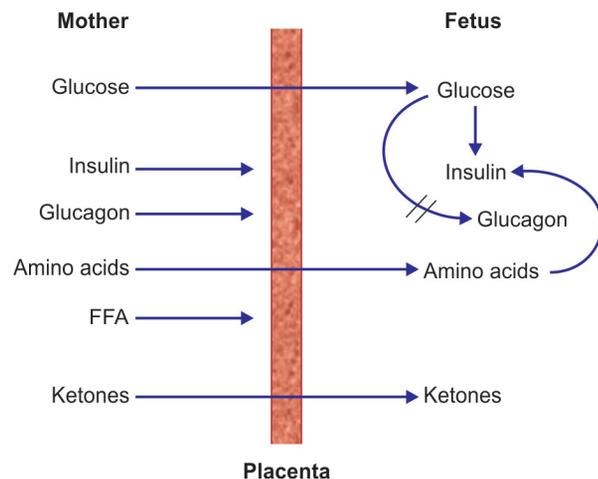




Glucose also seems to be transferred across the placenta by means of facilitated diffusion. Placental transfer of glucose and other materials related to carbohydrate handling in pregnancy is pictured in Fig. 1.5.



**Fig. 1.5:** A schematic representation of maternal–fetal nutrient and hormone exchange across the placenta in pregnancy. Glucose, amino acids, and ketones move freely into the fetal circulation, whereas insulin, glucagon, and free fatty acids (FFA) do not.

Fetus uses glucose at a rate of 6 mg/kg/minute at term. This rate is quite high compared with that in the normal adult, which is approximately 2.5 mg/kg/minute. In addition to glucose, amino acids are freely transported across the placenta into the fetal circulation. This transfer produces maternal hypoaminoacidemia, particularly of alanine, an important precursor of glucose in gluconeogenesis. In pregnancy, feeding produces hyperglycemia, an increase in serum insulin levels, and hypertriglyceridemia. There is also a diminished response to insulin. These changes are related to protection of fetal tissues from fluctuations in glucose by switching the maternal tissues over to free fatty acid and triglyceride metabolism. The placental production of lactogen, a substance known to have lipolytic properties, is responsible for this.

### Iron and Mineral Requirements

Physiologic iron requirements are three times higher in pregnancy than they are in menstruating women. Approximately 1200 mg must be acquired from the body iron store or from the diet by the end of pregnancy to meet both the requirements of the mother for the expansion of circulating red cell mass and demands of the developing fetus. The average requirement for a menstruating woman for the same period of time is 400 mg. The increased requirement is, therefore, 800 mg.

The demand for additional iron is not spread evenly throughout pregnancy. In the first trimester, requirements are actually reduced because menstruation has ceased, the demands of the fetus are still small and the expansion of the maternal red cell mass has not yet started to occur. The need for additional iron commences early in the second trimester and reaches a peak toward the end of the third trimester, when requirements rise to between 4 and 6 mg/day.

The relative importance of iron stores on one hand and increased iron absorption on the other is best illustrated by examining iron balance during pregnancy in women from industrialized countries. They enter pregnancy with adequate stores. The additional iron is derived from both the stores and increased absorption. The serum ferritin level is the best measure of the size of iron stores; 1  $\mu\text{g/L}$  serum ferritin = 8 mg storage iron in an adult. The 50th percentile for serum ferritin concentrations is 36  $\mu\text{g/L}$ . This value predicts a mean iron store of 300 mg. Therefore, the average size of iron stores for women entering pregnancy is 300 mg. Because the estimated total additional requirement during pregnancy is 800 mg, the average woman must absorb 500 mg (2 mg/day) more iron than she required while menstruating to avoid a negative iron balance.

However, iron absorption is regulated by the size of body iron stores. The operation of this important regulatory process is not affected by the advent of pregnancy. Women who enter pregnancy with adequate iron stores absorb relatively little iron during the first trimester. Stores are utilized first as the demand for iron increases in the second trimester. Absorption is accelerated only after there has been a substantial fall in the size of the iron store. At the time of the greatest need in late pregnancy, stores are essentially exhausted in most women. Virtually, all of the iron is derived from absorption.

Pregnant women consume a bioavailable diet that supply about 12 mg nonheme iron/day. The results show that the women utilize iron stores first. Absorption increase markedly only after most of the storage iron has been used. At the time of highest iron requirement in the third trimester, virtually all of the iron is derived from absorption. The diets of women in developing countries do not contain sufficient bioavailable iron to meet these needs during the second and third trimesters even if iron stores are adequate at the beginning of pregnancy. Supplementation will be necessary in the second and third trimesters of pregnancy, even if supplementation before conception improves iron storage status in the first trimester.



- c. Antacids
- d. Progesterone
- e. Laxatives

#### Assess for Referral

To identify valuable and high-risk pregnancy for timely referral and to decide the referral center.

#### Second Visit

- 26 weeks in WHO module
- 16 weeks (NICE)

#### 16 Weeks

- Assess the test reports
- Review, discuss and record the screening test results
- Measure weight and BP
- Symphysiofundal height almost always corresponds to period of pregnancy in weeks
- External ballotment
- Iron/folic acid supplementation
- First dose of tetanus toxoid immunization
- Test urine for proteinuria.

#### Third Visit (18–20 weeks)

- Weight and BP measurement
- Quickening
- SFH assessment
- Fetal heart sound
- Dating scan, if not done in first trimester
- Anomaly scan
- Antiglobulin test in Rh negative mother
- Treatment for bacteriuria
- Iron/folic acid supplementation

**Fourth Visit** (26–28 weeks of NICE Module) = Second visit in WHO module (26 weeks)

#### Detailed History

- Weight and BP measurement
- Symphysiofundal height
- Glucose screening tests by 75 gm glucose load
- Urine for proteinuria
- Offer a second screening for anemia
- Repeat antiglobulin test, if negative antepartum dose of anti-RhIgG is given
- Iron/folic acid supplementation or for treatment of iron deficiency anemia
- Deworming with single dose albendazole in presence of anemia
- Second dose of tetanus toxoid immunization
- Assessment for referral in case of hypertension, GDM, heart disease, small fetus, BOH, etc.

**Fifth Visit** (32 weeks) = Third visit (Third visit in WHO Model)

- Detailed history and enquire about new developments like weakness, fever, edema, dysuria, lack of fetal movements, any pain related to threatened preterm labor, bleeding, vaginal discharge, etc.
- Weight gain, BP measurement
- SFH measurement corresponding to POA or not
- Single/twins
- Malpresentation
- Evidence of preterm labor
- Suspicion of placenta previa, IUGR
- Breathing disturbance in anemia/heart disease
- Fetal heart activity
- USG Doppler assessment in case of poor fetal growth
- Urine analysis and test for proteinuria in case of hypertension
- Control of BP by antihypertensive drugs (in tertiary center)
- Control of glucose intolerance (in tertiary center)
- Discussion about referral

**Sixth Visit** (34 weeks) (NICE)

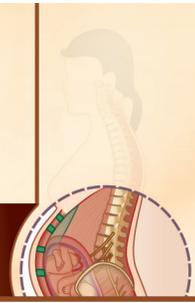
- To measure weight and BP
- Measure and plot symphysiofundal height
- Presentation, lie
- Fetal heart tone
- Administer second dose of anti-RhIgG to Rh-ve mothers
- Screen for women who need additional care and referral

**Seventh Visit** (36 weeks) (NICE)

- To measure BP and test for proteinuria
- Check symphysiofundal height
- Position of baby and its presentation
- Offer external cephalic version in breech presentation, if fails discuss referral
- Offer admission in patients with IUGR, twins and APH mothers.

**Eighth Visit** (38 weeks) (NICE)/36–38 weeks (fourth visit in WHO Model)

- Measure blood pressure
- Assess for anemia, edema, respiratory symptoms
- Fetal lie, presentation, engagement, fetal size
- USG to assess fetal growth and wellbeing
- Pelvic assessment
- Assess for time and likely mode of vaginal delivery



### How to Differentiate 40 Weeks Uterus from 32 Weeks Uterus

- Pregnancy at term (accurate LMP and EDD)
- Lightening feel.
- Shape of the uterus becomes spherical.
- Liquor reduces.
- Head is usually engaged.
- Head feels hard.

### Leopold Maneuvers

#### A. Fundal palpation/fundal grip (Fig. 2.3):

- This palpation helps determine the lie and presentation of the fetus.
- Palpate the uterine fundus gently by laying both hands on the sides of the fundus in an attempt to determine which pole of the fetus (the breech or the head) is occupying the uterine fundus. The head feels like a hard globular, ballotable mass whereas the breech is broad, irregular, soft, nonballotable mass.
- In the case of a transverse lie, the fundal grip will be empty.



Fig. 2.3: Fundal grip

#### B. Lateral palpation/umbilical grip (Fig. 2.4):

- This palpation is used to locate the fetal back to determine the fetal lie.
- Place the hands on either side of the uterus at the level of the umbilicus and apply gentle pressure. The back of the fetus is felt like a continuous hard, flat surface on one side of the midline and the limbs are felt as irregular small knobs on the other side.
- In the case of a transverse lie, the back is felt in the midline either above or below the umbilicus transversely.



Fig. 2.4: Lateral grip

#### C. First pelvic grip/superficial pelvic grip (Fig. 2.5):

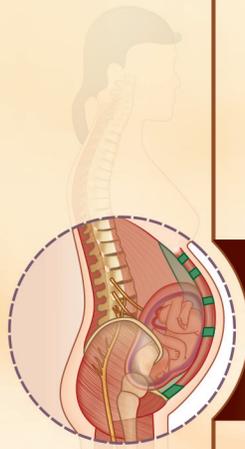
- To perform this grip, one must face the foot end of the mother. Keep both the palms of hand on the sides of the uterus parallel to inguinal ligament, with the fingers held close together, pointing downward and inward, and palpate to recognize the presenting part. If fingers deviate and presenting part is nonballotable, it is engaged. If fingers converge below the presenting part which can be moved sideways easily, it is not engaged.
- If the presenting part is the head, the level of occiput and sinciput is assessed. If the occiput is below the sinciput, then the head is flexed. If the sinciput is below, then head is deflexed.



Fig. 2.5: First pelvic grip

#### D. Second pelvic grip/deep pelvic grip (Fig. 2.6):

- Spread the right hand widely over the symphysis pubis, with the ulnar border of the hand touching



# Hemorrhage in Early Pregnancy

## 3.1. ABORTION

The bleeding in pregnancy before 20 weeks can be grouped into two:

1. Those associated with causes directly related to pregnancy: Abortion, ectopic pregnancy, and trophoblastic disease.
2. Those associated with gynaecological lesions like cervical polyp, erosion, cancer cervix, varicose veins of cervix and vagina, etc.

### EARLY MISCARRIAGE IN PREGNANCY

#### Introduction

Sporadic miscarriage is the most common complication of pregnancy and approximately 25% of women lose their pregnancy at some time in their reproductive lives. The term miscarriage is used in pregnancy loss before 20 weeks of pregnancy.

#### Incidence

The incidence of clinical spontaneous sporadic pregnancy miscarriage is 12–15%. However, the rate of subclinical pregnancy loss is much higher and almost 22% pregnancies end in abortion before it is detected clinically. The most of the miscarriages occur in the first trimester and are termed as early pregnancy losses. Only 2–5% pregnancies miscarry after fetal heart is detected on ultrasound. Late miscarriage which is defined as loss after fetus has reached an ultrasound size of at least 13 weeks gestation is rare. However, this is more common among the recurrent miscarriers to the extent of 22–37%. The risk of miscarriage is also increased in elderly age as women >40 years of age have 30% chance of miscarrying a clinically recognized pregnancy. The risk of pregnancy loss also increases with history of previous miscarriages: 15% after one pregnancy loss, 25% after 2 previous pregnancy losses and 30% after 3 previous pregnancy losses.

Abortion may be spontaneous, induced elective or therapeutic.

### SPONTANEOUS ABORTION

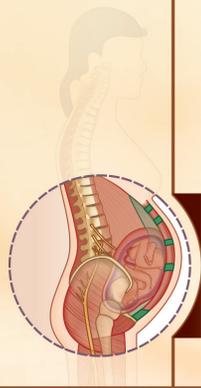
#### Definition

It is the spontaneous expulsion of embryo or fetus before the stage of viability, i.e. below 20 weeks or <500 gm weight who unlikely to survive even if born alive.

Fetal loss after 20th week is considered late pregnancy loss ending in stillbirth and when pregnancy is lost between 20 and 37 weeks is considered preterm IUD and after 37 weeks is called term intrauterine deaths.

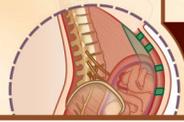
#### Causes

- In the first trimester, embryonic causes of spontaneous abortion are the predominant etiology and account for 80–90% of miscarriages.
- Genetic abnormalities within the embryo (i.e. chromosomal abnormalities) are the most common cause of spontaneous abortion and account for 50–65% of all miscarriages.
- The most common single chromosomal anomaly is 45X karyotype, with an incidence of 14.6%.
- Trisomies are the single largest group of chromosomal anomalies and account for approximately one-half of all anomalies associated with miscarriage. Trisomy 16 is the most common trisomy found. Approximately 20% of genetic abnormalities are triploidies.
- Maternal causes of spontaneous miscarriage include the following:
  - ♦ *Genetic*: Maternal age is directly related to the aneuploidy risk (>30% in people aged 40 years).



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