0.2 mg PO if available
- ◆ Let her empty the bladder.
- ◆ Try to expel the placenta with the contraction caused by ergometrine.
- ◆ Examine the placenta for completeness.
- ◆ If placenta is still in refer her to the nearest H/C for manual removal
- ◆ If the uterus is still lax perform bimanual compression.
- ◆ If the bleeding persists check for laceration and suture it.
- ◆ If no atony and trauma but bleeding continues anticipate the possibility failure of clotting of the blood and refer her **urgent for hysterectomy**

The complications of PPH

- Shock
- Anemia
- Poor resistance

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.
- Manage all stages of labour carefully.

Retained Placenta

Definition: 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

Management: Refer the mother for Manual removal

Inversion of the uterus

Definition: When the uterus turns inside out.

Cause:

- ◆ Mismanagement of 3rd stage as:
- ◆ Combined method of placental expulsion.
- ◆ Traction of the cord in an atonic uterus
- ◆ Polyps (chronic inversion)

Management:

- Don't try to expel the placenta.
- Elevate the buttock by putting the pillow under the buttock.
- Keep the patient NPO and refer as soon as possible to hospital

Summary of vaginal bleeding, causes and management

BLEEDING DURING PREGNANCY OR AFTER CHILD BIRTH		
Bleeding Problem	May be caused by	what to do
Bleeding during the first 3 months of Pregnancy with constant pain or pain that comes and goes	Pregnancy in the tube	URGENT! Send to a H/C right away.

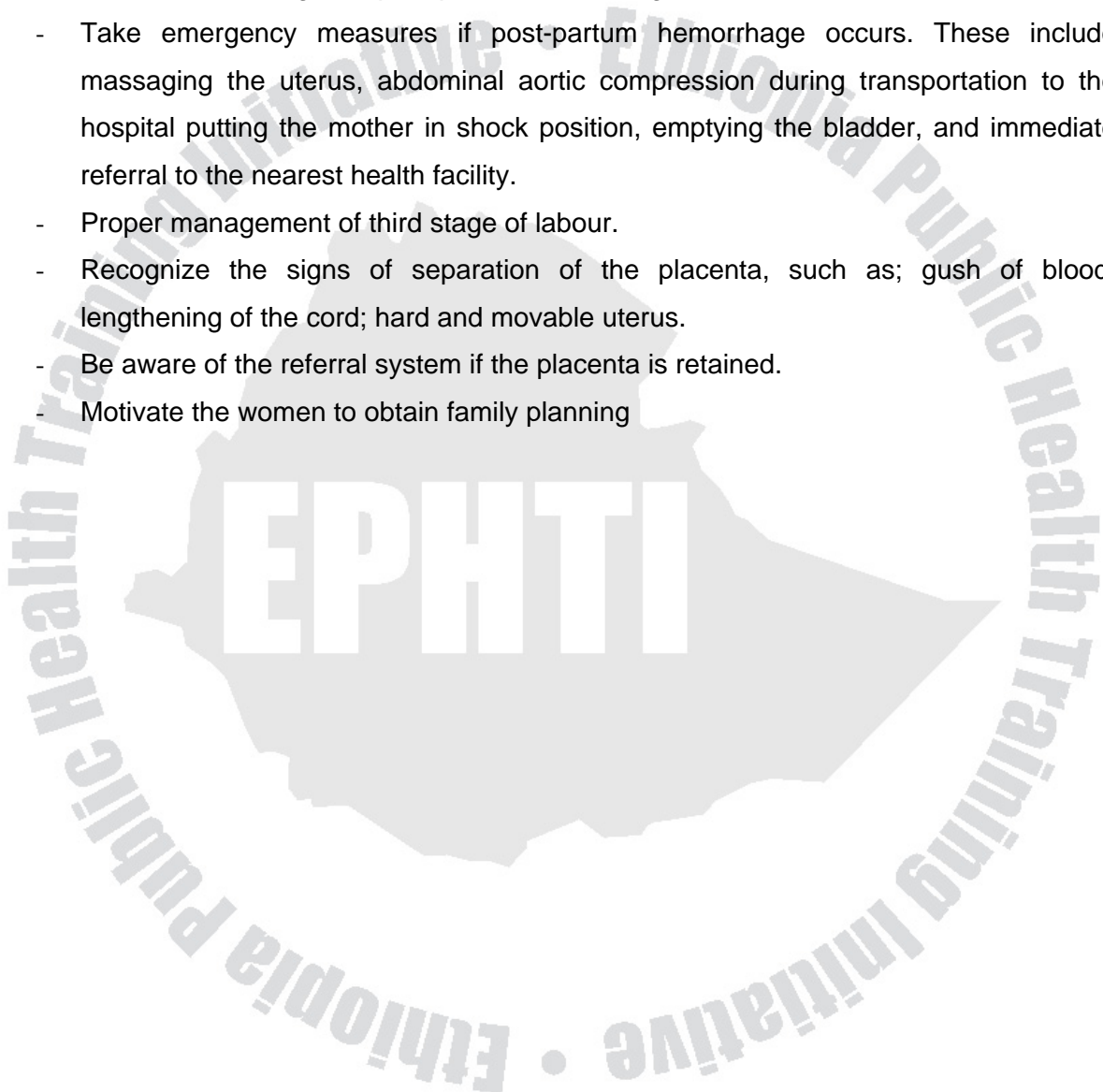
Bleeding during the last 3 months of pregnancy	The after birth (Placenta) coming off the wall of the womb	URGENT! Send to a H/C right away.
Spotting, or light bleeding instead of normal menstrual bleeding	The fetus is attaching to the wall of the womb /Implantation	This is normal tell patient the reason why this happen
Bleeding during the first 6 months of pregnancy	May be a miscarriage (especially if patient also has cramping pains like birth pains)	Watch and wait. If bleeding becomes heavy send to hospital.
Heavy during or just after birth.	Piece of the placenta left in the womb. The womb is too tired to squeeze or tighten	Urgent! Send to H/C
Heavy bleeding or that lasts longer than 15 days or bleeding with pain and fever.	Piece of pregnancy tissue may remain in the womb . Infection in the womb.	Send to H/C right away.
Bleeding during or after sex	May be: PID, STD, Rape, Cancer of the cervix and problems in the womb	Send to H/C
Bleeding during menopause	Growth or cancer of the womb/cervix	Send her to H/C for PAP or other tests

Summary

The role of EHW in the preventions of maternal bleeding:

- 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 ` to prevent malaria.
- 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, 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



3.3. Satellite Module for Diploma 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.

3.3.2. Laboratory markers of maternal bleeding

- Hematuria /blood
- Normochromic normocytic red blood cells
- Hypochromic microcytic red blood cells

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 normochromic 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 lenkocytes, 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
- Pregnancy test for HCG
- Pap-smear examination

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 μ 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 thoughly the solutions indicated below.

Tube N ^o	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 concn. in a sample can be read from the calibration curve.

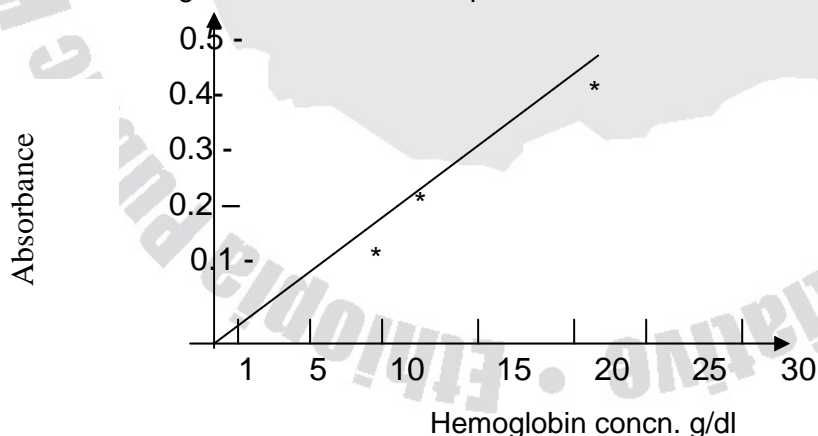


Fig. Example of an HicN hemoglobin calibration Graph using commercially. produced HicN standards: 6 g/dl. 12g/dl, 18 g/dl

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 proportion of whole blood occupied by red cells. Anticoagulated blood in a glass capillary's of specified length, bore size, and wall thickness is centrifuged in a micro hematocrit centrifuge at RCF 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:

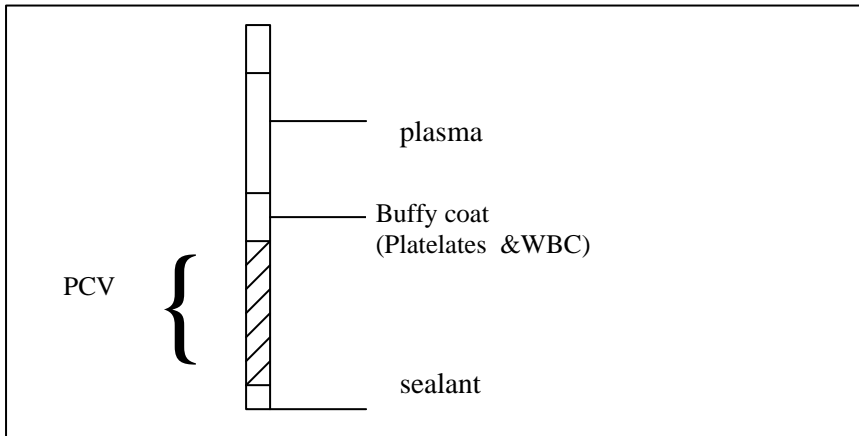
1. Fill about three quarters of the tube by capillarity (if anticoagulated venous blood, adequate mixing is mandatory)
2. Seal the unfilled end, preferably using a sealant material. If unavailable, Heat-seal the capillary using a small flame from a spirit lamp or pilot flame of a Bunsen burner, rotating 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 & the top of the plasma column of the 100 Line. Read off The PCV from scale. The Reading point is the top of the Red cell column just below the buffy coat layer (consisting of WBC& platetates).

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

Calculator 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 men0.40 – 0.54
- Adult Women0.36 – 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), Toludin Red Unheated Serum Test (TRUST), Reagin Screening Test (RST) and Enzyme Immuno 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 & detection of antibodies
- False –positive results owing to non-specific cross reactivity
- False–negative results in up to 40% of cases of primary syphilis & 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 Minutes 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 serom with 18- gauge needle & syring.
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 demonstrates when complete or partial inhibition of reactivity occurs with undiluted serum; maximum reactivity is obtained only with diluted serum. This prozone rxn 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) cardioipin, charcoal allows the result to be read macroscopically.
- Humidifier cover (to cover the card during) rotation

Reagent

- RPR test antigen: contain cardiolipin, charcoal

Preliminary Testing Antigen suspension

- 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 rotattor, and covered with the humidifier cover.
5. Rotate for 8 Mints 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 puscells (Gonorrhoea)

Note: puscells with out intracellular diplococci indicate nongonococcal arthritis

- 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 β -hemolytic streptococci)
- Gram-ve rods like E.coli, 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 coccobacill:
- Presence and number of pus cells
- Presence of yeast cells and epith. 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)
- Treponema pallidum (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 where as 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 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 over looked.

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 blo
- 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 s of the same type as that of the recipient.

There are two types of compatibility testing (X-maching) 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

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

UNIT FOUR

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	Nurses	HEW	Medical Lab
1	B	T,F,T,F, F,	B	F	-hematuria, hemoglobinuria, Normocytic normochroic red blood cells
2	D	T,F,T,T,F	C	T	-CBC, VDRL/ RPR, Gram stain, ABO and Rh- blood grouping, PAP-smear examination, pregnancy test etc..
3	B	T,F,T,T,F	B	T	- Acid hematin (sahli hellige), Cyanmethamoglobin method, Hemocue method, Oxyhemoglobin method.
4	B	T,T,T,T,F	C	T	-Serology
5	B	T,T,F,F,T	C	F	D
6	A	T,F,T,T,F	B	F	D
7	B	T,T,T,F,F	A	F	F
8	A	F,T,T,F,F	C	F	D
9	B	T,T,T,T,F	D	T	E
10	B	T,F,F,T,F	D	F	A
11		A			
12		D			

4.3 Annex-III: Abbreviation

HC- Health Center

IV- Intravenous

FHB - Fetal Heart Beat

C/s - Cesarean Section

EPHW – Extention Package Health Workers

APH – Antepartum haemorrhage

PPH – Postpartum Haemorrhage

GAS – Gestational age (in weeks)

CLD- Chronic Liver Disease

D/C – Disseminated Intravascular coagulation

HPN – Hypertension

DM – Diabetus 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 reagin

ART:- Automated reaagin test

EIA:- Enzyme Immuno Assay

TPHA:- Treponema pallidum hemagglutination

FTA-AB:- Flourcent antibody absorption

PCV:- Packed cell volume

ICSH: International Community of Standard Hematology

PPH-Post partum hemorrhage

Hgb-hemoglobin

FHB-fetal heart beat

S/S-Signs and symptoms

C/P-Clinical picture

H/C-Health center

V/E-Vaginal examination

VVF-Vesico-vaginal fistula

RVF-Recto-vaginal fistula