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PREGNANCY, CHILDBIRTH AND POSTPARTUM MANAGEMENT GUIDELINES

Level- 1

A Guide for Nurses, Midwives and Doctors

Third Edition 2022

Department of Woman & Child Health

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ACRONYMS – ABBREVIATIONS

ABS	*Antibody Screening Test*	*GDM*	*Gestational Diabetes Mellitus*
ANC	*Antenatal Care*	*Gm*	*Gram*
APH	*Antepartum Haemorrhage*	*Hb*	*Haemoglobin*
ART	*assisted reproductive technology*	*HIV*	*Human Immunodeficiency Virus*
BMI	*Body Mass Index*	*ICT*	*Indirect Coomb's test*
BP	*Blood Pressure*	*IM*	*Intramuscular*
BS	*Blood Sugar*	*IU*	*International Unit*
CBC	*Complete Blood Count*	*IUD*	*Intrauterine Device*
Cm	*Centimetre*	*IUGR*	*Intrauterine Growth Restriction*
CPHL	*Central Public Health Laboratory*	*IUI*	*Intrauterine Insemination*
dL	*Decilitre*	*IVF*	*In Vitro Fertilisation*
DM	*Diabetes Mellitus*	*LBW*	*Low Birth Weight*
DNA	*Deoxyribonucleic Acid*	*PE*	*pulmonary embolism*
DVT	*deep vein thrombosis*	*IVDU*	*intravenous drug user*
DWCH	*Department of Woman and Child Health*	*IPC*	*Intermittent pneumatic compressions*
ELIZA	*Enzyme Linked Immunosorbent Assay*	*PID*	*Pelvic Inflammatory Disease*
FBS	*Fasting Blood Sugar*	*LSCS*	*Lower Segment Caesarean Section*
FHS	*Foetal heart Sounds*	*mcg*	*Microgram*
mg	*Milligram*	*STD*	*Sexually Transmitted Diseases*
SCD	*Sickle cell disease*	*TPHA*	*Treponema Pallidum Haemagglutination Assay*
mi	*Millilitre*	*TSH*	*Thyroid Stimulating Hormone*
mmHg	*Millimetres of Mercury*	*TT*	*Tetanus Toxoid*
Mmol	*Millimoles*	*UTI*	*Urinary Tract Infection*
NWCCP	*National Women & Child Care Plan*	*VDRL*	*Venereal Disease Research Laboratory*
OGTT	*Oral Glucose Tolerance Test*	*VZIG*	*Anti-Varicella Zoster Human Immunoglobulin*

PGBS	*Post Glucose Blood Sugar*	*VZV*	*Varicella Zoster Virus*
PHC	*Parent Health Centre*	*WB*	*Western Blot Test*
PNC	*Postnatal Care*	*SLE*	*Systemic lupus erythematosus*
PPH	*Postpartum Haemorrhage*	*VTE*	*Venous thromboembolism*
PROM	*Premature rupture of Membranes*	*LMWH*	*low molecular weight heparin*
RPR	*Rapid Plasma Reagin*	*WHO*	*World Health Organisation*
RBS	*Random Blood Sugar*	*GP*	*General Practitioner*
RPHL	*Regional Public Health Laboratory*	*OHSS*	*Ovarian hyperstimulation syndrome*
RT-PCR	*Real time polymerase chain reaction*	*IBD*	*inflammatory bowel disease*
SCBU	*Special Care Baby Unit*	*TFT*	*Thyroid Function Test*

DEFINITIONS

Term	*Definition*
Amniotic fluid	*the liquid that surrounds a growing foetus in the uterus*
Amniotic sac	*the sac around the foetus inside the uterus*
Antenatal	*a term that means ˜before birth' (alternative terms are ˜prenatal' and ˜antepartum')*
Antepartum haemorrhage	*bleeding from the vagina in pregnancy >24-week gestation*
Apgar score	*a test given one minute after a baby is born, then again five minutes later, that assesses a baby's appearance (skin colour), pulse, grimace (reflex), activity (muscle tone) and respiration. A perfect Apgar score is 10; typical Apgar scores are seven, eight or nine. A score lower than seven means that the baby might need help in breathing*
Assisted reproductive technology	*any procedure performed to help achieve a pregnancy like IVF*
Artificial rupture of membranes	*when a healthcare practitioner bursts the sac holding the amniotic fluid using an instrument with a pointy tip. Often used to speed up a labour that has slowed*
Baby blues	*mild depression that follows childbirth for the first 10 days; usually the result of hormonal swings. Usually resolves spontaneously*
Braxton Hicks contractions	*a tightening of the uterus that may feel like a labour contraction. Braxton Hicks contractions are not painful and do not get stronger and closer together like true contractions (also called ˜false labour')*
Contraction	*the often strong and painful tightening of the uterus during labour that causes the woman's cervix to dilate and that helps push the foetus through the birth canal*
Crowning	*time during labour when the foetus's head has reached the external vaginal opening and can be seen from the outside*
Dilation	*the opening of the cervix, measured as the diameter of the cervix in centimetres*

Ectopic pregnancy	*when a fertilised egg implants and grows outside of the uterus, usually in the fallopian tube. In most cases, an ectopic pregnancy is not viable.*
First-degree tear	*a tear involving only the perinatal skin that occurs at the time of delivery that doesn't always require stitches*
First trimester	*the first 13 weeks of pregnancy*
Full term	*when a pregnancy is a normal duration (≥ 37 weeks gestation)*
Home birth	*labour and delivery that takes place at home, with or without the supervision of a midwife*
Low birth weight	*when a baby weighs less than 2,500 grams at birth*
Multiple pregnancy	*when a woman is carrying more than one foetus*
Neonatal period	*the time from a baby's birth to four weeks of age*
Perineum	*the area between the vagina and anus*
Postnatal	*a term meaning ˜after birth'*
Postnatal depression	*A depressive symptom that persists for more than 2 weeks after birth*
Primary postpartum haemorrhage (PPH)	*Loss of > 500 ml of blood within 24th of delivery.*
Premature labour	*when a baby is born before 37 weeks gestation*
Second-degree tear	*a tear of the perineum involving both skin and muscles, but not the anus. Second-degree tears often require stitches*
Second-stage labour	*the time from the complete dilation of the cervix (10 cm) to the birth*
Secondary postpartum haemorrhage (PPH)	*Excessive blood loss PV >24 hr after delivery. Peak incidence: 5-7 d after delivery*
Second trimester	*the time from 14 week to the end of 26 week of pregnancy*
Stillbirth	*the death of a baby after 20 weeks' gestation but before birth*
Stretch marks	*discoloured stripy patterns that can appear on the abdomen, breasts, buttocks or legs during pregnancy because of skin stretching. They usually fade slowly after delivery*
Third- or fourth-degree tear	*a severe tear of the perineum involving the skin, muscles, and anus. Stitches are used to repair these tears*

Third-stage labour	*the time from the birth of the baby to the birth of the placenta*
Third trimester	*the time from 27week of pregnancy onwards*
Vacuum cap or ventose	*a suction cap that is sometimes used during birth to help to pull the baby out of the birth canal*
VBAC (vaginal birth after caesarean)	*when a woman has a vaginal birth after having had one or more previous caesarean sections*

Definitions of different types of referrals: -

Routine appointment	*Appointment should be given **within two weeks** or as requested by the referring doctor.*
Urgent appointment	*Appointment should be given **within 48 hours** in consultation with the concerned department.*
Emergency referral	*Patients should be escorted immediately **with I.V. line has been inserted, via an ambulance and a medical attendance** (nurse, midwife or a doctor). The doctor on-call in the referring hospital should be informed earlier by the phone*

Definitions of pregnancy stages on months and weeks:

Trimester	Month	Week
First Trimester	1	1 – 4
	2	5 – 8
	3	9 – 13
Second Trimester	4	14 -17
	5	18- 21
	6	22- 26
Third Trimester	7	27- 30
	8	31- 35
	9	36-40

CHAPTER 1

1.1 INTRODUCTION

1.2 PURPOSE

1.3 SCOPE

1.4 STRUCTURE OF THE GUIDELINES

1.5 WHAT IS NEW IN THIS EDITION OF THE GUIDELINES?

1.1 Introduction

The Sultanate of Oman has accomplished great achievements within the health sector over a short period of time. These achievements have been widely recognized and acclaimed by various international organisations, including the World Health Organisation (WHO), The United Nations Children's Fund (UNICEF) and the United Nations Population Fund (UNFPA).

Oman has made significant achievements in reducing perinatal mortality from 15 per 1000 births in 2007 to 14.1 per 1000 births in 2019. In addition, the infant mortality rate has dropped from 64 in 1980 to 7.6 per 1000 live births in the year 2020. The antenatal coverage and the percentage of mothers delivered under the supervision of skilled personnel are maintained at 99% during the past five years (MOH, 2020). Since the establishment of the National Maternal Deaths Surveillance and Review system by the Ministry of Health (MOH) in 1991, each maternal death has been reviewed to identify lessons to be learned to prevent similar deaths. Since then, the Maternal mortality ratio (MMR), has also shown a slight decline from 27.37 in 1991 to 14.1 in 2019 per 100,000 live births. However, it increased during the COVID-19 pandemic to reach 29.4 per 100,000 in 2020.

Antenatal care (ANC) and Postnatal care (PNC) can be defined as the care provided by skilled health care professionals to pregnant women in order to ensure the best health conditions for both mother and baby during pregnancy and postnatal period. The components of ANC and PNC include risk identification, prevention and management of pregnancy – related or concurrent diseases, health education and health promotion.

Quality of maternal health care delivery is ensured by putting in place a standard client maternal health record and a parent healthcare-facility-based antenatal register, both providing information on the profile of each pregnant woman, risks factors, obstetrics and medical conditions, health care needs, plans and management carried out during antenatal (ANC), perinatal (PN) & postnatal (PNC) and their outcomes. Furthermore, health care provider's knowledge and skills are kept updated by pre- and in-service training on assessed job needs.

Development and update of this operative guideline by the Ministry of Health Oman (MOH) aim to provide a clear, evidence- based ANC practices that empowers health care provider's knowledge and keep them updated with the evidence-based practices. Thus, ensuring the best possible standard of health care delivery, and through this effort, achieve a further reduction in maternal mortality, stillbirth and neonatal mortality.

The interventions described in this guideline are based on the latest available scientific evidence, from the World Health Organisation (WHO) as well as from other well-known international organizations such as Royal College of Obstetrics and Gynaecologists (RCOG), the National Institute for Health and Care Excellence (NICE) guidelines, the American College of Obstetrics and Gynaecologists (ACOG), the American Academy of Family Physicians (AAFP), (American Thyroid Association (ATA) etc.

This updated edition includes new evidence-base guidelines for management of medical problems with pregnancy which include Gestational diabetes mellitus (GDM), hypertension, thyroid diseases, venous thromboembolism (VTE), hyperemesis gravidarum, sickle cells disease, pregnancy induced cholestasis, varicella infection and vaginal discharge.

This updated "Pregnancy & childbirth guidelines level 1" third edition is designed for the use of doctors and nurses working at primary health care facilities (Health centres with or without deliveries, polyclinics and small hospitals). However, it can be also used in higher healthcare facilities when applicable in managing some obstetrics and medical conditions.

1.2 Purpose

This guideline aims to provide guidance on routine antenatal care at primary health care level. It addresses the detection of pregnancy- related complications and the prevention of concurrent disease at routine ANC visits. It doesn't address the subsequent treatment of such complications or disease, where the consequence of detection is referral for additional management or specialist care. Thus, management of the women of high-risk pregnancies is beyond the scope of this guideline (Level 1). It will be further covered in Pregnancy & Childbirth Management Guidelines (Level 2).

1.3 Scope

This guideline covers all aspects of routine antenatal care, intrapartum and postnatal care provided at primary health care level as well as management of obstetrics and medical complications at primary healthcare level. However, it can be also used in higher healthcare facilities when applicable in managing some obstetrics and medical conditions.

1.4 Structure of the guideline

Chapter 1: This chapter provides an introduction to the guideline, along with the purpose and scope. It also provides the structural framework of the guideline that can help the reader access the different parts of this document with ease.

Chapter 2: This chapter covers all aspects of antenatal care through the following sections:

2.1 Standards of care

2.2 Tasks of Antenatal care

2.3 Common symptoms and medical conditions during pregnancy

- 2.3.1 Common symptoms in pregnancy
- 2.3.2 Nausea and vomiting in pregnancy and hyperemesis gravidarum
- 2.3.3 Anaemia in pregnancy
- 2.3.4 Venous thromboembolism (VTE)
- 2.3.5 Diabetes in pregnancy
- 2.3.6 Hypertension in pregnancy
- 2.3.7 Thyroid diseases in pregnancy
- 2.3.8 Sickle Cell Disease (SCD) in pregnancy
- 2.3.9 Intrahepatic cholestasis of pregnancy
- 2.3.10 Thrombocytopenia in pregnancy
- 2.3.11 Pregnancy with RH negative blood group
- 2.3.12 ABO Incompatibility
- 2.3.13 Urinary tract infections (UTI)
- 2.3.14 Vaginal discharge during pregnancy
- 2.3.15 HIV in pregnancy
- 2.3.16 Syphilis in pregnancy
- 2.3.17 Chicken pox (varicella) in pregnancy
- 2.3.18 Counselling on lifestyles in pregnancy

2.4 The common obstetric complications encountered during antenatal period such as bleeding, abdominal pain, fever, loss or decreased foetal movements and premature rupture of membranes.

2.5 Normal labour and childbirth, including use of the partogram and active management of the third stage of labour. This section aims to provide the healthcare worker with the information needed to differentiate between the normal process and a complication.

2.6 The routine Postnatal Care (PNC) and complications. It describes and outlines post-natal check-up for special conditions as well as a number of postnatal complications.

2.7 Clinical principles of managing complications and emergencies during pregnancy and childbirth. It also contains general principles of care, including infection prevention, fluid replacement and local anaesthesia.

2.8 Common procedures that may be necessary in some conditions. These procedures are not intended to be detailed "how-to do" instructions but rather a summary of the main steps associated with each procedure.

Chapter 3: This chapter outlines what is required for the implementation of the guidelines, including human resources, and roles and responsibilities of different stakeholders.

Chapter 4: This chapter provides the annexures and links to references that were used in developing of this guideline.

1.5 What is new in this updated edition of the guideline?

The following is a list of topics that were newly addressed in this edition:

- Instructions about use of basic ultrasound in ANC care
- Nutritional assessment during pregnancy
- Management of common symptoms during pregnancy
- Management of nausea and vomiting
- Prevention of venous thromboembolism during pregnancy
- Management of medical complications during pregnancy:
  - Sickle cell disease in pregnancy
  - Intrahepatic cholestasis of pregnancy
  - Thrombocytopenia in pregnancy
  - Thyroid disease in pregnancy
  - HIV and syphilis in pregnancy
- Counselling on lifestyles during pregnancy including travel, exercise, intercourse, smoking, breast feeding, and traditional medicines
- Perinatal depression

CHAPTER 2

2.1 STANDARDS OF CARE

***2.2* TASKS OF ANTENATAL CARE**

2.3 COMMON SYMPTOMS AND MEDICAL CONDITIONS DURING PREGNANCY

2.3.1 COMMON SYMPTOMS IN PREGNANCY

2.3.2 NAUSEA AND VOMITING IN PREGNANCY, AND HYPEREMESIS GRAVIDARUM

2.3.3 ANAEMIA IN PREGNANCY

2.3.4 VENOUS THROMBOEMBOLISM (VTE)

2.3.5 DIABETES IN PREGNANCY

2.3.6 HYPERTENSION IN PREGNANCY

2.3.7 THYROID DISEASES IN PREGNANCY

2.3.8 SICKLE CELL DISEASE (SCD) IN PREGNANCY

2.3.9 INTRAHEPATIC CHOLESTASIS OF PREGNANCY

2.3.10 THROMBOCYTOPENIA IN PREGNANCY

2.3.11 PREGNANCY WITH RH NEGATIVE BLOOD GROUP

2.3.12 ABO INCOMPATIBILITY

2.3.13 URINARY TRACT INFECTIONS (UTI)

2.3.14 VAGINAL DISCHARGE DURING PREGNANCY

2.3.15 HIV IN PREGNANCY

2.3.16 SYPHILIS IN PREGNANCY

2.3.17 CHICKEN POX (VARICELLA) IN PREGNANCY

2.3.18 COUNSELLING ON LIFESTYLES IN PREGNANCY

***2.4* OBSTETRIC COMPLICATIONS**

2.5 NORMAL LABOUR

2.6 ROUTINE POSTNATAL CARE AND COMPLICATIONS

2.7 EMERGENCY

2.8 COMMON PROCEDURES

2.1 Standards of care

a) Pregnancy and childbirth management is an integral part of the Woman and Child Health (WCH) services and are provided in all governorates of the Sultanate of Oman. Standardised antenatal care (ANC), intrapartum care and postnatal care (PNC) services with health education should be provided by trained health care personnel.

b) Total of eight ANC and two PNC visits should be achieved by the end of a normal pregnancy and childbirth. ANC and PNC should be provided to all women and should be tailored to the needs of individual woman.

c) Registration of the woman (antenatal booking) should be carried out in the parent health institution as soon as a pregnancy is confirmed, preferably less than 13 weeks of gestation. A comprehensive physical examination (including general examination, cardiovascular, respiratory, abdominal systems examinations, breast and thyroid examinations. etc.) should be carefully performed by a trained doctor for all pregnant women during the first ANC visit.

d) All pregnant women should have booking investigations at first visit and if not done for any reason to be done in subsequent visits.

e) All pregnant women should be allowed to carry their own Maternal Health Record (Green card) issued to them at the time of booking.

f) All pregnant women should receive appropriate information about the number and timing of antenatal visits and to be given an opportunity to discuss the schedule and the type of care with their health providers

g) All pregnant women should be referred and seen at 22-24 weeks by obstetrician for routine assessment and anomaly scan. Obstetricians should document in the recommendation section in the Maternal Health Record (Green card) if any specific future plans for the women during ANC, labour or PNC period as indicated.

h) Referral should be made to the obstetrician for high-risk cases as outlined in this guideline. Clear management instructions should be provided by the obstetricians if a high-risk patient is referred back to the primary health care for routine ANC care.

i) Delivery should only be conducted by a trained health personal.

j) All visit details of ANC and PNC must be documented in the Green card, ANC register and Alshifa system.

k) New-born baby Child Health Record (HP-140) and EPI Register should be used to document child health status, immunization & follow up plan.

2.2 Tasks of Ante-Natal Care (ANC)

Routine Ante-Natal Care (ANC) of 8 antenatal visits is considered to be adequate for uncomplicated pregnancy. Refer to (table 7) for the schedule of standardised ANC visits including the tasks that to be performed at each visit. Each antenatal visit has a focused content. Longer time slots should be allocated to allow comprehensive assessment and discussion.

At the time of booking (First Antenatal care visit), all women should receive appropriate information about the number and timing of antenatal visits and to be given an opportunity to discuss the schedule and the type of care with their healthcare providers.

The following should be done at the ANC clinic:

a) **Record of Personal Information:**

At the first visit all the personal information should be documented as per the "Maternal Health Record" (Green Card) and Al Shifa system.


Ministry of Health
Sultanate of Oman

سلطنة عمان
وزارة الصحة

MATERNAL HEALTH RECORD سجل صحة الحامل

الأسم Name | القبيلة Tribe

ANC Registration Number رقم سجل الحامل

Parent institution code رمز المؤسسة الصحية			Serial Number الرقم التسلسلي			Month الشهر		Year السنة	

Parent Institution المؤسسة الأم

الولاية Wilayat

المحافظة Governorate

Department of Woman & Child Health
Directorate General of Primary Health Care

دائرة صحة المرأة والطفل
المديرية العامة للرعاية الصحية الأولية

(HP-194) 2022

FIGURE 1: GREEN CARD

b) History Taking:

- The history taking should be at the first ANC visit and should include preconception care, current and previous obstetrical & gynaecological risks, medical history, current danger signs & symptoms, birth spacing history and family medical history.
- It should be documented as indicated in the green card and Al Shifa system.
- With regard to their current pregnancy, women should also be asked about the following:
  - Exposure to radiation
  - Drugs taken during 1st trimester
  - Fever, rash in 1st trimester
  - Current medication and Allergy

c) Clinical Examination of pregnant women:

- ***Measurement of weight and body mass index (BMI):*** Maternal weight and height should be measured at the first ANC visit. The woman's Body Mass Index (BMI) should be calculated (weight [kg]/height [m] ². If abnormal BMI (< 18 or > 25), woman should be referred to dietitian for nutritional assessment.
- ***Measurement of blood pressure:*** The blood pressure (BP) measurement should be recorded carefully at booking and during each ANC visit. Measure blood pressure in sitting position, if diastolic blood pressure is above 90 mmHg, (repeat after 1-hour rest), if diastolic blood pressure is still ≥90 mmHg, ask the woman if she has; severe headache, blurred vision, shortness of breath, epigastric pain and check urine for protein. See management in section 2.3.6 (Hypertension in pregnancy).
- ***Systemic Examination:*** This includes examination for pallor, jaundice, lymph nodes, thyroid, cardiovascular system, chest, abdomen, oedema, skeletal system and dental problems.
- ***Breast Examination:*** Breast should be examined at booking, then as indicated for any skin, nipple changes or lumps.
- ***Obstetric Examination****:*

The specific Obstetric examinations recommended at each visit include:

- Estimation of foetal size at each antenatal appointment to detect small - or large for gestational age foetus. Symphysis-fundal height should be measured at each antenatal appointment from 24 weeks of gestation. A discrepancy ≤ 4 cm between the fundal height and the gestational age is acceptable. Patients should be referred for growth

scan and an obstetric opinion, by an urgent appointment if discrepancy of > 4 cm was noted.

- Foetal heart sounds to be checked by Doppler foetal heart recorder in every ANC visit and mother should be asked about the feeling of foetal movements in every ANC visit.
- Foetal presentation should be assessed by abdominal palpation from 32-34 weeks onward, as presentation is likely to influence the plan of delivery.

Suspected foetal malpresentation should be confirmed by an ultrasound assessment.

d) Risk grading (every visit)

Risk grading should be done at booking and at every visit**.** It should be updated in both the Maternal Health Record and Al Shifa system. If any of the listed conditions is present, consider the pregnancy as **high risk.**

1. Current Obstetrics and Gynaecology risks

- Age < 15 or > 40 years
- BMI > 30
- Gestational diabetes Mellitus
- Pregnancy induced hypertension (PIH)
- Diastolic BP ≥ 90mmHg at first trimester
- Antepartum haemorrhage
- Thrombocytopenia
- Pelvic tumour
- Current multiple pregnancy
- Intrauterine growth restriction
- Surgery on reproductive tract (myomectomy, removal of septum, cone biopsy, cervical cerclage)
- Assisted reproductive e.g., IVF
- RH antibodies isoimmunisation

2. Previous Obstetrics and Gynaecology risks

- Pre-eclampsia/eclampsia
- Caesarean Section
- Preterm labour

- Premature Rupture of Membranes (PROM)
- Three or more consecutive miscarriages during 1st trimester
- Second Trimester miscarriage
- Postpartum haemorrhage
- Deep Venous Thrombosis (DVT), Pulmonary Embolism (PE)
- Infertility (primary/secondary)
- Surgery on reproductive tract (myomectomy, removal of septum, cone biopsy, cervical cerclage)
- Low birth weight < 2500 gm or Macrosomia ≥ 4000 gm
- Foetal or neonatal death
- Rh antibodies Isoimmunisation
- Malformation or chromosomally abnormal child

3. Medical risks

- Hypertension
- Diabetes mellitus
- Anaemia ≤7 g/dl
- Renal diseases
- Cardiac diseases
- Sickle cell disease
- Thalassemia Major
- Thrombophilia
- Chronic Hepatitis
- HIV / Syphilis
- Psychiatric Disorder
- Epilepsy
- Genetic Disorders
- Thyroid Disorders
- Airways conditions
- Previous anaesthesia complications
- Other diseases or conditions which need special attention

4. Current danger signs and symptoms:

- Severe pallor
- Persistent headache

- Blurring of vision
- Generalized oedema
- Convulsion
- Unilateral leg oedema
- Calf tenderness
- Difficult breathing
- Vaginal bleeding or leaking
- Persistent or severe abdominal pain
- Unexplained persistent fever

e) Laboratory Tests

There are certain tests to be conducted during each ANC visit as shown in the table below marks (✓) the test to be done.

TABLE 1: LABORATORY TESTS TO BE PERFORMED DURING ANC AND PNC VISITS

Laboratory test	At booking	13-15 Week	22-24 Week	28-30 Week	32-34 Week	36 Week	38 Week	40 Week	6 weeks PNC
Blood group & Rh factor	✓								
Antibody screening (ABS)*	✓			✓					
Sickling (if not known)	✓								
HPLC (if sickling +ve)									
Haemoglobin (gm/dl)	✓			✓		✓			✓
Platelet's count	✓			✓		✓			✓
RPR (rapid plasma regain) for syphilis**	✓								
TPHA (if RPR + ve)									
HIV antibody test**	✓								
Urine test for : - Urine microscopy	✓								✓
- Urine GKP (Glucose, Ketone, Protein)	✓								
- Urine for albumin	✓	✓	✓	✓	✓	✓	✓	✓	✓
- Urine culture & sensitivity if indicated									
Blood sugar test (Venous sample):									
RBS /FBS	✓								
OGTT***	✓		✓						✓

* *Antibody screening test to be done for pregnant women at booking and 28 weeks, if her Rh factor is negative & husband Rh factor is positive.*

** *HIV and RPR test to be done at booking and at any visit if the status is unknown*

*** *OGTT to be done when indicated (refer to Algorithm 6: Screening for Diabetes in Pregnancy).*

Screening investigations (must be done at booking visit, if missed need to be done in the next visits):

- **All pregnant women should be offered screening for HIV infection**

  Counselling (pre-testing information) to the woman should be given before collecting the blood sample. HIV result test should be documented in the green card as **reactive /non-reactive**

- **All pregnant women should be screened for syphilis infection**

  Screening for Syphilis should be offered at booking because treatment of syphilis is beneficial to the mother and foetus

  If a pregnant woman is found to have a positive, RPR Confirm the diagnosis by performing TPHA. Sexual partner should be screened for syphilis.

- **All pregnant women must perform RBS or FBS for screening of diabetes and then follow-up according to guideline** ***(see*** *Algorithm 6: Screening for Diabetes in Pregnancy).*

  OGTT (oral glucose tolerance test) is done at 22-24 weeks up to 28 weeks by using 75 g of anhydrous glucose or 82.5 g of glucose monohydrate should be done as the guideline.

  Instructions for OGTT test explained in *Instructions for doing OGTT in pregnant woman, page 80).*

- **All pregnant women should be tested for blood group and Rh factor status.** Antibody screening test to be done for Rh negative pregnant women at booking and to be repeated at 28 weeks, if husband is Rh positive.

- **All pregnant women should be tested for Sickle Cell Disease (SCD)**

  If a pregnant woman found to be positive, electrophoresis test should be done to confirm whether sickle cell trait or sickle cell disease. The result should be documented in green card.

- **All pregnant women must be offered urine test for microscopy, glucose, ketones and albumin (Urine GKP)**
  - Urine albumin should be done in all ANC visits.
  - Asymptomatic bacteriuria is common in pregnant women and there is evidence that treatment of such cases reduces the risk of pyelonephritis and leads to better outcomes of pregnancy.

- Women should be offered routine screening for asymptomatic bacteriuria by midstream urine culture early in pregnancy
- If urine microscopy showed more than 20 WBCs per high power field, send urine for culture.
- Mid-stream and urine culture should be sent if there is history of urinary tract infection.
- Urine examination requires a clean–catch mid-stream specimen to minimize the possibility of contamination. Patients should be educated on how to collect the specimen

***Note:** Urine for protein should be done whenever high blood pressure is detected (diastolic blood pressure ≥ 90 mmHg).*

f) Ultrasonography in Antenatal Care:

- Ultrasound assessment is an essential component in antenatal care. It monitors foetal parameters and pregnancy progress. It should be done for all pregnant women.
- The timing and frequency depend on the indications for the examination which vary for each trimester.
- Unnecessary routine use of ultrasound should be avoided in an uncomplicated pregnancy.

The most common obstetric indications for ultrasound examination by trimester are listed in the table below: -

TABLE 2: MOST COMMON OBSTETRIC INDICATIONS FOR ULTRASOUND EXAMINATION BY TRIMESTER

Booking Ultrasound at First trimester	Second and Third Trimester ultrasound (In secondary care setting)
Confirmation of the presence of an intrauterine gestational sac (IUGS)	Anomaly scan at 22 -24 weeks for all pregnant women.
Confirmation of Foetal cardiac activity (viability)	Growth scan at 32-34 weeks, if indicated (e.g., GDM, hypertensive disorders, thyroid, SCD, CKD, Infections, etc.)
Calculation of pregnancy age (gestation age) and estimation of Expected Date of Delivery (EDD)	Evaluation and follow up for any obstetric problems detected; (e.g. IUGR, amniotic fluids problems, placental abnormalities, foetal presentation abnormalities)
Diagnosis of multiple gestations	

Estimation of Gestational Age and Expected Date of Delivery (EDD):

- As soon as data from the last menstrual period (LMP), the first accurate ultrasound examination, or both are obtained, the gestational age and the EDD should be determined, discussed with the patient, and documented clearly in the green card and Al Shifa.
- Crown – rump length (CRL) is the most precise parameter used for dating scan in first trimester (up to 13+6 weeks). Beyond 13+6 weeks, Bi parietal Diameter (BPD) & Head Circumference (HC) are the preferable measurement. It is considered accurate to within five to seven days in the first trimester, 10 to 14 days in the second trimester & third trimester
- An accurately assigned EDD early in antenatal care is vital for timing of appropriate obstetric care; scheduling ANC visits, evaluation of foetal growth; and designing interventions to prevent preterm births, post term births, and related morbidities.
- EDD for a pregnancy that resulted from In- Vitro Fertilization (IVF) should be assigned using the age of the embryo and the date of transfer.

Crown–rump length measurement is used to determine gestational age up to 13+6 weeks. Beyond 14 weeks, head circumference (HC), biparietal diameters (BPD) or femoral length (FL) are the preferable measurement.

The most common foetal biometric measurements used in antenatal ultrasound are:

- Bi-Parietal Diameter (BPD)
- Head Circumference (HC)
- Femoral Length (FL)
- Abdominal Circumference (AC)
- Amniotic Fluid Index (AFI)
- Estimated Foetal Weight (eFW)

Reporting obstetric ultrasound findings should include:

1. Confirmation of intrauterine gestational sac (IUGS).
2. Number of foetuses – Single, Multiple
3. Foetal Cardiac activity – Present or Absent
4. Foetal biometric measurements - CRL, BPD, HC, FL, AC, (if trained doctor/radiographer)

Common abnormal Ultrasound Findings that need to be referred to obstetrician for further evaluation:

1. Absence of intrauterine gestation sac (IUGS), to rule out ectopic pregnancy
2. Absent foetal cardiac activity – missed abortion / miscarriage, foetal death
3. Abnormal amniotic fluid measurements
4. Presence of foetal anomaly

g) Nutrition care in pregnancy

Counselling on lifestyle interventions, such as written and verbal instructions about nutrition by a dietitian and exercise, throughout pregnancy is effective in preventing excess gestational weight gain and related complications.

Main Recommendations

- A healthy diet contains adequate energy, protein, vitamins and minerals, obtained through the consumption of a variety of foods, including green and orange vegetables, meat, fish, beans, nuts, whole grains and fruit.
- Include additional food in second and third trimester is amount appropriate to meet healthy pregnancy weight gain.

Pregnant women need a balanced eating plan including:

- **Grains:** Include breads, cereals, and pastas made with whole grain flours, as well as brown rice, whole grain corn.
- **Fruits:** All types of fruits, including fresh, frozen, dried or canned without added sugars.
- **Vegetables:** A variety of colourful vegetables, fresh, frozen or canned with no added salt should be included. Raw sprouts should be avoided.
- **Protein foods:** Choose lean protein from meat, poultry, fish, eggs, beans and peas, peanut butter, soy products and nuts. Pregnant women should avoid eating tilefish, shark, swordfish, marlin, orange roughy and king mackerel, and limit white (albacore) tuna to four ounces per week. Deli, luncheon meats and hot dogs should be reheated to 165°F, if consumed.
- **Dairy:** This includes low-fat or fat-free milk, cheese, yogurt and fortified soymilk. Unpasteurized milk and some soft cheeses that are made from unpasteurized milk also should be avoided.

- Avoid extra calories from added sugars and solid fats, which can lead to unhealthy weight gain. Advise healthful fats from foods such as avocados, nuts and seeds as well as vegetable oils including canola and olive oil. Limit items like soft drinks, sweets and fried foods.

Key Nutrients for Healthy Pregnancy:

- *Folic acid (folate)*: reduce the risk of neural tube defects. It is advised Take folic acid supplements (400 micrograms) every day from stopping contraception until 13wk pregnant. Eat foods containing folate, eg. green vegetables, brown rice, fortified bread, and cereals.
- *Iron:* Iron -rich foods is found in red meat, beans, lentils, green vegetables, and fortified cereals. Fruits, and vegetables help with iron absorption

Foods to avoid

a) *Raw/undercooked meat, eggs, and ready meals causes risk of food posing.it is advised to:*

- Eat well-cooked meat- hot right through, with no pink bits' left
- Eat eggs cooked until white and yolk are solid. Shop mayonnaise and mousses are safe but avoid home-made dishes containing raw egg
- Ensure ready meals are piping hot all the way through

b) *Liver products and vitamin A supplements* Too much vitamin A can harm a foetal development. Avoid eating liver and supplements containing vitamin A or fish liver oils.

c) *Some types of fish*: it is advised to eat ≥ 2 portions of fish per week (including 1 of oily fish- mackerel, sardines, fresh – not canned – tuna, or trout) but:

- Avoid shark, swordfish, or marlin, and limit tuna to 2 steaks or 4 cans weekly. Mercury in these fish can harm a baby's nervous system
- Avoid raw shellfish, as they can cause food poisoning.

<u>Other instructions to pregnant woman:</u>

- Follow safe food handling practices
- Wash hands after handling raw meat
- Keep raw meat separate from foods ready to eat
- Limit caffeine intake (coffee & tea) to 300 mg per day. Advice <4 cups of coffee as high level can cause miscarriage or low birth weight
- Adequate intake of fluids – 2.5 litres/day.

TABLE 3: GUIDELINES OF WEIGHT GAIN IN PREGNANCY

Guidelines of Weight Gain in Pregnancy	
BMI (Pre – pregnancy)	Recommended Weight Gain (during pregnancy)
<18.5	13-18 kg
18.5 - 24.9	11- 16 kg
25.0 – 29.9	7– 11 kg
≥ 30	5 - 9 kg
* American Academy of Family Physicians	

All pregnant women should receive counselling on nutrition by dietitian at least twice in pregnancy (at booking, and 32 weeks)

Conditions that pregnant women must have dietary counselling:

1. Constipation:

Advise pregnant women to:

- Enjoy a wide variety of foods that are high in fibre, such as vegetables, legumes, fruit and wholegrains and drink plenty of water.
- Being physically active can also help with reducing constipation.
- Wheat bran or other fibre supplements can be used to relieve constipation in pregnancy if the condition fails to respond to dietary modification, based on a woman's preferences and available options.

2. Nausea and vomiting:

Some suggestions that may help include:

- Eat some dry bread, biscuits or cereal before getting up in the morning. Get up slowly, avoiding sudden movements.
- Drink liquids between, rather than with, meals to avoid bloating, as this can trigger vomiting.
- Avoid large meals and greasy, highly spiced foods.
- Suck on something sour like a lemon.
- Relax, rest and get into the fresh air as much as possible. Keep rooms well ventilated and odour free.
- Try food and drinks containing ginger, such as ginger tea, as these sometimes relieve nausea
- Ginger, chamomile, vitamin B6 are recommended for the relief of nausea in early pregnancy, based on a woman's preferences and available options

3. GDM:

- Medical nutrition therapy (MNT) is essential for the management of GDM that assist in achieving and maintaining glycaemia and reducing the risk of adverse maternal and neonatal outcomes. Pregnant women should provide adequate amounts of macronutrients to support pregnancy, based on nutrition assessment. Thus, a referral to a dietitian/ nutritionist is crucial.
- Aiming for consistent carbohydrate intake at meals and snacks to help optimize glycaemic control
- For women with pre-existing diabetes, individualizing timing, and spacing of meals and snacks based on the stage of pregnancy, lifestyle preference, medications and treatment goals
- Encouraging women with GDM to eat 3 meals with 2 or more snacks per day
- Choosing high fibre, low glycaemic index carbohydrate foods
- Maintaining healthy weight
- Include fresh wholesome foods – whole fruits instead of fruit juices, whole grains/ multigrain flours instead of refined flours
- Include adequate intake of fluids – 2.5 litres/day
- Eat less junk food, bakery products, fried foods, salted foods
- Minimize sugars and artificial sweeteners
- Avoid alcohol and tobacco in all forms
- Avoid saccharin and cyclamate.

h) Immunization

Women should be fully immunized before they get pregnant in order to protect the infant against many diseases. The most common vaccines advised in pregnancy:

1. **Tetanus, diphtheria, and pertussis (Tdap) vaccine** should be given during each pregnancy irrespective of the woman's history of receiving Tdap. To maximize maternal antibody response and passive antibody transfer to the infant, optimal timing for Tdap administration is between 27 and 36 weeks of gestation, although it may be given at any time during pregnancy.
2. **Influenza vaccine** is recommended for all pregnant women in any trimester.
3. Certain vaccines, including meningococcal and hepatitis A and B vaccines that are considered safe during pregnancy, may be indicated based on risk.
4. Rabies post exposure prophylaxis with rabies immune globulin and vaccine should be administered after any moderate- or high-risk exposure to rabies
5. Most live-virus vaccines, including measles-mumps-rubella vaccine, varicella vaccine, and live attenuated influenza vaccine, are contraindicated during pregnancy
6. Check women's status of Rubella immunization, if not immunized or if immunization status is not known, immunize the woman after delivery and give advice not to conceive for the next 3 months to prevent congenital Rubella syndrome

TABLE 4: VACCINATION IN PREGNANCY

Vaccine	Before pregnancy	During pregnancy	After pregnancy	Type of vaccine
Seasonal Influenza	Yes	Yes	Yes	Inactivated
T dap	Yes if indicated	Yes, vaccinate during each pregnancy ideally between 27-36 weeks of gestation	Yes, immediately postpartum, if not received previously	Toxoid / inactivated
Hepatitis B	Yes if indicated	Yes, if indicated	Yes, if indicated	Inactivated
Hepatitis A	Yes, if indicated	Yes, if indicated	Yes, if indicated	Inactivated
Meningococcal -polysaccharide - conjugate	If indicated	If indicated	If indicated	Inactivated
Varicella	Yes, if indicated, avoid conception for 3 moths	**No**	Yes, if indicated, give immediately postpartum if susceptible to Varicella.	Live attenuated
MMR	Yes, if indicated, avoid conception for 3 months	**No**	Yes, if indicated, give immediately postpartum if susceptible to Rubella	Live attenuated

i) Health Education

Pregnant women should be offered proper information and support to enable them to make informed decisions regarding their care during pregnancy. Women's choices should be recognized as an integral part in the decision-making process. They must be offered opportunities to attend antenatal educational sessions and be given written information about antenatal care.

At the first contact, pregnant women should be offered information about: the pregnancy-care services and options available, lifestyle considerations, including dietary information. Health education leaflets should be offered as they are designed to provide information on many aspects related to pregnancy in all 3 trimesters. Booklet No.1 should be given at booking, No.2 at 13-15 weeks visit and No.3 at 28 weeks visit. Now all are available for all women with QR code over the maternal health record.

j) Drug Prescription

- All drugs should be avoided or prescribed cautiously for clear and specific indications and the lowest effective therapeutic dose should be used.
- Folate supplementation: decrease the risk of neural tube defects (open spina bifida, anencephaly, encephalocele) by 72%. Pregnant women should be advised to take folic acid of 400micrograms daily from when pregnancy is being planned until 13 weeks of gestation.
- Pregnant woman ≥ 13 weeks' gestation (Hb ≥ 11gm/dL) should be given a standard dose of ferrous sulphate, and folic acid (fefol)daily.
- Pregnant woman diagnosed with mild to moderate iron deficiency anaemia (Hb ≤ 11gm/dL) should be offered ferrous sulphate, and folic acid daily.
- All women should be informed at the booking appointment about the importance for their own and their baby's health of maintaining adequate vitamin D stores during pregnancy and while breastfeeding.
- Pregnant women should be informed that vitamin A supplementation (intake greater than 700 micrograms) might be teratogenic and therefore it should be avoided.
- Aspirin 75 mg -150 mg is recommended for the prevention of preeclampsia in women at high risk of developing the condition –see the indications to start aspirin page 89.
- Heparin injection should be advised according to VTE scores by obstetrician (*see Table 16: Risk Score for Thromboprophylaxis for details).*

The following table illustrates some drugs with their possible effect on the foetus:

TABLE 5: DRUGS CONTRAINDICATED IN PREGNANCY

Drug	Harmful effects /Remarks
Warfarin	Punctate chondrodysplasia Avoid, especially in first trimester. Do not stop Warfarin dose in a pregnant woman with valvular cardiac disease, discuss with cardiologist/ senior obstetrician.
Antiepileptic drugs	IUGR, Mild microcephaly, Cleft palate Maternal benefit may outweigh risk. Don't stop, discuss with neurologist.
Amino- glycosides	Ototoxic, especially for foetus
Tetracycline	Deposited in teeth and bone
Chloramphenicol	In late pregnancy, may cause "Gray Baby" syndrome
Prostaglandin Synthetase inhibitors	Avoid e.g., NSAID
Synthetic oestrogen and progestogen	to be avoided unless indicated
Glucocorticoids	Cleft-lip/palate. If maternal use is essential, try to reduce the dose

k) Follow up of defaulters:

- Follow-up of defaulters is a follow up of the pregnant women who miss their appointment.
- ANC defaulter tracing is an effective way of improving the relationship between pregnant women and health care workers thus contributing towards improving ANC uptake and tracing the high risk women who missed their appointments for timely intervention.
- It should be undertaken by ANC staff via a method of contact that is appropriate to the woman, may include: telephone call or text message.

l) Plan of Delivery

The assessment for delivery should take place at every antenatal visit. The decision depends on the present and the past medical and obstetrical history.

The following tables illustrate the criteria for planning on the place of delivery:

TABLE 6: CRITERIA FOR DELIVERY IN PRIMARY CARE INSTITUTION (ONLY WHERE DELIVERY SERVICES ARE AVAILABLE)

Parity 1-7
Normal Weight (40- 80 Kg) and height (≥ 152 cm)
Fundal height measurements correspond to gestational age
No significant medical diseases
No major pregnancy complications (present or past)
No previous still birth or neonatal death
No previous low birth weight baby (<2500 g) or high birth weight baby (≥ 4000 g)
Adequate haemoglobin level (≥ 11g/dl)

TABLE 7: CRITERIA FOR DELIVERY IN SECONDARY CARE

Previous Obstetric& Gynaecological risks:
Age < 15 years or > 40 years
BMI > 30 or Body weight <40 kg or Height less than 152 cm
Primigravida or multigravida ≥ 8
Previous pregnancy problems
Previous still birth or neonatal death
Previous difficult delivery or prolonged labour (including 3rd stage complication)
Previous low birth weight baby (< 2500 g) or Previous high birth weight baby (≥ 4000 g)
History of infertility (primary or secondary) for ≥ 3 years
Previous surgery on reproductive tract (myomectomy, removal of septum, cone biopsy, caesarean section, cervical cerclage)
Current Obstetric& Gynaecological risks:
PIH, pre-eclampsia, eclampsia
Gestational diabetes

Antepartum haemorrhage
Assisted reproduction (IVF/IUI)
Multiple pregnancy
Polyhydramnios or oligohydramnios
Current IUGR
Anaemia (Hb < 11 gm/dL)
Thrombocytopenia
Malpresentation
Cervical incompetence
Current preterm labour or premature rupture of membranes (34-37) weeks or post maturity (≥ 42 weeks)
Current Medical History
Diabetes mellitus (uncomplicated)
Essential hypertension★
Renal diseases with or without Hypertension
Sexually transmitted diseases
Haemoglobinopathies (sickle cell disease, Thalassemia Major) ★
Other significant medical diseases

★ *Some cases might need to deliver in the tertiary care; cases should be evaluated according to the severity of the condition.*

TABLE 8: CRITERIA FOR DELIVERY IN TERTIARY CARE

Current medical History
Diabetes mellitus with severe complications
Heart disease (unless mild and well tolerated)
Renal disease with Hypertension, impaired renal function, or renal transplant
Positive cases of HIV and active Hepatitis B
Current Obstetrical History
Rhesus antibodies / atypical antibodies.
IUGR (severe)

Place of delivery of a foetus with abnormality (compatible with life) depends on the type of the abnormality. The delivery should be conducted in a place where SCBU facilities are available, and the decision should be shared between the obstetrician and the paediatrician.

Summary of all tasks requested to be done during ANC visits: -

TABLE 9: TASKS REQUESTED TO BE DONE DURING ANC VISITS

When	Tasks (Always begin with Rapid Assessment and Management)
First Visit at Booking (preferably before 13 weeks)	• **History taking including:** Ask the woman about her present pregnancy status, preconception history, medical & obstetrical history, history of previous pregnancies, and check her for general danger signs • **Profiling** • **Explain to the mother all the services available will be provided during antenatal visits** • **Clinical examinations**; breast, systemic, weight, height, BMI, BP and fundal height • **Laboratory tests:** Urine tests (for albumin, ketones, glucose, microscopy), Hb, Blood group & Rh factor, ABS, RBS, OGTT (if indicated), VDRL, HIV, sickling test & urine culture if indicated • **Ultrasound for dating (if available),** best to be done from 8-12 weeks • **Risk grading** • **VTE scoring** and referring those with score ≥ 4 to start heparin injections • **Supplementation of folic acid (5mg)** • **Supplementation of Aspirin** (if indicated) • **Counsel on:** Danger signs, exposure to X-Rays & teratogenic substance, clinic attendance, nutritional advice, information on pregnancy signs and symptoms • **Refer to dietician for diet counselling** • **Discuss the mode of delivery**
Second Visit (13-15 weeks)	• **Clinical examinations**: BP, systemic examination, fundal height &foetal heart sounds • **Laboratory tests**: no routine laboratory tests at this visit, unless not done at booking or missed labs. • **Ultrasound for dating** (only if not done before) • **Risk grading** • **Supplementation of folic acid & iron** • **Supplementation of Aspirin** (if indicated)

When	Tasks (Always begin with Rapid Assessment and Management)
	• **Counsel on**: Danger signs, diet, and supplementation • Refer to obstetrician for anomaly scan at 22-24 • Discuss the mode of delivery
Third Visit (22-24 weeks Obstetrician visit)	• **Clinical examinations:** BP, systemic examination, fundal height, foetal heart sounds & ask about foetal movement • **Refer to obstetrician for anomaly scan** (if not referred earlier) to be done at this visit • **Laboratory tests:** OGTT, urine albumin and CBC (if indicated) • **Risk grading** • **Supplementation of folic acid and iron** • **Supplementation of Aspirin** (if indicated) • **Counsel on:** Danger signs, diet, exercise, compliance of iron and management of common symptoms • **Discuss the mode of delivery**
Fourth Visit (28-30 weeks)	• **Clinical examinations:** BP, systemic examination, fundal height, foetal heart sounds and ask about foetal movement • **Laboratory tests:** Hb, urine albumin, ABS test (if indicated), give anti-D if Rh-negative) IU 1500- 1250) • **Risk grading** • **VTE scoring** and referring those who score ≥ 3 to start heparin injections • **Supplementation of folic acid & iron** • **Supplementation of Aspirin (if indicated)** • **Counsel on:** Danger signs, preparation for lactation, foetal movement • **Discuss the mode of delivery**

When	Tasks (Always begin with Rapid Assessment and Management)
Fifth Visit (32-34 weeks)	• **Clinical examinations:** BP, systemic examination, fundal height, foetal heart sounds, ask about foetal movement • **Laboratory tests:** no routine laboratory tests at this visit apart from urine albumin • **Pelvic grip** • **Risk grading** • **Supplementation of folic acid & iron** • **Refer to dietician for diet counselling and breastfeeding** • **Counsel on:** Danger signs, Preparing for delivery including the mode and place for delivery, signs of onset of labour
Sixth Visit (36-weeks)	• **Clinical examinations:** BP, systemic examination, fundal height, foetal heart sounds, presentation, foetal lie, and engagement & ask about foetal movement • **Laboratory tests:** Hb • **Risk grading** • **Supplementation of folic acid and iron** • **Counsel on** signs of onset of labour, danger signs, foetal movements, the need to review by the obstetrician (if not delivered on the expected date), postnatal visit, caring of new-born baby breast feeding and birth spacing methods
Seventh Visit (38 weeks)	• **Clinical examinations:** BP, systemic examination, fundal height, foetal heart sounds, presentation, foetal lie, and engagement & ask about foetal movement • **Laboratory tests:** no investigations needed in this visit, Hb (if not done at 36 weeks) • **Risk grading** • **Supplementation of folic acid and iron** • **Counsel on** signs of onset of labour, danger signs, foetal movements, the need to review by the obstetrician (if not delivered on the expected date), postnatal visit, caring of new-born baby breast feeding and birth spacing methods • **Make sure to give the woman appointment at 40 weeks at secondary care (if not delivered by then) to plan for delivery**

When	Tasks (Always begin with Rapid Assessment and Management)
Eighth Visit (40 weeks)	• **Clinical examinations:** BP, systemic examination, fundal height, foetal heart sounds, presentation, foetal lie, and engagement & ask about foetal movement • **Risk grading** • **Refer to secondary care**

m) Referral to Secondary / Tertiary Care Level

The routine ANC care is to be at the parent institution. All cases should be referred once to the secondary care at 22-24 weeks for comprehensive obstetric assessment and anomaly scan. In addition, any woman with any conditions in Table 10 should be referred to secondary care.

The table shows the time at which to refer the case.

TABLE 10: INDICATIONS FOR REFERRAL TO SECONDARY CARE DUE TO RISK FACTORS

Risk factors for referral at booking	
Medical history	**Obstetric / Gynaecological history**
Hypertension	Pre-eclampsia/ eclampsia
Diabetes Mellitus	3 or more consecutive 1st trimester miscarriage
Renal Disease	Thrombosis/ Embolus
Cardiac disease	RH isoimmunisation
Sickle Cell Disease	Malformation/ chromosomally abnormal child
Thyroid disease	Conception following Clomid (after 2 years of infertility) or IUI or IVF or Pregnancy following prolonged infertility (more than 3 years) with spontaneous conception
Thalassemia Major	Previous foetal and neonatal death
Chronic Hepatitis	Surgery on reproductive tract
HIV	Pelvic tumour
Psychiatric Disorders	Previous preterm, low birth weight or macrosomia
Epilepsy	Previous second trimester miscarriage / cervical incompetence
Genetic Disorders	Previous PROM
Connective tissue disorder	VTE Score ≥ 4
Other medical conditions	History of previous Hydatidiform Mole
Risk factors for later referral	**Time of referral**
Previous APH/PPH	At 24 weeks
Previous caesarean section	At 32 weeks
Previous obstructed labour	At 32 weeks

Placenta praevia	At 32 weeks
Foetal Malpresentation, unstable lie	At 36 weeks by urgent appointment
Intrauterine growth restriction	Whenever suspected/detected
Multiple pregnancy	Whenever suspected/ detected
Polyhydramnios/Oligohydramnios	Whenever suspected/ detected
VTE score ≥3	At 28 weeks

If any significant medical or obstetric problems are detected (other than those mentioned) the doctors should use their clinical judgment for referral to secondary care level.

2.3 Common symptoms and medical conditions in pregnancy

2.3.1 Common symptoms in pregnancy

a) **Acute abdominal pain** (*see* 2.4.4 Abdominal pain in pregnancy)

b) **Back pain** Affects 50% of pregnant women, usually from the second trimester onwards and worse in the evenings, it may interfere with sleep and activities

Management: Encourage light exercises (unless contraindicated e.g., pre-eclampsia), treat with simple analgesia if needed, use hot or cold compresses, +/- massage. Regular exercise throughout pregnancy is recommended to prevent low back pain as well as pelvic pain. Other treatment options include physiotherapy, support belts and acupuncture.

***Note:* if persistent and severe back pain refer to orthopaedics for evaluation**

c) **Breast Pain:** Most common early in pregnancy, associated with darkening and enlarging of nipples at around 12 weeks.

Management: Reassurance, use cotton supportive bras.

d) **Carpal tunnel syndrome:** Affects around 30% of pregnant women. It results from compression of the median nerve within the carpal tunnel in the hand. The symptoms may include tingling, burning pain, numbness and a swelling sensation in the hand that might affect sensory and motor function of the hand.

Management: Reassure usually resolves after pregnancy, wrist splint at night may help, use simple analgesia if needed, if sever refer to secondary care for physiotherapy/ steroid injections. If does not resolve after pregnancy, refer for orthopaedic assessment

e) **Constipation:** Affects up to 40 % of pregnant women, usually associated with poor dietary fibre and fluid intake, in addition to the increase in the levels of progesterone that affect gastric motility and increase transit time.

Management: increase fluids and dietary fibres intake (found in vegetables, nuts, fruit and whole grains) as well as daily exercise. If necessary, use a bulk –forming laxative, e.g., ispaghula husk for women with troublesome constipation that is not relieved by dietary

modification or fibre supplementation. Avoid bowel stimulants (e.g. Senna) as they increase uterine activity.

f) **Cramps of leg:** Affects 1 in 3 in late pregnancy, it is abnormal sensation of cramps in lower legs, worse at night. The aetiology is not known. It may be due to the change in blood circulation and stress on the leg muscles due to the increase in the body weight.
Management Non-pharmacological therapies, such as muscle stretching, relaxation, heat therapy, dorsiflexion of the foot and massage, raising the foot of the bed by 20 cm can provide some relief. Woman can be advised to take calcium and magnesium oral supplementation.
***Note:* - DVT should be ruled out, not to be missed.**

g) **Haemorrhoids:** Also called pills, are swollen veins around the anus. May be associated with itching, pain and bleeding. It affects 8% of women in the third trimester. **Management:** Advice to increase fibre intake and drinking adequate amount of water to avoid constipation. If clinical symptoms remain troublesome, standard haemorrhoid creams /suppository can be considered and treat constipation if present.

h) **Headache:** Usually tension headache. Check BP and urine for protein to exclude pre-eclampsia (see 2.3.6 Hypertension in Pregnancy)
Management: Treat with rest and simple analgesia if needed. Migraine may increase or decrease in pregnancy.

i) **Heartburn:** Common complaint during pregnancy, affects 70% of women in third trimester. Heartburn is not harmful and not associated with adverse outcomes on mother or foetus. Therefore, the management is intended to provide relief of symptoms rather than to prevent harm to the foetus or mother.
Management: Reassure not harmful, advise woman to avoid fatty meals and gastric irritants such as caffeine, fizzy drinks, replacing the large meals with small portions and frequent meals, avoid eating late at night, maintaining upright positions, especially after meals, rising the head of the bed in sleeping. Consider prescribing antacids preparation to women with persisting symptoms despite lifestyle modifications. They are unlikely to cause harm in recommended dosages. Antacids may impair absorption of other drugs. Therefore, advise the woman, she should not take antacids within two hours of taken iron and folic acid supplements.

Note: ***Pre-eclampsia can present with epigastric pain. Check BP and urine protein if epigastric pain unresponsive to simple antacids***

j) **Hypotension:** common symptom of early pregnancy. Check if there is any bleeding.
Management: Advice to avoid standing suddenly and avoid hot baths.

k) **Itching/pruritus** common symptom in pregnancy, exclude intrahepatic cholestasis (*see Section 2.3.9 Intrahepatic Cholestasis of Pregnancy)* and other skin conditions.
Management: moistening creams, oily calamine lotions.

l) **Nausea and vomiting** (*see Section 02.3.2 Management of nausea and vomiting in pregnancy, and hyperemesis gravidarum*)

m) **Skin changes:** Pigmentation (e.g., linea nigra), spider naevi, abdominal striae, chloasma /melasma, palmer erythema, other skin rashes.
Management: moistening creams and oily calamine lotions, avoid exposure to sun, use sunscreen. Pre-existing skin conditions (e.g., atopic dermatitis, psoriasis, fungal infections, cutaneous tumours) may exacerbate during pregnancy. Need symptomatic treatment and referral to dermatologist as needed.

n) **Sweating and feeling hot:** Common in pregnancy. Check apyrexial. If apyrexial, reassure normal in pregnancy. If pyrexial, look for the source of infection. Fever in pregnancy *(see Section 2.4.3 Fever during pregnancy and labour)*

o) **Symphysis pubis dysfunction:** Affects 3% of pregnant women. Symphysis separate causing discomfort and pain in the pelvic area radiating to the lower back, upper thighs and perineum. Some women feel or hear click on the pelvic area. The pain can be worsening when walking, going up or down the stairs and turning over in bed and resolved by rest. It can be due to posture and hormonal changes during pregnancy that causes stretching and loosening of ligaments and muscles or due to previous damage to pelvis due to any accident.
Management: treat with simple analgesia, exercises to strengthen pelvic floor, stomach, back and hip muscles, advice rest on semi- recumbent position when in pain, referral to secondary care for physiotherapy. Generally, resolves after delivery but if persists refer to orthopaedics

p) **Urinary frequency:** Check urine microscopy - UTI is common in pregnancy and associated with premature delivery (*see Section 2.3.13 Urinary tract infections (UTI))*

q) **Vaginal bleeding** (*see Section 2.4.1 Vaginal bleeding in early pregnancy (before 22 weeks) and Section 2.4.2 Vaginal bleeding in later pregnancy and labour)*

r) **Vaginal discharge:** Usually increase in pregnancy. Investigate if smelly, itchy, sore or associated with dysuria. (*see Section 2.3.14 Vaginal discharge during pregnancy)*

s) **Varicose veins:** Pregnancy can aggravate pre-existing varicose veins. Some women may notice the varicose veins for the first time during pregnancy due to hormonal changes and the growing uterus, which cause pressure on the veins in the pelvis. It causes aching legs, fatigue, itch and ankle /foot swelling.

Management: if ankles are swollen, exclude pre-eclampsia (check BP, dipstick urine for proteinuria). Advice the woman to elevate legs when setting, use compression stockings. Avoid standing for long periods of time. Complications include thrombophlebitis- treat with ice packs, elevation, support stockings and analgesia.

2.3.2 Management of nausea and vomiting in pregnancy, and hyperemesis gravidarum

Definitions

- **Nausea and vomiting of pregnancy (NVP)**

Nausea and vomiting of pregnancy affect about 80% of pregnancy. It is diagnosed when the onset of nausea and vomiting is in the first trimester of pregnancy, and other causes of nausea and vomiting have been excluded.

- **Hyperemesis gravidarum**

Hyperemesis gravidarum is the severe form of nausea and vomiting of pregnancy. It can be diagnosed when there are persistent nausea and vomiting of pregnancy with weight loss of more than 5% pre-pregnancy weight loss, dehydration and electrolyte imbalance.

Complications

Although nausea and vomiting are considered as common disorders in pregnancy they can lead to severe maternal mortality and morbidity. In the last 10 years one maternal death & maternal near miss cases (Wernicke's encephalopathy) were reported in Oman.

TABLE 11: COMPLICATIONS OF HYPEREMESIS GRAVIDARUM

Maternal complications
• Hypokalaemia causes lethargy, skeletal muscle weakness and cardiac arrhythmia, • Hyponatremia and central pontine myelinolysis, Wernicke's encephalopathy, • Vitamin B6/B12 deficiency causes anaemia and peripheral neuropathy, • Malnutrition, • Mallory-Weiss oesophageal tears, • Venous thromboembolism (due to dehydration and immobilisation) • Psychological morbidity
Foetal complications
• Growth restriction, • Wernicke's encephalopathy is associated with a 40% incidence of foetal death, • there is No increased risk of congenital malformations

Classification of severity of nausea and vomiting of pregnancy

Pregnancy-Unique Quantification of Emesis (PUQE) score can be used to classify the severity of nausea and vomiting of pregnancy into (mild, moderate and severe). It can be used to track progress with treatment. (Institute of Obstetricians and Gynaecologists, Nov 2015)

TABLE 12: MOTHERISK PUQE-24 SCORING SYSTEM

Question	Score				
In the last 24 hours, for how long have you felt nauseated or sick to your stomach?	Not at all (1)	≤ 1hour (2)	2-3 hours (3)	4-6 hours (4)	≥ 7 hours (5)
In the last 24 hours, have you vomited or thrown up?	I did not throw up (1)	1-2 (2)	3-4 (3)	5-6 (4)	≥ 7 (5)
In the last 24 hours, how many times have retching or dry heaves without throwing up?	None (1)	1-2 (2)	3-4 (3)	5-6 (4)	≥ 7 (5)
Total scores	Mild: ≤6		Moderate: 7-12		Severe: 13-15

**Adopted from (Lowe, 2019)*

Management of Nausea and vomiting of pregnancy and hyperemesis gravidarum

a) <u>Management at Primary Health care:</u>

- History and physical examination should be focused to exclude other diagnoses. Physical examination should include palpation of the abdomen for abdominal tenderness and signs of peritonism, assessment for neck stiffness and signs of raised intracranial pressure if history suggestive of central nervous cause.

TABLE 13: DIFFERENTIAL DIAGNOSIS FOR NAUSEA AND VOMITING IN PREGNANCY

- Molar pregnancy
- Ovarian torsion
- Gastrointestinal (Gastritis/peptic ulcer, reflux oesophagitis, cholecystitis, pancreatitis, bowel obstruction)
- Urinary tract infection
- Metabolic and endocrine disorders (Diabetic ketoacidosis, hyperthyroidism, uremia, Addison's disease)
- Central nervous system causes (e.g., migraine, tumour, infection, vestibular disease)
- Cardiac causes: pulmonary embolism - myocardial infarction.

- Woman weights need to be recorded as a baseline and to monitor any loss of weight.
- Unless indicated, no need to perform investigations for women with PUQE score ≤6.
- Complete blood count, Urea and electrolytes (U&E), Liver function test (LFT) and thyroid function test (TFT) should be done for those with PUQE score ≥ 7.
- Ketonuria alone should not be used to assess the severity of NVP but should be interpreted in light of the overall clinical picture of patient.
- Treatment should aim to correct hypovolemia, electrolyte imbalances and ketosis, provide symptomatic relief in form of anti-emetic medication, and thromboprophylaxis.
- There is no evidence to support the effectiveness of dietary restrictions, woman is advised to avoid personal triggers of nausea.
- Woman should be offered a psychological support with emphasis that the condition is self-limiting.

b) Criteria for referral to secondary care:

- PUQE score 7-12 with dehydration or ketonuria not responding to IV fluid or with abnormal blood investigations.
- Women with weight loss
- PUQE score ≥13 or if insulin dependent diabetic (Koren, May 2002)
- The following algorithm shows the assessment and management of nausea and vomiting of pregnancy at primary health care level:

ALGORITHM 1: ASSESSMENT AND MANAGEMENT OF NAUSEA AND VOMITING IN PREGNANCY

- **Take detail history and complete PUQE score**
- **Perform clinical examination including** Temperature, PR, BP, RR, signs of dehydration (decreased skin turgor, dry mucous membranes, decreased urine output, concentrated urine, and postural drop in blood pressure), abdominal examination - other examination as guided by history
- **Exclude other causes** e.g., infections, gastrointestinal, endocrine, metabolic, cardiac, and CNS causes, drug history, etc.
- **Check urine ketones**
- **Consider need for performing investigations:** urine routine, blood glucose, U&E, TFT, LFT
- **Early ultrasound scan** (if not done before) to confirm viability, gestational age and to rule out multiple or molar pregnancy

Mild NVP
PUQE score ≤ 6

- Weight patient and record it.
- Antiemetic
- Advise on diet and fluids
- Discharge home if no signs of dehydration and ketosis

Moderate NVP
PUQE score 7-12

Keep in observation room

- Weight patient and record it
- If woman is unable to tolerate oral fluid and ketotic, start IV fluid. (Hartmann's (Ringer lactate) or sodium chloride 0.9%). Infuse 1st litre in 1-2 hour, then reassess.
- Discontinue IV fluid when ketonuria has resolved, no sign of dehydration and women is able to maintain oral fluid.
- Antiemetic
- Weight patient after fluids and record it
- Discharge home if well otherwise admit to the ward (local hospital) or referred to secondary care for admission

Severe NVP
PUQE score ≥13
Ketonuria, clinically

- Correct hypovolemia
- Refer to secondary care hospital for evaluation and management

Dietary advice

- Modification of the amount and size of meals consumed throughout the day, to have frequent smaller amounts of food and fluids.
- The meals should contain more carbohydrate than fat and acid.
- Protein-rich meals also decrease symptoms.
- Lighter snacks, including nuts, dairy products, and beans.
- Drinks that contain electrolytes and other supplements are advised.
- To avoid foods or food preparations that trigger nausea.
- Ginger is effective in reducing nausea and vomiting in women with mild and moderate symptoms.

Antiemetics used in the management of nausea and vomiting in pregnancy:

First line:

Promethazine (Phenergan) 10 –25 mg 4–8 hourly PO,2.5 mg IM, OR

Prochlorperazine (Stemetil) 5–10 mg 6–8 hourly PO

Second line:

Metoclopramide (Primperan) 5–10 mg 8 hourly PO, IV or IM

Domperidone 10 mg 8 hourly PO; 30–60 mg 8 hourly PR

Note: The woman should be asked about previous adverse reactions to antiemetic therapies. Drug-induced extrapyramidal symptoms and oculogyric crises can occur with the use of phenothiazine and metoclopramide. If this occurs, immediately discontinue these medications.

Lifestyle advice: To avoid stress and take rest as required to alleviate symptoms

c) Management at secondary care level

- Exclude other causes of nausea and vomiting. Perform laboratory investigation as indicated including U&E, LFT, TFT. U&E might need to be repeated daily to assess electrolyte balance in severe cases.
- Correct hypovolemia with IV fluids if the woman is unable to tolerate oral fluids. Dextrose-containing solutions can precipitate Wernicke's encephalopathy in women with thiamine deficiency
- Start input/output chart
- Refer the woman to dietician
- Naso-gastric feeding or total parental nutrition (TPN)) may be required in severe and protracted cases in particular when there is:
  - Significant weight loss or failure to achieve an appropriate gestational weight gain
  - Low body mass index (BMI) or underweight
  - Significant vitamin deficiencies
  - Persistently abnormal LFTs
- Criteria for discharge
  - No ketones in the urine
  - Tolerating oral fluids and food without vomiting
- On discharge from hospital arrange follow-up antenatal care to include monitoring for foetal growth restriction. Appropriate antiemetic prescription should be provided to the woman
- Repeat assessment with repeated admission

The following algorithm shows the assessment and management of nausea and vomiting of pregnancy at secondary health care level:

ALGORITHM 2: ASSESSMENT AND MANAGEMENT OF NAUSEA AND VOMITING OF PREGNANCY AT SECONDARY HEALTH CARE LEVEL

Exclude other causes of nausea and vomiting in pregnancy.
laboratory investigation e.g., LFT, TFT, U&E etc.
Record PUQE score daily on assessment and management checklist
Weight patient and record
Early ultrasound scan (if not done before) to confirm viability, gestational age and to rule out multiple or molar

Correct hypovolemia, electrolyte imbalance and ketosis

Correct hydration with IV fluids if the woman is unable to tolerate oral fluids and ketotic using Hartmann's or sodium chloride 0.9%. Infuse first litre over 1-2 hours and then reassess, including urine ketone testing. If required further IV fluids should be run at rate of 1000mls over 4 hours, followed by further assessment.
If the serum potassium level is found to be less than 3.2mmol/l, potassium supplements should be given. *
Maintaining strict fluid balance record.
Check each urine sample for ketones
Insulin-dependent diabetics must be managed carefully to prevent hypo- and hyperglycemia.
Daily U & E to assess electrolyte balance in severe cases

Prevent vomiting

Provide antiemetics.
Patients with severe hyperemesis may require more than one antiemetic to control symptoms.
Encourage small, frequent oral fluids and foods based on the patient's personal preference

Provide vitamin supplementation & nutrition support

Provide vitamin supplementation
Nutrition advice
Consider nasogastric & parenteral feedings in very severe cases

Prevent VTE

Assess risk for venous thromboembolism (VTE) and provide thromboprophylaxis

Provide psychological support

Reassure the woman and allow to rest

***Fluid replacement in the management of nausea and vomiting in pregnancy**

Intravenous (IV) fluids: Normal saline with KCl or Hartmann solution

If K+ is normal to give one litre of Hartmans over 2 hours
If K+ is (3.2-3.4) give 0.9% sodium chloride and K+ 40 mmol/L - 250 ml/hour
If K+ is (3.5-3.9) give one litre of 0.9% sodium chloride with 20 mmol/litre - 500ml/hour

If K+ is < 3.2 needs admission for further management refer to secondary/tertiary care

Note: Dextrose-containing solutions can precipitate Wernicke's encephalopathy in women with thiamine deficiency

2.3.3 Anaemia in Pregnancy

Definition: -

Anaemia in pregnancy is defined as haemoglobin concentration Hb < **11 g/dl**. Iron deficiency anaemia (IDA) is the most common cause of anaemia in pregnancy and associated with increased risk of maternal morbidity and mortality

Routine supplements

- Daily folic acid (400 microgram) is required before 13 weeks' gestation to reduce the incidence of neural tube defects.
- Combined iron and folic acid preparations (Fefol tablets) are available, started from 13 weeks of gestation.

Risk factors for IDA in pregnancy: -

- Multiple pregnancies
- Poor diet and lacking iron - rich food
- Previous gastrointestinal diseases
- Medications that decrease absorption of iron like antacids, multivitamins.
- Short interval between pregnancies

Complications:

Untreated IDA in pregnancy can be associated with significant adverse consequences for mother and child: -

- Low birth weight
- Preterm birth
- Increased risk of postnatal haemorrhage (PPH)
- Perinatal and neonatal mortality
- Fatigue, weakness, poor quality of life may lead to postpartum depression
- Potential implications for future neurodevelopment of the infant

Diagnosis

1. **Clinical symptoms and signs: -** are non-specific and cannot be relied on for diagnostic purposes. Fatigue is the most common symptom, in addition to pallor, weakness, headache, palpitations, dizziness, dyspnoea, irritability and restless legs. Haemoglobin levels outside the normal range for pregnancy should be investigated and iron supplementation considered if indicated
2. **Laboratory testing: -**
   - Low Haemoglobin (Hb), mean cell volume (MCV) and mean cell haemoglobin (MCH) are suggestive of iron deficiency, and it should be routinely checked for all pregnant women at booking and 28 wks., and 36 weeks
   - Low serum ferritin is diagnostic of iron deficiency in pregnancy. However, a normal ferritin level does not exclude iron deficiency, as pregnancy is associated with a physiological rise in acute phase proteins including ferritin.

Management of Iron Deficiency Anaemia in Pregnancy

1. **Rapid assessment of the patient** (see Algorithm 3)
2. **Dietary advice**
   - All pregnant women should receive general dietary advice at booking visit.
   - Once women become iron-deficient in pregnancy, she should be referred to dietitian and seen regularly.
   - It is not possible to ensure repletion through diet alone and oral supplementation of ferrous is needed
   - Education and counselling regarding diet may improve iron intake and enhance absorption

Counselling dietary advice for pregnant women

- To take diet rich in iron folate such as liver, kidney heart, lean meat, egg yolk, shellfish, dried beans, legumes, dried fruits, green leafy vegetables, whole cereals and jaggery.
- To take vitamin C containing food such as orange, lemon, kiwi, mango, papaya, etc
- Do not overcook green leafy vegetables.
- Do not consume milk, tea, coffee or antacids with food or within two hours of taking iron tablets

3. Oral iron and folic acid supplements

- Women should be prescribed ferrous tablets as per algorithm 3
- Women should be counselled how to take oral iron supplements correctly. This should be on an empty stomach, at least 1 hour before meal, take with water or a source of vitamin C. Other medications, multivitamins and antacids should not be taken at the same time
- Iron is known to cause gastric irritation, nausea and constipation/diarrhoea, affecting compliance *There are strategies to reduce the side effects of oral iron and improve tolerability of iron tablets. Shown in Table 14*
- Multivitamins usually have insufficient iron to correct anaemia and, furthermore, often contain other minerals that interfere with iron absorption; thus, it should not be prescribed alone to correct IDA.
- Repeat Hb testing is required 2–3 weeks after commencing treatment for established anaemia, to assess compliance, correct administration and response to treatment.
- If response to oral iron replacement is poor, compliance should be confirmed and concomitant causes that may be contributing to the anaemia considered, such as folate deficiency or malabsorption, consider referral for IV iron.

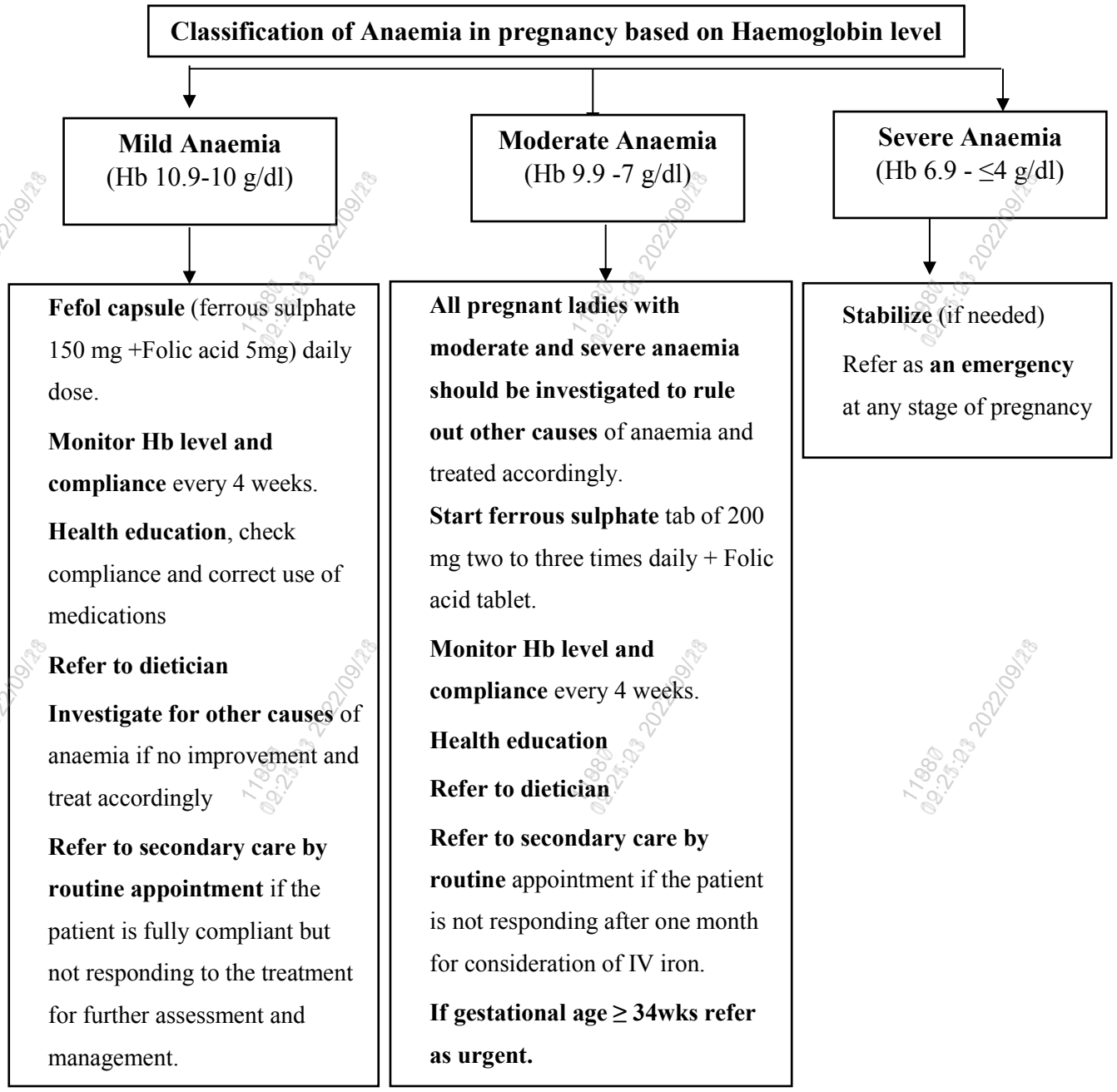
TABLE 14: STRATEGIES TO REDUCE THE SIDE EFFECTS OF ORAL IRON AND IMPROVE TOLERABILITY OF IRON

Strategies to reduce the side effects of oral iron and improve tolerability of iron:

- Reducing the dose (e.g., once daily) or the frequency (every other day).
- Making dietary modifications (e.g., taking iron with food) although this may reduce absorption.
- Switching to a formulation with a lower amount of elemental iron (e.g., ferrous gluconate, ferrous furate, etc
- Switching from a tablet to a liquid, for each it is easier to titrate the dose
- Slow release and enteric-coated forms should be avoided
- Once a tolerated dose is found, the patient can sometimes increase the dose slowly as tolerated

ALGORITHM 3: ASSESSMENT AND MANAGEMENT OF ANEMIA IN PREGNANCY

- **Take detail history**: - weakness, fatigue, palpitation, vomiting, poor diet, medications
- **Identify risk factors**: - multiple pregnancy, poor diet, gastrointestinal diseases, medications that decrease absorption of iron like antacids, multivitamins, short interval between pregnancies
- **Perform clinical examination** including vitals: pulse ate, Blood Pressure, pallor
- **Exclude other causes** e.g., bleeding, gastrointestinal causes, drug history, etc.
- **Early ultrasound scan** (if not done before) to confirm viability, gestational age and to rule out multiple or molar pregnancy



Postpartum anaemia

Definition:

Postnatal anaemia is defined as an Hb <10 mg/l. The risk of postnatal anaemia is reduced by identification and management of iron deficiency in the antenatal period.

Post-partum care:

- After delivery, women with blood loss ≥ 500 ml, those with uncorrected anaemia detected in the antenatal period or those with symptoms suggestive of anaemia postnatal should have their Hb checked within 48 h of delivery.
- All women should be tested for Hb level at 6 weeks' postnatal visit.
- All women with Hb ≤ 10 g/ in the postpartum period should be given an iron supplementation for 3-6 months
- Women who are previously intolerant of, or do not respond to, oral iron and/or where the severity of symptoms of anaemia requires prompt management should be referred to secondary care for IV iron.

2.3.4 Venous thromboembolism (VTE)

Introduction

Venous thromboembolism (VTE) is a collective term that describes deep vein thrombosis (DVT) and pulmonary embolism (PE). Pregnant women have a four to five-fold increased risk of thromboembolism as compared to non-pregnant women. The risk for VTE increases with gestational age, reaching a maximum just after delivery.

Thromboprophylaxis (thrombosis prevention): is medical treatment to prevent the development of thrombosis in women considered at high risk for developing thrombosis**.**

Pulmonary embolism (PE) is one of the leading causes of maternal deaths. In Oman, between 2008 and 2017 the total maternal deaths were 135 out of them 16 were due to thromboembolism. Eleven cases occurred during postnatal period and five were during antenatal period. Also, based on maternal near-miss review between 2016 and 2017, five cases suffered pulmonary embolism. The mortality and morbidity associated with venous thromboembolism (VTE) in obstetric patients can be reduced by up to two thirds by taking appropriate measures in time.

Risk factors for Venous thromboembolism:

It is recommended that any pregnant woman should be assessed using VTE risk factors. The following should be considered:

- The strongest personal risk factor for VTE in pregnancy is a history of VTE. Many antenatal VTE occur in the first trimester and therefore prophylaxis for women with previous VTE should begin early in pregnancy.
- Risks of recurrent VTE appear higher for those with a family history and deficiencies of the naturally occurring anticoagulants, particularly type 1 antithrombin deficiency.
- Obesity is recognized as a major risk factor for the development of VTE in pregnancy and the puerperium
- Personal history of Thrombophilia. Family history of VTE increase the risk for developing VTE.
- Caesarean section is a significant risk factor for post-partum VTE and women who have an emergency caesarean section are at a greater risk as compared to those who have an elective caesarean section. Women who have vaginal delivery are also at risk of thromboembolism.
- Obstetric risk factors: pre-eclampsia, ART/IVF, multiple pregnancy, prolonged labour >24 hour, PPH >1 litre, preterm < 37 weeks birth, stillbirth.

- Other risk factors include Medical co-morbidities e.g., cancer, heart failure, active SLE, inflammatory polyarthropathy or inflammatory bowel disease, nephrotic syndrome, Type I diabetes with nephropathy, sickle cell disease, current intravenous drug user, woman age >35 years, parity ≥ 3, smoking, immobility e.g., Paraplegia and gross varicose vein.

Risk Assessment for Venous Thromboembolism in pregnancy and puerperium

- All women should undergo documented assessment of risk factors for VTE in antenatal and repeated postpartum. A formal VTE risk assessment with numerical scoring is recommended (Tables 15 & 16).
- Risk assessment should be done at:
  - Pre-pregnancy,
  - Early pregnancy at booking,
  - At 28th weeks of pregnancy, and
  - Intrapartum or within 6 hours after birth,
- Risk assessment should be repeated if the woman is admitted to hospital for any reason or develops complications
- Risk assessment should be done by a trained doctor. If midwife is running the ANC, then the assessment can be done by the trained midwife.

TABLE 15: RISK FACTORS FOR VENOUS THROMBOEMBOLISM AND RISK ASSESSMENT SCORING

Risk Factors	Score
Pre-existing risk factors	
Previous history of VTE (except single event provoked by major surgery)	4
Previous history of VTE provoked by major surgery	3
Thrombophilia - o Heritable: Antithrombin Deficiency Protein C, Protein S Deficiency Factor V Leiden, Prothrombin Gene mutation o Acquired: Antiphospholipid Syndrome, Persistent Lupus Anticoagulant Persistent moderate /high titre anti cardiolipin antibodies or Persistent beta 2 glycoprotein antibodies *Any case already diagnosed of thrombophilia should be referred to haematologists at booking	4
Medical co-morbidities e.g., cancer, heart failure, active SLE, inflammatory polyarthropathy or inflammatory bowel disease, nephrotic syndrome, Type I diabetes with nephropathy, sickle cell disease, current intravenous drug user	3
Family history of unprovoked or estrogen provoked VTE in first degree relative	1
Age >35 years	1
Obesity BMI from 30-39 kg/m2 at booking	1
Obesity BMI ≥ 40 kg/m2 at booking	2
Parity ≥ 3	1
Smoking	1
Paraplegia	1
Gross varicose veins	1
Obstetrics risk factors in (current pregnancy)	
Pre-eclampsia	1
ART/IVF (Assisted Reproductive Technology/ In vitro Fertilisation)	1
Multiple pregnancy	1
Emergency Cesarean Section	2
Elective Cesarean section	1
Mid cavity or rotational operative delivery	1
Prolonged labour >24 hour	1
PPH >1 litre or transfusion	1
Preterm < 37 weeks of birth	1
Stillbirth in current pregnancy	1
New onset / transient risk factors (in current pregnancy)	
Any surgical procedure in pregnancy or puerperium	3
Hyperemesis** /dehydration	3
Ovarian hyperstimulation Syndrome (sever type only)- is a complication of fertility treatment (assisted reproduction technology).	4
Immobility	1
Current systemic infection	1
Long hours of travel > 8 hours.	1

*__ART__ assisted reproductive technology, __IVF__ in vitro fertilisation
**__Hyperemesis gravidarum__: is the severe form of nausea and vomiting of pregnancy. It can be diagnosed when there is persistent nausea and vomiting with dehydration and electrolyte imbalance.
***__Ovarian Hyper Stimulation Syndrome__: is a complication of fertility treatment (assisted reproduction technology)

TABLE 16: RISK SCORE FOR THROMBOPROPHYLAXIS

Risk Score	Antenatal Thromboprophylaxis	Postpartum Thromboprophylaxis
If total score ≥ 4 (antenatal)	Consider thromboprophylaxis from the first trimester	Thromboprophylaxis for 6 weeks postnatal
If total score 3 (antenatal)	Consider thromboprophylaxis from 28 weeks	Thromboprophylaxis for 6 weeks postnatal (Postnatal risk reassessment to be made)
If total score ≥ 2 postnatal	-	Consider thromboprophylaxis for at least 10 days
New Onset/ Transient potentially reversible risk factors	Consider thromboprophylaxis	Consider thromboprophylaxis

1. Referral to obstetricians

- Any pregnant woman with history of VTE should be referred immediately at booking to obstetrician for initiation of thromboprophylaxis.
- Any pregnant woman with VTE risk factors scores ≥ 4 should be referred at booking to secondary/ tertiary care for initiation of thromboprophylaxis.
- Any pregnant woman with VTE risk factors scores 3 should be referred to obstetrician during the antenatal care for initiation of prophylaxis at 28 weeks.

2. Advice to pregnant women:

Discuss the risk of VTE in pregnancy and the importance of seeking urgent medical assistance if symptoms develop

Symptoms and signs of pulmonary embolism and deep vein thrombosis:

Pulmonary embolism:

- Dyspnoea (most common symptom of PE)
- Palpitations/tachycardia
- Chest pain
- Haemoptysis
- Hypoxia/cyanosis
- Tachypnoea
- Hypotension
- Collapse

Deep vein thrombosis

- In pregnancy is often proximal and may not present with usual features of distal DVT
- Unilateral leg pain
- Swelling in an extremity with pitting oedema
- Increase in calf/thigh circumference particularly of 2 cm or more
- Increased temperature
- Prominent superficial veins
- Pitting oedema
- Importance of mobilization and hydration in preventing VTE in pregnancy and after birth.

3. Thromboprophylaxis according to risk assessment

- Initiation of thromboprophylaxis according to VTE risk assessment should be done by obstetrician at secondary / tertiary health care institutions. The dose and duration of thromboprophylaxis agent to be clearly documented in the Maternal Health Record (Green card), with the plan for follow-up.
- The management of following conditions should be taken by haematologist with expertise in thrombosis in pregnancy and after delivery.
  - Women with previous confirmed VTE
  - Woman with multiple pervious VTE (no other risk factors)
  - Women with previous VTE and with family history of antithrombin deficiency, regardless of family history (homozygous prothrombin gene mutation or factor V Leiden and combined thrombophilia (companions' heterozygous cases)
  - Woman with previous VTE and acquired thrombophilia (antiphospholipid syndrome), no long –term oral anticoagulation
- Women receiving antenatal LMWH should be advised to stop LMWH if they have vaginal bleeding or labour signs.
- Women receiving antenatal LMWH (prophylactic dose), and planned for elective caesarean section, should receive LMWH on the day prior to delivery, but not later than 18:00 hours. Any morning dose on the day of delivery should be omitted.
- Risk assessment should be performed in each woman at least once following delivery and before discharge.
- Start or resume thromboprophylaxis 4-6 hours after vaginal delivery and 6-8 hours after caesarean section.
- Women with multiple previous VTE and woman with previous VTE and heritable thrombophilia consider high dose of LMWH antenatally and postpartum till they return to oral anticoagulants (these will mostly be on lifelong anticoagulants, so may go back to warfarin earlier than 6 weeks)
- Woman delivered with high risk of haemorrhage due to major antepartum haemorrhage, coagulopathy, progressive wound hematoma, suspected intra-abdominal bleeding and postpartum haemorrhage ask haematologist for advice, restart LMWH as soon as possible when haemorrhage is reduced, after measuring patient's risk factor and benefit for prophylaxis and with the aid of lab results assuring safety of resumption of prophylactic dose.

- Woman at very high risk of thrombosis where regional aesthetic technique may be required or there is an increased risk of haemorrhage ask haematologist for advice. Avoid regional techniques for at least 12 hours after the previous dose of LMWH. Avoid regional techniques for at least 24 hours after the last dose of LMWH, if the patient on a therapeutic regimen of LMWH. Avoid LMWH for 4 hours after use of spinal anaesthesia or after the epidural catheter has been removed within 12 hours of the most recent injection

ALGORITHM 4: ANTENATAL THROMBOPROPHYLAXIS ACCORDING TO RISK

☐ Any previous VTE except a single event related to major surgery

→ **HIGH RISK**
Requires prophylaxis with LMWH from first trimester of pregnancy

Any one of

☐ single previous VTE related to major surgery
☐ Thrombophilia (refer to haematologist)
☐ Cancer, heart failure, active SLE, inflammatory Poly arthropathy or IBD, nephrotic syndrome, Type I DM with nephropathy, SCD, current intravenous drug user

→ **INTERMEDIATE RISK**
Requires prophylaxis with LMWH from 28 weeks of pregnancy

SELECT ALL THAT APPLY	Risk score
At every assessment	
☐ Age >35 years	1
☐ Obesity BMI > 30-39 kg/m2 at booking	1
☐ Obesity BMI ≥ 40 kg/m2 at booking	2
☐ Parity ≥ 3	1
☐ Multiple pregnancy	1
☐ Smoker	1
☐ Gross varicose veins	1
☐ Pre-eclampsia in current pregnancy	1
☐ ART/IVF*	1
☐ Immobility, e.g., paraplegia	1
☐ Family history of unprovoked VTE in first degree relative	1

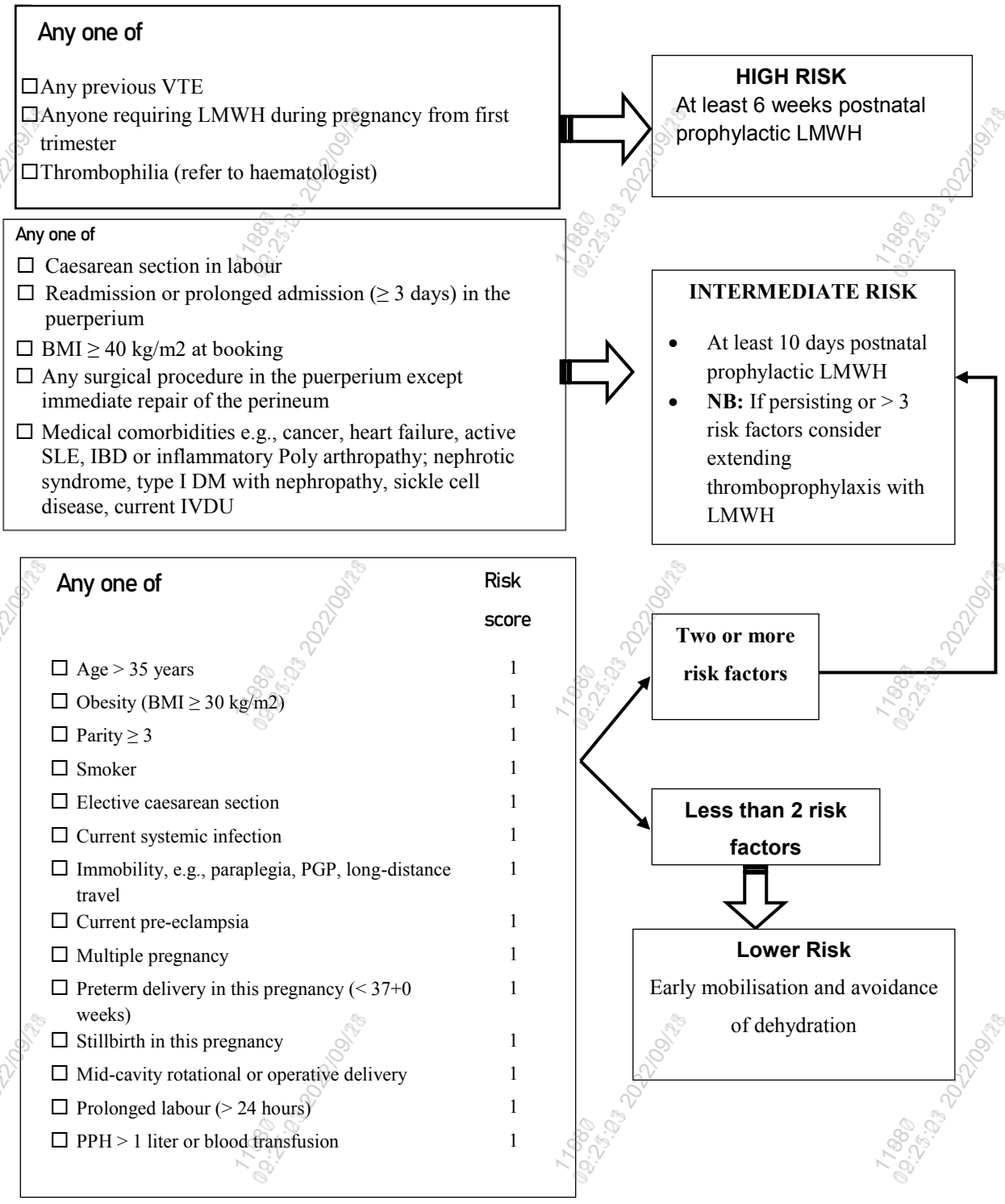
Score ≥ 4	**Requires LMWH prophylaxis from the time of assessment**
Score 3	**Requires LMWH prophylaxis from 28 weeks**,
Less than 3 risk factors	**No need for thromboprophylaxis** Advice mobilisation and avoidance of dehydration

Transient risk factors	Risk score
☐ Hospital admission > 3 days	4
☐ OHSS (first trimester only)	4
☐ Any surgery (pregnancy or postpartum)	3
☐ Severe hyperemesis or dehydration requiring IV fluid	3
☐ Infection requiring admission to hospital	1
☐ Long hours of travel > 8 hours	1

→ **Consider LMWH prophylaxis While in the hospital or until resolves**

ART: artificial reproductive technology, BMI: body mass index, IBD: inflammatory bowel disease, IVF: in-vitro fertilisation, LMWH: low molecular weight heparin, OHSS: Ovarian hyperstimulation syndrome, PE: pulmonary embolism, SCD: Sickle cell disease, SLE: systemic lupus erythematosus, VTE: venous thromboembolism, IVDU: intravenous drug user

ALGORITHM 5: POSTNATAL THROMBOPROPHYLAXIS ACCORDING TO RISK SCORE



ART: artificial reproductive technology**, BMI:** body mass index, **IBD**: inflammatory bowel disease, **IVF:** in-vitro fertilisation**, LMWH:** low molecular weight heparin, **OHSS**: Ovarian hyperstimulation syndrome, **PE:** pulmonary embolism, **SCD**: Sickle cell disease, **SLE:** systemic lupus erythematosus, **VTE:** venous thromboembolism, **IVDU**: intravenous drug user

6. Agents for Thromboprophylaxis:

- Low Molecular Weight Heparin (LMWH) are the agents of choice for antenatal and postnatal thromboprophylaxis.
- Unfractionated heparin (UFH) can be used as alternative in woman with risk of bleeding or have allergic reactions to LMWH.
- The following table illustrates the suggested thromboprophylactic doses for LMWH antenatal and postnatal:

TABLE 17: THROMBOPROPHYLAXIS DURING PREGNANCY AND POSTPARTUM

Weight (Kg)	Enoxaparin Sodium (LMWH)
< 50	20 mg (2000 units) once daily
50-90	40 mg (4000 units) once daily
91-130	60 mg (6000 units) once daily OR 2 divided doses
131-170	80 mg (8000units) daily 2 divided doses
>170	0.6mg (60 units) /kg/day - 2 divided doses
High prophylactic dose for women weighing 50–90 kg	40 mg (4000 units) 12 hourly
Unfractionated heparin (UFH) Alternative to enoxaparin sodium in women with risk of bleeding OR allergic reactions to LMWH: unfractionated heparin (UFH) dose: 5000-10000 units every 12 hours, to be administered with monitoring	

Remarks:

- Counsel the patient on LMWH during pregnancy and to stop the LMWH injection if she has vaginal bleeding or labour signs.
- Thromboprophylaxis should be started as soon as the immediate risk of haemorrhage is reduced.
- If the patient has had exposure to unfractionated heparin (UFH), monitor platelet count.
- Do not monitor anti-Xa levels when LMWH used for thromboprophylaxis.
- Reduce LMWH dose in patients with renal impairment.

Contraindication / cautions of LMWH thromboprophylaxis

- In women at risk of bleeding after careful consideration of the balance of risks of bleeding and thrombosis.
- Previous or current allergic reactions to LMWH
- Active bleeding, coagulopathy or low platelets (fewer than 75 x 109 /l). to be delayed
- Known bleeding disorder (e.g., haemophilia, von Will brand's disease or acquired coagulopathy)
- Active antenatal or postpartum bleeding or considered at increased risk of major haemorrhage
- Acute stroke (haemorrhagic or ischemic) in previous 4 weeks
- Severe renal disease (glomerular filtration rate [GFR] < 30 ml/minute
- Severe liver disease with prolonged prothrombin time.
- Uncontrolled hypertension (blood pressure > 200 mmHg systolic or > 120 mmHg diastolic)

Note:

- **Warfarin** is restricted in pregnancy to the few situations where heparin is considered unsuitable, e.g., in women with mechanical heart valves.
- **Low dose aspirin** is Not recommended as thromboprophylactic agent in obstetric patients

7. Instruction to women on how to take thromboprophylaxis injection (how to take the injection) shown in Annex 2.

8. Follow-up of woman on thromboprophylaxis

- Ensure woman received guidance on how to take the LMWH injection, her daily dose, the site of injection, the rate of injection, infection control measures, and the disposal of the syringe after each use
- Advice the woman to get the injection in the nearest primary health institution if she did not receive training on how to give herself the injection or not sure what to do.
- If she missed taking the injection should take it as soon as possible, the next dose should be taken 24hours later and to keep a note of the new time.
- Counsel the woman to stop LMWH injection if she has vaginal bleeding or labour signs and to attend to hospital.
- If the patient has had prior exposure to un fractioned heparin (UFH), monitor platelet count
- Do NOT monitor anti- Xa-levels when LMWH used for thromboprophylaxis
- Reduce LMWH dose in patients with renal impairment

9. Instructions to woman on safe disposal of used heparin syringes

Ensure the following instructions were clearly given to the woman on thromboprophylaxis and her concerns and quires were answered.

1. Place the syringes in a sharps disposal container immediately after they have been used.

- DO NOT bend or break the needles after use.
- DO NOT recap the needles after use.
- DO NOT remove the needles after use.
- If you don't have "sharp container" you can use a plastic bottle with tight cap as sharp
- container.
- Close the "sharp container"/ bottle cap tightly after each use
- Be careful not to fill the container more than ¾ of its capacity
- Wash your hands immediately after disposing the syringe.
- Keep the container out of reach of children

2. Dispose of used sharps disposal containers according to your health facility guidelines.

- When the container is ¾ full, take it to the nearest health facility
- Give the container to the focal for disposal medical waste in the health facility.
- DO NOT throw sharp containers in trash
- DO NOT put in sharp containers in recycling bin.

3. If someone is accidentally pricked with a used needle, advise him/her to wash the area around the puncture and visit the nearest health facility for medical advice.

4. Make sure the health education material (booklet) is given to the woman on thromboprophylaxis.

10. Responsibilities

Responsibilities of doctors in antenatal care clinic at primary health care

- History taking to identify VTE risk factors during pregnancy.
- Apply risk assessment scoring for VTE for all pregnant women.
- Refer all pregnant women with score ≥3 to obstetrician for further evaluation and management.
- Document all relevant information in the maternal health record (green card).
- Report any side effects from thromboprophylaxis use and refer accordingly.

Responsibilities of obstetricians at secondary / tertiary health care

- Reassess all referred pregnant women for VTE risk.
- Provide counselling on importance of thromboprophylaxis and when to report any side effects.
- Provide thromboprophylaxis agents (type, frequency and duration).
- To put clear plan for follow up.
- Document of the plan for management and follow up in the patient's file and in the maternal health record (green card).
- Document and record client's information and thromboprophylaxis dose and duration on the educational leaflet.

Responsibilities of midwife / nurse (outpatient clinics and inpatient in the ward)

- Provide Counselling on importance of thromboprophylaxis and report any side effects.
- Explain to the client how to give self-injection and storage and disposable instructions.
- Explain to one of the client's family members how to give heparin injection if the client refused self-injection
- Monitor LMWH use during pregnancy

Responsibilities of pharmacist

- Provide prescription review for appropriateness
- Double check prepared medication
- Provide patient counselling regarding the medication usage, importance of adherence, Instruction in the injection technique, dose, storage, Safe disposal and importance on thromboprophylaxis when to report drug related problem
- Instruct the patient what to do with the leftover of the heparin injections
- Keep records for any returned medicines

2.3.5 Diabetes in Pregnancy:

Introduction:

The ongoing epidemic of obesity and diabetes has led to a higher rate of type-2 diabetes in women of childbearing age, resulting in an increase in the number of pregnant women with undiagnosed type-2 diabetes. Also, when obese women become pregnant, they have higher risk of developing gestational diabetes mellitus (GDM)

Types of Diabetes in Pregnancy

a) Diabetes detected during pregnancy including:

1. Gestational Diabetes Mellitus (GDM): An abnormal glucose tolerance with onset or first recognition during pregnancy
2. Overt Diabetes: A diagnosis of overt diabetes can be made in women who meet any of the following criteria at their initial prenatal visit:
   - Fasting plasma glucose ≥7.0 mmol/l [≥126 mg/dL], and Random plasma glucose ≥11.1 mmol/l [≥ 200 mg/dL]

   And/Or
   - HbA1C ≥6.5% using a standardized assay.

b) Pre-existing diabetes including:

1. Type-2 Diabetes: caused by insulin resistance or relative insulin deficiency. It is often associated with obesity.

2. Type-1 Diabetes: caused by absolute insulin deficiency with positive autoimmune markers which destroy pancreatic β-cells, (anti-islet cell abs, anti-GAD abs, and low c-peptide), and history of diabetic ketoacidosis.

Significance of diabetes in pregnancy: The adverse outcomes may include:

- Increased risk of miscarriage
- Increased risk of congenital anomalies
- Pre-eclampsia
- Hydramnios
- Foetal macrosomia

- Foetal organomegaly (hepatomegaly, cardiomegaly)
- Birth trauma
- Perinatal mortality
- Neonatal respiratory problems and metabolic complications (hypoglycaemia, hyperbilirubinemia, hypocalcaemia)
- Development of obesity and diabetes during childhood.

Note: Pre-gestational/Overt diabetes - Leads to more congenital anomalies
GDM - Leads to more macrosomia and premature delivery
The risk of complication in Overt Diabetic women is twice as much as in GDM

Treatment of pre-existing diabetes when planning pregnancy

Glycaemic Control:

Women with diabetes, planning pregnancy should strive to achieve blood glucose and haemoglobin A_{1C} (HbA_{1C}) levels as close to normal as possible while avoiding hypoglycaemia. Overweight and obese women need to lose weight prior to conception.

Adjustment of Medical Therapy:

- In women on insulin therapy, the multi dose regimen (MDI) is the most appropriate option to facilitate target achievement and to allow flexible dosing adjustment during pregnancy. The insulin dose may need to be increased as pregnancy advances.
- The physiology of pregnancy necessitates frequent titration of insulin to match changing requirements and underscores the importance of daily and frequent self-monitoring of blood glucose.
- In the first trimester, there is often a decrease in total daily insulin requirements, and women with type 1 diabetes, may experience increased hypoglycaemia.
- In the second trimester, rapidly increasing insulin resistance requires weekly or bi-weekly increases in insulin dose to achieve glycaemic targets.
- All oral hypoglycaemic medications except metformin should be stopped and replaced with insulin.
- Folic acid 5 mg OD needs to be supplemented 3 months before withdrawing contraception and continued until breastfeeding.

Retinal assessment:

- A baseline assessment of diabetic retinopathy is recommended to assess for any treatable condition which can be stabilized preconception. Women with established retinopathy should have retinal assessment done once in each trimester because of the risk of progression during pregnancy.

- In addition, rapid implementation of tight glycaemic control in the setting of retinopathy is associated with worsening of retinopathy.

Renal assessment:

Measuring urine albumin to creatinine ratio, serum creatinine, should assess renal functions, and estimated Glomerular Filtration Rate (GFR) before conception. Any significant changes can be assessed by nephrologist and stabilized prior to conception. Refer to nephrologist if the serum creatinine>120 umol/l or eGFR<60 ml/min

Control of Hypertension:

It is important to control blood pressure prior to conception to avoid deterioration post conception. ACE inhibitors and Angiotensin Receptor Blockers (ARBs) should be replaced with safer medication like Labetalol and Methyldopa.

Thyroid function:

Thyroid function should be assessed before pregnancy

Checklist for with Pre-existing Diabetes

Attain preconception HbA_{1C} <7.0%

Assess and manage any diabetic complication

Shift to multiple daily insulin (MDI), in patients on premixed insulin.

Achieve good blood pressure control on safe anti-hypertensive medication.

Supplement Folic Acid 5 mg OD: 3 months pre-conception

Discontinue potential teratogenic medications e.g.: ACE-inhibitors/ARB's, Statins, etc.

Gestational Diabetes Mellitus (GDM)

GDM is defined as a condition associated with maternal hyperglycemia less severe than that found in patients with overt diabetes but associated with an increased risk of adverse pregnancy outcome. Pregnancy is characterised by insulin resistance and hyperinsulinaemia. The resistance results from placental secretion of diabetogenic hormone, as well as increased maternal adipose deposition, decreased exercise, and increased caloric intake. GDM occurs when the pancreatic function is not sufficient enough to overcome the insulin resistance created by changes in diabetogenic hormones during pregnancy

Risk factors for developing GDM:

- BMI ≥ 30
- Past history of GDM
- First-degree relative with diabetes
- Previous history of macrosomia (baby weight ≥4 kg)
- History of previous unexplained IUFD
- Women with polycystic ovary syndrome
- A_{1C} ≥5.7%, impaired fasting glucose (IFG), or impaired glucose tolerance (IGT) on a previous diabetes screening test
- Other clinical conditions associated with insulin resistance (e.g., severe obesity, acanthosis nigricans)

Screening and diagnostic testing:

When to screen:

Universal screening is recommended at first prenatal visit, irrespective of the trimester.

The International Association of Diabetes and Pregnancy Study Groups (IADPSG) and American Diabetes Association (ADA) criteria for a positive two-hour 75-gram oral glucose tolerance test for the diagnosis of gestational diabetes:

Fasting ≥5.1 mmol/L (≥92 mg/dL)

And /OR

Two-hour PP ≥8.5 mmol/L (≥153 mg/dL)

Oral Glucose Tolerance Test

What is Oral Glucose Tolerance Test (OGTT)?

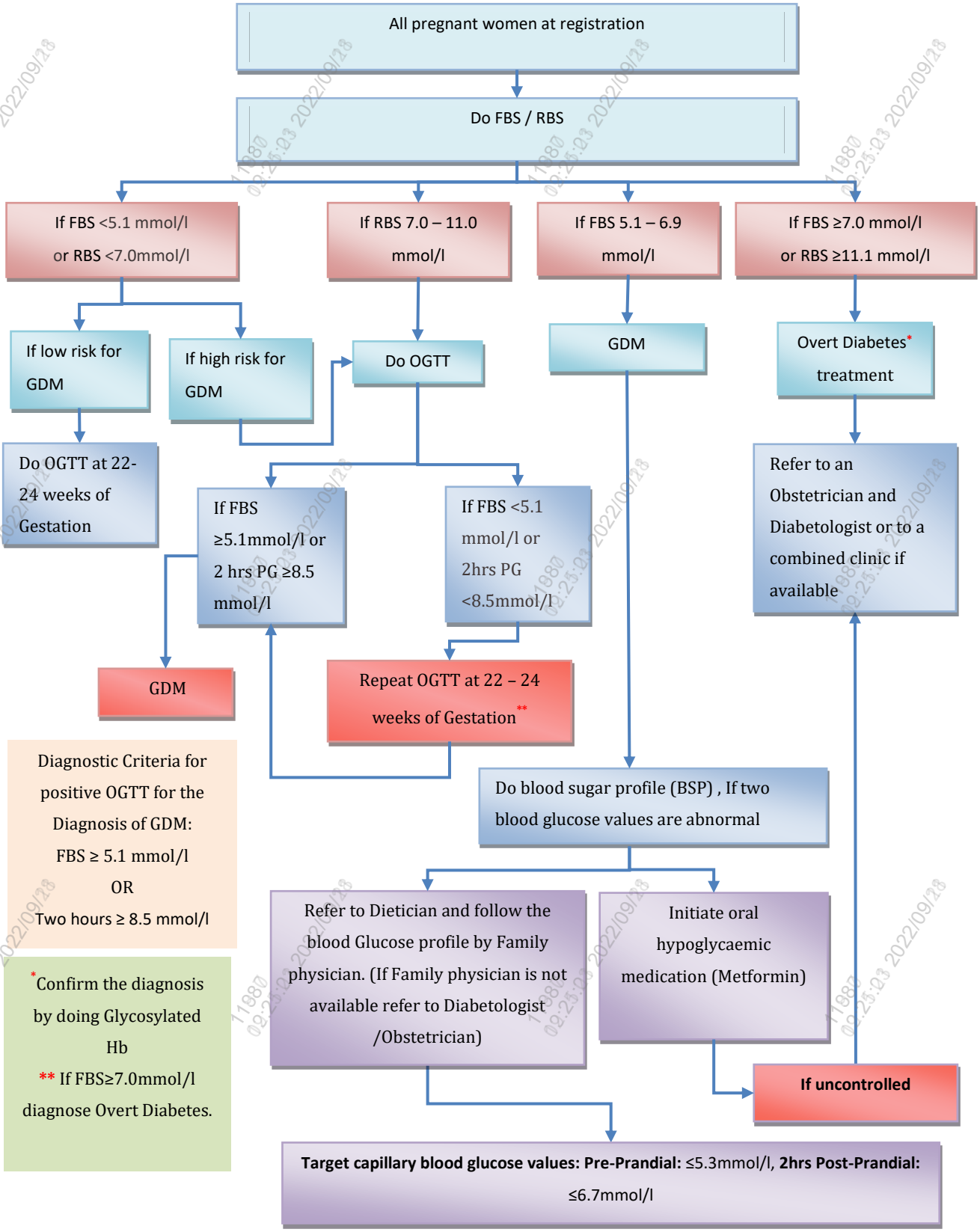
Oral Glucose Tolerance Test is a test designed to assess the body response to glucose. In OGTT, the patient is given a glucose solution and blood samples are drawn afterword at intervals to measure how well the body cells are able to absorb glucose.

Instructions for doing OGTT in pregnant woman:

- OGTT is usually done between 22-24 weeks up to 28 weeks as a screening for gestational diabetes or early at booking if woman has risk factors (Algorithm 6)
- There is no need to instruct the woman to prepare or change her diet before the test (low carbohydrate diet in the 3 days before the test is not recommended)
- The woman is required to fast for 8-10 hours. Advise her not to eat or drink anything except sips of water if she want .
- Collect venous sample for the fasting plasma glucose immediately when the woman reached the clinic in the morning.
- Then, give her to drink the oral glucose solution (75 g of anhydrous glucose or 82.5 g of glucose monohydrate) slowly within 3-5 minutes.
- Collect the second blood samples after 2 hours.
- The women must stay in the clinic for 2 hours and should not eat or drink or do any exercise during the 2 hours.

***Note:* There is no need to wait for the result of fasting plasma glucose before given the oral glucose solution. Also, do not use glucometer to check the FBS.**

ALGORITHM 6: SCREENING FOR DIABETES IN PREGNANCY



Management of GDM and Overt Diabetes:

Rationale for treatment: Identifying women with GDM is important because appropriate therapy can decrease foetal and maternal morbidity, particularly macrosomia.

1. Management of lifestyle:

A. Nutritional therapy:

All patients with GDM should receive nutritional counselling by a registered dietician (when possible) upon diagnosis and be placed on an appropriate diet. The goals of medical nutritional therapy are to:

- Achieve normoglycemia
- Prevent ketosis
- Provide adequate weight gain
- Contribute to foetal well-being

Calorie allotment: Calorie allotment is based on ideal body weight and is calculated based on the current weight of the pregnant woman. The suggested caloric intake is approximately:

- 30 kcal per kg current weight per day in pregnant women (BMI 22 to 25).
- 24 kcal per kg current weight per day in overweight pregnant women (BMI 26 to 29).
- 12 to 15 kcal per kg current weight per day for obese pregnant women (BMI >30).
- 40 kcal per kg current weight per day in pregnant women (BMI <22).

TABLE 18: CURRENT INSTITUTE OF MEDICINE (IOM) WEIGHT GAIN GUIDELINES

Pre-Pregnancy BMI	Recommended range of total weight gain (Kg)	Rate of weight gain in 2nd and 3rd Trimester (in kg/week)
BMI <18.5	12.5 – 18.0	0.51(0.44-0.58)
BMI 18.5 - 24.9	11.5 – 16.0	0.42(0.35-0.5)
BMI 25.0 - 29.9	7.0 – 11.5	0.28(0.23-0.33)
BMI > or = 30	5.0 – 9.0	1.22(0.17-0.27)
N.B: Calculations assume a 0.5 to 2 kg weight gain in the first trimester		

B. Exercise:

The ADA encourages a program of moderate exercise (e.g., walking for 30 minutes) as part of the treatment plan for women with GDM when there are no medical or obstetrical contraindications to this level of physical activity.

2. Glucose monitoring:

Multiple daily self-measurements of blood glucose are important as they help in identifying women who should begin anti-hyperglycaemic agent and appears to decrease the risk of macrosomia. More frequent monitoring is advised for patients on insulin therapy, ideally should be done daily, pre and post meals.

TABLE 19: MINIMUM MONITORING REQUIRED FOR PREGNANT WOMEN ON ORAL THERAPY

	Fasting	Post Breakfast	Pre-Lunch	Post Lunch	Pre-dinner	Post Dinner
Sunday	✓					
Monday		✓				
Tuesday			✓			
Wednesday				✓		
Thursday					✓	
Friday						✓

Note: Glycaemic targets:

Premeal - ≤5.3 mmol/L (95 mg/dL)

2 h Post meal- ≤ 6.7 mmol/L (120 mg/dL)

3. Medical therapy:

A. Oral hypoglycaemic agents:

Women with diabetes may be advised to use Metformin as an adjunct or alternative before starting insulin. Metformin can be initiated at a dose of 500mg twice daily and increased up to 2.5g/day. Dose increments should be done over 3-5 days both to reduce gastrointestinal side effects and to permit identification of the minimum dose required for adequate glycaemic control.

B. Injectable:

Insulin (Detemir, NPH, Regular Insulin, Aspart, Lispro all fall in Category B of US -FDA), Glargine in category C.

Insulin:

- None of the currently available insulin preparations have been demonstrated to cross the placenta.
- Approximately 15% of women with GDM require insulin therapy because target glucose levels are exceeded despite, they are being on dietary therapy and metformin.

- As a basal supplement with an intermediate to long-acting preparation NPH, glargine, detemir supresses hepatic glucose production and maintain near normoglycemia in the fasting state. So, if fasting blood glucose concentration is high, intermediate-acting insulin, such as NPH (or other basal insulin e.g., detemir or glargine if available) is given before bedtime.
- As a pre-meal (prandial) bolus dose of short-acting (regular) or rapid-acting Lispro or Aspart, to cover the extra requirements after food is absorbed. If post prandial blood glucose level is high, insulin Aspart or insulin Lispro can be given before meals (doses should be individualized based on blood glucose elevation, small doses 2-4 unites can be started if mild elevation and should be adjusted bi-weekly).
- If both pre-prandial and postprandial blood glucose concentrations are high, then initiate a four-injection regimen per day, and this should be individualized. If the readings showed marked hyperglycaemia, then insulin doses can be calculated as follows:
- A total dose of:
  - (0.7 unit/kg up to week 12),
  - (0.8 unit/kg for weeks 13 to 26),
  - (0.9 unit/kg for weeks 26 to 36), and
  - (1.0 unit/kg for weeks 36 to term).

- Use 50% of TDD for basal insulin and 50% for pre-meal rapid-acting insulin boluses

Patients with T1D

- **10-14 weeks' gestation:** period of increased insulin sensitivity; insulin dosage may need to be reduced accordingly.
- **14-35 weeks' gestation:** insulin requirements typically increase steadily.
- **>35 weeks' gestation:** insulin requirements may level off or even decline.
- In severely obese woman, the initial doses of insulin may need to be increased to 1.5 to 2.0 units/kg to be able overcome the combined insulin resistance of pregnancy and obesity.
- Avoid hypoglycaemia as frequent hypoglycaemia can be associated with intrauterine growth restriction.

C. Aspirin:

- Add Aspirin (75 mg – 150 mg) from 12 weeks of gestation.

4. Peri-partum and Post-partum management:

Peri-partum management:

- Maternal hyperglycaemia should be avoided during labour to reduce the risk of foetal acidosis and neonatal hypoglycaemia.
- Maternal blood glucose levels should be kept between 4.0 -7.0 mmol/L.
- Women should receive adequate glucose during labour in order to meet the high energy requirements. Routine IV Dextrose and IV insulin protocols may be helpful

Post-partum follow-up:

- Encourage women to breastfeed post-delivery.
- Metformin may be used during breast-feeding.
- Because GDM may represent pre-existing undiagnosed type 2 or even type 1 diabetes, women with GDM should be tested for persistent diabetes or prediabetes at 6–12 weeks postpartum with a 75g OGTT using non-pregnancy criteria for diagnosis.
- For those with Type 1 diabetes, advised to continue pre pregnancy insulin doses.
- Both metformin and intensive lifestyle intervention prevent or delay progression to diabetes in women with a history of GDM.
- We recommend that all women who have had gestational diabetes receive counselling on lifestyle measures to reduce the risk of type 2 diabetes, and the need for regular diabetes screening, especially before any future pregnancies.

Contraception:

- Any type of contraception is acceptable.
- Low-dose oestrogen-progestin oral contraceptives may be used in women with a history of GDM as long as there is no medical contraindication.
- Progestin-only (but not combined oestrogen-progestin) oral contraceptives (OCs) have been associated with an increased risk of developing type-2 diabetes in women with recent GDM.

Future risks:

These patients are at high risk for recurrent GDM, impaired glucose tolerance, and overt diabetes over the subsequent five years.

Recurrence: One-third to two-thirds of women with GDM will have GDM in their subsequent pregnancy.

5. Follow-up and prevention of type-2 Diabetes Mellitus

All women with previous GDM should undergo an oral glucose tolerance test 6 to 12 weeks after delivery, using a two-hour 75-gram oral glucose tolerance test. An abnormal fasting blood glucose level is diagnostic.

a) Diagnose diabetes, if fasting glucose level is ≥7 mmol/L (126 mg/dl) and/or 2-hour post glucose level is ≥11.1 mmol/L (200mg/dl),
b) Diagnose impaired fasting glucose if fasting blood glucose level is 5.5-6.9 mmol/L (100-125 mg/dl) and
c) Diagnose impaired glucose, tolerance if the 2-hour post glucose load ranges from 7.8-11 mmol/L (140-200 mg/dl)

Follow-ups:

Those with impaired glucose tolerance should be counselled about their risk for developing overt diabetes and referred for proper management.

They should have annual assessment of their glycaemic status

Women with normal glucose tolerance should be counselled regarding their risk of developing GDM in subsequent pregnancies and Type 2 diabetes in the future, long-term follow up is essential. Reassessment of glycaemic status should be undertaken every two years

2.3.6 Hypertension in Pregnancy

• Hypertensive disorders during pregnancy are one of the leading causes of maternal morbidity and mortality.

• Hypertension in pregnancy is associated with higher rates of preterm birth, placental abruption, intrauterine growth restriction, stillbirths, and perinatal mortality.

• Early detection and management of women with high risk factor is critical to the management of pregnancy-induced hypertension and the prevention of convulsions. These women should be followed up regularly and given clear instructions on when to return to their health care provider.

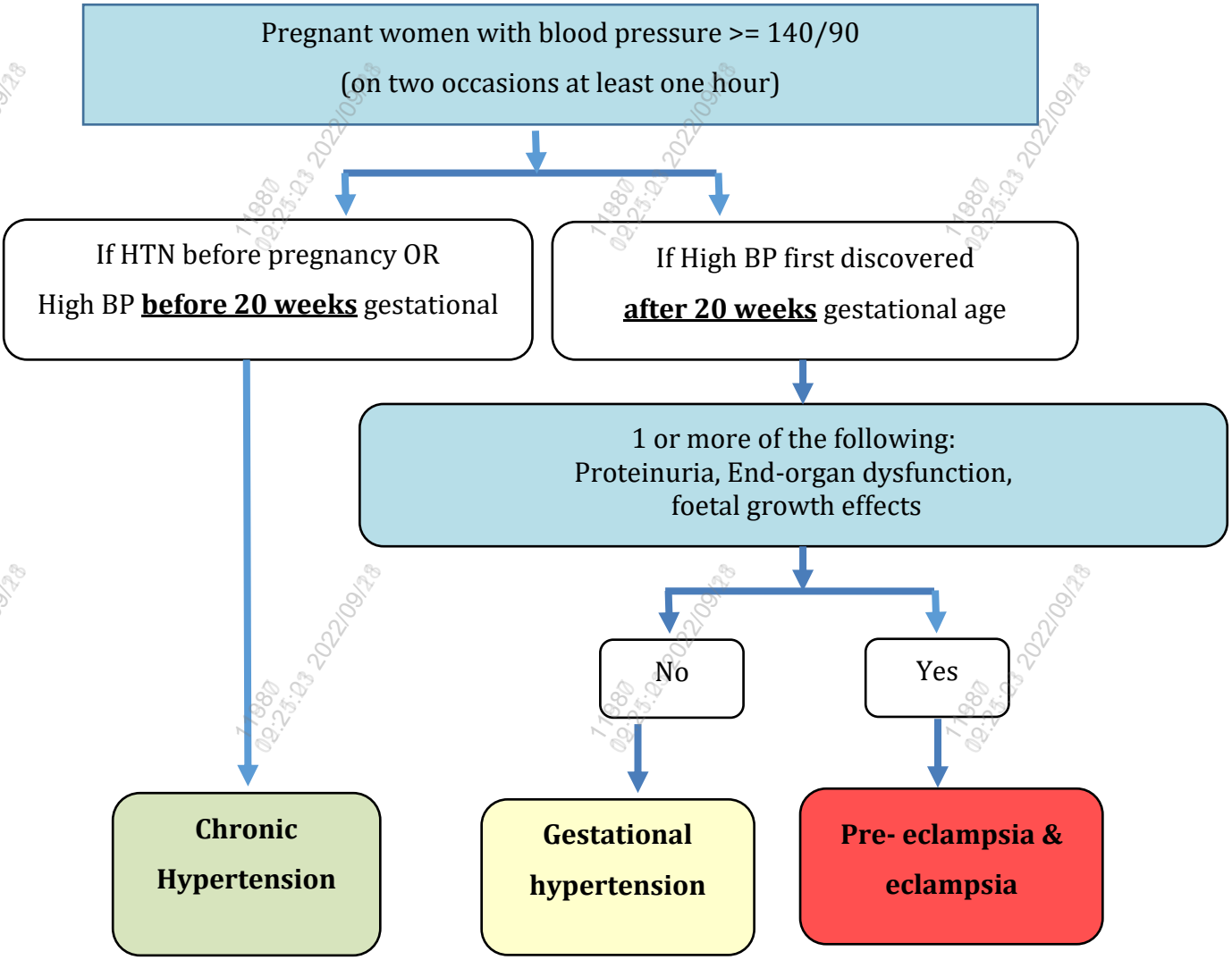
Screening for hypertension should be done all pregnant women in each ANC visits

Classification of Hypertension in pregnancy:

There are three major hypertensive disorders that occur in pregnant women:

1. Chronic hypertension
2. Gestational hypertension
3. Preeclampsia - eclampsia

ALGORITHM 7: HYPERTENSION IN PREGNANCY



Preconception Care of Women in Reproductive Age with Hypertension Include:

- Counselling about the risks of hypertension during pregnancy
- All women with chronic HTN, should be counselled earlier in their hypertension clinics about the need to change their medication regimen if they become pregnant or planning for pregnancy.
- Women who have chronic hypertension should be evaluated annually for end-organ effects (e.g., renal insufficiency, retinopathy, ventricular hypertrophy,).
- Hypertension should be controlled prior to conception.
- Offer pregnant women with hypertension advice on weight management, exercise, healthy eating and lowering the amount of salt in their diet.
- Advice early registration and monitoring after pregnancy confirmation
- Folic acid should be prescribed for all women at preconception care 3 months before pregnancy and continue on it till the end of pregnancy

Risk Factors for Preeclampsia at ANC Booking Assessment

TABLE 20: RISK FACTORS FOR PREECLAMPSIA AT ANC BOOKING ASSESSMENT

Moderate risk factors include:	High risk factors include:
● First pregnancy ● Age 40 years or older ● Pregnancy interval of more than 10 years ● Body mass index (BMI) ≥ 35 kg/m2 at first visit ● Family history of pre-eclampsia ● Multiple pregnancy	● Hypertensive disease in a previous pregnancy ● Chronic kidney disease ● Autoimmune disease, such as systemic lupus erythematosus or antiphospholipid syndrome ● Type 1 or type 2 diabetes ● Chronic hypertension

Note:* Aspirin (75 mg – 150 mg) *per day is recommended for pregnant women with at least two moderate risk factors or at least one high risk factor for preeclampsia to take as early as pregnancy is confirmed (preferably 12 weeks) and consider for continuation until 36 weeks of gestation.

Management of Hypertension in Pregnancy and Postpartum

1. Chronic Hypertension in Pregnancy

Definition:

Chronic hypertension is diagnosed by BP of 140/90 mm Hg and above (on two occasions taken at least one hour apart) that is present at the booking visit, or before 20 weeks, or if the woman is already taking antihypertensive medication or persisted high BP 12 weeks after delivery.

Classification:

- Mild HTN: BP (140/90 – 149/99 mmHg)
- Moderate HTN BP 150-159 /100 –109 mmHg
- Severe HTN: BP ≥ 160/110 mmHg
- **Assess** the risk factors for preeclampsia (see Table 20)

Antenatal Management of Chronic Hypertension:

1. **Do baseline investigations** (if not done for the last 3 months): RFT, uric acid, LFT, TFT, urine albumin creatinine ratio and ECG for all cases.
2. **Start/adjust antihypertensive medication:**
   a. **Chronic HTN on medication:**
   - Discuss the case with obstetrician by phone
   - Continue treatment, if safe to do so unless blood pressure is < 110/70 mmHg or the woman has symptomatic hypotension.
   - Change to safe drugs in pregnancy i.e., Stop ACE inhibitors, ARBs and diuretics within 2 days (if not stopped pre pregnancy) and offer safe alternatives (see table 21)

   b. **Chronic HTN not on medications or diagnosed at booking:**
   - Monitor by BP chart for 5 days
   - Discuss the case with obstetrician by phone
   - Initiate antihypertensive therapy if persistent systolic BP ≥140 mmHg or diastolic BP of 90 mmHg, or signs of hypertensive target-organ damage.

- Treat with first line drug Labetalol 200 mg (based on the BP chart), nifedipine 20 mg for women in whom labetalol is not suitable, or methyldopa 250 mg if both labetalol and nifedipine are not suitable.)
- Aim: BP < 135/85mmHg (Don't lower BP to less than 130 /80 mmHg)
- Start at least 75 mg of Aspirin daily from 12 weeks till birth

Instruct woman to report any symptoms suggestive of preeclampsia, decreased foetal movement, vaginal bleeding and signs of preterm labour

3. **Do ultrasound** scan: Routine (dating scan, anomaly scan) plus additional foetal growth scans every 4 weeks until delivery.
4. **Refer to obstetrician in secondary care:**
   - Mild – Refer the case with urgent appointment
   - Moderate HTN: Discuss the case with obstetrician and refer as advised
   - Severe HTN: Escort as EMERGENCY after stabilization
5. **Antenatal follow up:**

- Pregnant women should be following up in secondary / tertiary care
- They can be given additional antenatal appointments in Health center as advised by obstetrician (shared care)

2. Gestational hypertension

Definition:

- Not known hypertensive
- Elevated blood pressure first detected after 20weeks of gestation in the absence of proteinuria or new signs of end organ dysfunction
- BP readings should be documented on two occasions at least one hour apart.

Classification

- Mild HTN: BP (140/90 – 149/99 mmHg)
- Moderate HTN BP 150-159 /100 –109 mmHg
- Severe HTN: BP ≥ 160/110 mmHg

Antenatal Management of gestational hypertension

1. **Do full assessment** which should include history, examination and assessment of risk factors
2. **Measure full blood count, liver function and renal function at presentation**
3. **Discuss the case** with obstetrician by phone
4. **Start antihypertensive medication as follow:**

a) Mild – Moderate gestational HTN:

- Start anti-hypertensive treatment if BP remains above 140/90 mmHg.
- Treat with first line oral Labetalol 200 mg (based on BP chart). Alternatives include Methyldopa and Nifedipine SR.
- Aim of BP below 135/85 mmHg
- Measure BP and check for proteinuria once to twice weekly (depending on BP) until BP is 135/85 mmHg or less
- Measure full blood count, liver function and renal function at presentation and then weekly
- Refer mild cases with urgent appointment
- For moderate cases, discuss with obstetrician and refer accordingly

b) Severe gestational HTN:

- Give intravenous hydralazine or labetalol (oral or Intravenous), repeat the dose every 15 minutes
- Test for proteinuria and look for signs and symptoms of pre-eclampsia/eclampsia and managed accordingly (see algorithm 8)
- Stabilize and escort to secondary / tertiary care as emergency as soon as possible
- ***Note:*** until escorting the patient , measure BP every 15minutes

Note: **The cases with gestational hypertension should be followed up at secondary and tertiary hospitals for plan of management**

3. Pre-eclampsia

Definition:

- New onset of hypertension (over 140 mmHg systolic or over 90 mmHg diastolic) after 20 weeks of pregnancy and the coexistence of one or more of the following new-onset conditions:

i. **Proteinuria** (urine protein: creatinine ratio of 30 mg/mmol or more or albumin: creatinine ratio of 8 mg/mmol or more, or at least 1 g/litre [2+] on dipstick testing) or

ii. **Other maternal organ dysfunction:**

- Renal insufficiency (creatinine 90 micromol/litre or more)
- Liver involvement (elevated transaminases [alanine aminotransferase or aspartate aminotransferase over 40 IU/litre] with or without right upper quadrant or epigastric abdominal pain)
- Pulmonary oedema
- Neurological complications such as eclampsia, altered mental status, blindness, stroke, clonus, severe headaches or persistent visual scotomata
- Haematological complications such as thrombocytopenia (platelet count below 150,000/microlitre), disseminated intravascular coagulation or haemolysis

- **HELLP syndrome**

Haemolysis, elevated liver enzymes and low platelet count.

iii. **Uteroplacental dysfunction** such as foetal growth restriction, abnormal umbilical artery doppler waveform analysis, or stillbirth.

- BP readings should be documented on two occasions at least one hour apart. If systolic BP ≥ 160 mmHg or diastolic ≥ 110 mmHg confirmation within minutes is sufficient
- Look for symptoms and signs of severe preeclampsia (severe headaches, visual scotomata, nausea or vomiting, epigastric pain, oliguria and severe hypertension, as well as progressive deterioration in laboratory blood tests such as rising creatinine or liver transaminases or falling platelet count, or failure of foetal growth or abnormal Doppler findings.)

Classification

- Preeclampsia
- Preeclampsia superimposed on chronic hypertension

Antenatal management of pre-eclampsia:

1. Carry out a full clinical assessment at each antenatal appointment
2. **If BP 150/100 to159/109 mmHg:** Give Intravenous hydralazine or intravenous labetalol (if injection is not available give oral labetalol 200 mg) and escort as emergency to secondary / tertiary hospital
3. **If BP ≥ 160/110mmHg OR there are symptoms or signs of severe preeclampsia** (see page 93) :
   - Give Intravenous hydralazine 5 MG (if available), or Intravenous labetalol 20 MG over 2 minutes or Oral Labetalol 200 mg.

     AND
   - Give magnesium sulphate (loading dose 4 g (Prepare 8 ml of 50% magnesium sulphate solution + 12 ml of normal saline). To be given slowly IV over 15-20 minutes.), followed by an infusion of 1 g/hour maintained for 24 hours. If the woman has had an eclamptic fit, the infusion should be continued for 24 hours after the last fit. If patient developed respiratory arrest, stop magnesium sulphate and give calcium gluconate (Antidote for MgSo4) 1 g (10 ml of 10% solution) IV slowly until respiration begins.

     ***Note:* Do not use diazepam, phenytoin or other anticonvulsants as an alternative to magnesium sulfate in women with eclampsia.**

- Stabilize and Escort the patient to secondary / tertiary hospital. Repeat BP measurement EVERY minutes when waiting for the ambulance
- Severe hypertension can be confirmed within a short interval (minutes)

ALGORITHM 8: SUMMARY OF ASSESSMENT AND MANAGEMENT OF PREGNANT WOMEN WITH HIGH BLOOD PRESSURE

At any antenatal visit, pregnant women with blood pressure >= 140/90 (at least 2 readings within one hour)

- **Medical History: - known** case of HTN (with or without treatment), Chronic kidney disease, Type 1 or 2 diabetes, autoimmune disease such as systemic lupus erythematosus or anti phospholipid syndrome
- **Past obstetric history:** - hypertensive diseases in previous pregnancies
- **Family History:** - HTN, pre-eclampsia
- **Risk factors for developing Pre-eclampsia:** first pregnancy, Age 40 yrs. or older, pregnancy interval of more than 10 yrs., multiple pregnancy
- **Clinical examination:** BMI >30, Pulse, pedal oedema, puffiness in face, hands and feet, weight gain, abdominal examination
- **Do baseline investigations**: urine dipstick for protein, urine microscopy, CBC, U&E, LFT, Uric acid, urine albumin to creatinine ratio.
- **Ultrasound:** foetal viability, gestational age, foetal weight

Danger symptoms & signs of pre-eclampsia

- Headache, visual disturbance, vomiting, epigastric pain, puffiness in hands, feet and face
- Proteinuria
- End organ dysfunction (Renal insufficiency, Elevated liver enzymes, low platelets)
- Foetal growth restriction

No

Mild to Moderate (Bp 140-159/90-109)

- **Start oral antihypertensive medications (Labetalol** 200 mg, Nifidiine 20 mg SR if labetalol not suitable, Methyldopa 250 mg if both labetalol and Nifidipine are not suitable)
- **Start Aspirin 75- 150 mg** for all patients once daily from 12 weeks.
- **Refer to secondary care as urgent appointment.**
- **Discharge home with BP chart**

Follow up BP chart and urine protein after one week

UNONTROLL → **Upgrade treatment gradually** aim for target BP of 135/85 Re-assess Danger signs. → If any Danger signs appear any times → **Pre- eclampsia & eclampsia**

Severe (Bp >=160/110)

- Give **Hydralazine 5 mg IV** or **Labetalol 20 mg IV or Labetalol 200 mg orally** for all patients.
- **Stabilize the patient and escort as emergency** to hospital for further assessment and investigations to rule out.

Yes

Pre- eclampsia & eclampsia

- Give **Hydralazine 5mg IV** or **Labetalol 20 mg IV or Labetalol 200 mg orally** for all patients.
- **<u>If BP >=160/110</u>** Give also **Magnesium sulphate IV**
- Be aware of possible respiratory arrest due to magnesium sulphate, give anti dot (calcium gluconate) IV slowly.
- **Manage convulsions** (*(see Section 2.3.6 Hypertension in Pregnancy, d)Eclampsia))*
- If in labour, **expedite delivery** if possible
- **Stabilize the patient and escort as emergency** to hospital.

TABLE 21: SAFE ANTIHYPERTENSIVE MEDICATION IN PREGNANCY

Drug	Starting dose	Usual effective dose	Max dose	Remarks
Labetalol	100 mg tab twice daily Injection 20 mg IV over 2 minutes initially then 40-80 mg IV every 10 minutes	200 to 800 mg in two or three divided doses.	2400mg Total dose should not exceed 300 mg	• First line of treatment • Labetalol should be used in cautious in women with history of asthma & heart failure
Methyldopa	250 mg tabs two to three times a day	1000 mg in 2-3 divided doses	3000 mg	•Contraindicated in depression
Nifedipine SR	20 mg BID	30 to 90 mg OD	120 mg	• can be added as a second line treatment
Hydralazine IV	5mg IV slowly over 3-4 minutes, if IV not possible give IM	Only for emergency	20 mg	• Only for severe hypertension; BP ≥ 160/110 mmHg

d) Eclampsia

Definition:

A convulsive condition associated with pre-eclampsia.

Antenatal management:

- Maintain ABC (Airway, Breathing, Circulation)
- Manage convulsions
  - Gather equipment (airway, suction, mask and bag, oxygen) and give oxygen at 4-6 L per minute.

- Protect the woman from injury but do not actively restrain her.
- Start an IV line and infuse IV fluids (maintenance dose: 80 ml/hr or 1ml/kg/hr) after the convulsion.
- Give anticonvulsive drug: 4 g of 20 % magnesium sulphate loading dose. To be given slowly IV over 5-15 minutes. · If unable to give IV, give 10 g of magnesium sulphate IM divided into 2 doses; give 5 g (10 ml of 50% solution) IM deep in upper outer quadrant of each buttock with 1 ml of 2% lignocaine in the same syringe.
- Recurrent fits should be treated with a further dose of 2–4 g given intravenously over 5 to 15 minutes.

To Prepare 4 g of 20 % magnesium sulphate take 8 ml of 50% magnesium sulphate solution (4 mEq / ml) + 12 ml of normal saline

- ***Note:*** **in case of respiratory arrest (caused by magnesium sulphate):**
  - Assist ventilation with face mask and bag
  - Give calcium gluconate 1 g (10 ml of 10% solution) IV slowly until calcium gluconate begins to antagonize the effects of magnesium sulphate and respiration begins.

- Position the woman on her left side to reduce risk of aspiration of secretions, vomit and blood.
- Give antihypertensive medications such as labetalol oral or IV as first line, if still BP uncontrolled, give Hydralazine 5 mg IV, slowly over 3-4 minutes, if diastolic BP ≥ 100 mmHg. If IV not possible give IM, if diastolic blood pressure remains > 90 mmHg, repeat the dose at 30-minute intervals until diastolic BP is around 90 mmHg. Do not give more than 20 mg in total.
- Aspirate the mouth and throat as necessary.
- Monitor vital signs (pulse, blood pressure, and respiration), reflexes and foetal heart rate hourly.
- If in labour, expedite delivery if possible
- Do Not give ergometrine after delivery
- Escort as an emergency after resuscitation (If not in labour)

New onset postpartum hypertension may be due to onset of preeclampsia or HELLP syndrome after delivery

Treatment of hypertension during the postnatal period, including during breastfeeding

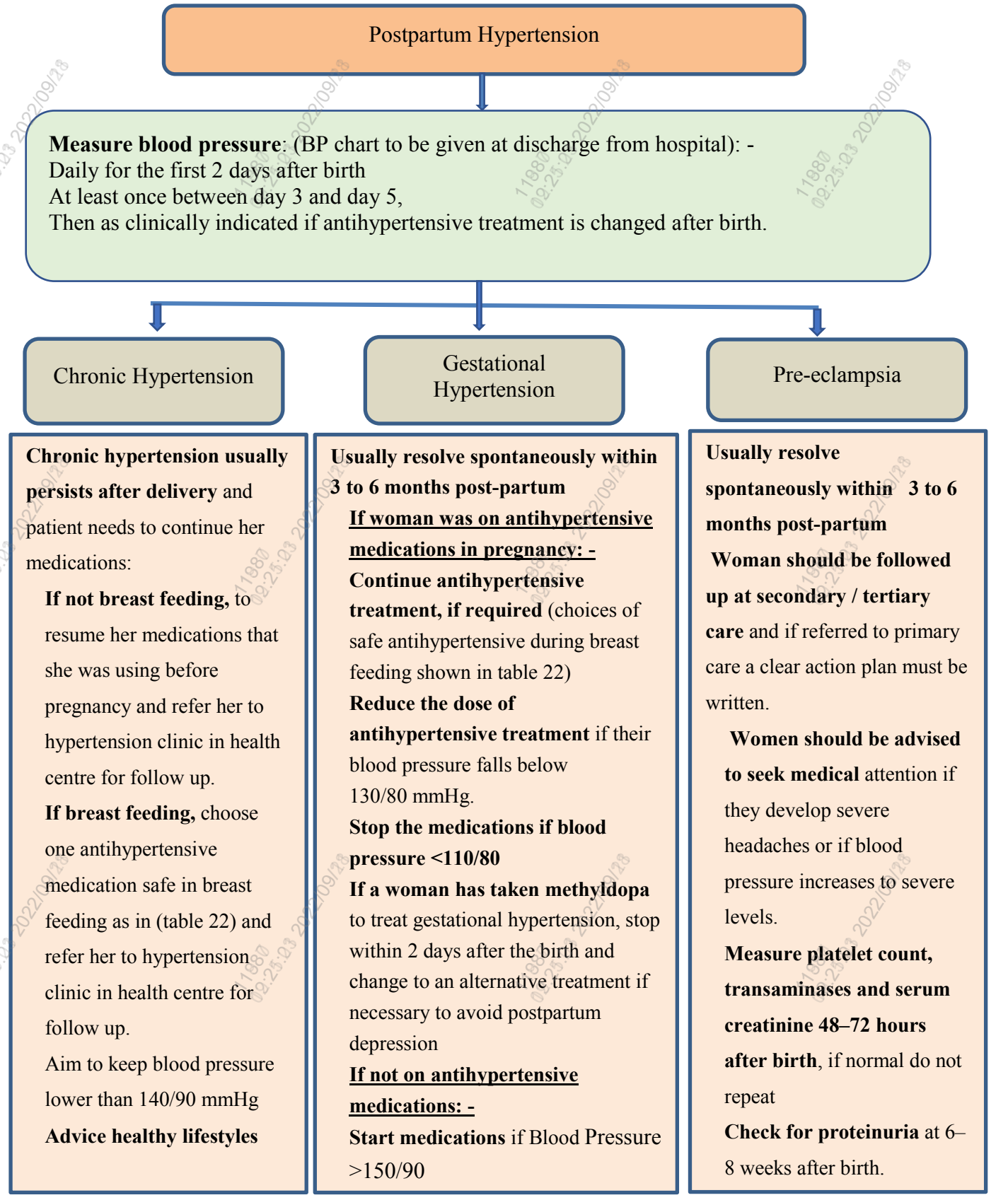
- Postpartum Hypertension and pre-eclampsia are either persistent or exacerbated hypertension in women with previous hypertensive disorders of pregnancy or a new onset condition present for the first time in the postnatal period.
- 81 % of new onset hypertension (Gestational hypertension and pre-eclampsia) usually resolves and normalize with 3 months' post-partum, but it can be persistent up to 6 months
- It is important to advice the women to seek medical help if they develop severe headaches or if blood pressure increases to severe levels.
- Advise women with hypertension who wish to breastfeed that their treatment can be adapted to accommodate breastfeeding, and that the need to take antihypertensive medication does not prevent them from breastfeeding.
- Explain to women with hypertension who wish to breastfeed that:
  - most antihypertensive medicines taken while breastfeeding only lead to very low levels in breast milk, so the amounts taken in by babies are very small and would be unlikely to have any clinical effect
  - As antihypertensive agents have the potential to transfer into breast milk: advise women to monitor their babies for drowsiness, lethargy, pallor, cold peripheries or poor feeding.
- Most common medications that can be used and considered safe during breast feeding:
  - **First- line treatment:** ACE inhibiters: (enalapril, captopril, avoid all other ACE inhibiters) except in women of African family origin, in whom a Calcium Channel blocker: (Nifedipine SR or amlodipine) would be used as first- line.
  - **Second - line treatment:** Beta blockers (less secreted in milk): Labetalol, metoprolol, propranolol, avoid other beta blockers (highly secreted in milk) such as atenolol.
- For women with hypertension in the postnatal period, if blood pressure is not controlled with a single medicine, consider a combination of nifedipine (or amlodipine) and enalapril. If this combination is not tolerated or is ineffective, consider either:
  - Adding labetalol to the combination treatment or
  - Swapping 1 of the medicines already being used for labetalol
- When treating women with antihypertensive medication during the postnatal period, use medicines that are taken once daily when possible.

- Treat women with hypertension in the postnatal period who are not breastfeeding and who are not planning to breastfeed as any non-pregnant women.

TABLE 22: SAFE ANTIHYPERTENSIVE DRUGS CAN BE USED DURING BREAST FEEDING

Class	Drugs considered save	Avoid- potentially harmful, No or Limited data
Beta blockers	Labetalol, propranolol, metoprolol	Avoid atenolol, no data for other beta blockers
Calcium channel blockers	Nifedipine, amlodipine	Limited data for Diltiazem, verapamil Avoid other calcium channel blockers
ACE inhibiters	Captopril, enalapril	Other ACE inhibiters
Angiotensin receptor blockers	None	No data
Thiazide diuretics	None	Limited data
Other	Methyldopa, Hydralazine	Limited data for Prazocin

ALGORITHM 9: POSTPARTUM HYPERTENSION



Risk of recurrence of hypertensive disorders in future pregnancies: -

TABLE 23: PREVALENCE OF HYPERTENSIVE DISORDERS IN A FUTURE PREGNANCY

Type of hypertension in previous or current pregnancy	• Risks in future
Gestational hypertension	• Gestational hypertension in future is about ≈11% to 15% (up to 1 in 7 women) • Pre -eclampsia - about ≈7% (1 in 14 women) • Chronic hypertension in the future is about ≈3% (up to 1 in 34 women)
Pre -eclampsia	• Gestational hypertension in future about ≈6% to 12% (up to 1 in 8 women) • Pre -eclampsia in future is up to about ≈16% (1 in 6 women) • If birth was at 28–34 weeks1: ≈33% (1 in 3 women)[1] • If birth was at 34–37 weeks: ≈23% (1 in 4 women • Chronic hypertension in the future is about ≈2% (up to 1 in 50 women)

2.3.7 Thyroid diseases in pregnancy

- Thyroid diseases are commonly encountered during pregnancy. Women may already have the diagnosis prior to conception or may be first diagnosed after becoming pregnant.
- If untreated during pregnancy is might be associated with an increased risk of miscarriage, premature birth, placental abruption, hypertensive disorders, growth restriction and foetal neurocognitive and developmental abnormalities

Preconception Care

Women with hypothyroidism should be counselled about:

- The importance of immediate monitoring at the onset of pregnancy
- To notify their physician immediately, after a missed menstrual cycle or positive home pregnancy test, to adjust their doses, by increasing their medication by two additional doses per week

Women with hyperthyroidism should be counselled about:

- Discussion of available treatment, (long term anti thyroid medication, radioactive iodine ablation, and subtotal thyroidectomy) and potential adverse effects, as well as the impact on future pregnancies
- A significant increase in congenital malformations and neonatal hypothyroidism has been reported when hyperthyroidism is not controlled in the first trimester of pregnancy
- Although radioactive iodine ablation is not associated with long term consequences on gonadal function, fertility, or pregnancy outcomes, women should wait six months after the therapeutic dose is administrated.
- The importance of achieving euthyroidism before conception.

Thyroid Disease Screening in Pregnancy

- Universal TSH screening for thyroid disease in pregnancy is not recommended.
- **Targeted screening by Thyroid Stimulating Hormone (TSH) is recommended for women at high risks**, including women with history of:
  - Thyroid disease
  - Current or past use of thyroid therapy
  - Any therapeutic intervention for hyperthyroidism e.g., surgery, radioactive iodine
  - Postpartum thyroid dysfunction
  - Symptoms suggestive of thyroid dysfunction
  - Examination findings goitre, nodules, etc.
  - Type 1 diabetes mellitus
  - Autoimmune disorder
  - Infertility
  - Morbid obesity, (BMI >= 40)
  - Recurrent miscarriage
  - Previous delivery of infant with thyroid disease
  - Family history of autoimmune thyroid disease

The optimal method to screen is to do Thyroid Stimulating Hormone (TSH).

If Thyroid Stimulating Hormone (TSH) is abnormal refer the patient with urgent referral to physician/endocrinologist and obstetrician, (She should be informed about the risk of delay review by medical team on herself and her foetus, if she is following in another hospital, she may need to arrange early appointment with them)

Most common thyroid diseases encountered in pregnancy:

- Hypothyroidism
- Hyperthyroidism and thyroid storm
- Thyroid nodules and cancers
- Postpartum thyroiditis

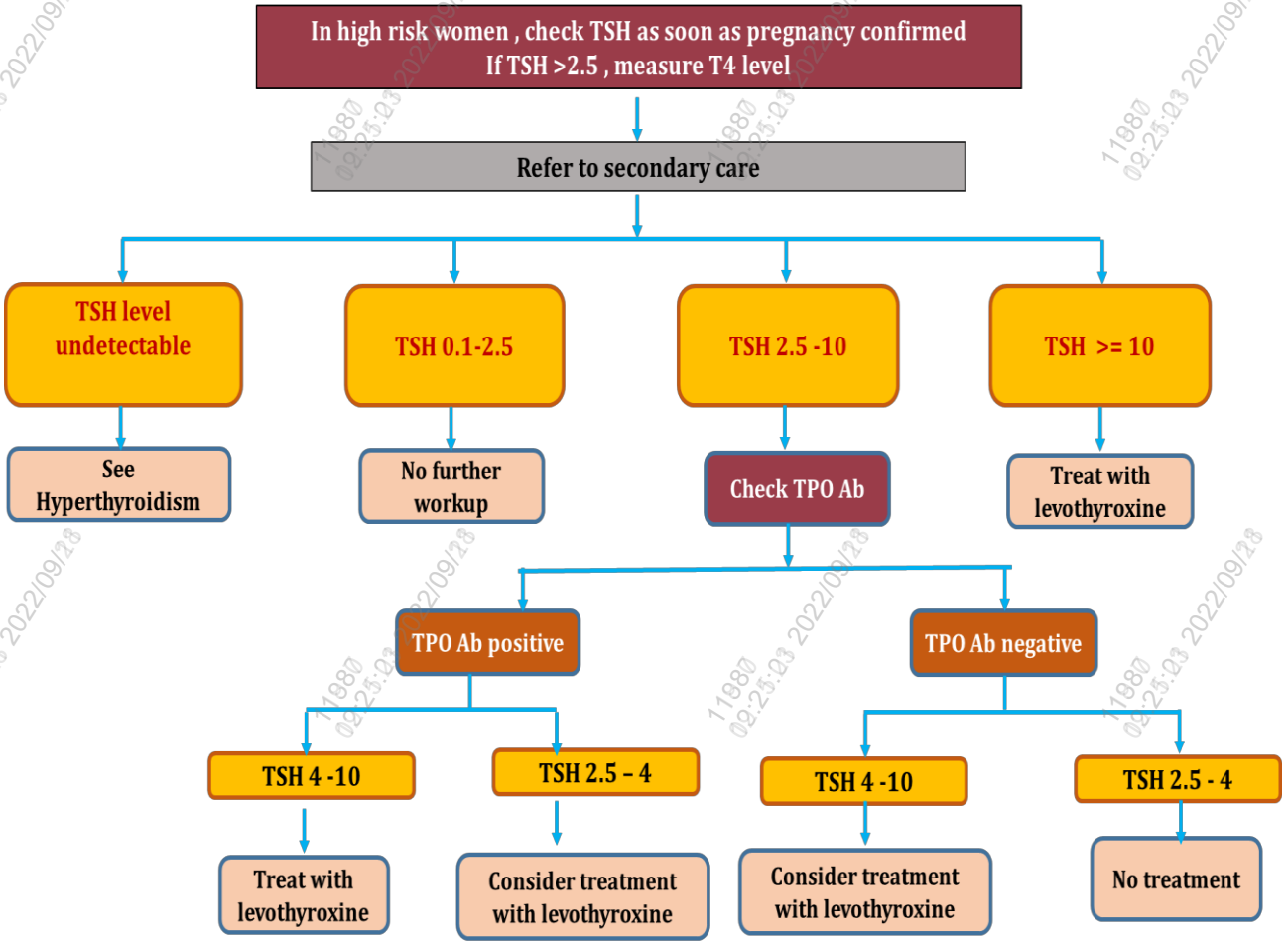
Hypothyroidism

Maternal hypothyroidism is defined as the presence of an elevated TSH and a decreased serum FT4 concentration during gestation, with both concentrations outside the (trimester-specific) reference ranges.

- Clinical symptoms include: - cold intolerance, muscle cramps, weight gain, oedema, dry skin, hair loss
- The most frequent cause of hypothyroidism is autoimmune thyroid disease (Hashimoto's thyroiditis), where Thyroid Peroxidase Ab (TPOAb) enzyme is high and can be detected in approximately 30%–60% of pregnant women with an elevated TSH concentration
- It is appeared to be a greater risk for adverse events in women who are TPOAb positive compared to those who are TPOAb negative, even when thyroid function is identical.
- Decisions about treatment must be based on both measurement of thyroid function and TPOAb status

Diagnosis and Management of Hypothyroidism

ALGORITHM 10: DIAGNOSIS AND MANAGEMENT OF HYPOTHYROIDISM



TPO Ab: thyroid peroxidase antibody

Note: *Appropriate management results in improved outcomes, demonstrating the importance of proper diagnosis and treatment.*

Hypothyroidism Follow-up:

- In women known case of hypothyroidism, Levothyroxine is titrated to achieve a goal of serum thyroid-stimulating hormone (TSH) level less than 2.5 mIU /L.
- All women with overt and subclinical hypothyroidism (treated or untreated) or those at risk for hypothyroidism (e.g., patients who underwent thyroid surgery, treated with radioactive iodine or have positive autoimmune antibodies) should be monitored with a serum TSH measurement every 4 weeks until 20-week gestation, it should be measured again at 24 to 28 weeks and 32 to 34 weeks' gestation

Postpartum care of Hypothyroidism:

- Women with hypothyroidism should be referred to physician with an early appointment for further management and follow up
- Levothyroxine should be decreased to the pre- pregnancy dosage over a four-week period and further adjustment should be guided by TSH levels six weeks after delivery then after 3 and 6 months.
- More than 50% of women with Hashimoto's thyroiditis required an increase in the pre gestational thyroid hormone dose in the postpartum period, due to an exacerbation of autoimmune thyroid dysfunction post-partum
- Levothyroxine can be stopped for women with thyroid autoimmunity whose having normalized or decreased TSH at delivery. Repeat serum TSH at 6 weeks' post-partum.

Hyperthyroidism with pregnancy

- Hyperthyroidism is less common than hypothyroidism
- It can be physiologic change in pregnancy due to the high β-hCG levels like in cases of multiple gestation and molar pregnancies
- It can be induced transiently by hyperemesis gravidarum.
- Diagnoses is bases on the clinical symptoms.
- Clinical symptoms of hyperthyroidism include: - Tachycardia, nervousness, tremors, heat intolerance, sweating, weight loss, diarrhoea, goiter, eye signs in case of Graves' Disease, pretibial myxedema.

Types of hyperthyroidism in pregnancy:

A. Known hyperthyroidism
B. Overt hyperthyroidism
C. HCG - induced hyperthyroidism
D. Subclinical hyperthyroidism

Management & Follow-up of Hyperthyroidism in Pregnancy

Refer pregnant woman with hyperthyroidism as urgent to physician /endocrinologist

- Patients on anti-thyroid medications if presented with fever, sore throat, do CBC if available and consult the on call physician and refer the patient to rule out agranulocytosis
- Follow up throughout pregnancy should be done at secondary/ tertiary care

Thyroid Nodules Detected During Pregnancy

- Prevalence: 1-2%, 90-95% of solitary nodules are benign
- Aside from history and physical examination, order TSH, then refer her to physician for further management.

Thyroid Storm (medical emergency)

- Also referred to as thyrotoxic crisis, is an acute, life-threatening, hyper metabolic state induced by excessive release of thyroid hormones in individuals with thyrotoxicosis.
- Clinical features include (fever, tachycardia, cardiac arrhythmia, CNS abnormalities, cardiac myopathy leading to heart failure and pulmonary hypertension)
- Patients should be treated in an ICU setting for close monitoring of vital signs and for access to invasive monitoring and inotropic support, if necessary.
- Initial stabilization and management at primary health care includes:
  - Supportive measures (connect on cardiac monitor, supplemental oxygen, and intravenous fluids. Dextrose solutions are the preferred intravenous fluids to cope with continuously high metabolic demand.
  - Aggressively control hyperthermia by applying sponging and by administering paracetamol
  - Administer beta blocker drugs (e.g., propranolol) to minimize sympathomimetic symptoms orally at a dose of 60-80 mg
  - Administer intravenous hydrocortisone 100 mg to decrease peripheral conversion of T4 to T3. This may also be useful in preventing relative adrenal insufficiency due to hyperthyroidism and improving vasomotor symptoms.

- Escort the patient to secondary care for correcting the hyperthyroid state by administering a loading dose of antithyroid medications and close monitoring.

Post-partum care of women with hyperthyroidism

- Refer woman to continue follow up with secondary care.

Postpartum Thyroiditis

- Postpartum thyroiditis is defined as temporary inflammation of the thyroid gland that results in abnormal TSH, affects around 5 % of women after birth and within the first 12 months postpartum
- It is the most common form of postpartum thyroid dysfunction and may present as hyper- or hypothyroidism
- Refer urgently to physician whenever detected
- Propranolol is the recommended treatment for symptomatic hyperthyroidism
- Levothyroxine is indicated for the hypothyroidism in women who are symptomatic, breastfeeding, or who wish to become pregnant

2.3.8 Sickle Cell Disease (SCD) in pregnancy

- SCD is a group of inherited Autosomal Recessive disorders caused by mutation in the 'sickle' gene, which affects haemoglobin structure. It includes sickle cell anaemia (HbSS) and the heterozygous disorders of combination of haemoglobin S with other abnormal haemoglobin.
- Sickle cell trait is a combination of haemoglobin S with normal haemoglobin A

Complications

SCD is associated with both maternal and foetal complications and is a common cause of maternal mortality and severe morbidity. It is one of the leading causes of maternal near-miss and contributed to 6 maternal deaths between 2008 and 2021

a) Maternal complications: -

- Premature labour
- Acute painful crises during pregnancy
- Increase in spontaneous miscarriage
- Antenatal hospitalization
- Delivery by caesarean section
- Infection
- Thromboembolic events
- Increase risk of pre-eclampsia and pregnancy-induced hypertension
- Acute chest syndrome

b) Foetal complications

- Restricted uterine growth
- Perinatal mortality

Preconception care

- Woman with SCD should be advised to plan their pregnancy to optimize their health and reduce complications. Woman should be advised to discuss her intention to conceive with her haematologist/ physician.
- All medications need to be reviewed and adjusted by treating haematologist/ physician such as: Hydroxyurea and ACE I /ARBs which are commonly used in pregnancy to

reduce the acute attacks and renal compilations respectively, should be stopped at least 3 months before conception because of teratogenic effect.

- Vaccination status should be determined and updated before pregnancy. Women should be given:
- H. influenza type b and the conjugated meningococcal C vaccine as a single dose if they have not received these vaccinations before.
- Pneumococcal vaccine every 5 years.
- Hepatitis B vaccine if needed based on her immune status
- Influenza vaccine annually
- Folic acid (5 mg) should be given once daily preconceptually and throughout pregnancy
- Woman should be counselled that SCD is associated with both maternal and foetal complications as mentioned above.

Antenatal care

- **Booking visit**
  - Many women with SCD conceive without preconception care. Therefore, all above actions outlined under preconception care should take place as early as possible and the woman should be referred to secondary care for review by an obstetrician and a haematologist /physician.
  - Take detailed history of the disease including complications, blood transfusion, ICU admissions and surgeries in the past.
  - Take detailed history of previous pregnancies, outcome and any complications.
  - Review medications: if taking hydroxycarbamide, ACE inhibitors or ARBs, these should be stopped
  - Perform clinical examination as outline in the booking visit. It is important to record baseline blood pressure, and to determine splenic size.
  - Women with SCD should be referred to haematologist or physician (if haematologist not available) and to be screened for end organ damage (if this has not been undertaken preconceptually).
  - Women with SCD should avoid precipitating factors of sickle cell crises such as exposure to extreme temperatures, dehydration, hypoxia, overexertion, and stress
  - Persistent vomiting can lead to dehydration and sickle cell crisis and women should be advised to seek medical advice early.

- Give Influenza vaccine if it has not been given in the previous year.
- Check haemoglobinopathy status of husbands of all women with SCD or SCT.
- VTE scoring should be done at booking and in every visit .

Investigations:

- CBC, blood group, Hb electrophoresis, reticulocyte count, antibodies screen
- LFT, RFT, urea & electrolytes
- HIV/hepatitis antigen B& C
- Serum ferritin if anaemic
- Urine culture & sensitivity
- Viability scan

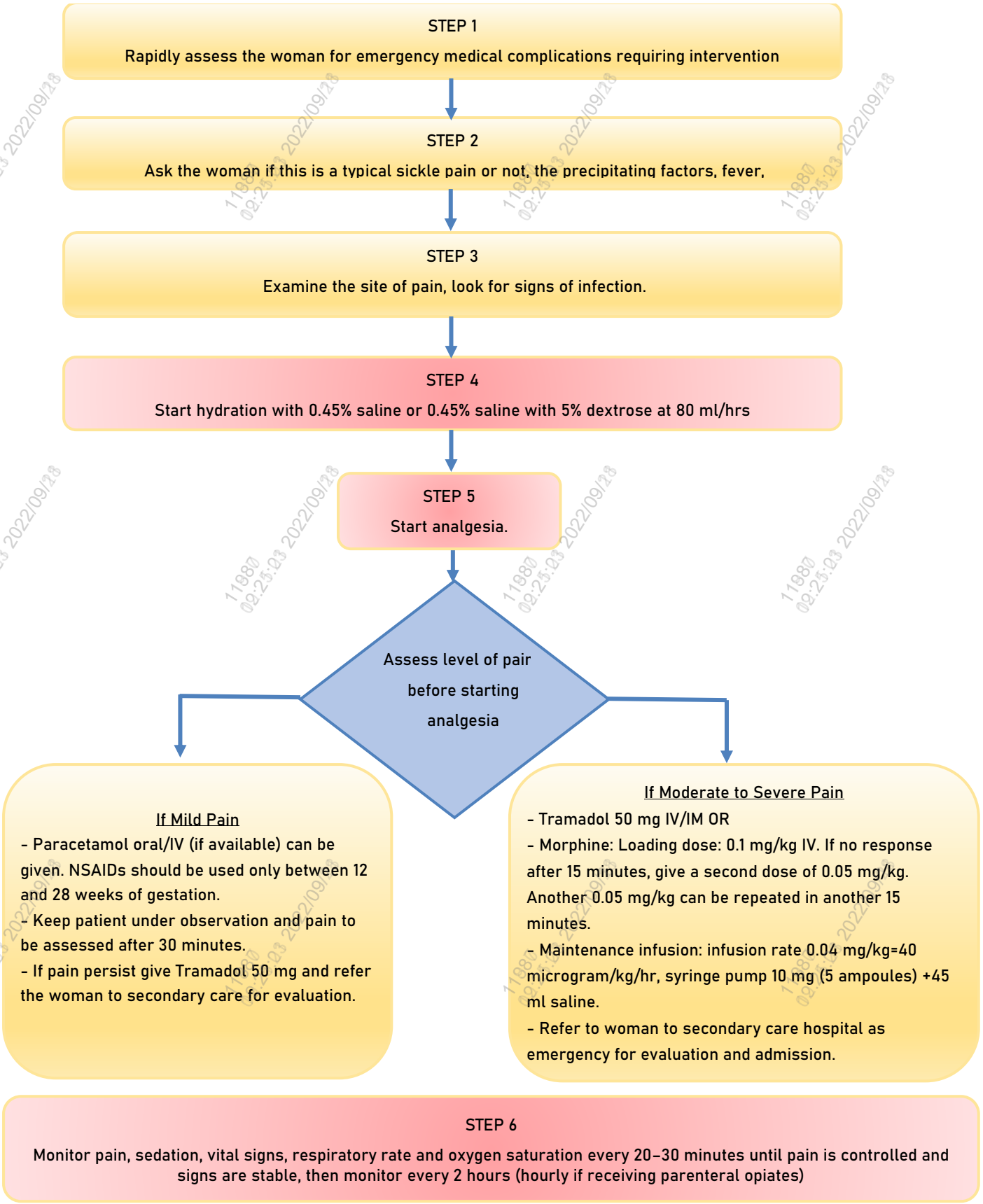
Medications:

- Folic acid 5 mg OD
- Iron supplement may be given to woman with anaemia and low ferritin levels
- Aspirin at least 75 mg once daily from 12 weeks of gestation to reduce risk of developing pre-eclampsia
- Prophylactic antibiotics in post splenectomy patients: Penicillin V 250 mg twice daily

Sickle cell crisis

- Painful crisis is the most frequent complication of SCD during pregnancy.
- About 27% to 50% of women with SCD having a painful crisis during pregnancy.

ALGORITHM 11: WHEN PRESENTED WITH A PATIENT WITH SICKLE CELL CRISIS IN PREGNANCY



Note: Pethidine should be avoided because of the risk of toxicity and pethidine-associated seizures in patients with SCD

- Provide routine postnatal care
- The risk of sickle cell crisis remains increased, it can occur in 25% of women and was more common following general anaesthesia, so to reduce the risk:
  - Women should be encouraged for hydration and early mobilization.
  - Thromboprophylaxis in the form of low-molecular-weight heparin is recommended from 28 weeks, during hospital admissions and postnatal for 6 weeks irrespective of the mode of delivery.
  - Crises should be managed as for non-pregnant women. NSAIDs are routinely administered in the postpartum period and can be used during breastfeeding.
  - Breastfeeding should be encouraged, as in women without SCD.
- Advice on birth spacing:
  - Progesterone only pills are preferred in the first 6 months.
  - Combined Oral contraceptives (COCs) may be prescribed after 6 months with close monitoring of liver function and blood pressure. No additional risk of thromboembolic disease in women with SCD was observed with lower dose of COC pills.
  - Intrauterine device in SCD increases the risk of infection and menorrhagia.
  - Levonorgestrel releasing IUD and Depo-Provera injection are the preferred choice for women with SCD. As per WHO recommendation benefits should outweigh risks.

2.3.9 Intrahepatic Cholestasis of Pregnancy

Introduction

- Intrahepatic Cholestasis of Pregnancy (ICP) is a multifactorial condition characterized by unexplained pruritus in the absence of a skin rash with abnormal liver function tests (LFTs), both which resolve after birth. It frequently develops in late pregnancy in individuals who are genetically predisposed.
- ICP has no clear aetiology, and it is believed to be a multifactorial disorder with environmental, hormonal, and genetic contributions.
- It has been associated with an increased foetal mortality, warranting close antenatal surveillance with obstetrician. Thus, early recognition, treatment, and timely delivery are important.

Complications: -

- **Maternal**
  - Intense pruritus, which may become so intolerable causing lack of sleep.
  - Increased incidence of premature birth
  - Steatorrhea and vitamin K deficiency due to fat malabsorption that can cause a postpartum haemorrhage if not corrected by the time of delivery
- **Foetal**
  - An increased risk for foetal distress /death (due to increased likelihood of meconium passage)

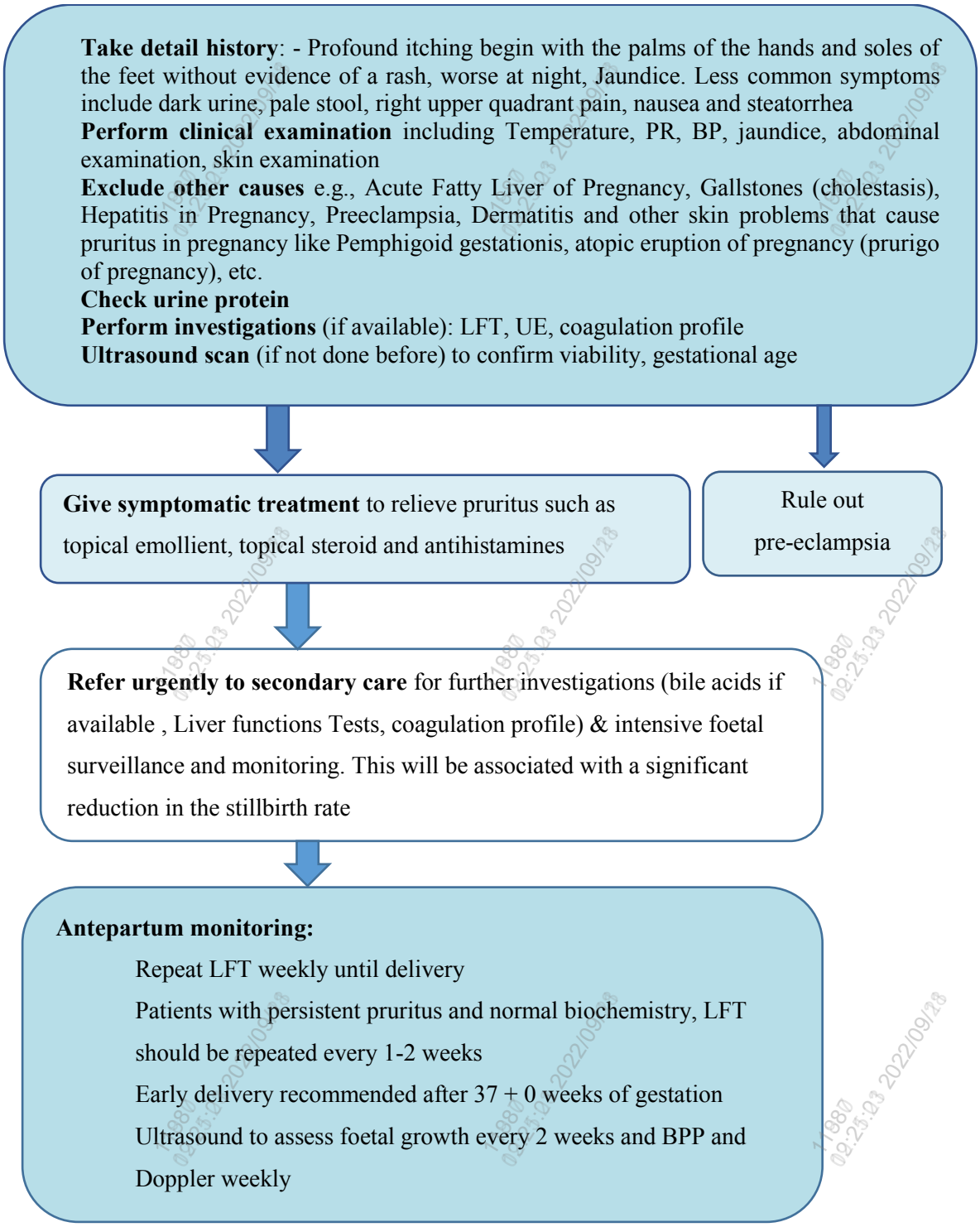
Clinical presentation:

- Intense pruritus +_ excoriation, affecting any part of the body but particularly the palms of the hands and soles of the feet, with no other skin manifestations
- It is often worse at night
- Typically presents in the third trimester

Differential Diagnoses

- Acute Fatty Liver of Pregnancy
- Gallstones (cholestasis)
- Hepatitis in Pregnancy
- Preeclampsia
- Dermatitis and other skin problems that cause pruritus in pregnancy like Pemphigoid gestationis, atopic eruption of pregnancy (prurigo of pregnancy) , scabies.

ALGORITHM 12: INTRAHEPATIC CHOLESTASIS OF PREGNANCY



Post-natal follow up and care:

- Pruritus usually disappears in the first few days following delivery accompanied by normalization of serum bile acids and other liver tests.
- Repeat liver biochemical tests 4-6 weeks after delivery to confirm resolving, if laboratory abnormalities do not return to normal, refer the woman to a physician to assess for underlying hepatobiliary diseases.
- Avoid oestrogen- containing contraception as it may increase the risk of recurrent cholestasis

Recurrence in future pregnancies:

- Cholestasis can recur during subsequent pregnancies in 60-70 percent of women with ICP

2.3.10 Thrombocytopenia in pregnancy

Definition: -

- Thrombocytopenia is defined as drop in platelets count less than 150 x 109/L (The normal serum level of platelets in pregnancy is 150–400 x 109/L.)
- During pregnancy there is a general drop in platelet count, particularly during the last trimester.
- Thrombocytopenia occurs in 8-10% of all pregnancies. In most cases, thrombocytopenia is mild and benign, but it can be associated with severe complications for mother and foetus. The severity is classified as follow:
- The most common cause of thrombocytopenia in pregnancy is gestational thrombocytopenic accounting for 75% of the cases.

TABLE 24: PLATELET COUNT

Category	Platelet count
Mild	>100 x 10^9/L
Moderate	50-100 x 10^9/L
Severe	<50 x 10^9/L

Differential diagnosis of thrombocytopenia in pregnancy

- Gestational Thrombocytopenia
- Immune Thrombocytopenic Purpura (ITP)
- Thrombotic Thrombocytopenic Purpura (TTP)
- Pre-eclampsia, Eclampsia, Haemolysis, Elevated liver enzymes and low platelet count syndrome (HELLP)
- Haemolytic Uremic Syndrome (HUS)
- Hereditary thrombocytopenia
- Pseudo thrombocytopenia
- Viral infections (HIV, Epstein-Barr virus, cytomegalovirus, parvovirus, Hepatitis B virus)
- Medications (heparin, furosemide, etc.)
- Leukaemia/Lymphoma
- Severe Vitamin B12 or Folate Deficiency
- Splenomegaly

Assessment and evaluation of all women with thrombocytopenia in pregnancy:

- **Take history: -** bleeding (epistaxis, bleeding from gum, haematuria, gastrointestinal bleeding, easy bruising), previous history of thrombocytopenia, history of drugs (heparin, furosemide, etc.), family history of Thrombocytopenia.
- **Perform clinical examination including** Vitals: Pulse Rate, Blood Pressure, pallor, signs of bleeding ((Petechial, ecchymosis, purpura -usually only present if platelets <50 x 109/L), splenomegaly, hepatomegaly
- **Investigations** e.g., CBC, Coagulation screening (to be done in secondary), Peripheral blood smear, Renal function test, Liver function test, HIV serology-if not done before
- **Early ultrasound scan** (if not done before) to confirm viability, gestational age and to rule out multiple or molar pregnancy

Gestational Thrombocytopenia

- Defines as drop in platelets count usually mild to moderate (platelets counts between 150 - 80, if less than 80 exclude other causes)
- Diagnosis of exclusion
- Incidental finding on CBC
- Woman usually asymptomatic
- Typically occurs in 3rd trimester
- Spontaneous resolution after 1-2 months following delivery
- May recur in subsequent pregnancy
- Small risk of neonatal thrombocytopenia

NB: Check platelet count at third trimester

Management

- Refer to secondary care hospital for evaluation if platelets < 100
- Council the patient to report immediately, if she developed any bleeding signs
- Avoid traumatic instrumental vaginal delivery to minimize the risk of bleeding
- Verify that counts return to normal after delivery

Immune Thrombocytopenic Purpura (ITP)

- Adult ITP usually a chronic condition occurring in second to third decade of life. It is more common in female than male. It accounts for about 3% of thrombocytopenia in pregnancy.
- Diagnosis is by exclusion, however, in two-third of the cases the diagnosis is already established before pregnancy.
- Woman may have signs of purpura, bruising, mucosal bleeding
- Two thirds of cases are self-limiting

Management

- Pre-conception counselling for those with established diagnosis of ITP before pregnancy:
- ITP may relapse or worsen during pregnancy.
- About one-third of women will require treatment during pregnancy, most commonly around the time of delivery. The treatment might carry both maternal and foetal risks.
- There is a small risk of haemorrhage at delivery.
- It is not possible to predict accurately whether a neonate will be affected. The risk is high if a sibling has had thrombocytopenia, or the mother has undergone splenectomy.
- The risk of intracranial haemorrhage for the foetus/neonate is very low.

Antenatal care:

- Refer to secondary care hospital for multidisciplinary care

Labour/ delivery

- Woman with ITP should be referred for delivery at secondary care hospital

Thrombocytopenia associated with hypertensive disorders

- *(see Section 2.3.6 Hypertension in Pregnancy).*

Thrombotic Thrombocytopenic Purpura (TTP)

- A rare life-threatening disorder occurred in 1: 25,000 pregnancies.
- Onset can vary from first trimester to postpartum period
- TTP that occurred before pregnancy, can relapse during pregnancy

- Signs are due to a severe deficiency of von Willebrand factor (vWf) cleaving protein are:
- Microangiopatic haemolytic anaemia
- Thrombocytopenia
- Neurological symptoms (from headache to coma)
- Renal dysfunction
- Fever
- Abnormal U&E

Management

- Refer as emergency to secondary care hospital

2.3.11 Pregnancy with RH negative blood group

- Rh D negative women who carry an RhD positive foetus may produce antibodies to the foetal Rh D antigens after a fetomaternal haemorrhage (FMH). These antibodies may then cross the placenta in future pregnancies and cause haemolytic disease if the foetus is RhD positive.
- A woman can also be sensitised by a previous miscarriage, spontaneous or elective abortion or amniocentesis or other invasive procedure
- If a pregnant woman is Rh negative, husband should be tested for Rh typing and results should be documented in the Maternal Health Record. If the husband is Rh negative, no further management is required for the woman. If husband is Rh positive, a regular screening for Rh antibodies by performing coomb's test is required.

Management

- Indirect Coomb's test should be performed at the following intervals
  - At first visit (booking)
  - At 28-30 weeks' visit
- If Coomb's test showed to be positive, patient should be referred to the secondary /tertiary care with urgent appointment for Indirect Coomb's Test (ICT) titration

Prophylaxis for women who are Rh negative

Antenatal Prophylaxis

- All Rh-negative pregnant women who have not been previously sensitised should be offered routine antenatal prophylaxis with anti-D immunoglobulin (RAADP) either with a single dose regimen at around 28 weeks (250 -300 mcg = 1250-1500 IU) or two-dose regimen (100 mcg =500 IU given at 28 and 34 weeks).

Note: **If Anti-D immunoglobulin is missed at 28 weeks, do ICT and give as soon as possible.**

- Rh negative women who have received routine antenatal prophylaxis should receive additional anti-D Ig when they are undergoing any potential sensitising procedures like ECV, amniocentesis or has antepartum haemorrhage within 72 hours of the event. If, exceptionally, this deadline has not been met some protection may be offered if anti-D immunoglobulin is given up to 10 days after the sensitizing event
- Before giving anti D immunoglobulin prophylaxis at 28 weeks, it is important to send a sample for blood group antibody screen. Then, if antibody screen is negative no need to

repeat anti body screen (coomb's test) again after second dose or after delivery as it will show positive because of anti-D immunoglobulin which was given.

- Anti D immunoglobulin prophylaxis (single dose regimen or two-dose regimen), should be given even if anti-D immunoglobulin is given due to sensitizing event, as for example if anti D is given for amniocentesis, it will cover that event only, but it will not replace the prophylaxis dose

- **Routine antenatal anti-D Immunoglobulin Prophylaxis is indicated for all pregnant women who are Rh negative and who are not known to be sensitized to Rh D antigen**
- **Anti D Immunoglobulin Prophylaxis following sensitizing events should always be administered as soon as possible**

Prophylaxis Following miscarriages

- **Spontaneous miscarriage**
  - Complete or incomplete miscarriage after 12 weeks of gestation, need prophylaxis
  - Incomplete miscarriage before 12 weeks of gestation where there is D&C, need prophylaxis.
  - Complete miscarriage before 12 weeks when there is no instrumentation, doesn't need to receive anti D.
- **Threatened miscarriage**
  - All non-sensitised Rh-negative women with threatened miscarriage after 12 weeks of gestation need prophylaxis
  - All non-sensitised Rh-negative women with threatened miscarriage before 12 weeks of gestation where the bleeding is heavy or repeated or where there is associated abdominal pain and gestation is approaching 12 weeks of gestation, need prophylaxis
  - Prophylaxis is not required if bleeding stops, and foetus is viable
  - **Dosage**: one dose of 1250-1500 IU Anti-D intramuscular injection with no need for repeated dose until 28 weeks of gestation if pregnancy continues.

Postnatal Prophylaxis

- At least 1250-1500 IU of Anti-D immunoglobulin should be given within 72 hours following delivery of a Rh-positive infant. It can be given up to 10-day post-partum

  Note: Blood sampling for grouping and Rh status of the infant should be performed immediately after birth.

2.3.12 ABO Incompatibility

ABO incompatibility usually arises when the woman blood group is O and develops either anti A, or anti B antibodies.

The women usually have a history of either:

- Blood transfusion
- Unexplained still birth
- Unexplained neonatal death
- Baby with severe jaundice in neonatal period

Management

- All pregnant women should be screened for antibodies by doing the indirect Coomb's test (ICT) at the following intervals
  - At first visit (booking)
  - At 28-30 weeks' visit

- If coomb's test showed to be positive, patient should be referred to the secondary care with **urgent appointment** for ICT titration

2.3.13 Urinary tract infections (UTI)

Definition: -

UTI is defined as the presence of at least 100,000 organisms per millilitre of urine in an asymptomatic patient, or as more than 100 organisms/ml of urine with accompanying pyuria (>7 white blood cells /ml) in a symptomatic patient A diagnosis of UTI should be supported by a positive culture for uropathogen, particularly in patients with vague symptoms. UTI during pregnancy is classified into 2 groups: symptomatic & asymptomatic UTI. E coli is the most common cause of UTI, accounting for approximately 70-80% of cases in pregnancy. It originates from faecal flora colonising the periurethral area, causing an ascending infection.

Risk factors for complicated UTI in pregnancy include the following:

- Immunosuppression
- Pre-existing diabetes
- Recurrent or persistent UTIs before pregnancy
- Sickle cell anaemia
- Neurogenic bladder
- Tobacco use
- Age < 20 years
- Late presentation for prenatal care
- Low socioeconomic status

Possible complications of untreated bacteriuria during pregnancy:

- Pyelonephritis
- Pre- term birth
- Low birth weight
- Pre- eclampsia. (Rates of preeclampsia in patients with UTI compared with those without reported UTI were 31.1% vs 7.8%, respectively)
- Septic shock
- Increased perinatal mortality

Differential diagnosis

The differential diagnosis of urinary tract infection (UTI) in pregnancy includes the following:

- Vaginal infections
- Cervicitis
- Chlamydial Genitourinary Infections
- Nonbacterial and Non-infectious Cystitis
- Ectopic Pregnancy
- Nephrolithiasis
- Sexually transmitted infection (e.g., gonorrhoea, nongonococcal urethritis)
- Threatened or incomplete miscarriage

The following table shows the detection and management of UTI during pregnancy:

TABLE 25: DETECTION, CLASSIFICATION AND MANAGEMENT OF UTI IN PREGNANCY

Assess (signs & symptoms)	Probable Diagnosis	Management	When to refer to secondary care
● **Typical:** - Dysuria - Increased frequency and urgency of urination ● **Other (Atypical):** - Retropubic / suprapubic pain Abdominal pain	**Cystitis**	● Do urine test (microscopy and culture if indicated by the microscopy) ● Give Paracetamol ● Start antibiotics (**see below box**) ● Encourage to increase fluid intake by mouth ● Repeat urine culture after 1 week from the last dose of the antibiotics (if the initial test was positive)	If the infection reoccurs for three or more times despite adequate treatment, refer by **routine appointment**
● **Typical:** - Dysuria Spiking fever /Chills Increased frequency and urgency of urination - Abdominal pain ● **Other (Atypical):** - Retropubic / suprapubic pain - Loin pain /tenderness. Tenderness in rib cage - Anorexia - Nausea /vomiting	**Acute Pyelonephritis**	● Do urine test (microscopy and culture) ● Give Paracetamol ● Hydration of the patient ● Refer for further management	Refer as **emergency** whenever suspected For admission and IV antibiotics

Treatment of urinary tract infections in pregnancy: -

- **Behavioural methods**
  - Women with UTI should be counselled about behavioural methods that ensure good hygiene and reduce bacterial contamination of the urethral meatus, thereby preventing inadequate treatment and recurrent infection. It includes the following:
  - Wipe front-to-back after urinating or defecating
  - Wash hands before and after using the toilet
  - Clean the urethral meatus first when bathing
- **Antibiotic therapy**
  - Oral antibiotics are the treatment of choice for asymptomatic bacteriuria and cystitis.
  - Treatment is most commonly initiated empirically before culture and susceptibility results return.
  - If treatment fails, check urine for culture and sensitivity if available, and treat with an appropriate antibiotic for the organism.
  - Urine culture to be repeated one week after the last dose of the antibiotics
  - Current oral regimens are summarised below

Antibiotics to be used in management of cystitis:

- **Amoxicillin 500 mg** orally three times daily (alternative: 850 mg orally two times daily) for 5-7 days (to be continued for 10 days if culture was positive)
  Alternative:
- **Cephalexin 500 mg** orally four times per day for 5-7 days
  OR
- **Amoxicillin- Clavulanate 500/125 mg** TID, if not available, then Amoxicillin Clavulanate 375 mg plus amoxicillin 250mg three times per day for 5 days ((alternative: amoxicillin – clavulanate 875/125 mg orally two times daily for 5-7 days)
  OR
- **Nitrofurantoin 100 mg** bid 5-7 days. (If G6PD normal)

Pyelonephritis

- Pyelonephritis should be referred and treated in Secondary Care
- The standard course of treatment for pyelonephritis consists of **hospital admission** and **intravenous (IV) administration of antibiotics** until the patient has been afebrile for 48 hours.
- The recommended IV antibiotic would be a broad-spectrum beta-lactam, such as **ceftriaxone.**
- Once culture results with susceptibilities become available and the patient is clinically improved, treatment can be transitioned to an oral antibiotic regimen.
- Patients should be discharged with 10-14 days of antibiotic treatment, and then will need daily prophylactic antibiotics for the remainder of pregnancy.
- **IV fluids must be administered with caution**. Patients with pyelonephritis can become dehydrated because of nausea and vomiting and need IV hydration. However, they are at high risk for the development of pulmonary oedema and acute respiratory distress syndrome (ARDS).
- Fever should be managed with antipyretics (Paracetamol) and nausea and vomiting with antiemetic. If fever persists beyond 24 hours, urine and blood cultures should be repeated and a renal ultrasound should be performed.

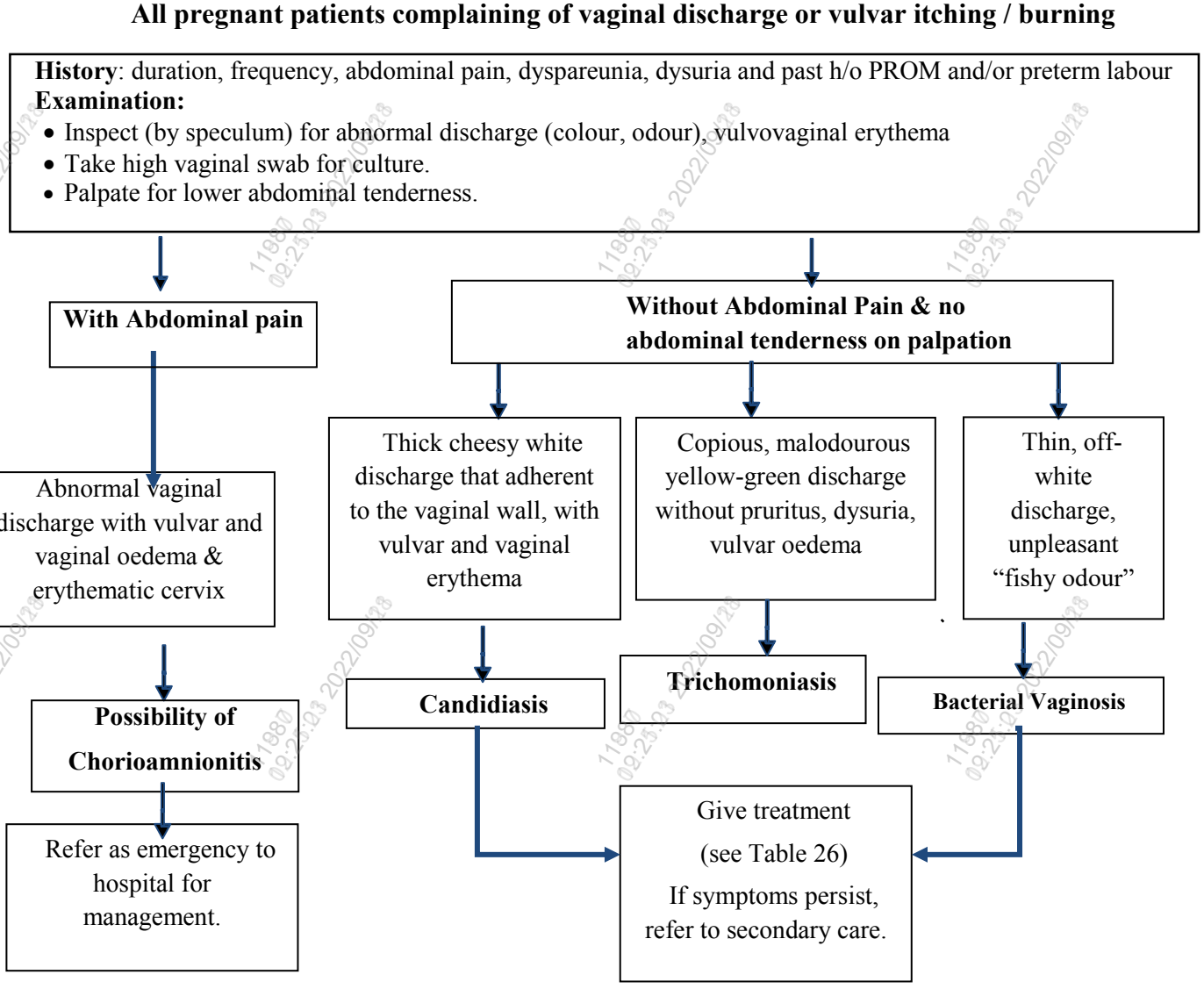
2.3.14 Vaginal discharge during pregnancy

Vaginal infections in pregnancy are common and important because they can cause spontaneous abortion, pre-term labour and chorioamnionitis. Several infections such as gonorrhoea, chlamydia, group B streptococci, HIV and herpes virus can be transmitted during labour directly to the foetus.

Diagnosis:

For the diagnosis of vaginal discharge during pregnancy, the following chart can be used**.**

ALGORITHM 13: DIAGNOSIS OF VAGINAL DISCHARGE DURING PREGNANCY



Specific Management

TABLE 26: SPECIFIC MANAGEMENT OF VAGINAL DISCHARGE DURING PREGNANCY

Diagnosis	Treatment	Remarks / When to refer to secondary care
Candidiasis	Drug option • **Clotrimazole 500 mg vaginal suppositories** inserted in the vagina as a single dose (preferred) • **Clotrimazole or Miconazole vaginal cream** one full applicator inserted in the vagina daily for 7 days Alternative: • **Nystatin suppositories**, each contain 100,000 units every night for 7-14 nights • If have vulvovaginits: **give antifungal with steroid skin cream** (low to mid potency topical corticosteroids preparations are (preferred)	• Vaginal swab should be done if recurrent (more than 2 times in spite of treatment • If no response to the treatment. Refer by **routine appointment**
Bacterial Vaginosis	• **Metronidazole** 500 mg orally twice a day for 7 days OR • **Metronidazole** 250 mg orally three times a day for 7 days OR • **Clindamycin cream** 2% one full applicator (5 g) bed intra-vaginally at time for 7 days	• Routine treatment of sex partners is not recommended • Follow-up visits are unnecessary if symptoms resolve • Use condom during the treatment • Refer by **routine appointment** for persistent symptoms

Trichomonas vaginitis	• **Metronidazole 2 g** in a single dose at any stage of pregnancy **OR** • **Metronidazole 500 mg** orally twice a day for 7 days **OR** • **Metronidazole 250 mg** orally three times a day for 7 days	• Counsel, use Condom • All symptomatic pregnant women should be treated at any pregnancy stage • Sex partners should be treated • Rescreening at 3 months following initial infection can be considered • Refer by routine referral if symptoms persistent

2.3.15 HIV in pregnancy

Mother-to-child transmission of HIV (MTCT)

- The risk of mother-to-child transmission of human immunodeficiency virus (HIV) during pregnancy, delivery, and breastfeeding is as high as 25-30% in the absence of treatment.
- With the implementation of H IV testing, counselling, antiretroviral medication, delivery by caesarean section prior to onset of labour for those with high viral load, and discouraging breastfeeding, vertical transmission can be decreased to less than 2%
- The exact mechanism of mother-to-child transmission of HIV remains unknown. Transmission may occur during intrauterine life, delivery, or breastfeeding
- Screening for HIV in pregnancy was added to antenatal care in 2009 as an essential component of ANC package.
- Universal coverage of HIV screening in Sultanate of Oman reached 99.9% in 2020.

Objectives of HIV screening in pregnancy

- Prevention of HIV transmission from women living with HIV to their infants.
- Early detection, provision of optimal care and support to women living with HIV, their children and families.

HIV testing and counselling during pregnancy

- All registered women in ANC clinics should be offered testing for HIV after counselling and taken verbal consent.
- Rapid HIV testing should be done during labour /post-partum for women who have not been subjected to the test during antenatal period (un-booked)
- If HIV testing (done/not done) and the result (reactive /non-reactive), not documented in the maternal health record or in the Al shifa system and HIV status is not known, woman should be tested for HIV.
- Pre-testing information should be given to all women before collecting blood, which should cover, reason for testing, health benefits of testing for the woman herself, and her baby in utero by preventing mother to child transmission.

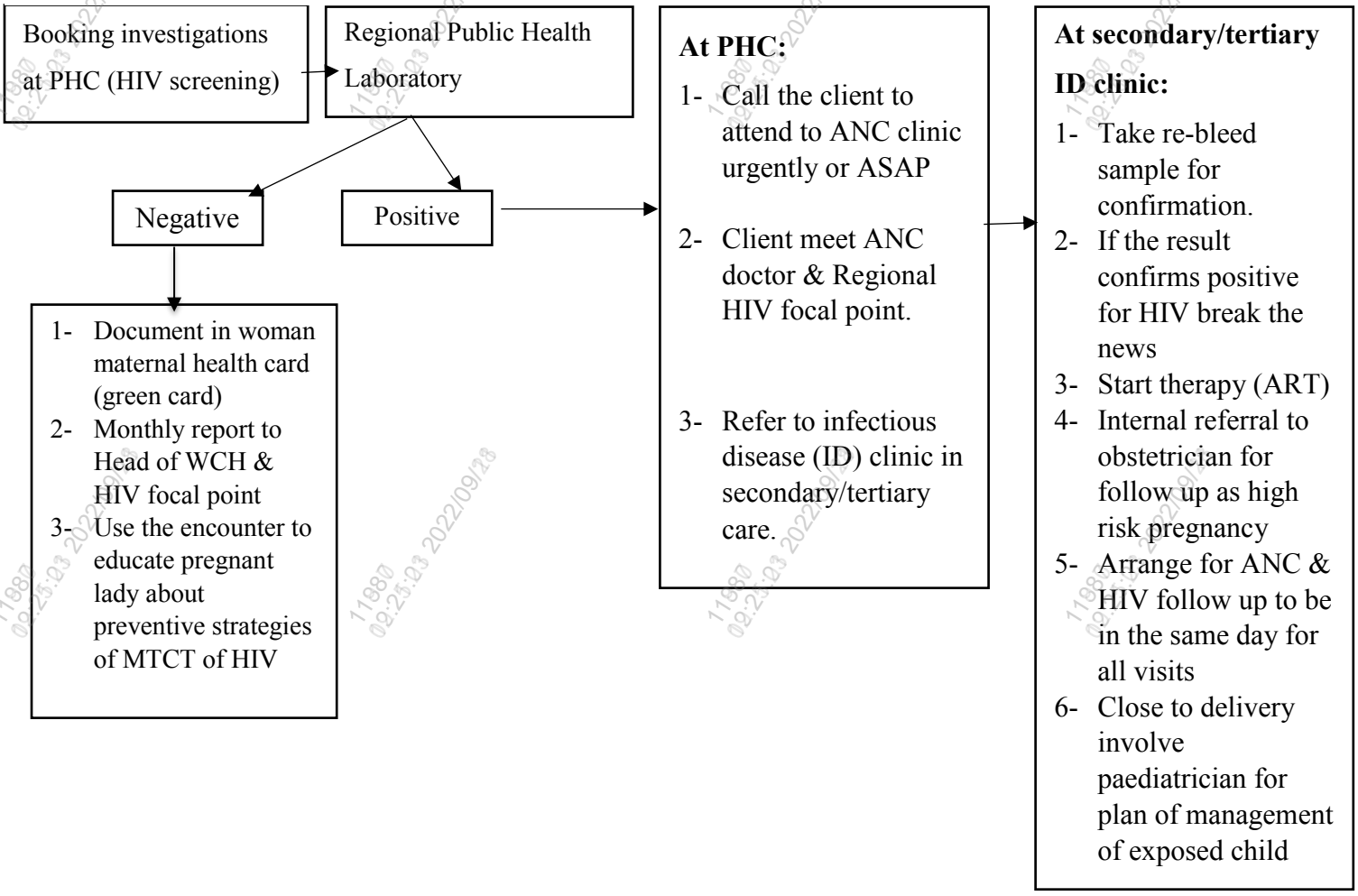
- Verbal consent before blood collection should be obtained for every pregnant woman as follows:

"Few routine blood tests are being done for you to check your health status. Some of these tests are related to nutrition, infections…etc. which may indicate the need for an early and appropriate management"

Handling results of HIV

- Post-test information/counselling should be done for both HIV negative and positive.
- All women with positive HIV results should be referred to secondary /tertiary care for re-bleed test, breaking news and counselling by a trained HIV counsellor or the treating HIV focal physician.
- No discrimination should be done while handling HIV positive cases or their contacts with respect to evaluation or management.

ALGORITHM 14: MANAGEMENT OF HIV POSITIVE CASES



Maintaining confidentiality with HIV cases

- Each PHC facility will ear mark a focal doctor who will be responsible for organizational set up in facility, receiving the HIV test reports, organizing referrals to the treating HIV focal physician
- The identity of the detected cases and contacts, their record and management carried out, should always be kept confidential.
- No discrimination should be done while handling HIV positive cases or their contacts with respect to evaluation or management.
- The result should be documented in the maternal health record in the laboratory investigations section as reactive or non-reactive.
- Do not write in red or in any other manner in the maternal health record that woman is HIV positive.

Postnatal care (PNC)

- Continue follow up during PNC for the baby and mother as per their needs and keep woman informed on self-care and when to report.
- Advice women to follow all instructions given from the secondary care regarding treatment plan and follow ups.
- Reiterate the counselling about avoiding breast feeding given during ANC to further reduce the risk of HIV transmission to the child
- Vaccinate - baby as per HIV/AIDS national guidelines, under the guidance of paediatrician.

Remember:

✓ If HIV testing was not performed at the booking visit, for any reason, it should be done in the subsequent visit, make sure it is done and documented in the green card as reactive or non- reactive

✓ Counselling is one vital service to be provided following HIV screening. It will be offered at different points of contact and by a trained health provider using standard proper counselling materials

✓ HIV positive results should be treated with sensitivity and only trained counsellor should inform the patient about the results

✓ Woman and child health head section should keep the record of the HIV positive women and send it to DWCH.

2.3.16 Syphilis in pregnancy:

Syphilis is caused by the bacterium *Treponema pallidum*. The infection is most commonly transmitted through sexual contact (vaginal, oral, or anal sex). Birth defects can occur in infants born to women who are infected with syphilis prior to or during pregnancy. Congenital syphilis causes foetal or perinatal death in 40% of the infants affected.

Main clinical manifestations in the mother

- **In primary syphilis**, a sore or multiple sores appear at the site where the bacterium entered the body – typically near the genitals, the rectum, or the oral cavity. The sores are usually firm, round and painless.
- **In secondary syphilis**, fever, swollen lymph nodes and skin rash, and wart-like genital lesions (condyloma lata) can be seen. In latent stage, there are no signs or symptoms.
- **In tertiary syphilis**, several medical problems affecting the heart, neurologic system and other organs can be seen. Individuals with the infection move from one stage to the next in the absence of treatment.

Main clinical manifestations in the infant

- **Early congenital syphilis:** - some infants with early congenital syphilis are asymptomatic at birth and some might present as rhinitis ("snuffles"), hepatosplenomegaly, skin rash with desquamation, chorioretinitis and pigmentary chorioretinopathy (salt and pepper type), glaucoma, cataracts, interstitial keratitis, optic neuritis, periostitis and cortical demineralization of metaphysis and diaphysis areas of long bones, anaemia and thrombocytopenia. Some clinical signs consistent with congenital syphilis – such as hydrops and hepatosplenomegaly – might be detected by ultrasound during pregnancy. Infants who remain undiagnosed and untreated can progress to late congenital syphilis
- **Late congenital syphilis**, present in numerous additional clinical manifestations, including, but not limited to saddle nose due to destruction of cartilage, frontal bossing due to periostitis, tibial thickening (saber shins), joint swelling (clutton joints), perforation of hard palate, abnormal tooth development (Hutchinson's teeth, mulberry molars), interstitial keratitis, neurologic deafness and optic atrophy. Infants might be born without clinical signs of syphilis but go on to develop late-stage manifestations of congenital syphilis that include developmental delay, neurologic manifestations and late congenital syphilis physical signs.

Congenital syphilis is preventable with prompt action

ALGORITHM 15: SCREENING AND MANAGEMENT OF REACTIVE SYPHILIS SEROLOGY IN PREGNANCY

Routine Antenatal Screening

All pregnant women at initial booking

Check blood taken for HIV & syphilis serology

Record test results in Green Card and Al Shifa (e.g., Reactive/Non-reactive)

If initial blood test is RPR positive

Reflexively test sample for **TPHA** and **RPR titre;**

If necessary, send blood sample to local lab for these tests

Action based on TPHA and RPR titre results

If TPHA is positive…

Make urgent eReferral to Obs & Gynae as 'walk-in' at secondary/tertiary hospital (preferably in same hospital as mother's planned delivery)

Give patient a copy of the eReferral

Document serological test results on Al-Shifa and mother's antenatal Green Card, e.g., TPHA Reactive or Non-reactive; RPR titre value

Complete Surveillance Form CS-ANC and send to Governorate Head of WCH and copy to Head of Communicable Diseases

LATE BOOKERS (booking after 20w gestation)
Make sure these mothers are screened for HIV & syphilis at booking.
UNBOOKED MOTHERS Screen for HIV & syphilis on admission
N.B. RPR is the screening test in MOH facilities. VDRL and RPR titres are NOT interchangeable. Use only VDRL or only RPR titres when evaluating a patient's response to treatment.

Assessment of maternal syphilis by Obstetric Team

(TPHA: POSITIVE)

Manage as HIGH RISK Pregnancy

Take sexual history, identify STI risk factors

Check for previous Hx of and Rx for syphilis

Review obstetric history (e.g., stillbirths)

Look for symptoms & signs of infection: chancre, rash, lymphadenopathy

If maternal syphilis treatment required:

Complete Surveillance **Form CS-OBS** and send to Governorate Head of WCH and copy to Head of Communicable Diseases

Refer Husband for testing in Health Centre and advise no sexual contact until both parties treated

A. RPR titre ≥ 1:8; TPHA positive, then code A51.9 (Early syphilis) on Al Shifa and treat:

Benzathine penicillin 2.4 MU i/m x 1 dose if <28w gestation; or

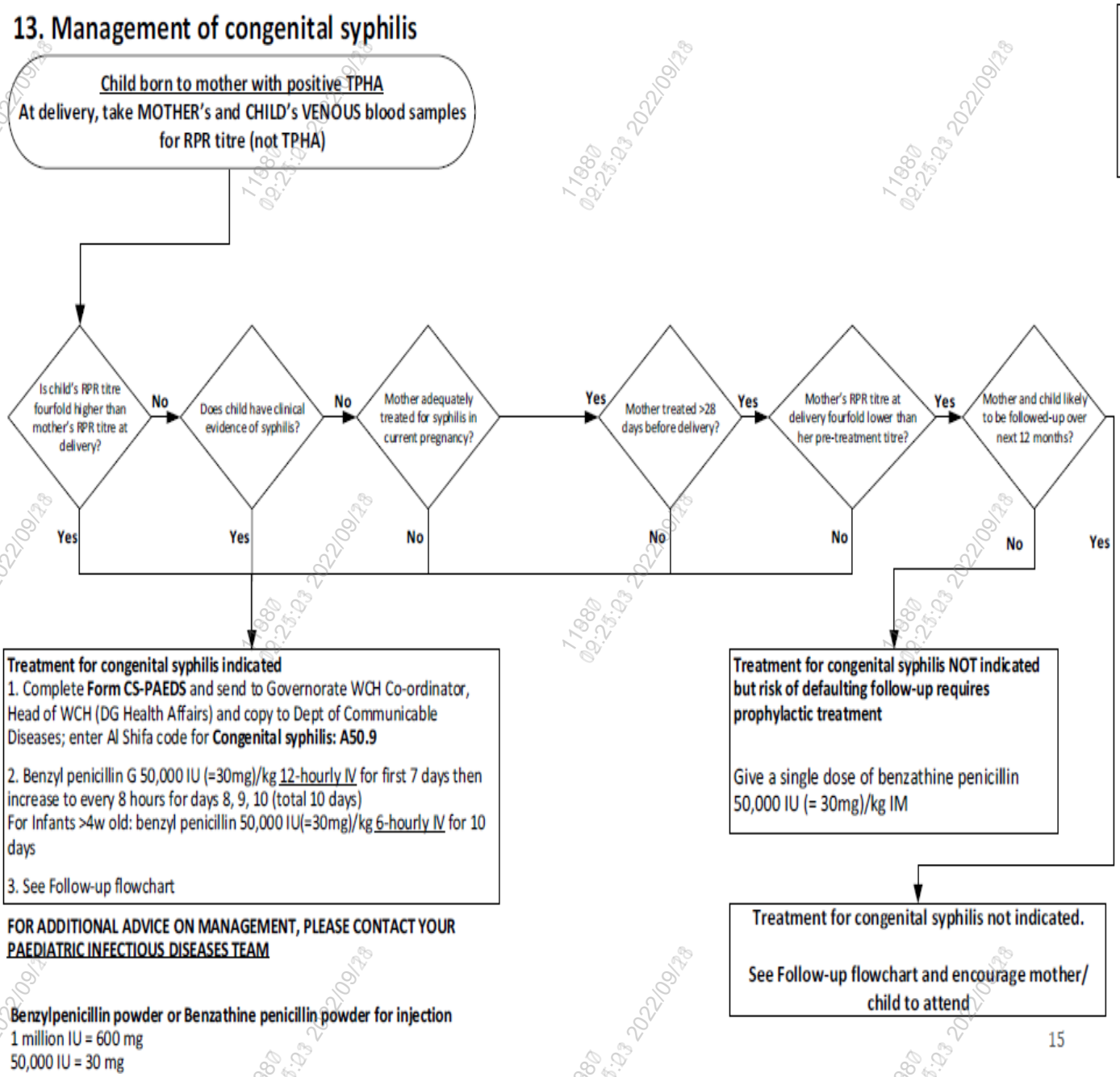
Benzathine penicillin 2.4 MU i/m x 2 doses one week apart if >28w gestation

B. RPR ≤ 1:4, TPHA positive, code A53.0 on Al Shifa. (Diagnosis covers late or indeterminate stage syphilis, previous Hx/Rx of syphilis with risk of re-infection; previous syphilis treatment not adequate or not documented):

Benzathine penicillin 2.4 MU i/m weekly x 3 doses

Repeat maternal RPR titre at delivery.
See Notes if patient has penicillin allergy.
Emphasise importance of completing treatments and refer to Paediatric team for post-natal assessment of child.

ALGORITHM 16: FLOWCHART FOR MANAGEMENT OF CONGENITAL SYPHILIS BY PAEDIATRIC TEAM



Treatment

- Penicillin G is the only known effective antimicrobial for preventing maternal transmission to the foetus and treating foetal infection.
- Some evidence suggests that additional therapy is beneficial for pregnant women. For women who have primary, secondary, or early latent syphilis, a second dose of benzathine penicillin 2.4 million units IM can be administered 1 week after the initial dose.
- When syphilis is diagnosed during the second half of pregnancy, management should include a sonographic foetal evaluation for congenital syphilis. However, this evaluation should not delay therapy. Sonographic signs of foetal or placental syphilis (i.e., hepatomegaly, ascites, hydrops, foetal anaemia, or a thickened placenta) indicate a greater risk for foetal treatment failure; cases accompanied by these signs should be managed in consultation with obstetric specialists. Evidence is insufficient to recommend specific regimens for these situations.
- Women treated for syphilis during the second half of pregnancy are at risk for premature labour and/or foetal distress if the treatment precipitates the **Jarisch-Herxheimer reaction**. These women should be advised to seek obstetric attention after treatment if they notice any fever, contractions, or decrease in foetal movements. Stillbirth is a rare complication of treatment, but concern for this complication should not delay necessary treatment. No data are available to suggest that corticosteroid treatment alters the risk for treatment-related complications in pregnancy.
- Missed doses are not acceptable for pregnant women receiving therapy for late latent syphilis. Pregnant women who miss any dose of therapy must repeat the full course of therapy.
- All women who have syphilis should be offered testing for HIV infection.

Management of Sex Partners

- The partner of the infected woman should be evaluated clinically and serologically and treated accordingly.

Special Considerations

Penicillin Allergy

- No proven alternatives to penicillin are available for treatment of syphilis during pregnancy. Pregnant women who have a history of penicillin allergy should be desensitized and treated with penicillin. Skin testing or oral graded penicillin dose challenge might be helpful in identifying women at risk for acute allergic reactions
- Tetracycline and doxycycline are contraindicated in the second and third trimester of pregnancy. Erythromycin and azithromycin should not be used, because neither reliably cures maternal infection nor treats an infected foetus. Data are insufficient to recommend ceftriaxone for treatment of maternal infection and prevention of congenital syphilis.

HIV Infection

- Placental inflammation from congenital infection might increase the risk for perinatal transmission of HIV. All women with HIV infection should be evaluated for syphilis and receive a penicillin regimen appropriate for the stage of infection.

2.3.17 Chicken pox (varicella) in pregnancy

Definition:

Chicken pox (varicella) is the primary infection with varicella-zoster virus (VZV; a highly contagious human herpesvirus 3), which is transmitted by respiratory droplets and by direct personal contact with vesicle fluid. The incubation period is 1-3 weeks, and the disease is infectious 48 hours before the rash appears till the vesicle's crusts over.

Pregnant women who have no history or uncertain history of previous infection must be advised to avoid contact with chickenpox patients and shingles during pregnancy and to immediately inform health care workers of potential exposure.

Preconception care

- Advise women with no past history of immunity to chickenpox (no past history of chickenpox infection or vaccination): To take varicella vaccine (live attenuated virus), two doses, given 4 to 8 weeks. Immunity from the vaccine may persist for up to 20 years. If she received varicella vaccine, she should avoid pregnancy for 3 months and to avoid contact with other susceptible pregnant women
- Advised woman to avoid contact with chickenpox patients and shingles during pregnancy and to immediately inform health care workers of potential exposure
- Counsel women that a previous history of chickenpox infection is 97–99 % predictive of the presence of serum varicella antibodies

Risks Associated with Varicella Virus Infection in Pregnancy

A) Maternal risks:

- Pneumonia
- Hepatitis
- Encephalitis (This condition is associated with high mortality rate)

.

B) Foetal risks:

- **Foetal Varicella Syndrome (very rare):** If the mother developed the disease or acquired the infection before 20 weeks (up to 28 weeks in some cases) of pregnancy. Foetal Varicella Syndrome characterized by one or more of: Skin scarring in a

dermatomal distribution, eye defects (microphthalmia, chorioretinitis, and cataracts), hypoplasia of the limbs, neurological abnormalities (microcephaly, cortical atrophy, mental retardation and dysfunction of bowel & bladder sphincter.

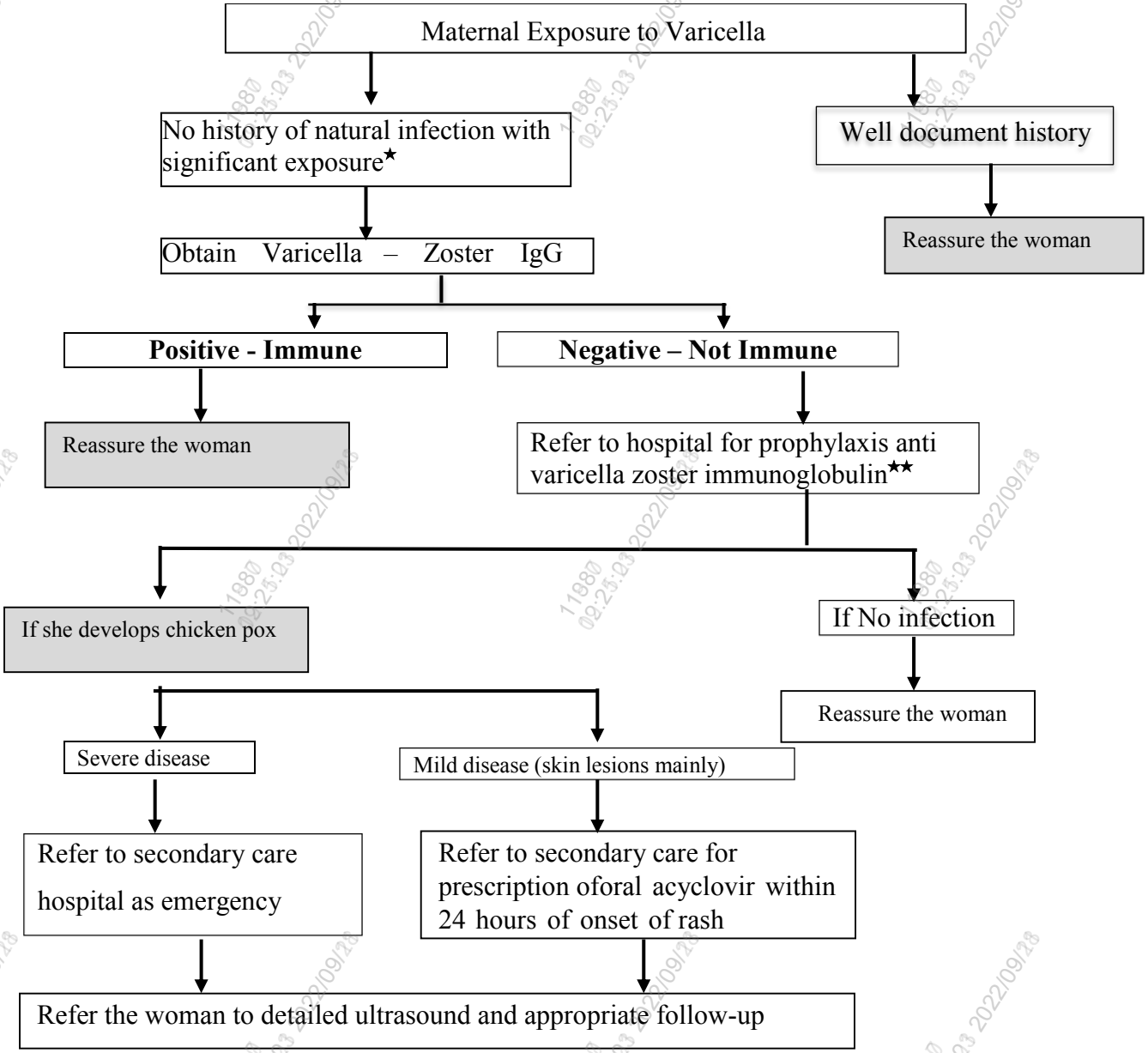
- **Varicella Infection of the New-born:** More likely if maternal infection occurs in the last 4 weeks of a woman's pregnancy

The risk of spontaneous miscarriage does not increase if chickenpox occurs in the first trimester

Management of Chicken Pox with Pregnancy

For the diagnosis and management of chicken pox during pregnancy, the following chart can be used.

ALGORITHM 17: DIAGNOSIS AND MANAGEMENT OF VARICELLA IN PREGNANCY



★ ***History:***

a) ***Evaluate susceptibility:*** *A self-reported past history of varicella among pregnant women is a powerful predictor of antibodies to varicella infection.*

b) Defining exposure: *Significant exposure to Varicella infection is defined as household contact, face to face contact with an index case, or sharing the same hospital room with a contagious patient.*

★★***Anti varicella zoster human immunoglobulin:*** *1gm by deep intramuscular injection, second dose required if further exposure occurs after 3 weeks.*

Clinical conditions that may be faced in ANC clinic:

Problem 1:

Pregnant women present with history of contact with chicken pox patient

a. Careful history must be taken to confirm the significance of the contact and the. susceptibility of the patient.
b. If the woman had previous immunity against chicken pox reassure the woman
c. If the woman with uncertain or no previous history of chickenpox and she had a significant exposure, blood sample should be taken and send for serology (IgG) to determine VZV Immunity or non-immunity
    i. **If IgG positive i.e., immune** to VZV, reassure the pregnant woman that neither she nor her baby is at risk
    ii. **If IgG negative i.e., not immune** to VZV, the pregnant woman should be referred to obstetrician to be offered immunoglobulin (VZIG) as soon as possible. (Less than 10 days since the contact
d. Advise the woman that she is potentially infectious from 8-28 days after contact
e. Advise not immune woman for postpartum varicella immunization

Problem 2:

Pregnant woman who develops the rash of chicken pox

a. Symptomatic treatment and hygiene should be advised.
b. Oral Antivirus (Acyclovir)
    - If the woman presents < 24 hours of the appearance of the rash and she is ≥ 20 weeks of gestations, prescribe acyclovir
    - If the woman presents < 24 hours of the appearance of the rash and she is < 20weeks of gestation, consider acyclovir (Acyclovir is not licensed for use in pregnancy and the risks and benefits of its use should be discussed with the woman

c. Ultrasound: Women who develop chickenpox less than 28 weeks of gestation should be referred to obstetrician, at 16–20 weeks or 5 weeks after infection for discussion and detailed ultrasound examination.
d. Advise woman to avoid contact with potentially susceptible individuals (neonate & other pregnant woman)

Problem 3:

Postpartum woman who develops the rash of chickenpox

If birth occurs within the 7 days' period following the onset of the maternal rash, or if the mother develops the chickenpox rash within the 7 days' period after birth there is a significant risk of varicella infection of the new-born.

a. Refer as emergency to neonatologist / paediatrician as the neonate should be given VZIG
b. Women with chickenpox should breastfeed if they wish and well enough to do so

Remember:

- Post-exposure prophylaxis is targeted to susceptible hosts who do not have a history of infection or serologic evidence of prior exposure.
- Post-exposure prophylaxis is not needed among women who were immunized with varicella vaccine in the past
- Patients need careful follow-up for signs of infection despite passive immunization
- Those who are infected despite post-exposure prophylaxis should be treated for varicella infection
- Varicella vaccine is contraindicated during pregnancy
- Women who are vaccinated postpartum can be reassured that it is safe to breastfeed

Varicella vaccine is contraindicated during pregnancy

2.3.18 Common counselling on lifestyles in Pregnancy

Exercise in pregnancy

- Patients with uncomplicated pregnancies should be encouraged to engage in physical activity as it is safe and not associated with adverse outcomes
- Regular physical activity during pregnancy can sustain and improve cardiovascular fitness; improve mood; decrease postpartum recovery time; and decrease the risks of gestational diabetes mellitus, excessive weight gain, operative delivery, caesarean delivery, and preeclampsia, decrease the risk of thrombosis and thromboembolic events.
- Exercise recommendations should take into consideration any obstetric complications or pre-existing medical conditions (table 27)

TABLE 27: CONTRAINDICATIONS TO AEROBIC EXERCISE DURING PREGNANCY

- Significant heart disease
- Incompetent cervix with or without cercelage
- Intrauterine growth restriction
- Multiple gestation
- Persistent or unexplained vaginal bleeding
- Placenta Previa after 26 to 28 weeks' gestation
- Preeclampsia or pregnancy-induced hypertension
- Preterm labour
- Restrictive lung disease
- Ruptured membranes
- Severe anaemia
- Uncontrolled chronic medical conditions
- Hypertension / Thyroid disease
- Type 1 diabetes mellitus
- Seizure disorders

- At least 30 minutes of moderate exercise on most days of the week is a reasonable activity level for most pregnant women
- Pregnant women should avoid activities that put them at risk of falls or abdominal injuries

- Pregnant women should be informed of the potential dangers of certain activities during pregnancy, for example, contact sports, high-impact sports and vigorous racquet sports that may involve the risk of abdominal trauma, falls or excessive joint stress, and scuba diving, which may result in foetal birth defects and foetal decompression disease.

Sexual intercourse in pregnancy

- Pregnant woman should be informed that sexual intercourse in pregnancy is not known to be associated with any adverse outcomes e.g., Preterm delivery or abortions
- Women can continue to have sex during pregnancy; however, in certain situations (e.g., placenta previa), avoiding sex is generally recommended

Alcohol in pregnancy

- Alcohol passes freely across the placenta to the foetus
- Women planning a pregnancy and pregnant woman should advised to avoid drinking alcohol
- Alcohol has an adverse effect on the foetus such as foetal alcohol syndrome (can cause brain damage and growth problems)

Smoking in pregnancy

- Maternal cigarette smoking in pregnancy is associated with an increased risk of perinatal mortality, sudden infant death syndrome, placental abruption, preterm premature rupture of membranes, ectopic pregnancies, placenta Previa, preterm delivery, miscarriage, low birth weight and the development of cleft lip and cleft palate in children.
- At booking; smoking status of pregnant woman and her partner should be discussed and provide information about the risks of smoking to the foetus and the hazards of exposure to passive smoking.
- Pregnant women should be informed about the specific risks of smoking during pregnancy (such as the risk of having a baby with low birthweight and preterm birth). The benefits of quitting at any stage should be emphasised.
- Provide support on how to stop smoking: if she has further concerns can be encouraged to use Stop Smoking Service if available by providing details on when, where, and how to access them.

Air travel in pregnancy

- In the absence of obstetric or medical complications, air travel generally safe for pregnant women up to four weeks before the due date.
- Most commercial airlines allow pregnant travellers to fly until 36 weeks' gestation. Some limit international travel earlier in pregnancy
- The pretravel evaluation of a pregnant traveller should begin with a careful medical and obstetric history, with particular attention paid to gestational age and evaluation for high-risk conditions.
- Long flights are associated with an increased risk of venous thrombosis. Certain preventive measures should be advised to minimize these risks, including use of support stockings and periodic movement of the lower extremities, avoidance of restrictive clothing, occasional ambulation, and maintenance of adequate hydration.

Malaria prophylaxis

- Malaria may be much more serious in pregnant than in no pregnant women and is associated with high risks of illness and death for both mother and child.
- Malaria in pregnancy may be characterized by heavy parasitemia, severe anaemia, and sometimes profound hypoglycaemia, and may be complicated by cerebral malaria and acute respiratory distress syndrome. Placental sequestration of parasites may result in foetal loss due to abruption, premature labour, or miscarriage. An infant born to an infected mother is most likely had a low birth weight, and, although rare, congenital malaria is a concern.
- Because no prophylactic regimen provides complete protection, pregnant women should avoid or delay travel to malaria-endemic areas. However, if travel is unavoidable, pregnant women should take precautions to avoid mosquito bites, and use of an effective prophylactic regimen is essential.
- Chloroquine and mefloquine are the drugs of choice for pregnant women for destinations with chloroquine-sensitive and chloroquine-resistant malaria, respectively. Doxycycline is contraindicated because of teratogenic effects on the foetus after the fourth month of pregnancy. Primaquine is contraindicated in pregnancy because the infant cannot be tested for G6PD deficiency, putting the infant at risk for haemolytic anaemia. Atovaquone-proguanil is not recommended because of lack of available safety data.

Breastfeeding

- Generally, it's safe to continue breast-feeding while pregnant — as long as taking care about eating a healthy diet and drinking plenty of fluids.
- Breastfeeding should be recommended as the best feeding method for infants
- Breastfeeding contraindications include maternal human immunodeficiency virus infection, chemical dependency, and use of certain medications

Hair treatments

- Although hair dyes and treatments have not been explicitly linked to foetal malformation, they should be avoided during early pregnancy

Herbal therapies

- Pregnant women should avoid herbal therapies with known harmful effects to the foetus, such as ginkgo, ephedra, and ginseng, and should be cautious of substances with unknown effects

Seat-belt use

- Pregnant women should use a seat belt, above and below the gravid abdomen but not cross.

2.4 Obstetric Complications

2.4.1 Vaginal bleeding in early pregnancy (before 22 weeks)

- Vaginal bleeding or spot is a common presentation in early pregnancy.
- 20-40% of pregnant women will experience bleeding during the first trimester of pregnancy (1-13weeks).
- The major causes are miscarriage (10–20% of clinical pregnancies) and ectopic pregnancy (1–2%).
- Bleeding in the very early weeks of pregnancy may be related to endometrial implantation.

General Management:

The initial assessment of a woman with vaginal bleeding in early pregnancy must first consider hemodynamic stability and the degree of pain or bleeding.

- **Ask about bleeding** when start, how much blood lost, still bleeding, or stopped, is the bleeding increasing or decreasing, passing products of conception (POC) or clots, history of a recent abortion, history of fainting and history of abdominal pain.
- **Perform a rapid evaluation** of the general condition of the woman, including vital signs (pulse, blood pressure, respiration, temperature)
- **Immediate escort to hospital is necessary in a hemodynamically unstable patient, after stabilization.** It is important to recognize that young women may suffer significant blood loss before any signs of hemodynamic instability are evident.
- **Even if signs of shock are not present, keep shock in mind as you evaluate the woman further because her status may worsen rapidly.**
- The most likely diagnoses of a hemodynamically unstable patient with early pregnancy bleeding are a ruptured ectopic pregnancy or massive hemorrhage secondary to incomplete miscarriage.
- **Insert 2 large I.V lines (No.14-16) and start infuse IV fluids.**
- In the hemodynamically stable patient, a more detailed assessment should be done.

History:

- LMP, bleeding duration and amounts, any associated factor, associated pain, etc.
- Obstetric History
- Medical or surgical history
- Medication history

Examination:

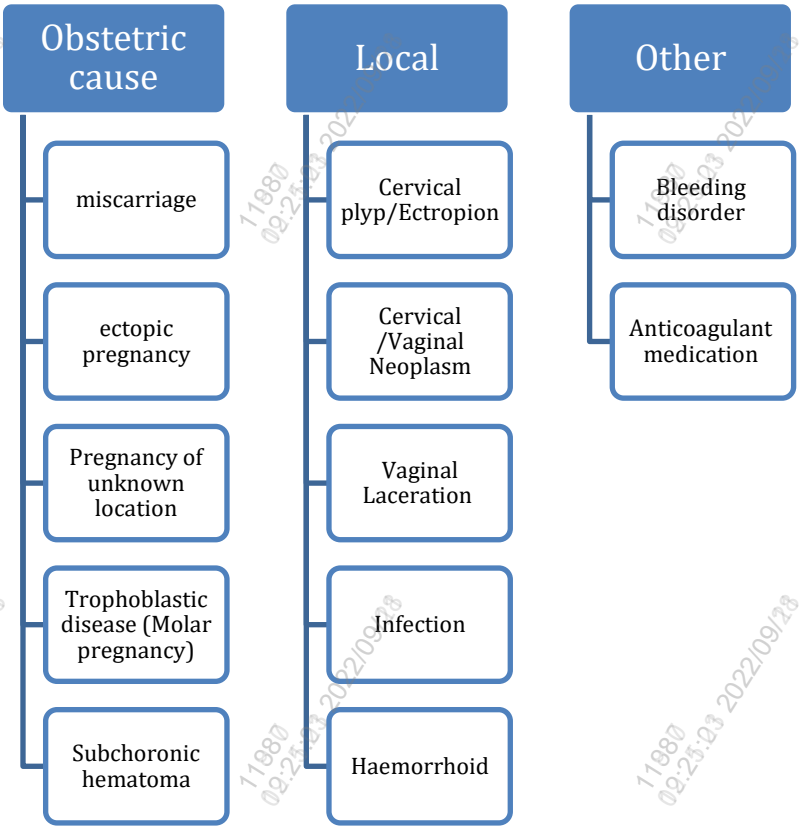
- Vital signs (Pulse, Blood Pressure, O2 saturation, Temperature)
- Signs of anaemia

- Abdominal examination may reveal areas of tenderness, guarding or rigidity, and signs of distension.
- Speculum examination: It is performed to assess the amount and origin of ongoing bleeding
- The vagina and cervix should be inspected for other causes of bleeding (e.g., ectopian polyps) or vaginal laceration.
- Asses cervical os, pelvic tenderness and pelvic and cervical motion tenderness

Confirm the pregnancy by ultrasound (if available)

Investigation: CBC

ALGORITHM 18: OBSTETRIC COMPLICATIONS: DIFFERENTIAL DIAGNOSIS



1. Miscarriage:

- When intrauterine pregnancy is confirmed previously and the patient present with vaginal bleeding
- Up to 30% of known pregnancies will miscarry within the first trimester and <3% will occur within the second trimester

Types of miscarriage:

- Threatened Miscarriage
- Missed Miscarriage
- Incomplete Miscarriage
- Complete Miscarriage
- Inevitable Miscarriage

2. Ectopic pregnancy;

- Ectopic pregnancy occurs when a fertilized ovum implant outside of the uterine cavity.
- **The risk factors**: STD, tubal surgery, previous ectopic pregnancy. Infertility, Pregnancy with assisted reproductive technique
- **History**: Abdominal pain is common complaint, vaginal bleeding, any associated risk factor
- **Examination:**
  - Vital Signs (Temperature Pulse, Blood pressure, O2 saturation)
  - Abdomen: if any signs of peritonitis (rigid abdomen or tenderness)

- If suspected ectopic pregnancy refer as emergency and escort to the secondary or tertiary hospital

3. Gestational Trophoblastic disease (molar pregnancy)

- The usual presentation bleeding per vagina and give history of excessive nausea and vomiting
- Abdominal examination find the size of uterus is larger than gestational age expected.
- Refereed as urgent to secondary or tertiary hospital.

Remember:

- The patient should be stabilized before transfer
- Perform Rapid Evaluation of general condition of the patient
- Keep shock in mind even if signs of shock not present
- Refer all cases of vaginal bleeding in early pregnancy as an indicated to hospital.

ALGORITHM 19: ASSESSMENT AND MANAGEMENT PREGNANT WOMEN WITH EARLY PREGNANCY BLEEDING

Early pregnancy bleeding < 22 weeks

Rapid assessment and management (RAM)

- **History:** Amount of bleeding (heavy* or spotting), evidence of passage of products of conception (POC), Abdominal pain.
  Symptoms of hypovolemia: dizziness, palpitation
- **Clinical Examination:** Vital signs: Heart Rate, Blood Pressure, signs of peritonitis, abdomen
- **Speculum examination** It can help identify non obstetric causes of bleeding, such as. If products of conception are visible
- **Ultrasound:** - confirm IUGS, cardiac activity.

Hemodynamically stable
Spotting /light bleeding
NO POC at present
IUGS confirmed in Ultrasound

Hemodynamically unstable
OR active heavy bleeding with or without POC
OR abdominal pain – peritoneal signs
OR no IUGS seen in Ultrasound

Threatened miscarriage: - light bleeding **/spotting, No clots or POC, abdominal pain +/- , closed cervix, foetal cardiac activity +

Missed abortion / miscarriage: - No foetal cardiac activity in ultrasound, bleeding +/-, abdominal pain+/-

Complete miscarriage: - history of heavy bleeding & passing POC (BUT now decrease bleeding or no bleeding & clots at present, abdominal pain +/-, closed uterus

Local causes: - vaginitis, cervicitis, or a cervical polyp

Ectopic pregnancy: - abdominal pain +/-, bleeding +/-, fainting, No IUGS seen in ultrasound

Incomplete miscarriage: - heavy bleeding, partial expulsion of POC, abdominal pain, dilated cervix, uterus smaller than date

Inevitable miscarriage: - heavy bleeding, no expulsion of POC, abdominal pain and cramps, dilated cervix, uterus corresponds to date

Molar pregnancy: -: - heavy bleeding, POC resemble grapes, abdominal pain, dilated cervix, uterus larger than date

Discuss the case with Obstetrician

Refer the Patient to the hospital as **urgent**

If at any time, the patient became hemodynamically **unstable,** or **heavy bleeding or POC** appeared.

Stabilize (Insert 2 big IV cannulas & start IV fluids)

Discuss the case with Obstetrician

Escort the Patient to the hospital as **emergency**

- Use the following table to make a diagnosis and if any of the conditions listed is suspected and refer as indicated to secondary / tertiary hospital

TABLE 28: DIFFERENTIAL DIAGNOSIS OF VAGINAL BLEEDING IN EARLY PREGNANCY

Assessment (Signs & Symptoms)	Probable Diagnosis	Management & Advise
• Light ★ bleeding • Closed cervix • Uterus corresponds to dates	Threatened abortion	• Refer with **urgent appointment** to secondary care
Two or more of the following signs: • abdominal pain • fainting • pale • very weak	Ectopic pregnancy	• Insert an IV line and give fluids • Refer as **emergency** to hospital
• History of heavy bleeding★★ but - now decreasing, or - no bleeding at present • Closed cervix • Uterus smaller than dates • Light cramping/lower abdominal pain • History of expulsion of products of conception	Complete abortion	• If no fever or severe bleeding refer with **urgent appointment** to secondary care
• Heavy ★★ bleeding • Dilated cervix • Uterus corresponds to dates • Cramping/lower abdominal pain • No expulsion of products of Conception	Inevitable abortion	• Insert an IV line and give fluids • Refer to hospital as **emergency**
• Heavy★★ bleeding • Dilated cervix • Uterus smaller than dates • lower abdominal pain • Partial expulsion of products of conception	Incomplete abortion	• Insert an IV line and give fluids • Refer to hospital as **emergency**
• Heavy★★ bleeding • Dilated cervix • Uterus larger than dates • Partial expulsion of products of conception which resemble grapes • Cramping /lower abdominal pain	Molar pregnancy	• Insert IV line • Give IV fluids rapidly • Refer to hospital **as emergency**

★ *Light bleeding: takes time for a clean pad or cloth to be soaked*

★★ *Heavy bleeding: takes five minutes or less for a clean pad or cloth to be soaked*

2.4.2 Vaginal bleeding in later pregnancy and labour

Problems

- Vaginal bleeding after 22 weeks of pregnancy.
- Vaginal bleeding in labour before delivery

TABLE 29: TYPES OF BLEEDING IN LATE PREGNANCY

Type of Bleeding	Probable Diagnosis	Action
Blood-stained mucus (show)	Onset of labour	Proceed with management of normal labour and Childbirth
Any other bleeding after 22 weeks of gestation	Antepartum haemorrhage • Abruptio Placenta • Placenta Previa • Ruptured uterus	Determine cause using Table 21
Bleeding during labour	bleeding more than 100 ml since labour began • Abruptio Placenta • Placenta Previa • Ruptured uterus	Stabilized & refer as **emergency** to hospital

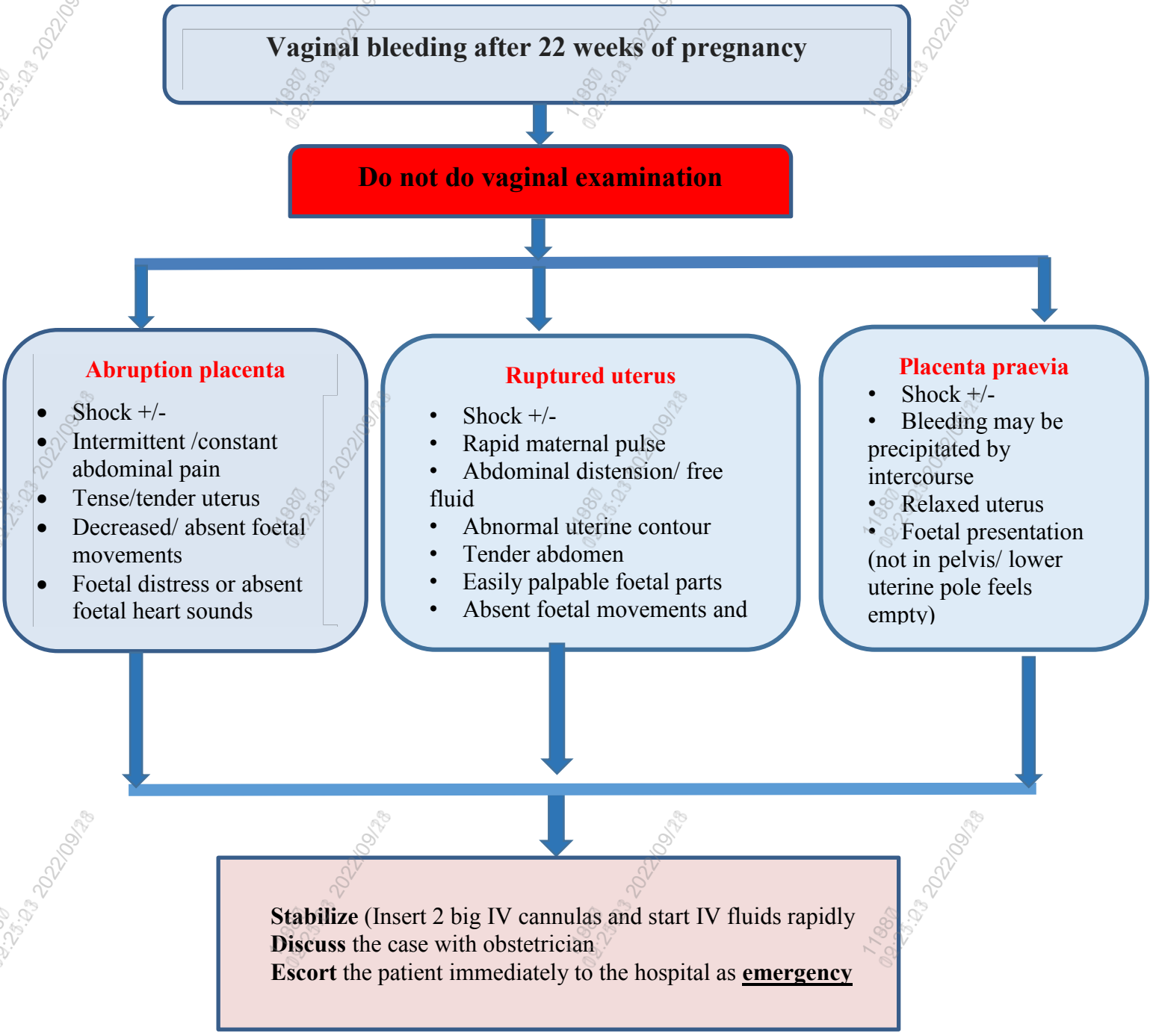
General Management of Vaginal Bleeding

- Call for help. Urgently mobilize all available personnel
- Perform a rapid evaluation of the general condition of the woman, including vital signs (Pulse, blood pressure, respiration, temperature)
- If shock is suspected, immediately begin treatment (*see Section 2.8.3 Shock).* Even if signs of shock are not present, keep shock in mind as you evaluate the woman further because her status may worsen rapidly. If shock develops, it is important to begin treatment immediately
    - Insert two large IV lines and infuse IV fluids
    - Do not do a vaginal examination at this stage
    - Check Maternal Health Record for previous ultrasound results
    - Use the following table to make a diagnosis and if any of the conditions listed is suspected
    - Refer as **emergency**

Diagnosis & Management of Vaginal Bleeding

Use the following table for diagnosis and management.

ALGORITHM 20: DIAGNOSIS & MANAGEMENT OF VAGINAL BLEEDING



2.4.3 Fever during pregnancy and labour

Problem

A woman has fever (temperature 38°C or more) during pregnancy or labour.

General Management

- Encourage adequate rest
- Encourage to increase fluid intake by mouth or start IV fluids if indicated
- Paracetamol 1 gm can be given 4-6 hourly
- Use tepid sponge to help decrease temperature

Diagnosis & Management

Use the following table for diagnosis and management of fever during pregnancy.

TABLE 30: DIAGNOSIS OF FEVER DURING PREGNANCY AND LABOUR

Presenting Symptom and Other Symptoms and Signs Typically Present	Symptoms and Signs Sometimes Present	Probable Diagnosis & Management
• Dysuria • Spiking fever/chill • Increased frequency and urgency of urination • Abdominal pain	• Retro pubic/suprapubic pain/ tenderness • Loin pain/tenderness • Tenderness in rib cage • Anorexia • Nausea/vomiting	• Acute pyelonephritis • Refer as emergency to secondary care
• Foul-smelling vaginal discharge in first 22 weeks • Fever • Tender uterus	• Lower abdominal pain • Prolonged bleeding • Purulent cervical discharge • Rebound tenderness	• Septic abortion • Refer as emergency to secondary care
• Fever/chills • Foul-smelling watery discharge after 22 weeks • Abdominal pain	• History of loss of fluid • Light vaginal bleeding • Tender uterus • Rapid foetal heart rate	• Chorioamnionitis • Refer as emergency to secondary care
• Fever • Difficulty in breathing • Cough with expectoration • Chest pain	• Signs of consolidation • Congested throat • Rapid breathing • Rhonchi/ rales	• Pneumonia / viral infection • Refer as emergency to secondary care

2.4.4 Abdominal pain in pregnancy

- Abdominal pain in pregnancy represents a diagnostic and therapeutic challenge and can occur due to obstetric causes as well for causes that are unrelated to pregnancy.
- It is very crucial to identify patients who have a serious or even life-threatening conditions and require urgent intervention as delay in diagnosis and treatment can lead to increase maternal and foetal/new-born morbidity and mortality.

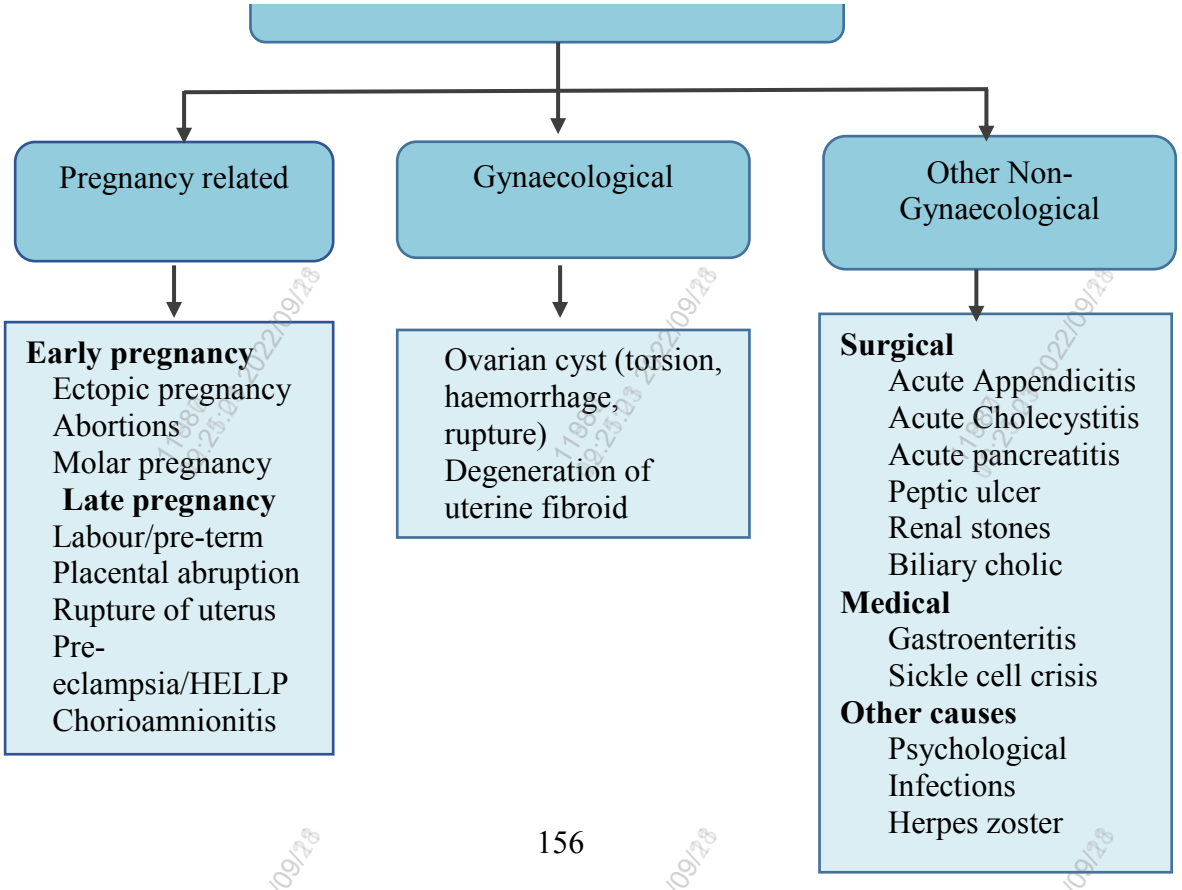
Abdominal pain at early Pregnancy: -

- The woman is experiencing abdominal pain in the first 22 weeks of pregnancy
- Abdominal pain may be the first presentation in serious complications such as abortion or ectopic pregnancy

Abdominal pain at late Pregnancy and after childbirth: -

- The woman is experiencing abdominal pain after 22 weeks of pregnancy
- The woman is experiencing abdominal pain during the first six weeks after childbirth

ALGORITHM 21: ABDOMINAL PAIN IN PREGNANCY



Diagnosis & Management

Use the following table for diagnosis and management of woman experiencing abdominal pain in pregnancy

TABLE 31:DIAGNOSIS AND MANAGEMENT OF WOMAN EXPERIENCING ABDOMINAL PAIN IN PREGNANCY

Probable Diagnosis	Symptoms and Signs	Management and Referral to Secondary care
Pregnancy – related (early pregnancy)		
Ectopic pregnancy	• Abdominal pain. • Fainting • Pale • Very weak • Tender adnexal mass • Amenorrhea • Cervical motion tenderness	• Insert IV line • Give IV fluids rapidly Escort to hospital as emergency
Miscarriages /Abortions	● Vaginal bleeding ● Abdominal pain ● Open/closed cervix ● Presence or not of tissues and clots	It depends on the situation See section
Molar pregnancy	• Heavy★★ bleeding • Dilated cervix • Uterus larger than dates • Partial expulsion of products of conception which resemble grapes Cramping /lower abdominal pain	• Insert IV line • Give IV fluids rapidly Escort to hospital **as emergency**
Pregnancy related (late pregnancy)		
Possible preterm labour	• Palpable contractions • Blood-stained mucus discharge (show) or watery discharge before 37 weeks • Cervical dilatation and effacement • Light★ vaginal bleeding	Refer as emergency to hospital
Possible term labour	• Palpable contractions • Blood-stained mucus discharge (show) or watery discharge at or after 37 weeks • Cervical dilatation and effacement • Light vaginal bleeding	Conduct labour if facilities available in the health institution or refer as emergency to the nearest delivering institution
Placental abruption	• Bleeding after 22 weeks gestation Intermittent or constant abdominal pain • Shock • Tense/tender uterus • Decreased/ absent foetal . movements Foetal distress or absent foetal heart sounds	• Do not do vaginal examination • Insert IV line • Give IV fluids rapidly Refer to hospital **as emergency**

Uterine rupture	• Bleeding (intra-abdominal and/or (vaginal • Severe abdominal pain (may decrease (after rupture • Shock • Rapid maternal pulse • Abdominal distension/ free fluid • Abnormal uterine contour • Tender abdomen • Easily palpable foetal parts • Absent foetal movements and foetal heart sounds	• Do not do vaginal examination • Insert IV line • Give IV fluids rapidly Refer to hospital as **emergency**
Choriamnionitis	• Foul-smelling watery vaginal discharge after 22 weeks gestation • Fever/chills • History of loss of fluids • Tender uterus rapid heart rate • Light vaginal bleeding	Refer **as emergency**
Gynaecological		
Ovarian cyst (torsion, haemorrhage, rupture)	• Abdominal pain • Adnexal mass on vaginal examination • Palpable, tender discrete mass in lower abdomen • Light★ vaginal bleeding	• Insert IV line • Give IV fluids rapidly Escort to hospital as emergency
Fibroid red degeneration Twisted pedunculated fibroids (torsion)	• Lower abdominal pain	• Insert IV line • Give IV fluids rapidly Escort to hospital as emergency
Endometritis	• Lower abdominal pain • Fever/chills • Purulent, foul- smelling lochia • Tender uterus • Light vaginal bleeding • Shock	• Insert IV line • Give IV fluids rapidly Escort to hospital as emergency
Pelvic abscess	• Lower abdominal pain and distension • Persistent spiking fever/ chills • Tender uterus • Poor response to antibiotics • Swelling in adnexa or pouch of Douglas	• Insert IV line • Give IV fluids rapidly Escort to hospital as emergency

Medical & Surgical		
Appendicitis	• Rt Lower abdominal pain, sometimes higher than expected. • Low-grade fever • Rebound tenderness • Nausea/vomiting • Increased white blood cells	Refer as emergency
Acute pyelonephritis	• Dysuria • Spiking fever/chills • Increased frequency and urgency of urination • Abdominal pain Retro pubic/suprapubic pain/ tenderness • Loin pain/tenderness • Tenderness in rib cage • Anorexia • Nausea/vomiting	Refer as emergency
Peritonitis	• Low-grade fever/chills • Lower abdominal pain • Absent bowel sounds Rebound tenderness • Abdominal distension • Anorexia • Nausea/vomiting • Shock	Refer as emergency
Cystitis	• Dysuria • Increased frequency and urgency of urination • Abdominal pain • Retro pubic/ suprapubic pain/ tenderness	Manage as in Table 19

2.4.5 Missed Abortion / Miscarriage

Definition:

Absent foetal heart activity and/or cessation of pregnancy related symptoms before 24 weeks of pregnancy.

Diagnosis

By ultrasound (Trans-vaginal / abdominal ultrasound):

- Intrauterine sac (>20 mm mean diameter) with no obvious yolk sac or foetus, OR
- Absence of foetal heart activity in a pregnancy with crown-rump length of > 6 mm

General management:

- Repeat ultrasound examination at interval of 1 to 2 weeks to confirm the diagnosis
- After confirming the diagnosis, discuss the case and refer to the secondary care as advised to decide on the mode of management.

2.4.6 Decreased foetal movements

Definition

Foetal movements are less than 10 movements per 12 hours.

Diagnosis

a. History

- Check when last had food or fluids
- Check maternal activity
- Check for any significant risk factors

b. Examination

- Check Symphysis Pupis Height (SPH)
- Check foetal heart activity by Doppler

c. Management:

1. If < 28 weeks, or gave history of not taking food

- Advise her to take food and observe for movements for the next 1 hour
- Check for foetal heart activity
- If normal movements and normal foetal heart activity: reassure the women and provide kick chart
- If no movements and/or abnormal foetal heart activity: refer to the secondary care as emergency

2. If ≥ 28 weeks and/or risk factors: Refer to the secondary care as emergency

2.4.7 Pre-mature Rupture of Membranes (PROM)

Definition:

Rupture of membranes with vaginal loss of amniotic fluid before labour has begun. It can occur either when the foetus is immature (preterm or before 37 weeks) or when it is mature (term).

Diagnosis:

Maternal history:

- Gestational age
- Time of rupture of membranes
- Description of liquor (colour, consistency, presence of meconium-stained liquor)
- Symptoms of infection
    - Fever
    - Maternal tachycardia
    - Yellowish vaginal discharge

Examination:

- Sterile speculum examination
    - Presence of pool of fluid in the vagina
    - Nitrazine test: amniotic fluid will turn paper blue
    - Microscopic examination of vaginal fluid show ferning due to the presence of sodium chloride under oestrogen effect
    - Examination for lanugo hair

- Abdominal examination: determine foetal lie, presentation, heart rate and presence of Contraction

Note:

Nitrazine test is the most practical and of help, but false positive rate is 17% due to contamination with urine, blood or semen.

Management:

- If history and speculum examination show evidence of leakage, refer to the secondary care as emergency
- If Nitrazine test is positive, refer to the secondary care as emergency
- If history, examination and Nitrazine test are not suggestive of rupture of membranes, reassure the patient and advise her to observe by applying a clean pad
- Instruct the women to report immediately if signs of leaking reoccur

2.5 Normal labour

- Greet the woman and make her comfortable
- Perform a rapid evaluation of the general condition of the woman including vital signs (pulse, blood pressure, respiration, temperature)
- Perform a rapid evaluation of the maternal health record
- Assess foetal condition
  - Listen to the foetal heart rate immediately after a contraction
  - Count the foetal heart rate for a full minute (after contraction) at least once every
  - minutes during the active phase and every five minutes during the second 15 stage
  - If there are **foetal heart rate abnormalities** (less than 110 or more than 160 beats
  - per minute), suspect foetal distress
  - If the **membranes have ruptured**, note the colour of the draining amniotic fluid
  - Presence of thick meconium indicates the need for close monitoring and possible
  - intervention for management of foetal distress
  - Absence of fluid draining after rupture of the membranes is an indication of
  - reduced volume of amniotic fluid, which may be associated with foetal distress

TABLE 32: CONDITIONS DURING LABOUR REQUIRING IMMEDIATE REFERRAL

Condition	Transfer to
Primigravida	Secondary care
Foetal Malpresentation	Secondary care
Foetal distress (abnormal foetal heart rate, thick meconium, blood-stained liquor)	Secondary care
Ruptured membranes more than 24 hours	Secondary care
Prolonged labour (poor dilatation despite good contractions)	Secondary care
Prelabour rupture of membranes (before 22 weeks)	Secondary care
Uncontrolled premature labour (before 37 weeks)	Secondary care

2.5.1 Supportive care during labour and childbirth

- Encourage the woman to have personal support from a person of her
  - choice throughout labour and birth (if permissible in the institution)
  - Arrange seating for the companion next to the woman
  - Encourage the companion to give adequate support to the woman during labour and childbirth (rub her back, wipe her brow with a wet cloth, assist her to move about

- Ensure good communication and support by staff
  - Explain all procedures, seek permission and discuss findings with the woman
  - Provide a supportive, encouraging atmosphere for birth that is respectful of the woman's wishes
  - Ensure privacy and confidentiality

- Maintain cleanliness of the woman and her environment
  - Encourage the woman to wash herself or bath or shower at the onset of labour (if possible, in the providing institution).
  - Clean the vulva and perineal areas before each examination.
  - Wash your hands with soap before and after each examination.
  - Ensure cleanliness of labouring and birthing area(s).
  - Clean up all spills immediately

- Ensure mobility
  - Encourage the woman to move about freely
  - Encourage the woman to empty her bladder regularly

Note: Do not routinely give an enema to women in labour.

- Encourage the woman to eat light meals, drink water, nutritious liquid drinks are important, even in late labour to avoid dehydration
- Teach breathing techniques for labour and delivery
- Encourage the woman to breathe out more slowly than usual and relax with expiration
- Help the woman in labour who is anxious, fearful or in pain
  - Give her praise, encouragement and reassurance
  - Give her information on the process and progress of her labour
  - Listen to the woman and be sensitive to her feelings

- If the woman is distressed by pain
  - Encourage mobility, as comfortable for her
  - Suggest change of position
  - Encourage companion to
  - Massage the woman's back if she finds this helpful
  - Hold the woman's hand and sponge her face between contractions
  - Encourage her to use the breathing technique
  - Encourage warm bath or shower, if available

Note: Analgesics drugs during labour apart from paracetamol to be avoided

Barbiturates and sedatives should not be used to relieve anxiety in labour

2.5.2 Diagnosis and confirmation of labour

- Suspect or anticipate labour if the woman has
  - Intermittent abdominal pain after 22 weeks gestation
  - Pain often associated with blood-stained mucus discharge (show)
  - Watery vaginal discharge or a sudden gush of water

- Confirm the onset of labour if there is
  - Cervical effacement, i.e., the progressive shortening and thinning of the cervix during labour; and
  - Cervical dilatation, i.e., the increase in diameter of the cervical opening measured in centimetres

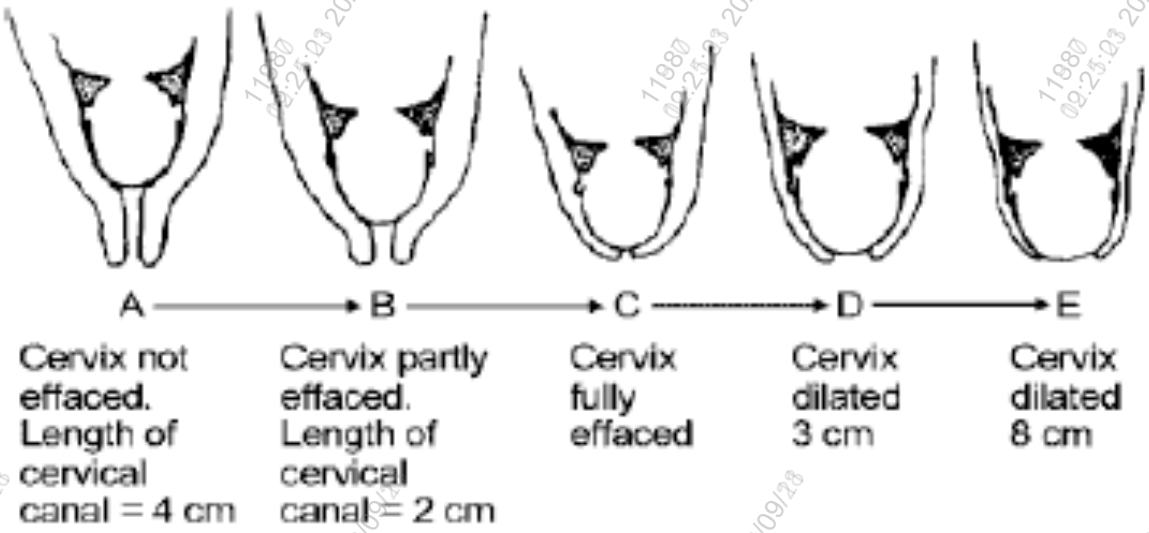


FIGURE 2: EFFACEMENT AND DILATATION OF THE CERVIX

2.5.3 Diagnosis of stage and phase of labour

TABLE 33: DIAGNOSIS OF STAGE AND PHASE OF LABOUR

- Symptoms and Signs	Stage	Phase
Cervix not dilated	False labour/ Not in labour	
Cervix dilated less than 3 cm	First	- Latent
- Cervix dilated 3-9 cm - Rate of dilatation typically one cm per hour or more - Foetal descent begins	First	Active
- Cervix fully dilated (10 cm) - Foetal descent continues - No urge to push	Second	Early (non-expulsive)
- Cervix fully dilated (10 cm) - Presenting part of foetus reaches pelvic floor - Woman has the urge to push	Second	Late (expulsive)

Note: **Third stage of labour begins with delivery of the baby and ends with the expulsion of the placenta.**

- Descent Assessment
- Abdominal Palpation
- By abdominal palpation, assess descent in terms of fifths of foetal head palpable above the symphysis pubis:
- A head that is entirely above the symphysis pubis is five-fifths (5/5) palpable
- A head that is entirely below the symphysis pubis is zero-fifths (0/5) palpable

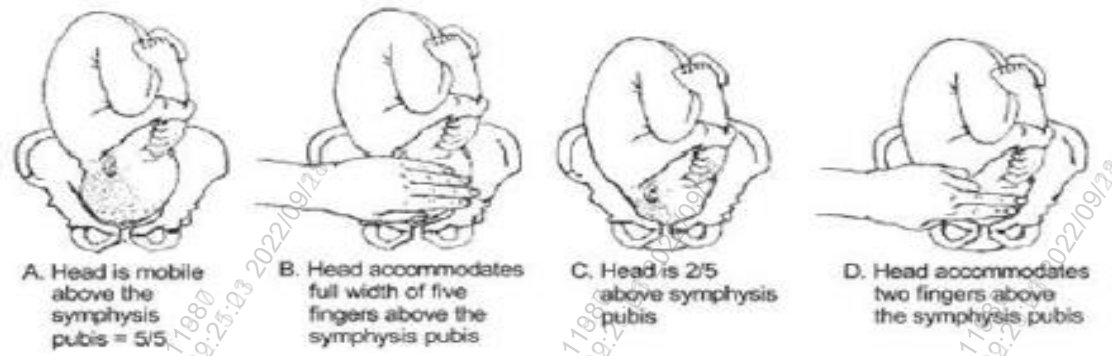


FIGURE 3: ABDOMINAL PALPATION FOR DESCENT OF THE FOETAL HEAD

Vaginal Examination

- Vaginal examination is used to assess descent by relating the level of the foetal presenting part to the Ischial spines of the maternal pelvis.

Note: When there is a **significant degree of caput or moulding**, assessment by abdominal palpation using fifths of head palpable is more useful than assessment by vaginal exam.

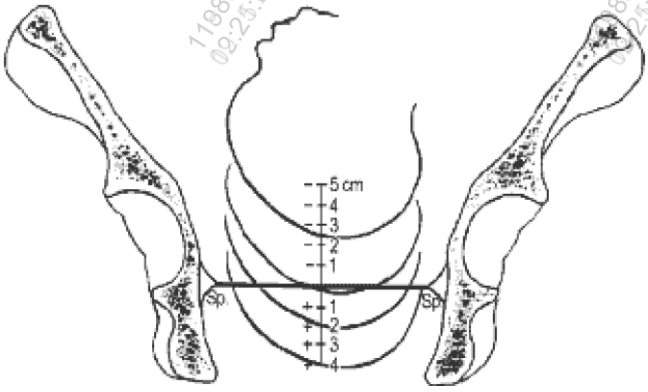


FIGURE 4: ASSESSING DESCENT OF THE FOETAL HEAD BY VAGINAL EXAMINATION; 0 STATION IS AT THE LEVEL OF THE ISCHIAL SPINE (SP)

Presentation and Position Assessment

Determine the presenting part:

- The most common presenting part is the vertex of the foetal head. If the vertex is not the presenting part, manage as a malpresentation
- If the vertex is the presenting part, use landmarks on the foetal skull to determine the position of the foetal head in relation to the maternal pelvis

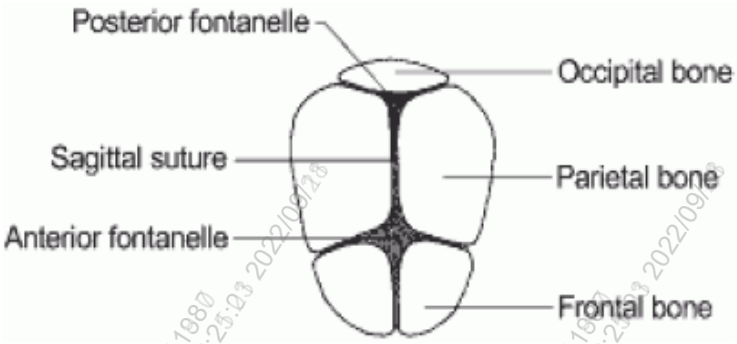


FIGURE 5: LANDMARKS OF THE FOETAL SKULL

Determine the Position of the Foetal Head

- The foetal head normally engages in the maternal pelvis in an occipital transverse **position**, with the foetal occiput transverse in the maternal pelvis.

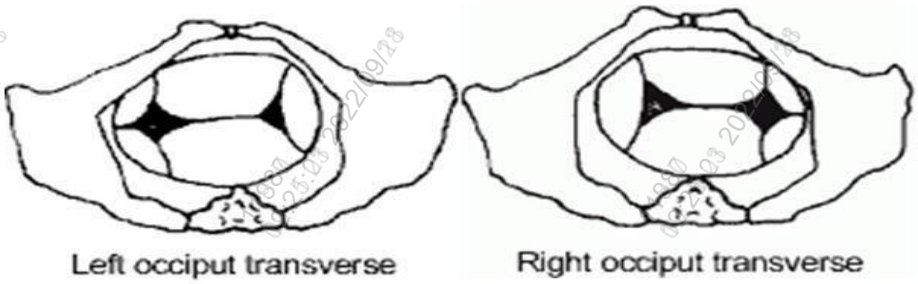


FIGURE 6: OCCIPUT TRANSVERSE POSITIONS

- With descent, the foetal head rotates so that the foetal occiput is anterior in the maternal pelvis (occiput anterior positions). Failure of an occiput transverse position to rotate to an occiput anterior position should be managed as an occiput posterior position.

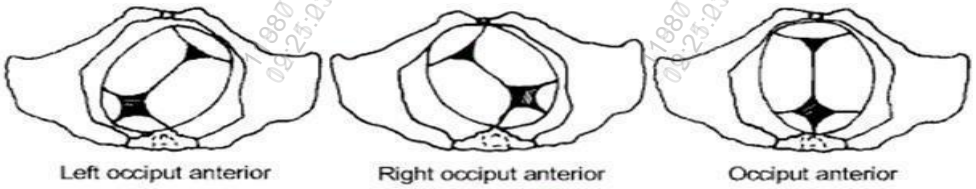


FIGURE 7: OCCIPUT ANTERIOR POSITIONS

- An additional feature of a normal presentation is a well-flexed vertex with the occiput lower in the vagina than the sinciput.

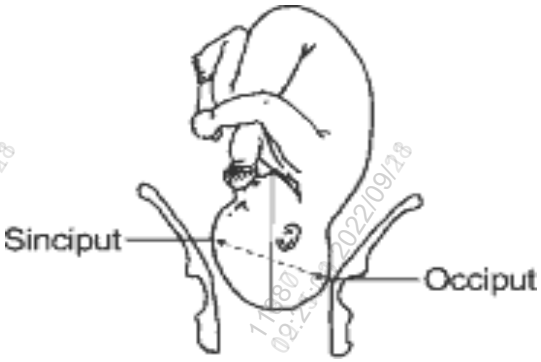


FIGURE 8: WELL-FLEXED VERTEX

Assessment of Progress of Labour

- Once diagnosed, progress of labour is assessed by:
- Measuring changes in cervical effacement and dilatation during the latent phase
- Measuring the rate of cervical dilatation and foetal descent during the active phase
- Assessing further foetal descent during the second stage
- Progress of the first stage of labour should be plotted on a partogram once the woman enters the active phase of labour. A sample partogram is shown in Figure 9.

TABLE 34: DURATION OF EACH STAGE OF LABOUR

Stage of Labour	Primigravida	Multipara
First stage	6- 18 hours	2- 10 hours
Second stage	30 minutes to 3 hours	5- 30 minutes
Third stage	0- 30 minutes	0- 30 minutes

Vaginal Examinations

Vaginal examinations should be carried out at least once every four hours during the first stage of labour and after rupture of the membranes. Plot the findings on a partogram.

- At each vaginal examination, record the following
  - colour of amniotic fluid
  - cervical dilatation and effacement
  - descent (can also be assessed abdominally)
- If the cervix is not dilated on first examination, it may not be possible to diagnose labour

- If contractions persist, re-examine the woman after four hours for cervical changes. At this stage, if there is effacement and dilatation, the woman is in labour if there is no change, the diagnosis is false labour
- In the second stage of labour, perform vaginal examinations once every hour

Using of Partogram

Fill all the required information in the front page of the Composite Obstetric Record

Plotting the Partogram:

- The partogram is designed to record all important information about the woman and foetus during labour. It is a tool for making decisions
- The progress of labour is recorded as a simple graph with the time on the horizontal axis and the various important features of labour on the vertical axis
- All observations such as BP, foetal heart, uterine contractions are charted by plotting the value of that observation, on the vertical axis, against the appropriate time, on the horizontal axis. In this way trends are easily recognized
- The findings of every vaginal examination (cervix dilatation and descent) are plotted on the partogram
- The midwife or doctor can see at a glance the condition of the mother and foetus, and the progress of labour
- The partogram provides valuable guidance in the management of labour
- The partogram is started when the cervix is 3 cm dilated
- Every 30 minutes
    - Count the foetal heart
    - Time the uterine contractions
    - Take the maternal pulse
- Every two hours Take the maternal blood pressure
- Every four hours:
    - Take maternal temperature
    - Test the urine
    - Perform a vaginal examination

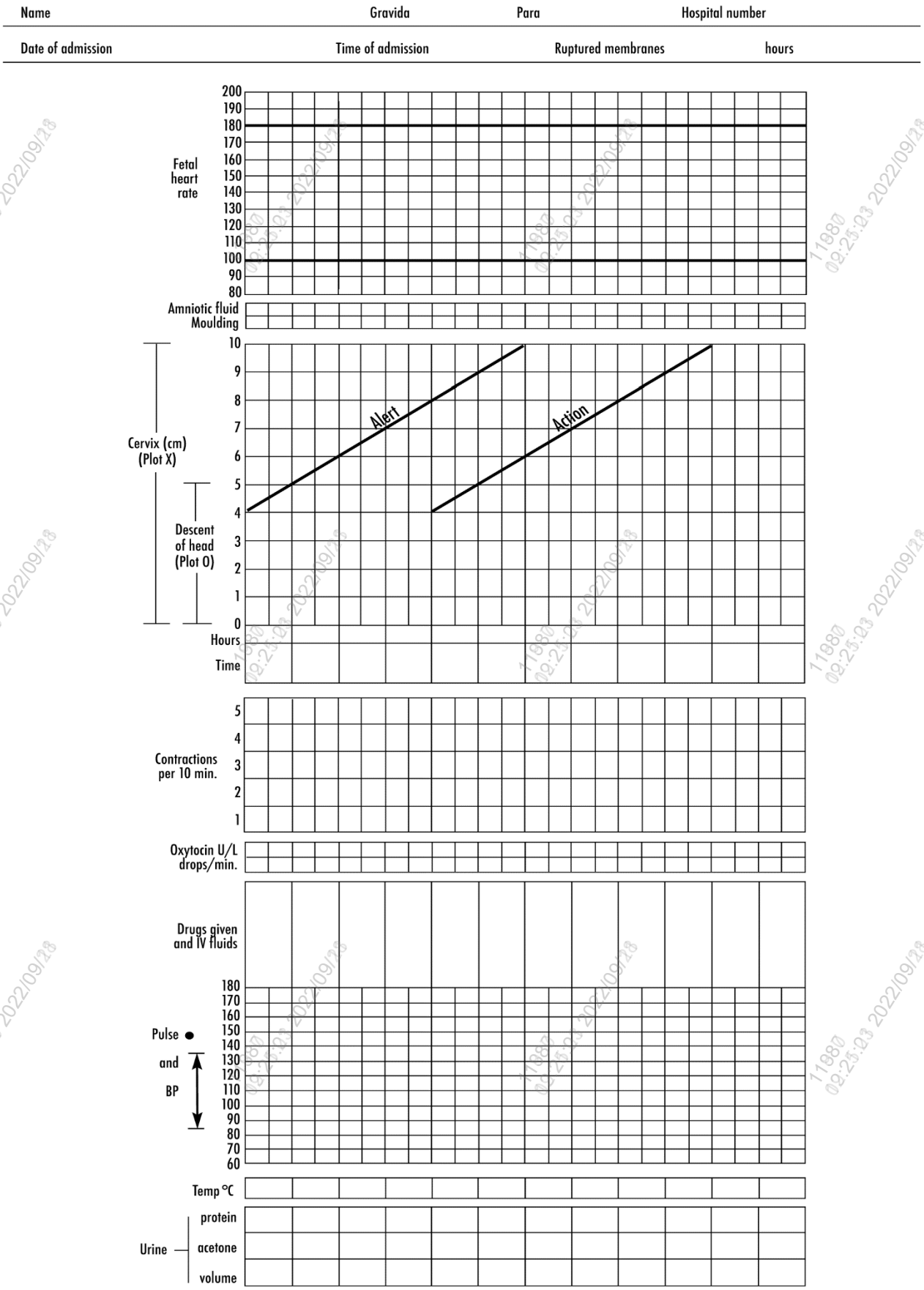


FIGURE 9: SAMPLE PARTOGRAM FOR NORMAL LABOUR

Use of Partogram in Active Management of Labour

- Alert line: As soon as the cervix is found to be cm or more dilated on vaginal examination, 3 an Alert line is drawn in red obliquely upward, along the expected rate of dilatation of 1 cm per hour.
- The Alert line indicates the expected rate of dilatation during the active phase of labour
- If on subsequent vaginal examination the cervical dilatation is to the right of the Alert line the doctor should be informed as it gives in indication that labour is not progressing as it should be.
- Action line: Is drawn parallel to the alert line, 4 hours to the right. This shows when some action should be taken
- If, on any vaginal assessment, the cervical dilatation is delayed or more to the 2 hours right of the Alert line i.e., on the Action line or beyond, some action should be taken to ensure that labour progresses safely.

Progress of First Stage of Labour

- Findings suggestive of satisfactory progress in the first stage of labour are
  - Regular contractions of progressively increasing frequency and duration
  - Rate of cervical dilatation at least 1 cm per hour during the active phase of labour (cervical dilatation on or to the left of alert line)
  - Cervix well applied to the presenting part
  - Findings suggestive of unsatisfactory progress in the first stage of labour are Irregular and infrequent contractions after the latent phase OR
  - Rate of cervical dilatation slower than 1 cm per hour during the active phase of labour
  - (cervical dilatation to the right of alert line)

OR

- Cervix poorly applied to the presenting part

Note: Unsatisfactory progress in labour can lead to prolonged labour.

Progress of Second Stage of Labour

- Findings suggestive of satisfactory progress in the second stage of labour are
  - Steady descent of foetus through birth canal
  - Onset of expulsive (pushing) phase

- Findings suggestive of unsatisfactory progress in second stage of labour are
  - Lack of descent of foetus through birth canal
  - Failure of expulsion during the late (expulsive) phase

- ***If there are foetal heart rate abnormalities (less than 110 or more than 160 beats per minute), suspect foetal distress and refer the patient to the secondary care as emergency***
- ***Positions or presentations in labour other than occiput anterior with a well-flexed vertex are considered malposition or malpresentation and refer the patient to the secondary care as emergency***
- ***If unsatisfactory progress of labour or prolonged labour is suspected refer patient to the secondary care as emergency***

Progress of Foetal Condition

Evaluate the woman for signs of distress:

- If **the woman's pulse is increasing**, she may be dehydrated or in pain. Ensure adequate hydration via oral or IV routes
- If the woman's blood pressure decreases, suspect haemorrhage
- If **ketones are present in the woman's urine**, suspect poor nutrition and give oral nutritious drinks and IV fluids.

Normal childbirth

Once the cervix is fully dilated and the woman is in the expulsive phase of the second stage (when she feels the urge to push), encourage the woman to push.

Note: Episiotomy is no longer recommended as a routine procedure. There is no evidence that routine episiotomy decreases perineal damage, future vaginal prolapse or urinary incontinence.

> ***Episiotomy** (see Section 2.9.3 Episiotomy) **should be considered in the case of:***
> ***Complicated vaginal delivery (breech, shoulder dystocia, forceps, vacuum (extraction***
> ***Scarring from female genital cutting or poorly healed third or fourth degree tears***
> ***Foetal distress***

- Ask the woman to pant or give only small pushes with contractions as the baby's head delivers
- To control birth of the head, place the fingers of one hand against the baby's head to keep it flexed (bent)
- Continue to gently support the perineum as the baby's head delivers
- Once the baby's head delivers, ask the woman not to push
- Feel around the baby's neck for the umbilical cord
  - If the cord is around the neck but is loose, slip it over the baby's head
  - If the cord is tight around the neck, doubly clamp and cut it before unwinding it from around the neck.

Completion of Delivery:

- Allow the baby's head to turn spontaneously
- After the head turns, place a hand on each side of the baby's head. Tell the woman to push gently with the next contraction
- Reduce tears by delivering one shoulder at a time

Note: If there is difficulty delivering the shoulders, suspect shoulder dystocia.

- Lift the baby's head anteriorly to deliver the shoulder that is posterior
- Support the rest of the baby's body with one hand as it slides out
- Place the baby on the mother's abdomen. Thoroughly dry the baby, wipe the eyes and assess the baby's breathing

Note: Most babies begin crying or breathing spontaneously within 30 seconds of birth:

- If the baby is crying or breathing (chest rising at least 30 times per minute) leave the baby with the mother
- If baby does not start breathing within 30 seconds, call for help and take steps to resuscitate the baby

Anticipate the need for resuscitation and have a plan to get assistance for every baby

- Clamp and cut the umbilical cord immediately after delivery of the baby
- Ensure that the baby is kept warm and in skin-to-skin contact on the mother's chest. Wrap the baby in a soft, dry cloth, cover with a blanket and ensure the head is covered to prevent heat loss
- If the mother is not well, ask an assistant to care for the baby
- Palpate the abdomen to rule out the presence of an additional baby(s) and proceed
- with active management of the third stage

Active Management of the Third Stage:

Active management of the third stage (active delivery of the placenta) helps to prevent postpartum haemorrhage. Active management of the third stage of labour includes:

A. Immediate oxytocin

B. Controlled cord traction and

C. Uterine massage

Oxytocin

- Within one minute of delivery of the baby, palpate the abdomen to rule out the presence of an additional baby(s) and give oxytocin 10 units IM
- Oxytocin is preferred because it is effective 2 to 3 minutes after injection, has minimal side effects and can be used in all women. If oxytocin is not available, give ergometrine mg IM 0.2

Do not give ergometrine to women with pre-eclampsia, eclampsia, high blood pressure and cardiac conditions because it increases the risk of convulsions and cerebrovascular accidents.

Controlled Cord Traction:

1. Clamp the cord close to the perineum using sponge forceps within one minute of delivery. Hold the clamped cord and the end of forceps with one hand.
2. Wait for signs of placenta separation: gush of blood and lengthening of the cord
3. Place side of the other hand (usually left) above symphysis pubis with palm facing towards the mother's umbilicus. This applies counter traction to the uterus during controlled cord traction. This helps to prevent inversion of the uterus.
4. Keep slight tension on the cord and await a strong uterine (two to three minutes).
5. When the uterus becomes rounded or the cord lengthens, very gently pull downward on the cord to deliver the placenta. Continue to apply counter traction to the uterus with the other hand
6. If the placenta does not descend during 30 to 40 seconds of controlled cord traction (i.e., there are no signs of placental separation), do not continue to pull on the cord.
   - Gently hold the cord and wait until the uterus is well contracted again. If necessary, use a sponge forceps to clamp the cord closer to the perineum as it lengthens
   - With the next contraction, repeat controlled cord traction with counter traction

Never apply cord traction (pull) without applying counter traction (push) above the pubic bone with the other hand

7. As the placenta delivers, the thin membranes can tear off. Hold the hands and gently turn it until the membranes are twisted
8. Slowly pull to complete the delivery of placenta.

9. If the membranes tear, gently examine the upper vagina and cervix and use sponge forceps to remove any pieces of membrane that are present
10. Inspect the placenta to be sure none of it is missing. If a portion of the maternal surface is missing or there are torn membranes with vessels, suspect retained placental fragments, transfer the patient to the secondary care as emergency
11. If uterine inversion occurs, transfer the patient to the secondary care as emergency
12. If the cord is pulled off, transfer the patient to the secondary care as emergency

Uterine Massage:

- Immediately massage the fundus of the uterus through the woman's abdomen until the uterus is contracted
- Perform uterine palpation and inspect for excessive vaginal bleeding every 15 minutes for the first two hours
- Ensure that the woman has passed urine before shifting to the ward or discharge

Examination for Vaginal Tears:

- Examine the woman carefully and only repair 1st and 2nd degree vaginal tears, lacerations and episiotomy
- If 2nd degree vaginal tear was difficult to repair, refer to the secondary care as emergency
- Refer the patient to the secondary care for the repair of 3rd degree vaginal tears and cervical tears as an emergency

Fourth Stage Assessment:

- Assess estimated blood loss at delivery
- Measure vital signs
- Assess uterine tone uterus should be firm, central and located at the umbilicus. If uterus is deviated from central position, soft and/or distended, check the bladder, if palpable, encourage the mother to pass urine or insert a urinary catheter

Management of women presenting with active labour and diagnosed with malpresentation:

Delivery with malpresentation should not be carried out in a primary health care. If women presented in labour every effort should be taken to transfer patient to the secondary care. Delivery can only be conducted if woman is an advanced stage of labour and there is no time to transfer.

Breach Presentation:

- Review general care principles and start an IV infusion. Provide emotional support and encouragement
- Perform needed manoeuvres gently and without undue force

Complete or Frank Breech

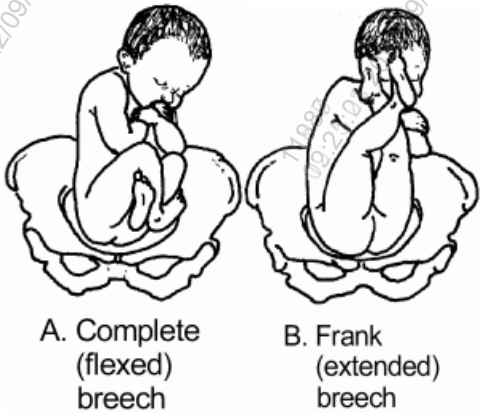


FIGURE 10: BREECH PRESENTATION

Delivery of the Buttocks and Legs

- Once the buttocks have entered the vagina and the cervix is fully dilated, tell the woman she can bear down with the contractions
- If the perineum is very tight, perform an episiotomy (*see Section 2.9.3 Episiotomy)*
- Let the buttocks deliver until the lower back and then the shoulder blades are seen
- Gently hold the buttocks in one hand, but do not pull
- If the legs do not deliver spontaneously, deliver one leg at a time
  - Push behind the knee to bend the leg
  - Grasp the ankle and deliver the foot and leg

- Repeat for the other leg

- Hold the baby by the hips, as shown in (figure 10). Do not hold the baby by the flanks or abdomen as this may cause kidney or liver damage

Do not pull the baby while the legs are being delivered

FIGURE 11: HOLD THE BABY

Delivery of the Arms

Arms are Felt on Chest

- Allow the arms to disengage spontaneously one by one. Only assist if necessary
- After spontaneous delivery of the first arm, lift the buttocks towards the mother's abdomen to enable the second arm to deliver spontaneously
- If the arm does not spontaneously deliver, place one or two fingers in the elbow and bend the arm, bringing the hand down over the baby's face

Arms are Stretched above the Head or Folded around the Neck

Use Lovset's manoeuvre (Figure 12)

- Hold the baby by the hips and turn half a circle, keeping the back uppermost and applying downward traction at the same time, so that the arm that was posterior becomes anterior
- .and can be delivered under the pubic arch
- Assist delivery of the arm by placing one or two fingers on the upper part of the arm. Draw the arm down over the chest as the elbow is flexed, with the hand sweeping over the face

- To deliver the second arm, turn the baby back half a circle, keeping the back uppermost and applying downward traction, and deliver the second arm in the same way under the pubic arch

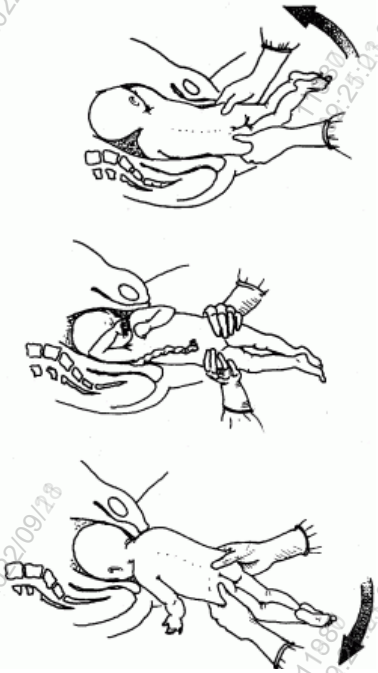


FIGURE 12: LOVSET'S MANOEUVRE

Baby's Body Cannot Be Turned

If the baby's body cannot be turned to deliver the arm that is anterior first, deliver the shoulder that is posterior see (Figure 13):

- Hold and lift the baby up by the ankles
- Move the baby's chest towards the woman's inner leg. The shoulder that is posterior should deliver
- Deliver the arm and hand
- Lay the baby back down by the ankles. The shoulder that is anterior should now deliver
- Deliver the arm and hand

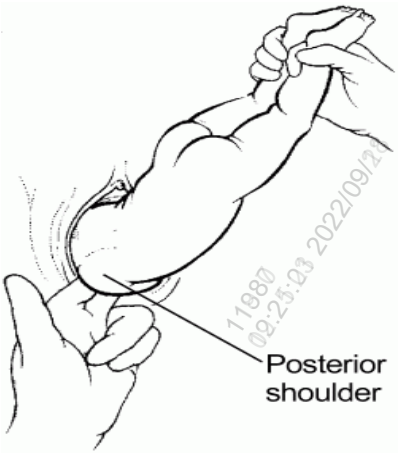


FIGURE 13: DELIVERY OF THE SHOULDER THAT IS POSTERIOR

Delivery of the Head

- Deliver the head by the Mauriceau Smellie Veit manoeuvre as follows:
- Lay the baby face down with the length of its body over your left hand and forearm
- Place the first and second fingers of this hand on the baby's cheekbones beside the nose
- Use the other hand to grasp the baby's shoulders with the middle finger pushing on the occiput
- Apply gentle traction downward and backwards direction until delivery of foetal chin followed by upward guidance of face and forehead over perineum

Note: Ask an assistant to push above the mother's pubic bone as the head delivers. This helps to keep the baby's head flexed.

- Raise the baby, still astride the arm, until the mouth and nose are free

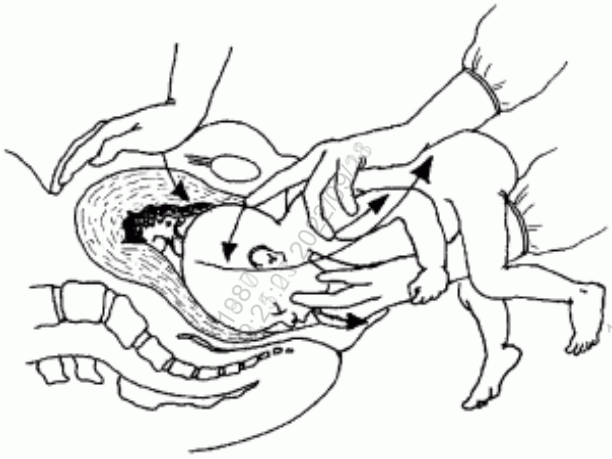


FIGURE 14: THE MAURICE AU SMELLIE VEIT MANEUVER

Shoulder Dystocia

Problem

The foetal head has been delivered but the shoulders are stuck and cannot be delivered.

General Management

- Be prepared for shoulder dystocia at all deliveries, especially if a large baby is anticipated
- Have several persons available to help

Shoulder dystocia cannot be predicted

Diagnosis

- The foetal head is delivered but remains tightly applied to the vulva
- The chin retracts and depresses the perineum
- Traction on the head fails to deliver the shoulder, which is caught behind the symphysis pubis

Management

- Make an adequate episiotomy to reduce soft tissue obstruction and to allow space for manipulation
- With the woman on her back, ask her to flex both thighs, bringing her knees as far

up as possible towards her chest. Ask two assistants to push her flexed knees firmly up onto her chest

FIGURE 15: ASSISTANT PUSHING FLEXED KNEES FIRMLY TOWARDS CHEST

- Wearing sterile gloves apply firm, continuous traction downwards on the foetal head to move the shoulder that is anterior under the symphysis pubis

Note: Avoid excessive traction on the foetal head as this may result in brachial plexus injury.

- Have an assistant simultaneously apply suprapubic pressure downwards to assist delivery of the shoulder

Note: Do not apply fundal pressure. This will further impact the shoulder and can result in uterine rupture.

- If the shoulder still is not delivered
  - Insert a hand into the vagina
  - Apply pressure to the shoulder that is anterior in the direction of the baby's sternum to rotate the shoulder and decrease the diameter of the shoulders
  - If needed, apply pressure to the shoulder that is posterior in the direction of the sternum

- If the shoulder still is not delivered despite the above measures

  -Insert a hand into the vagina

  -Grasp the humerus of the arm that is posterior and, keeping the arm flexed at the elbow, sweep the arm across the chest. This will provide room for the shoulder that is anterior to move under the symphysis pubis

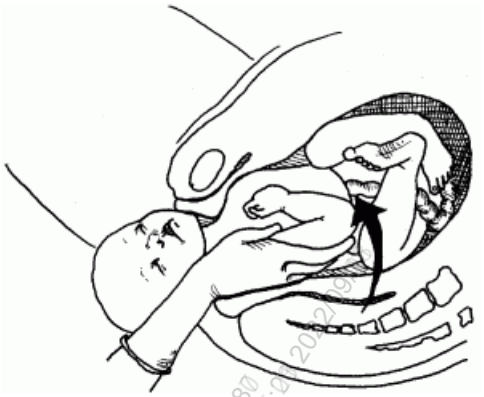


FIGURE 16: GRASPING THE HUMERUS OF THE ARM THAT IS POSTERIOR AND SWEEPING THE ARM ACROSS THE CHEST

- If all of the above measures fail to deliver the shoulder, other options include
  - Fracture the clavicle to decrease the width of the shoulders and free the shoulder that is anterior
  - Apply traction with a hook in the axilla to extract the arm that is posterior

2.6 Routine post-natal care

Routine post-natal care

It is the care given to the women and her baby for the first six weeks after delivery.

Aims of post-natal care:

- To promote the physical, mental & emotional health of the mothers and their babies
- To reduce the mortality and morbidity of mothers and their babies

Tasks of postnatal care

1. **Basic care:** To ensure basic care of all new-born
2. **Bonding:** To assist bonding between mother and babies by rooming in and minimizing separation unless medically indicated
3. **Breastfeeding:** To initiate breastfeeding within half to 1 hour of delivery and establishing it by supporting & counselling the mother
4. **Birth spacing**: To counsel period mothers about options for birth spacing in post-natal
5. **Education**: To provide information on baby care including hygiene & child safety

Basic care of new-borns:

Ensuring Warmth

<u>At birth</u>

- Warm delivery room: Temperature should be 25-28º C, no draught
- Dry baby: immediately after birth, place the baby on a warm, clean and dry surface. Dry the whole body and hair thoroughly, with a dry cloth
- Asses the new-born for the Apgar score
- Skin-to-skin contact: Leave the baby on the mother's chest (after cord cut) after birth.
- Cover the baby with a soft dry cloth of complications, wrap the baby
- If the mother cannot keep the baby skin-to-skin because in a clean, warm cloth and place in a cot. Cover with a blanket. Use a radiant warmer if room not warm or baby is pre-term

Subsequently

- Explain to the mother that keeping baby warm is important for the baby to remain healthy
- Dress the baby or wrap in soft dry clean cloth. Cover the head with a cap for the first few days
- Ensure the baby is dressed or wrapped and covered with a blanket
- If the mother and baby must be separated, ensure that baby is dressed or wrapped and covered with a blanket
- Assess warmth every 4 hours by touching the baby's feet: if feet are cold use skin-to-skin contact, add extra blanket and reassess
- Keep the room warm for the mother and baby. If the room is not warm enough, always cover the baby with a blanket and/or use skin-to-skin contact

At home

- Explain to the mother that babies need one more layer of clothes than older children or adults
- Keep the room or part of the room warm, especially in cold climate
- During the day, dress or wrap the baby
- At night, let the baby sleep with the mother or within easy reach to facilitate breastfeeding

Hygiene:

Eye care

- It is normal for a new-born baby to have some crusting or a little discharge
- Wash the baby eyes with clean water

Do not put any antibiotics unless advised by physician

Cord care

- Wash hands before and after cord care
- Do not put anything on the stump
- Fold nappy (diaper) below stump
- Keep cord stump loosely covered with clean clothes
- If stump is soiled, wash it with clean water and soap. Dry it thoroughly with clean cloth
- If umbilicus is red or draining pus or blood, examine the baby and refer to the paediatrician
- Explain to the mother that she should seek care if the umbilicus is red or draining pus or blood

Remember:

- Do not bandage the stump or abdomen
- Do not apply any substances or medicine to stump
- Do not touch the stump unnecessarily

Bath

At Birth:

- Only remove blood or meconium
- Do not remove vernix
- Do not bathe the baby before 6 hours

Later and at home:

- Wash the face, neck, underarms daily
- Wash the buttocks when soiled. Dry thoroughly
- Bath when necessary
- Ensure the room is warm, no draught
- Use warm water for bathing
- Thoroughly dry the baby, dress and cover after bath

Immunization

- Give all the required immunizations according to the national immunization schedule
- Give Vitamin A 200,000 IU to mother within 15 days after delivery, preferably before discharge
- Give Rubella Vaccine to mother if indicated
- Advise when to return for next immunization

Ensure Nutrition through Breast Feeding

- Ask the mother to help the baby attach when the baby seems to be ready. Signs of readiness to suckle include opening the mouth, rooting or searching, looking around, and moving.
- If the mother is ill and unable to breastfeed, help her to express breast milk and feed the baby by cup.
- Explain to the mother how to hold her baby during breastfeeding. She should hold the baby in skin-to-skin contact, if possible.

- Hold the baby's head and body straight so that the baby faces her breast, with the baby's nose near her nipple.
- Support the baby's whole body, not just the neck and shoulders.
- Explain to the mother how to encourage her baby to attach. She should:
- Touch the baby's lips with her nipple.
- Wait until the baby's mouth is opening wide.
- Move the baby quickly onto her breast, so that the baby's lower lip is well below the nipple.

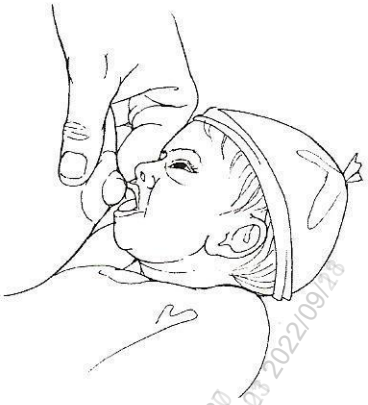


FIGURE 17: INITIATING BREASTFEEDING

- Assess attachment on the breast and suckling. Help the mother if she wishes. Especially if she is a first time or very young mother. Signs of correct attachment:
  - Baby's chin touches the breast.
  - Baby's mouth is wide open with the lower lip curled out.
  - More of the areola is visible above than below the mouth.
  - Baby suckles with slow, deep sucks and pauses sometimes.

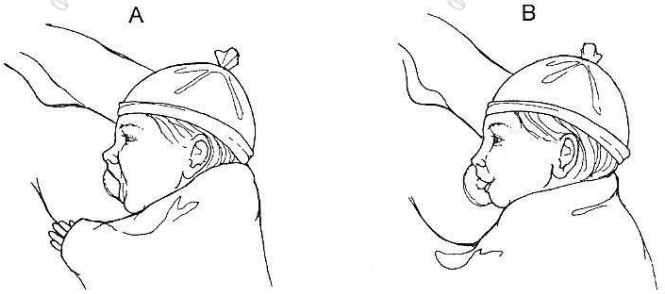


FIGURE 18: ATTACHING TO BREAST

Neonatal screening:

- Blood should be collected for routine screening from umbilical cord at birth or by heel puncture subsequently
- Hearing test to be performed before discharge

Documentation

Maternal Health Record: The details of labour should be entered in the Maternal Health Record.

Child Health Record: Every child must be issued a Child Health Record and all entries should be completed before discharge from the maternity ward. The child health checks done at birth should be done in the first 24 hours and be entered in the Child Health Record.

Post-natal visits to clinic

- The mother should visit the health centre at 2 weeks and then at 6 weeks postnatal
- Check blood pressure, pulse and temperature
- The investigations to be performed at 6-week visit
  - HB level
  - urine microscopy
  - TFT (if indicted)
  - OGTT (if indicated)

- Women should be examined by the doctor for: uterus, perineum, vagina/lochia, LSCS wound (if went under caesarean section) and breast & nipples
- Further counselling on breast feeding and lactation should be given at this stage
- Counselling on the appropriate methods of birth spacing should be re-emphasized on
- Screen all women for postpartum depression
- All women with low haemoglobin in the postpartum period should be offered iron supplementation for 3-6 months

2.7 Postnatal complications

2.7.1 Vaginal bleeding after childbirth (post-partum haemorrhage)

Postpartum haemorrhage is defined as blood loss sufficient to cause hemodynamic instability.

Problems

- Increased vaginal bleeding within the first 24 hours after childbirth (immediate PPH)
- Increased vaginal bleeding after the first 24 hours after childbirth till 6 weeks postpartum (delayed PPH). Usually caused by endometriosis

Continuous slow bleeding or sudden bleeding is an emergency intervene early and aggressively

Prevention

- Active management of 3rd stage
- Prophylactic Oxytocin
- Controlled Cord traction
- Inspection of placenta and lower genital tract

Active management of the third stage should be practised on all women in labour because it reduces the incidence of PPH due to uterine atony

Diagnosis of Vaginal Bleeding

TABLE 35: DIAGNOSIS OF VAGINAL BLEEDING AFTER CHILDBIRTH

Presenting Symptom and Other Symptoms and Signs Typically Present	Symptoms and Signs Sometimes Present	Probable Diagnosis
Immediate PPH Uterus soft and not contracted	Shock	**Atonic uterus** See Medical Management *(see Section 2.8.3 Shock)*
Immediate PPH	Complete placenta Uterus contracted	**Tears of cervix, vagina or perineum** If grade 1 suture *(see Section 2.9.4 Repair of vaginal and perineal tears)* Grades 2, 3 and 4 refer **as emergency**
Placenta not delivered within 30 minutes after delivery No tears in the genital tract	Immediate PPH★ Uterus contracted	Retained placenta, Refer as emergency
Portion of maternal surface of placenta missing or torn membranes with vessels	Immediate PPH★ Uterus contracted	Retained placental fragments Refer as emergency
Uterine fundus not felt on abdominal palpation Slight or intense pain	Shock Inverted uterus apparent at vulva Immediate PPH★★	Inverted uterus Refer as emergency
Immediate PPH* (bleeding is intra-abdominal and/or vaginal) Severe abdominal pain (may decrease after rupture)	Shock Tender abdomen Rapid maternal pulse	Ruptured uterus Refer as emergency

★*Bleeding may be light if a clot blocks the cervix or if the woman is lying on her back.*

★★*There may be no bleeding with complete inversion.*

General Management:

- Call for help. Urgently mobilize all available personnel
- Perform a rapid evaluation of the general condition of the woman, including vital signs (pulse, blood pressure, respiration, temperature)
- Check airway and give 100% oxygen by mask/bag
- Insert 2 IV lines (14 G), take blood for CBC, clotting, cross match 4 units and start IV fluids
- Give warmed crystalloid & colloid IV fluids as rapidly as needed while awaiting blood

Specific Management:

- Catheterize urinary bladder
- Rub the uterus +/- bimanual compression
- Packing of any visible perineal laceration with sterile gauze to tamponed bleeding transport.

Medical management:

- Give syntometrin (oxytocin 5 IU/ ergometrine 0.5 mg) IM injection.
- If still bleeding, start oxytocin drip 40 IU in 500 ml of 0.9% normal saline.
- Check pulse and BP every 15 minutes and treat shock as on *(see Section 2.8.3 Shock)*
- Refer the patient as **EMERGENCY** to hospital

Tears of Cervix, Vagina or Perineum

- Postpartum bleeding with a contracted uterus is usually due to a cervical or vaginal tear.
- Examine the woman carefully and repair 1st degree tears of vagina and perineum *(see Section 2.9.4 Repair of vaginal and perineal tears)*. If bleeding continues transfer the patient to the secondary **as emergency.**
- Patients with 2nd, 3rd and 4th degree vaginal tears and cervical tears should be stabilized and then referred to the secondary care **as emergency.**

Retained Placenta

There may be no bleeding with retained placenta

- Apply controlled cord traction to remove the placenta

Note: Avoid forceful cord traction and fundal pressure, as they may cause uterine inversion.

- If the placenta is not expelled, start the medical management (if not already started)
- Ensure that the bladder is empty. Catheterize the bladder, if necessary. If the placenta is undelivered after 30 minutes of oxytocin stimulation and controlled cord traction transfer as **EMERGENCY**

  Note: Very adherent tissue may be placenta accreta. Efforts to extract a placenta that does not separate easily may result in heavy bleeding or uterine perforation, which usually requires hysterectomy. Transfer the patient as **EMERGENCY** to hospital.

2.7.2 Fever after childbirth

Problem

Woman has fever (temperature 38°C or more) occurring more than 24 hours after delivery.

General Management

Needs to be taken seriously and to be investigated and referred to secondary care if needed.

- Encourage bed rest
- Ensure adequate hydration by mouth or IV
- Use a fan or tepid sponge to help decrease temperature
- Paracetamol 1 gm every 4-6 hours or as needed
- If shock is suspected, immediately begin management. Even if signs of shock are not present; keep shock in mind as you evaluate the woman further because her status may worsen rapidly. If shock develops, it is important to begin management immediately

Use the following table for diagnosis and management.

TABLE 36: DIAGNOSIS OF FEVER AFTER CHILDBIRTH

Presenting Symptom and Other Symptoms and Signs Typically Present	Symptoms and Signs Sometime Present	Probable Diagnosis/ management & when to refer
Breast pain and tenderness	Hard enlarged breasts Both breasts affected	Breast engorgement For management **(see below)**
Breast pain and tenderness Reddened, wedge-shaped area on breast	Inflammation preceded by engorgement Usually only one breast affected	Mastitis Treat with antibiotics (**see below**)
Firm, very tender breast Overlying erythema	Fluctuant swelling in breast Draining pus	Breast abscess Refer **as emergency** to the surgeon for drainage and antibiotics.
Dysuria Spiking fever/chills Increased frequency and urgency of urination Abdominal pain	Retro pubic/suprapubic pain Loin pain/tenderness Tenderness in rib cage Anorexia Nausea/vomiting	Acute pyelonephritis, Refer as emergency
Spiking fever despite antibiotics	Calf muscle tenderness	Deep vein thrombosis Refer as emergency
Fever/chills Lower abdominal pain Purulent, foul-smelling lochia Tender uterus	Light ★ vaginal bleeding Shock	Endometritis Refer as emergency
Lower abdominal pain and distension Persistent spiking fever/chills Tender uterus	Poor response to antibiotics Swelling in adnexa or pouch of Douglas	Pelvic abscess Refer as emergency
Low-grade fever/chills Lower abdominal pain Absent bowel sounds	Rebound tenderness Abdominal distension Anorexia Nausea/vomiting Shock	Peritonitis Refer as emergency
Fever Difficulty in breathing Cough with expectoration Chest pain	Clinical signs of consolidation Congested throat Rapid breathing Rhonchi/ rales	Pneumonia Refer as emergency

★*Light bleeding: takes longer than few minutes for a clean pad or cloth to be soaked.*

2.7.3 Breast Engorgement

Breast engorgement is an exaggeration of the lymphatic and venous engorgement that occurs before lactation. It is not the result of over distension of the breast with milk.

If the woman breastfeeding her baby:

- If the woman is breastfeeding and the baby is not able to suckle, encourage the woman to express milk by hand or with a pump to soften around the areola so the baby can latch on the breast
- If the woman is breastfeeding and the baby is able to suckle:
  - Encourage the woman to breastfeed more frequently, using both breasts at each feeding
  - Show the woman how to hold the baby and help it attach

Relief measures before feeding may include

- Apply warm compresses to the breasts just before breastfeeding, or encourage the woman to take a warm shower
- Massage the woman's neck and back
- Have the woman express some milk manually before breastfeeding and wet the nipple area to help the baby latch on properly and easily

Relief measures after feeding may include

- Support breasts with a binder or brassiere
- Apply cold compress to the breasts between feedings to reduce swelling and pain
- Give Paracetamol 1gm by mouth as needed
- Advice the patient to report back if no response within 24 hours

If the woman not breast feeding:

- Support breasts with a binder or brassiere
- Apply cold compresses to the breasts to reduce swelling and pain
- Avoid massaging or applying heat to the breasts
- Avoid stimulating the nipples
- Give Tab Paracetamol 1gm as needed
- Give Tab Cabergoline 1mg as single dose
- Give tab Bromocriptine 2.5 mg two times per day for 5 days
- Follow up in three days to ensure response

2.7.4 Breast Infection

a) Mastitis

- Treat with antibiotics
  - Cap Cloxacillin 500 mg four times per day for 10 -14 days

  OR
  - Tab Augmentin 375 mg + Cap amoxicillin 500mg two times per day for days 14- 10 days

  OR
  - Cap Cephalexin 500 mg four times per day for 10-14

- If beta-lactam allergy:
  - days Tab Clarithromycin 500 mg PO BID for 10-14
- Encourage the woman to

- Continue breastfeeding
- Support breasts with a binder or brassiere
- Apply cold compresses to the breasts between feedings to reduce swelling and pain
- Give Paracetamol 1gm by mouth as needed
- Follow up in three days to ensure response

2.7.5 Psychological morbidity

Peripartum depression

- Perinatal depression is defined as a major depressive disorder that is identified during pregnancy or within four weeks postpartum to one year.
- It is underdiagnosed and complicates 10% to 15% of pregnancies, resulting in significant morbidity for the mother and infant.
- If not detected and treated properly, it can be associated with significant maternal and foetal morbidities like poor nutrition, poor weight gain, distress, pre-eclampsia, prematurity, low birth weight, neurodevelopmental delays, and issues with maternal/infant bonding.
- Maternal suicide is a common cause of peripartum mortality

Baby blues

- Defines as mild depressive symptoms such as sleep disturbance, anxiety, or irritability who do not meet the criteria for peripartum depression.
- Symptoms of the baby blues usually develop during the first few days after delivery and resolve spontaneously within 10 days.
- It must be distinguished from perinatal depression which differs in the severity and duration of symptoms.

TABLE 37: DISTINGUISHING PERIPARTUM DEPRESSION FROM THE BABY BLUES

Characteristic	Baby Blues	Peripartum Depression
Duration	Less than 10 days	More than 2 weeks
Onset	Within 2 to 3 days postpartum	Often within the first month, may occur up to the first year
Prevalence	80%	5% to 7%
Severity	Mild dysfunction	Moderate to severe dysfunction
Suicidal ideation	Not present	May be present

Risk factors

- Previous history of depression
- Antenatal depression
- High levels of postnatal stress
- Stressful life events (e.g., marital conflict, intimate partner violence or emigration) during pregnancy or after delivery.
- Unintended/unwanted pregnancy
- Poor social and financial support
- Young age (e.g., age <25 years
- Single marital status
- Perinatal anxiety symptoms and disorders
- Perinatal sleep disturbance
- Adverse pregnancy and neonatal outcomes (e.g., including caesarean surgery, stillbirth, preterm birth, very low birth weight, and neonatal death).
- Postpartum blues (mild depressive symptoms)
- Breastfeeding difficulty/shorter duration/cessation
- Childcare stress such as inconsolable infant crying, difficult infant temperament, or infant sleep disturbance
- Season of delivery (e.g., postpartum depression may increase during the time of year when daylight is diminished)
- Family history of postpartum depression or psychiatric illness

TABLE 38: CRITERIA FOR MAJOR DEPRESSIVE DISORDER

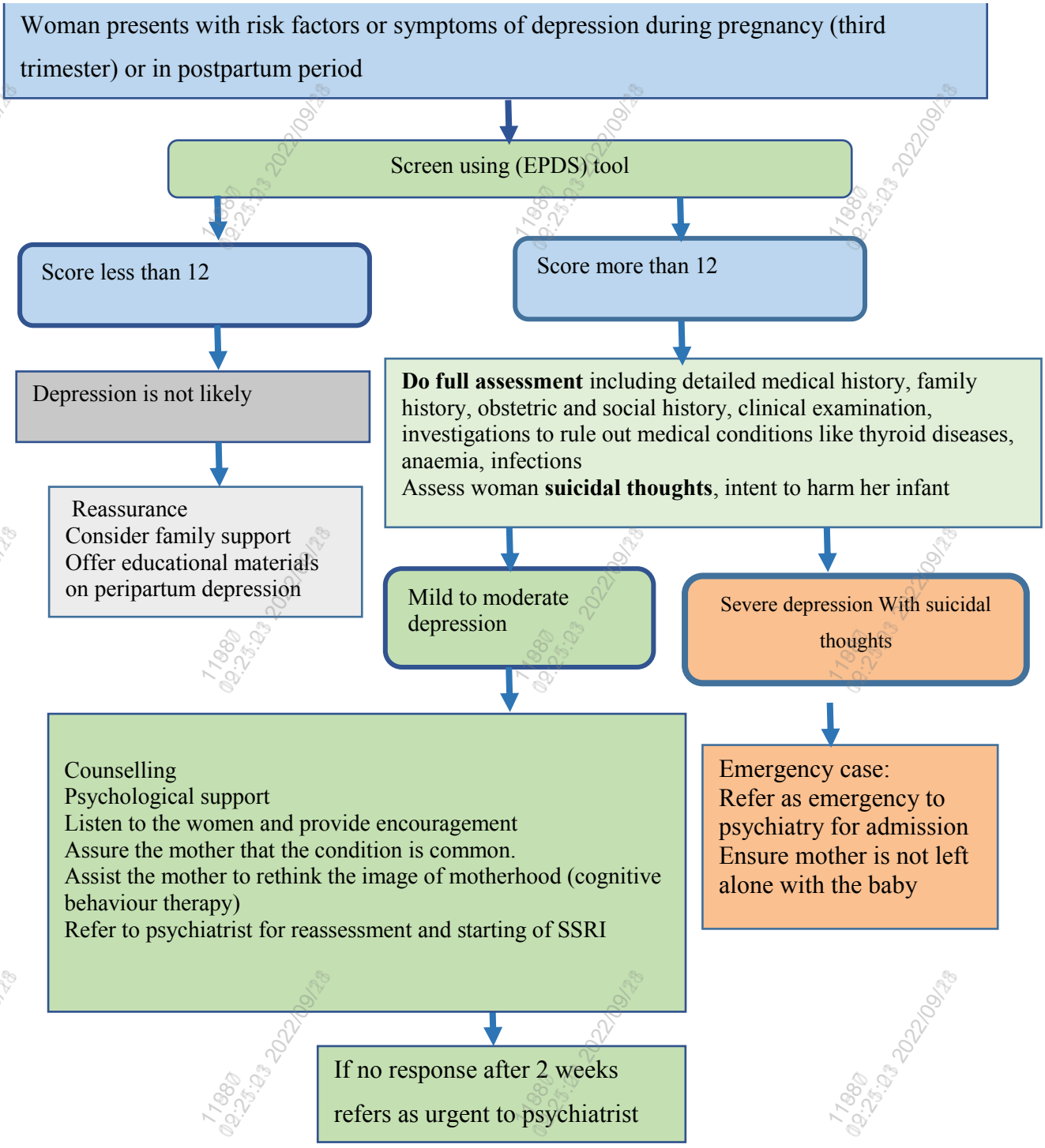
A. Five (or more) of the following symptoms have been present during the same 2-week period and represent a change from previous functioning; at least one of the symptoms is either (1) depressed mood or (2-) loss of interest or pleasure.
Note: Do not include symptoms that are clearly attributable to another medical condition.
1. Depressed mood most of the day, nearly every day
2. Markedly diminished interest or pleasure in all, or almost all, activities most of the day
3. Significant weight loss when not dieting or weight gain
4. Insomnia or hypersomnia nearly every day
5. Psychomotor agitation or retardation nearly every day
6. Fatigue or loss of energy nearly every day
7. Feelings of worthlessness or excessive or inappropriate guilt
8. Diminished ability to think or concentrate nearly every day
9. Recurrent thoughts of death, recurrent suicidal ideation or a suicide attempt
B. The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning
C. The episode is not attributable to the physiological effects of a substance or to another medical condition
Note: Criteria A-C represent a major depressive episode

Screening for depression

- Screening for depression in pregnancy and postpartum period should be done for women with risk factors of depression
- Edinburg Postnatal Depression Scale, a 10 -item, self-administered questionnaire is exclusively used worldwide. The score 12 and above is indicating need for further depression assessment and must be referred to psychiatrist for further assessment.

Women with postpartum depression should be evaluated also for bipolar disorder, postpartum psychosis and suicide risk and referred for emergent psychiatric evaluation when appropriate

ALGORITHM 22: ASSESSMENT AND MANAGEMENT OF SUSPECTED PERINATAL DEPRESSION



Prognosis:

The prognosis for postpartum depression is good with early diagnosis and treatment.

More than two-thirds of women recover within a year.

Providing a companion during labour may prevent postpartum depression.

POSTPARTUM PSYCHOSIS

- Postpartum psychosis typically occurs around the time of delivery and affects less than 1% of women
- The cause is unknown, although about half of the women experiencing psychosis also have a history of mental illness
- Postpartum psychosis is characterized by abrupt onset of delusions or hallucinations, insomnia, a preoccupation with the baby, severe depression, anxiety, despair and suicidal or infanticide impulses
- Care of the baby can sometimes continue as usual
- Prognosis for recovery is excellent but about 50% of women will suffer a relapse with subsequent deliveries

Management

- Provide psychological support and practical help (with the baby as well as with home (care
- Avoid dealing with emotional issues when the mother is unstable
- Refer **as emergency** to psychiatric hospital

2.8 Emergencies

2.8.1 Management of emergencies

Severe maternal morbidity and mortality are often preventable in many cases

Preventing Emergencies

Most emergencies can be prevented by:

- Careful planning
- Following clinical guidelines
- Close monitoring of the woman

Team members should know:

- Clinical situations and their diagnoses and treatments
- Drugs and their use, administration and side effects
- Emergency equipment and how it functions

The ability of a facility to deal with emergencies should be assessed and reinforced by frequent practice emergency drills

Initial Management

- Stay calm, think logically
- Do not leave the woman unattended
- Talk to the woman and help her to stay calm. Ask what happened and what symptoms
- she is experiencing
- Perform a quick examination including vital signs (blood pressure, pulse, respiration, temperature) and skin colour. Estimate the amount of blood lost if any and assess
- symptoms and signs
- Make one-person team leader
- Call for help
- If the woman is unconscious, assess the circulation, airway and breathing
- If shock is suspected, immediately begin treatment. Even if signs of shock are not present, keep shock in mind.
- Position the woman on her left side with her feet elevated. Loosen tight clothing

2.8.2 Rapid initial assessment

Always begin a clinical visit with Rapid assessment and management (RAM)

Check for emergency signs first if present, provide emergency treatment and refer Danger Signs:

- Severe pallor
- Persistent headache
- Blurring of vision
- Generalized oedema
- Convulsions
- Unilateral leg oedema
- Calf tenderness
- Difficult breathing
- Vaginal bleeding or leaking
- Persistent or severe abdominal pain
- Unexplained persistent fever

TABLE 39: RAPID INITIAL ASSESSMENT & MANAGEMENT CONSIDERATIONS

Assess	Danger Signs	Consider / Management
Circulation (Signs of shock)	Cold and moist skin Weak rapid pulse (≥110) Blood pressure: low (systolic <90 mm Hg)	Shock (Haemorrhagic or septic shock) *(see Section 2.8.3 Shock)*
Airway and breathing	Cyanosis Respiratory distress pale Wheezing or crepitations	Severe anaemia Heart failure Pneumonia Asthma Pulmonary embolism **Stabilize the patient and refer as urgent / emergency according to patient condition**
Vaginal bleeding Assess pregnancy status Assess amount of bleeding	**If in early pregnancy or not aware about pregnancy**	Abortion Ectopic pregnancy Molar pregnancy See Vaginal bleeding in early pregnancy *(see Table 28: Differential Diagnosis of Vaginal Bleeding in Early Pregnancy)*
	Late pregnancy and during labour **Examine:** Vulva: amount of bleeding Do not do a vaginal examination at this stage	Abruptio placenta Ruptured uterus Placenta Previa Vaginal bleeding in later pregnancy *(see Table 29: Types of Bleeding in Late Pregnancy)*

	Postpartum Ask if: ● Recently given birth, Placenta delivered or not. Examine: ● Vulva: amount of bleeding, obvious tears ● Uterus: atony Bladder: full. Do not do a vaginal examination at this stage	Atonic uterus Tears of cervix and vagina Retained placenta Inverted uterus **See Vaginal bleeding after childbirth** *(see Table 35: Diagnosis of Vaginal Bleeding after Childbirth)*
Unconscious or Convulsing	**Ask if** ● pregnant, length of gestation Convulsing (now or recently) ● If unconscious, ask relative "has there been a recent convulsion?" **Examine:** blood pressure: Temperature: 38□ C or more.	Eclampsia Malaria Epilepsy Tetanus **Management of Convulsions** *(see Section 2.3.6 Hypertension in Pregnancy, d)Eclampsia))*
High grade fever	**Ask if:** ● Very fast breathing ● Stiff neck ● Lethargy ● Very weak/not able to stand ● Frequent, painful urination **Examine:** ● temperature: 38°C or more neck stiffness ● lungs: air entry ● abdomen: severe tenderness vulva: purulent discharge Breast tenderness	Urinary tract infection **See** table 25 Endometritis Pelvic abscess Peritonitis Mastitis Meningitis Malaria Pneumonia/ H1N1 Fever after childbirth *(see Table 36: Diagnosis of Fever after Childbirth)* Complications of abortion

		See Vaginal bleeding in early pregnancy, Table 28
Abdominal pain	**Ask if** Pregnant, length of gestation **Examine** blood pressure pulse temperature: 38°C or more abdominal examination	Ovarian cyst Appendicitis Ectopic pregnancy Possible term or preterm labour Chorioamnionitis Abruptio placenta Ruptured uterus See Abdominal pain in early, later pregnancy and after childbirth *(see Table 31:Diagnosis and Management of Woman Experiencing Abdominal Pain in Pregnancy)*

2.8.3 Shock

Shock is characterized by failure of the circulatory system to maintain adequate perfusion of the vital organs. Shock is a life-threatening condition that requires immediate and intensive treatment. Suspect or anticipate shock if at least one of the following is present:

- Bleeding in early pregnancy (e.g., abortion, ectopic or molar pregnancy)
- Bleeding in late pregnancy or labour (e.g., placenta praevia, abruptio placenta, ruptured (uterus
- Bleeding after childbirth (e.g., ruptured uterus, uterine atony, tears of genital tract, retained (placenta or membranes
- Infection (e.g., unsafe or septic abortion, Chorioamnionitis, Endometritis, acute (pyelonephritis
- Trauma (e.g., injury to uterus or bowel during abortion, ruptured uterus, tears of genital tract)

Symptoms and Signs

- Diagnose shock if the following symptoms and signs are present:
- Fast, weak pulse (110 per minute or more)
- Low blood pressure (systolic less than 90 mm Hg)
- Other symptoms and signs of shock include: Pallor
- Sweatiness or cold clammy skin
- Rapid breathing (rate of 30 breaths per minute or more)
- Anxiousness, confusion or unconsciousness
- Scanty urine output (less than 30 mL per hour)

Management of Shock Immediate Management

- Call for help. Urgently mobilize all available personnel
- Monitor vital signs (pulse, blood pressure, respiration, temperature)
- If the woman is unconscious, turn her onto her side to minimize the risk of aspiration if she vomits and to ensure that an airway is open
- Keep the woman warm but do not overheather, as this will increase peripheral circulation and reduce blood supply to the vital organs
- Keep the head low

Specific Management

- Start an IV infusion (two if possible) using a large-bore (16-gauge or largest available) cannula or needle. Collect blood for estimation of haemoglobin and crossmatch just before infusion of fluids
- Rapidly infuse IV fluids (normal saline or Ringer's lactate) initially at the rate of 1L in 15-20 minutes

Note: Avoid using plasma substitutes (e.g., dextran). There is no evidence that plasma substitutes are superior to normal saline in the resuscitation of a shocked woman, and dextran can be harmful in large doses.

- Give at least 2 L of these fluids in the first hour; then give fluid replacement for ongoing losses.

Note: A more rapid rate of infusion is required in the management of shock resulting from bleeding. Aim to replace two to three times the estimated fluid loss.

Do not give fluids by mouth to a woman in shock

- Continue to monitor vital signs (every 15 minutes) and blood loss
- Catheterize the bladder and monitor fluid intake and urine output
- Give oxygen at 6-8 L per minute by mask or nasal cannula
- Stabilize and escort to hospital
- Intravenous replacement fluids are first-line treatment for hypovolaemia. Initial treatment with these fluids may be lifesaving and can provide some time to control bleeding and obtain blood for transfusion if it becomes necessary.

2.8.4 Communicating with women and their families

Good communication skills are required for all health care providers to build women trust and confidence.

All staff should:

- Respect the woman's dignity and right of privacy
- Be sensitive and responsive to the woman's needs
- Be non-judgmental about the decisions that the woman and her family have made thus far regarding her care

Rights of women

- Providers should be aware of the rights of women when receiving maternity care services:
- Every woman has the right to get information about her health
- Every woman has the right to discuss her concerns with her health care providers
- A woman should be informed before any procedure. Consent should be taken
- The woman has a right to express her views about the service she receives

Communication skills

- Speak in a calm, quiet manner and assure the woman that the conversation is confidential. Be sensitive to any cultural or religious considerations and respect her views. In addition:
- Encourage the woman and her family to speak honestly and completely about events during the complication
- Listen to what the woman and her family have to say and encourage them to express their concerns; try not to interrupt
- Respect the woman's sense of privacy
- Use supportive nonverbal communication such as nodding and smiling
- Answer the woman's questions directly in calm, reassuring manner
- Explain what steps will be taken to manage the situation or complication
- Ask the woman to repeat back to you the key points to assure her understanding
- If a woman must undergo a surgical procedure, explain to her the nature of the procedure and its risks and help to reduce her anxiety. Women who are extremely anxious have a more difficult time during surgery and recovery

Emotional and Psychological Support

- Emergency situations are often very disturbing for all concerned and evoke a range of emotions that can have significant consequences.

Emotional and Psychological Reactions:

- How each member of the family reacts to an emergency situation depends on the:
- Marital status of the woman and her relationship with her partner
- Social situation of the woman/couple and their cultural and religious practices, beliefs and expectations
- Personalities of the people involved and the quality and nature of social, practical and emotional support
- Nature, gravity and prognosis of the problem and the availability and quality of the health care services

Common reactions to obstetric emergencies or death include:

- Denial
- Guilt
- Anger
- Depression and loss of self-esteem
- Isolation
- Disorientation

General Principles of Communication and Support

- While each emergency situation is unique, the following general principles offer guidance. Communication and genuine empathy are probably the most important keys to effective care.
- Emotional and Psychological Support

At the time of the event

- Greet the women and introduce yourself
- Listen attentively. The woman/family will need to discuss their hurt and sorrow
- Show empathy
- Tell the woman/family about what is happening
- Be honest
- If language is a barrier to communication, find a translator
- Do not pass the problem on to nursing staff or junior doctors
- Both during and after the event, provide as much privacy as possible for the woman and her family
- Encourage family support

After the Event

- Give practical assistance, information and emotional support
- Respect traditional beliefs and customs and accommodate the family's needs as far as possible
- Provide counselling for the woman/family and allow for reflection on the event
- Explain the problem to help reduce anxiety and guilt
- Listen and express understanding and acceptance of the woman's feelings. Nonverbal communication may speak louder than words

- Repeat information several times and give written information, if possible. People experiencing an emergency will not remember much of what is said to them
- Health care providers may feel anger, guilt, sorrow, pain and frustration in the face of obstetric emergencies that may lead them to avoid the woman/family. Showing emotion is not a weakness
- Remember to care for staff who themselves may experience guilt, grief, confusion and other emotions

2.9 Common procedures

2.9.1 Infection prevention

- Infection prevention has two primary objectives
  - Prevent major infections when providing services
  - Minimize the risk of transmitting serious diseases such as hepatitis B and HIV/AIDS to the woman and to service providers and staff, including cleaning and housekeeping personnel.
- The recommended infection prevention practices are based on the following principles:
  - Every person (patient or staff) must be considered potentially infectious
  - Hand washing is the most practical procedure for preventing cross-contamination
  - Wear gloves before touching anything wet, broken skin, mucous membranes, blood or other body fluids (secretions or excretions)
  - Use barriers (protective goggles, face masks or aprons) if splashes and spills of any body fluids (secretions or excretions) are anticipated
  - Use safe work practices, such as not recapping or bending needles, proper instrument processing and proper disposal of medical waste.

Hand Washing

- Vigorously rub together all surfaces of the hands lathered with plain or anti-microbial soap. Wash for 15-30 seconds and rinse with a stream of running or poured water. Or rub your hands with an antiseptic solution
- Wash hands
  - Before and after examining each patient (or having any direct contact)
  - After exposure to blood or any body fluids (secretions or excretions), even if gloves were worn
  - After removing gloves because the gloves may have holes in them

Gloves and Gowns

- Wear gloves
  - When performing a procedure
  - When handling soiled instruments, gloves and other items

- When disposing of contaminated waste items (cotton, gauze or dressings)

- A separate pair of gloves must be used for each woman to avoid cross contamination
- A clean, but not necessarily sterile, gown should be worn during all delivery procedures
  - If the gown has long sleeves, the gloves should be put over the gown sleeves to avoid contamination of the gloves
  - Ensure that gloved hands are held above the level of the waist and do not come into contact with the gown

Basic Principles for Procedures:

Before any simple (non-operative) procedure, it is necessary to:

- Gather and prepare all supplies. Missing supplies can disrupt a procedure
- Explain the procedure and the need for it to the woman and obtain consent
- Provide adequate pain medication according to the extent of the procedure planned. Estimate the length of time for the procedure and provide pain medication accordingly
- Place the patient in a position appropriate for the procedure being performed. The most common position used for obstetric procedures (e.g., manual vacuum aspiration) is the lithotomy position
- Wash hands with soap and water and put on gloves appropriate for the procedure
- If the vagina and cervix need to be prepared with an antiseptic for the procedure (e.g. (manual vacuum aspiration
  - Apply antiseptic solution (e.g., iodophors, chlorhexidine) three times to the vagina and cervix using a high-level disinfected or sterile ring forceps and a cotton or gauze swab
  - Gently insert a sterile speculum or retractor(s) into the vagina
- If the skin needs to be prepared with an antiseptic for the procedure:
  - Apply antiseptic solution (e.g., iodophors, chlorhexidine) three times to the area using a high-level disinfected or sterile ring forceps and a cotton or gauze swab. If the swab is held with a gloved hand, do not contaminate the glove by touching unprepared skin
  - Begin at the centre of the area and work outward in a circular motion away from the area
  - At the edge of the sterile field discard the swab
- Never go back to the middle of the prepared area with the same swab. Keep your arms and elbows high and surgical dress away from the surgical field

2.9.2 Anaesthesia and analgesia

Local Anaesthesia

- Local anaesthesia (lignocaine with or without adrenaline) is used to infiltrate tissue and block the sensory nerves.
- Because a woman with local anaesthesia remains awake and alert during the procedure, it is especially important to ensure
  - Counselling to increase cooperation and minimize her fears
  - Good communication throughout the procedure as well as physical reassurance from the provider, if necessary
  - Time and patience, as local anaesthetics do not take effect immediately
- Emergency drugs and equipment (suction, oxygen, resuscitation equipment) should be readily available and in usable condition, and all members of the operating team trained in their use

Lignocaine

- Lignocaine preparations are usually 2% or 1% and require dilution before use (Box 1). For most obstetric procedures, the preparation is diluted to 0.5%, which gives the maximum effect with the least toxicity.

box 5: **Preparation of lignocaine 0.5% solution**

Combine:
- Lignocaine 2%, one part
- Normal saline or sterile distilled water, three parts (do not use glucose solution as it increases the risk of infection).

OR
- lignocaine 1%, one part
- Normal saline or sterile distilled water, three parts

General Principles for Anaesthesia and Analgesia

- The keys to pain management and comfort of the woman is
  - Supportive attention from staff before, during and after a procedure (helps reduce anxiety and lessen pain)
  - A provider who is comfortable working with women who are awake and who is trained to use instruments gently
  - The selection of an appropriate type and level of pain medication

Tips for performing procedures on women who are awake include

- Explain each step of the procedure before performing it
- Use lignocaine diluted solution in adequate amount
- Check the level of anaesthesia by pinching the area with forceps. If the woman feels the pinch, wait two minutes and then retest
- Wait a few seconds after performing each step or task for the woman to prepare for the next one
- Move slowly, without jerky or quick motions
- Handle tissue gently and avoid undue retraction, pulling or pressure
- Use instruments with confidence
- Avoid saying things like “this won’t hurt” when, in fact, it will hurt; or “I’m almost finished” when you are not
- Talk with the woman throughout the procedure

- The need for supplemental analgesic or sedative medications (by mouth, IM or IV) will depend on
  - The emotional state of the woman
  - The procedure to be performed
  - The anticipated length of the procedure
  - The skill of the provider and the assistance of the staff

2.9.3 Episiotomy

Episiotomy should not be performed routinely.

- Review for indications

Episiotomy should be considered in the case of:

> ***Complicated vaginal scarring from female genital cutting or poorly healed previous third- or fourth-degree tears***

- Apply antiseptic solution to the perineal area
- Provide emotional support and encouragement. Use local infiltration with lignocaine
- Make sure there are no known allergies to lignocaine or related drugs
- Infiltrate beneath the vaginal mucosa, beneath the skin of the perineum and deeply into the perineal using about 10 mL 0.5% lignocaine solution

Note: Aspirate (pull back on the plunger) to be sure that no vessel has been penetrated. If blood is returned in the syringe with aspiration, remove the needle. Recheck the position carefully and try again. Never inject if blood is aspirated. The woman can suffer convulsions and death if IV injection of lignocaine occurs.

- At the conclusion of the set of injections, wait two minutes and then pinch the incision site with forceps. If the woman feels the pinch, wait two more minutes and then retest

> ***Anaesthetize early to provide sufficient time for effect***

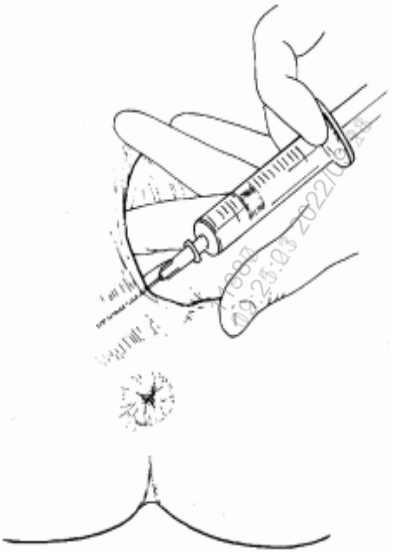


FIGURE 19: INFILTRATION OF PERINEAL TISSUE WITH LOCAL ANAESTHESIA

- Wait to perform episiotomy until
- The perineum is thinned out; and the baby's head is visible during a contraction cm of 4-3

Performing an episiotomy will cause bleeding. It should not, therefore, be done too early

- Wearing sterile gloves, place two fingers between the baby's head and perineum
- Use scissors to cut the perineum about 3-4 cm in the Medio lateral direction
- Control the baby's head and shoulders as they deliver, ensuring that the shoulders have rotated to the midline to prevent an extension of the episiotomy

- Carefully examine for extensions and other tears and repair (see below)

Repair of Episiotomy

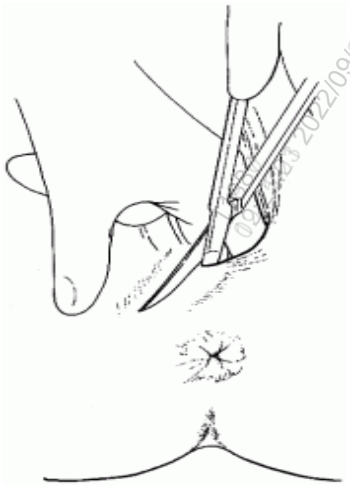


FIGURE 20: MAKING THE INCISION WHILE INSERTING TWO FINGERS TO PROTECT BABY'S HEAD

- Apply antiseptic solution to the area around the episiotomy
- Consider giving another dose of lignociane
- Close the vaginal mucosa using continuous 2-0 suture
  - Start the repair about 1 cm above the apex (top) of the episiotomy. Continue the suture to the level of the vaginal opening
  - At the opening of the vagina, bring together the cut edges of the vaginal opening
  - Bring the needle under the vaginal opening and out through the incision and tie
- Close the perineal muscle using interrupted 2-0 sutures
- Close the skin using interrupted (or subcuticular) 2-0
- Perform rectal examination after repair of episiotomy to make sure sutures are not felt in the rectal mucosa

It is important that absorbable sutures be used for closure. Polyglycolic sutures are preferred over chromic catgut for their tensile strength, non-allergenic properties and lower probability of infectious complications and episiotomy breakdown. Chromic catgut is an acceptable alternative but is not ideal.

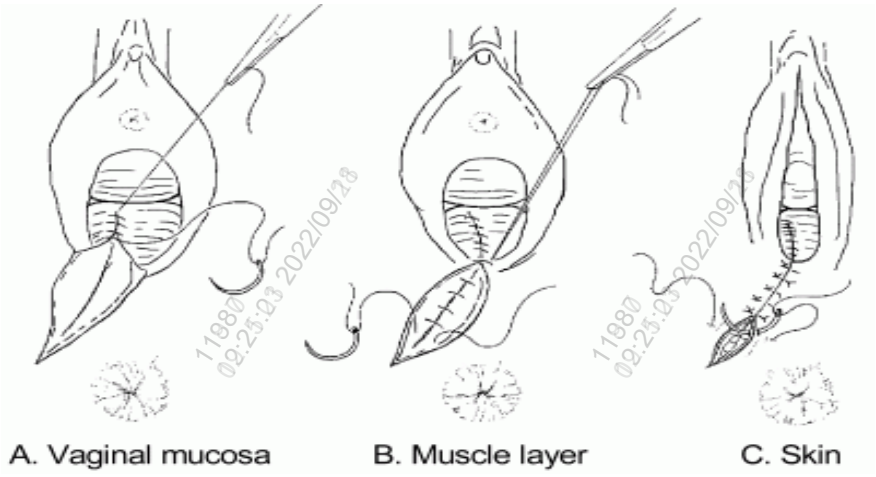


FIGURE 21: REPAIR OF EPISIOTOMY

Post episiotomy care:

Advise the patient to come back if

- Leaking of urine or stool
- Hard painful lump on or near the wound
- Bright red blood coming from wound
- Pain getting worse or the wound appears open

Information for woman

- Keep the area clean and dry
- Change the sanitary pads every 2-4 hours
- Drink plenty of water and eat lots of fibre to prevent constipation
- Take analgesics for pain
- Use sitz bath for 20 minutes (warm water increase circulation and help healing, cold (water relieves pain faster
- Do Kegel exercises (squeeze the muscle that you use to hold in urine, do this ten times per day, and increase the strength and period of contraction in the following (days
- Avoid antiseptics

Complications

1. If a haematoma occurs, open and drain. If there are no signs of infection and bleeding has stopped, reclose the episiotomy
2. If there are signs of infection, open and drain the wound. Remove infected sutures and debride the wound
   - If the infection is mild, antibiotics are not required
   - If the infection is severe but does not involve deep tissues, give a combination of antibiotics
     - Oral Cloxacillin 500 mg four times per day and oral Metronidazole mg three times per day for five days 400

   OR
     - Oral Augmentin 375mg with amoxicillin 250mg three times per day for five days
     - Oral Cephalexin 500 mg two times per day for five days
   - If the infection is deep, involves muscles and is causing necrosis to refer the patient to secondary care debridement as emergency for intravenous antibiotics and surgical

3. If there is episiotomy dehiscence (gapping):
   - Small defect may heal spontaneously
   - Some defects require surgical closure, needs referral back to the delivery hospital
   - **Early re-suturing** within the first two weeks of labour gives favourable results than conservative management

2.9.4 Repair of vaginal and perineal tears

There are four degrees of tears that can occur during delivery:

- **First degree tears** involve the vaginal mucosa and connective tissue
- **Second degree tears** involve the vaginal mucosa, connective tissue and underlying muscles
- **Third degree tears** involve complete transaction of the anal sphincter
- **Fourth degree** tears involve the rectal mucosa

It is important that absorbable sutures be used for closure. Polyglycolic sutures are preferred over chromic catgut for their tensile strength, non-allergenic properties and lower probability of infectious complications. Chromic catgut is an acceptable alternative but is not ideal.

Repair of First-Degree Tears

Most first-degree tears close spontaneously without sutures.

- Provide emotional support and encouragement. Use local infiltration with Lignocaine
- Ask an assistant to check the uterus and ensure that it is contracted
- Carefully examine the vagina, perineum and cervix
- If the tear is long and deep through the perineum, inspect to be sure there is no second-, third- or fourth-degree tear
- If the underlying muscles are involved, refer the patient to the secondary care **as emergency** for repair

Second, third and fourth perineal tears should be transferred to hospital after stabilizing

CHAPTER 3

3.1 PREREQUISITES TO IMPLEMENT THE GUIDELINES

3.2 HUMAN RESOURCES

3.3 TASKS AND RESPONSIBILITIES IN ANC AND PNC CLINIC

3.1 Prerequisites to implement the guidelines

- Availability of all recommended investigations, emergency drugs and vaccines
- Availability of this updated guideline in each ANC clinic
- Availability of the needed educational materials to pregnant women
- Training of the health care workers on how to use the guideline

3.2 Human resources needed in ANC and PNC clinic:

- Trained Nurses /Midwives
- Trained doctors
- Dietician
- Health Educator

3.3 Responsibilities in ANC and PNC clinic

A. Trained Nurses/ Midwife: -

- Register the pregnant women at booking and issue maternal health record (green card)
- Fulfil all personal information of the woman as per the maternal health record (Front page)
- Take detailed medical, surgical and obstetric history (review also the previous green cards for further information)
- Risk grading assessment in every visit with rapid assessment for danger signs
- Check: - weight, height, BMI, Blood pressure (BP), pulse
- Document all above mentioned information at the maternal health record (green card) sections, ANC register and at Al shifa system (ANC & PNC)
- Provide information about the antenatal care services
- Provide proper health education and support
- Ensure that pregnant women are fully vaccinated
- Collect and trace blood investigations (shared work with doctors), do any missed test in next visits.
- Trace pending investigations in each visit (shared work with doctors).
- Follow up defaulters of pregnant women by telephone calling or text messaging.
- Refer the pregnant women to the doctor for assessment, physical examination and booking scan
- Refer to dietitian for dietary counselling
- Refer to health educator

B. Trained doctors:

- Review the detailed history of the patient and the risk grading
- Do rapid assessment for danger signs
- Perform a comprehensive physical examination for pregnant women at booking including: - systemic examination, breast, thyroid, cardiovascular, chest, abdominal examination and repeat as needed.
- Asses VTE scoring for all pregnant women, refer those with score 3 and above to secondary care to start heparin injections as per guideline.
- Collect and trace blood investigations (shared work with nurses), do any missed test in next visits.
- Trace pending investigations in each visit (shared work with nurses).
- Perform the booking (dating) scan and arrange referral to secondary care for anomaly scan and growth scan if needed.
- Prescribe folic acids, fefol and other needed medications to pregnant women
- Refer all high-risk pregnant women to secondary care as indicated (see table 10)
- Participate in awareness activities in pregnancy
- Provide health education and support to all women.

C. Dietician

- Provide proper information and nutritional assessment and advice
- Follow up the referred pregnant women who need dietary consultation
- Participate in awareness activities related to nutrition in pregnancy

D. Health educators

- Provide proper health education and support

E. Department of Women & Child health in Ministry of Health.

- Review and update the guideline based on available new evidence base guidelines and according to best practices of an expert group in the country.
- Disseminate ANC guidelines to all Women and Child health sections in governorates

- Conducting national training workshops to train doctors and nurses on how to use ANC guidelines.
- Monitor and evaluate service provision in all health institutions

F. Sections of Women &Child health in the Governorates

- Disseminate ANC guidelines to all Primary health care institutions in governorates
- Conducting regional training of the health care workers on how to use the ANC guideline
- Monitoring the implementation of the guidelines in all health institutions in the governorate and keep guiding them to improve any malpractices.

G. Directorate General of Medical Supplies

- Maintain continuous supply of the recommended medications in all health institutions

H. Directorate General of specialized care

I. Disseminate the guidelines to all private clinics

J. Provide the recommended laboratory services

CHAPTER 4

4.1 DOCUMENT HISTORY AND VERSION CONTROL

4.2 ANNEXES

4.3 REFERENCES

4.1 Document History and Version Control

Document History and Version Control			
Version	**Description of Amendment**	**Author**	**Review Date**
01	Initial Release – 1st Edition	Team for Developing the Pregnancy, Childbirth and Postpartum Management Guidelines	2010
02	2nd Edition	Team for Developing the Pregnancy, Childbirth and Postpartum Management Guidelines	2016
03	3rd Edition	Team for Developing the Pregnancy, Childbirth and Postpartum Management Guidelines	2022

Written by	**Reviewed by**	**Approved by**
Team for Developing the Pregnancy, Childbirth and Postpartum Management Guidelines	Team for Developing the Pregnancy, Childbirth and Postpartum Management Guidelines	Dr Said Al Lamki

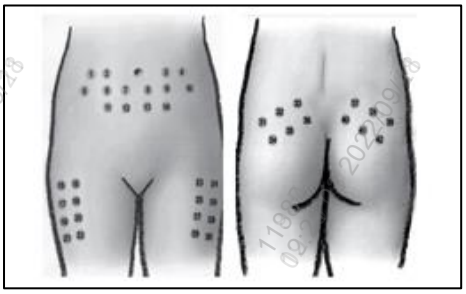
4.2 Annexes

Annex 1: Vaccination in Pregnancy

Vaccine	**Before** pregnancy	**During** pregnancy	**After** pregnancy	Type of vaccine
Hepatitis B	Yes, if indicated	Yes, if indicated	Yes, if indicated	Inactivated
Seasonal Influenza	Yes	Yes	Yes	Inactivated
MMR	Yes, if indicated, avoid conception for 3 months	**No**	Yes, if indicated, give immediately postpartum if susceptible to Rubella	Live attenuated
Meningococcal -polysaccharide - conjugate	If indicated	If indicated	If indicated	Inactivated
Varicella	Yes, if indicated, avoid conception for 3 moths	**No**	Yes, if indicated, give immediately postpartum if susceptible to Varicella.	Live attenuated

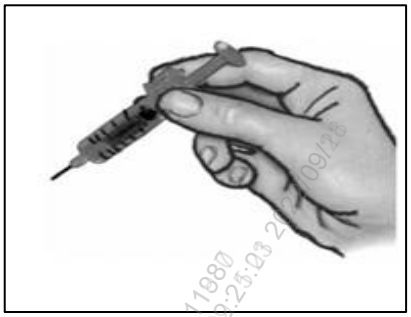
Note: - life attenuated vaccine must be avoided during pregnancy and women should wait for 3 months post vaccine if they are planning for pregnancy

Annex 2: Instruction to women on how to take thromboprophylaxis injection (how to take the injection)



STEP 1:

Wash your hands and make sure that the area you are going to inject is clean before you begin. Be sure to use different area (site) to inject each day to help to prevent bruising (see figure)



STEP 2

Open the back and remove the syringe, make sure the medicine is clear and has nothing floating in it. If you see anything in the medicine don't use

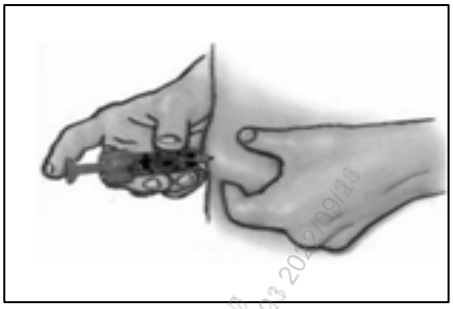
Do not squeeze the syringe to remove the air bubble as you may lose some of the medicine and then not have a full dose.

STEP 3

You need to make sure that you inject LMWH into fatty tissue. To do this, pinch a fold of skin between the thumb and fingers of one hand.

- If you are going to inject in your abdomen (tummy area) it is best to do this while sitting.
- If you are using your outer thigh, it is best to do this when sitting or lying down.
- If you decide to inject into your (buttock) you may not need to pinch any skin as there should already be enough of layer of fatty tissue.

LMWH must not be injected into the muscle as it won't be absorbed properly.



STEP 4

Hold the syringe with your other hand. Insert the entire needle into the fold of skin at a 45-90 degree angle. Then slowly press the plunger down until the full dose of LMWH has been given

STEP 5

Remove the needle while letting go of the fold of skin. Dispose of the syringe into yellow "sharp" box you have been given.

Annex 3: Edinburgh Postnatal Depression Scale1 (EPDS)

In the past 14 days

1. I have been able to laugh and see the funny side of things □ As much as I always could □ Not quite so much now □ Definitely not so much now □ Not at all	6. * Things have been getting on top of me □ Yes, most of the time I haven't been able to cope at all □ Yes, sometimes I haven't been coping as well as usual □ No, most of the time I have coped quite well □ No, I have been coping as well as ever
2. I have looked forward with enjoyment to things □ As much as I ever did □ Rather less than I used to □ Definitely less than I used to □ Hardly at all	7. * I have been so unhappy that I have had difficulty sleeping □ Yes, most of the time □ Yes, sometimes □ Not very often □ No, not at all
3. * I have blamed myself unnecessarily when things went wrong □ Yes, most of the time □ Yes, some of the time □ Not very often □ No, never	8. * I have felt sad or miserable □ Yes, most of the time □ Yes, quite often □ Not very often □ No, not at all
4. I have been anxious or worried for no good reason □ No, not at all □ Hardly ever □ Yes, sometimes □ Yes, very often	9. * I have been so unhappy that I have been crying □ Yes, most of the time □ Yes, quite often □ Only occasionally □ No, never
5. I have felt scared or panicky for no very good reason □ Yes, quite a lot □ Yes, sometimes □ No, not much □ No, not at all	10. * The thought of harming myself has occurred to me □ Yes, quite often □ Sometimes □ Hardly ever □ Never

Score	Depression Severity
0 - 9	Low depression symptoms
10 - 19	Moderate depression symptoms
20 - 30	Severe depression symptoms

4.3 References

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