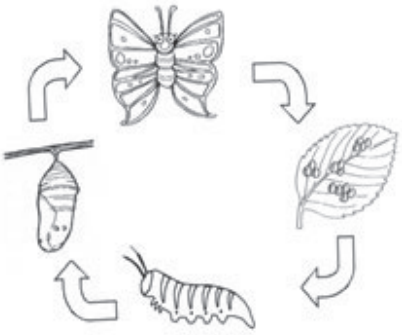
4 Prenatal Development and care during pregnancy

Activity :

Look at the figures given below and compare the life cycle of a butterfly and a human being.



Life cycle of Butterfly

Life cycle of a Human being

Is there any similarity ? Yes !

Just like the life cycle of a butterfly begins as an egg, the life of a human being also begins as a fertilized egg. Now we will study in detail how individuals develop from the time of conception. The period from conception to birth is referred to as the Prenatal period. Fertilization of an ovum (egg cell) by a sperm is the starting point of new life. The average length of prenatal period is 38 weeks from the date of conception. During this time a fertilized cell or zygote develops in a series of stages into a full term baby.

4.1 Conception

a) Meaning of fertilization and conception

Fertilization :

Fertilization is the process by which sperm and ova combine to create a single cell called a zygote. It occurs within 24 hours after the ovum descends to the tube. The sperms are contained in a fluid called semen. Semen is deposited at the neck of the uterus during intercourse. The sperms are drawn up into the fallopian tube by hormonal attraction and muscular contraction. The sperms secrete an enzyme which disperses the wall from around the ovum. Once it reaches the ovum it penetrates the cytoplasm. This leads to change in the membrane of the ovum in such a way that no other sperm can now enter it .The nuclear material in the head of the sperm now fuses with the nucleus of the ovum to get 46 chromosomes from both the parents. The cell then begins its mitotic division through the different stages of prenatal development. Fertilized ovum (zygote) slowly travels to uterus and moves for 5-6 days to get implanted into the walls of the uterus. This process is known as implantation. When implantation occurs it is called conception. A yolk sac is formed around the ovum cells till implantation process completes and it continues to nourish the ovum.

Activity :

Complete the flow chart of fertilization and implantation

a) Ovum descends to the tube

↓

b) Sperm deposited .....?

↓

c) ?

↓

d) Sperm secretes enzyme

↓

e) ?

↓

f) Change in membrane .....?

↓

g) ?

↓

h) Mitotic division

↓

i) ?

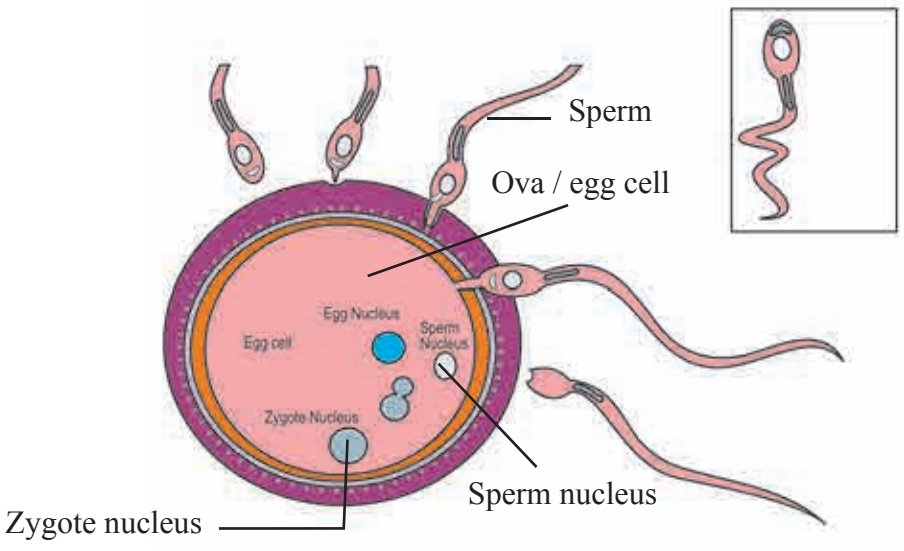


Fig. 4-1: Fertilization

b) Importance of fertilization :

Fertilization is most likely when intercourse happens 2 days before ovulation and a day after ovulation. This is so because the ova is capable of getting fertilized only for 24 hours after ovulation. Sperms also survive only for 12-48 hours in the female body. At the time of fertilization, few important factors such as i) heredity endowment ii) sex of the child iii) number of offsprings or children, are determined.

i) Heredity Endowment :

This is an important factor that influences development right from the prenatal stage. It is the genetic endowment inherited from the biological parents at the time of fertilization. When ovum and sperm unite, they endow the baby-to-be (organism) with a genetic makeup that influences a wide range of characteristics such as colour of skin and hair, height, health, intellect.

ii) Sex determination :

The sex of the child is determined at the time of fertilization. The combination of chromosomes from both the parents will determine whether the foetus is a girl or a boy. When the X - Chromosome of the father combines with the X - Chromosome of the mother the foetus will be a girl. When the Y - Chromosome of the father combines with the X - Chromosome of the mother the foetus will be a boy.

iii) Number of offsprings :

The important condition determined at the time of conception is whether the birth will be single or multiple. Singletones are children who are born alone. They may have siblings- brothers and sisters - but a period of nine months or more separate their birth from those of their siblings. The term 'multiple birth' refers to the birth of two or more babies within a few hours - twins, triplets.

There are two different types of twins: identical and fraternal.

- **Identical or Uni-ovular twins -**

Identical twins come from a single ovum fertilized by a single sperm. As identical twins are formed from one fertilized ovum, they are of same sex i.e. both boys or both girls. They have the same genetic make up and similarities are observed among them.

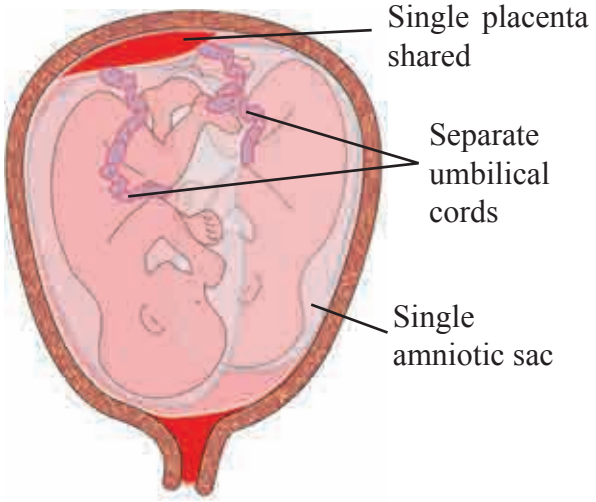


Fig. 4.2 (a) : Identical Twin Pregnancy : Single Placenta Twins

- **Fraternal or Non-identical twins -**

Two different sperms fertilize two ova released simultaneously. Such twins are called fraternal twins. They can be of same sex or different sex. Their genetic makeup will be different. Multiple birth i.e. having more than one child at the time of conception increases the possibility of premature birth and low birth weight. Proper care and nourishment of the pregnant woman should be ensured for a healthy baby and a safe delivery.

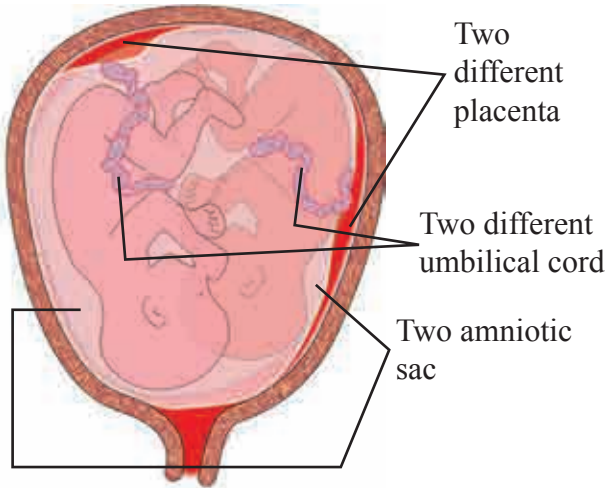


Fig. 4.2 (b) : Fraternal Twins

Table 4.1: Difference between identical twins and fraternal twins

Identical Twins Fig. 4.2 (a)	Fraternal/Non-identical Fig. 4.2 (b)
1. Single sperm fertilises single ovum	1. Two different sperms fertilizes two different ova
2. Mono zygotic	2. Di zygotic
3. Zygote divides into two separate individuals due to hormonal disturbances (before reduction division)	3. Result of simultaneous pregnancy due to two separate ova fertilized by two separate sperms.
4. Same genetic make-up	4. Different genetic make-up.
5. Same sex i.e. Boy-Boy or Girl-Girl	5. Different or same sex i.e. Boy-Boy, Girl-Girl and Boy-Girl
6. Usually share same placenta and same foetal sac	6. Usually different placenta and sac

4.2 Stages of Prenatal development :

Prenatal period is the period of the development from fertilization till birth. The length of this period is 280 days or 9 months 7 days or 40 weeks. This period is divided into three stages:

(a) Period of Ovum (fertilization – 2 weeks).

(b) Period of embryo (3 weeks – 8 weeks).

(c) Period of foetus (9 weeks till birth or 40 weeks).

(a) Period of ovum / zygote (fertilization – 2 weeks)

This is the period of about two weeks i.e. from fertilization to implantation (fixation of ovum in the uterine walls). The fertilized egg cell known as the zygote, divides into two cells by 36 hours then it divides into 4, 8, 16 and then sub divides into many more cells. Finally a cluster of many cells is formed which is known as 'Morula'. The next division of cells is within this cluster where a small cavity is formed. This stage is known as 'Blastula stage'. It further travels to the uterus and gets implanted. Sometimes it gets implanted in the fallopian tube resulting in 'tubal or ectopic pregnancy'. Sometimes there is a possibility of the tube getting ruptured due to growth of embryo. This leads to bleeding. In such cases, the embryo is removed by surgery.

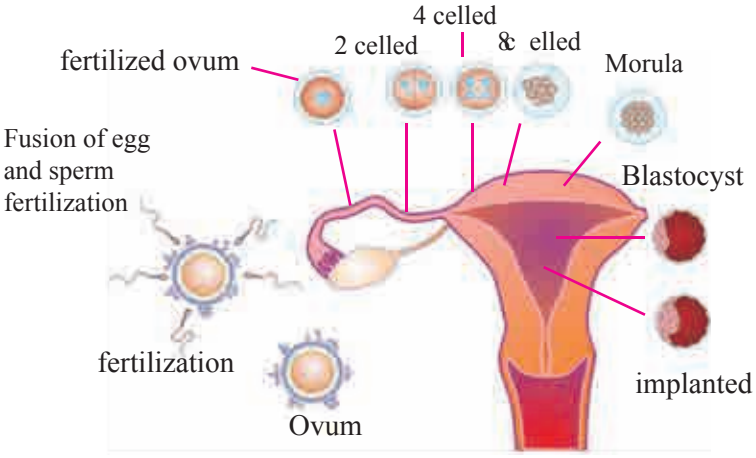


Fig. 4.3 : Fertilization, Morulla stage , Blastula Stage and Implantation

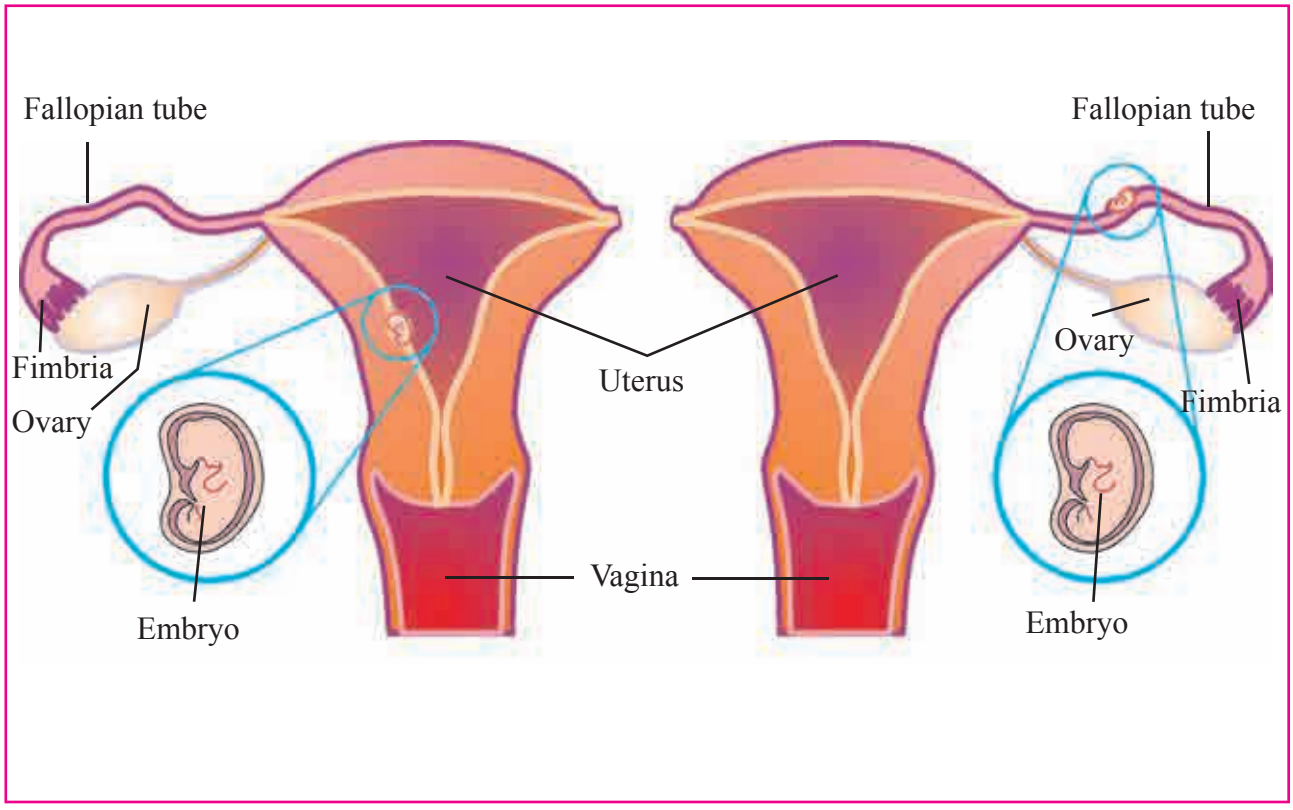


Fig. 4.4 : Embryo implanted normally

Fig. 4.5 : Ectopie Tubal Pregnancy

Implantation takes place in the second week after fertilization. i.e the zygote burrows into the uterine wall and establishes connections with the mother's blood vessels. When implantation takes place there will be some hormonal changes that prevent menstruation indicating that woman has conceived. The small cluster of cells near the center of the zygote will develop into the foetus. The layer, closest to the uterus(trophoblast), will develop into the placenta, a structure which provides nutrients to the foetus.

(b) Period of Embryo (3-8 weeks)

The period of embryo extends from 3rd to 8th week of pregnancy. In this period the internal organs and body structures of the embryo develop. The embryo is made up of three layers.

- **Ectoderm (outer layer) :**

It forms the skin, nails, hair, teeth, external part of sensory organs, e.g. taste buds of the tongue, nervous system, brain and spinal cord.

- **The Mesoderm (middle layer) :**

It forms the blood muscles, skeletal, circulatory, excretory and reproductive system.

- **The Endoderm (inner layer) :**

It forms the lungs, digestive system i.e. formation of internal body parts.

The period of embryo is marked by development of vital organs and other body structures called organogenesis.

Table 4.2 : Growth of Embryo

At the end of 2 weeks	The embryo is the size of a pinhead.	
At the end of 3-4 weeks :	• The embryo is now about the size of a pea. 	• The brain, spine, and heart have begun to form. By the end of 4 weeks the heart will be pumping blood. • A critical period as many birth defects may occur in the developing embryo • The eyes, nostrils, and arms are taking shape.
At the end of 8 weeks :		• the embryo's tail disappears and it is now called a foetus • **Fingerprints** are being formed , and bone cells are replacing cartilage.

Embryo's life support system :

There are three support systems for the developing embryo-the placenta, amniotic sac, and the umbilical cord.

Amniotic Sac :

About two weeks after fertilization, the amniotic sac begins to grow and fill with fluid. Outer layer of cells of embryo forms foetal membranes called amnion and chorion. These membranes along with a third membrane from mother's uterine wall become a sac around the embryo which is known as amniotic sac. This is filled with watery fluid i.e. amniotic fluid which protects the embryo from shocks, experienced by the mother. It also provides stable temperature to the embryo and prevents the sac from adhering to the embryo.

The placenta :

The fertilized ovum enters the uterus and implants itself in the wall. The portion of the mucus membrane which comes between the ovum and the muscular layer is the placenta. It develops during the first 12 weeks. The placenta is formed partly from cells of uterine lining and partly from the trophoblast. It is a disk shaped mass of tissues in which small blood vessels from mother and foetus intertwine but do not join. The placenta is connected to the embryo by the umbilical cord through which it delivers oxygen and nourishment to foetus. It also removes its bodily waste. The foetus breathes, eats, disposes waste products through this. Nutrients, amino acids, fatty acids, drugs are passed through this to the foetus. At 40 weeks the size of the placenta is approximately 9 inches in length and 0.8 inches in thickness. Its weight is approximately 1/6 th of the weight of the baby.

Umbilical Cord :

The umblical cord forms around the fifth week of pregnancy and can grow up to 20 inches at full term. It consist of two arteries and one vein. The vein carries oxygenated and nutrient rich blood from the placenta to the foetus and arteries carry the deoxygenated nutrient-depleted blood and waste product away from the foetus. When the infant is born, the umbilical cord is cut close to the baby's body.

Activity :

Represent the following diagrammatically / as a tree chart

a) The three stages of Prenatal development.

b) The three stages of Embryo development.

c) The three life support system of embryo.

(c) Period of foetus (9 weeks to birth) :

This period extends from nine weeks upto delivery.

Table 4.3 : Growth of foetus

At the end of 9 weeks	• The neural tube (brain, spinal cord and other neural tissues of the central nervous system) is well formed. • The digestive tract and sensory organs begin to develop.
At the end of 2-3 months :	• The foetus makes random movements . Finger nails, toe nails and teeth are beginning to develop. External ears are formed. • Reproductive organs develop.
At the end of 3-4 month :	• The foetus starts having breathing movements. It can open its mouth and swallow. • Foetal movement may be sensed now (called quickening). • The fingers and toes are well-defined. Eyelids, eyebrows, eyelashes, nails, and hair are formed. • Foetus also sucks his or her thumb, yawns and stretches. • Nervous system starts functioning. • Reproductive organs and genitalia are fully developed and visible on ultrasound. • Foetal heartbeat is audible through an instrument called a stethoscope.
5th Month	• Hair begins to grow on the head of the foetus. • Shoulders, back, and temples are covered by soft fine hair called lanugo.

At the end of 6th month :	• The foetus can respond to sounds that occur in the mother's surroundings. • Eyelids can open and close
At the end of 7th month :	• Hearing is fully developed. • If born prematurely, infant is more likely to survive after the seventh month.
At the end of 8th month	• Most internal systems are well developed, but the lungs may still be immature.
At the end of 9th month :	• Foetus continues to grow and mature, the lungs are nearly fully developed. • Reflexes are coordinated so the foetus can blink, close the eyes, turn the head, grasp firmly, and respond to sounds, light and touch. • Foetus is about 18 to 20 inches long and usually weighs about 7 pounds

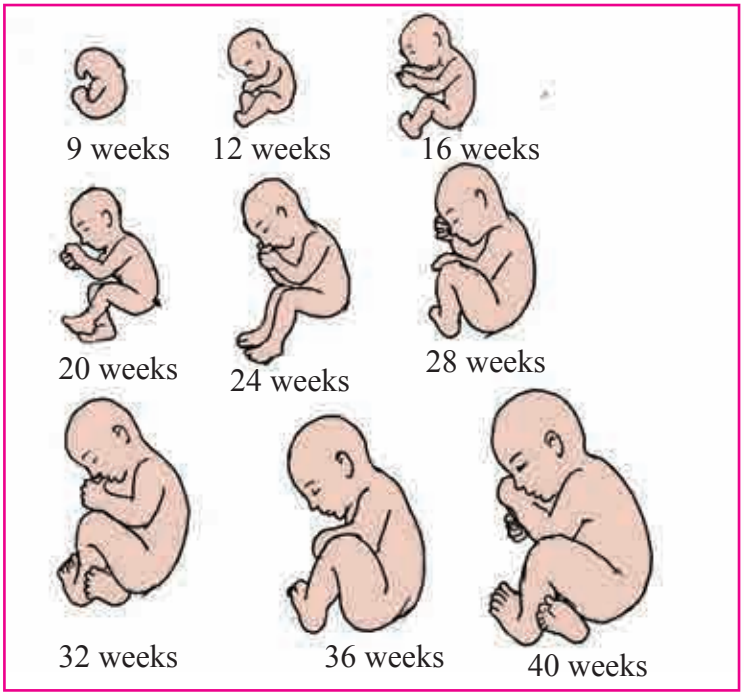


Fig. 4.6 : Growth of Foetus

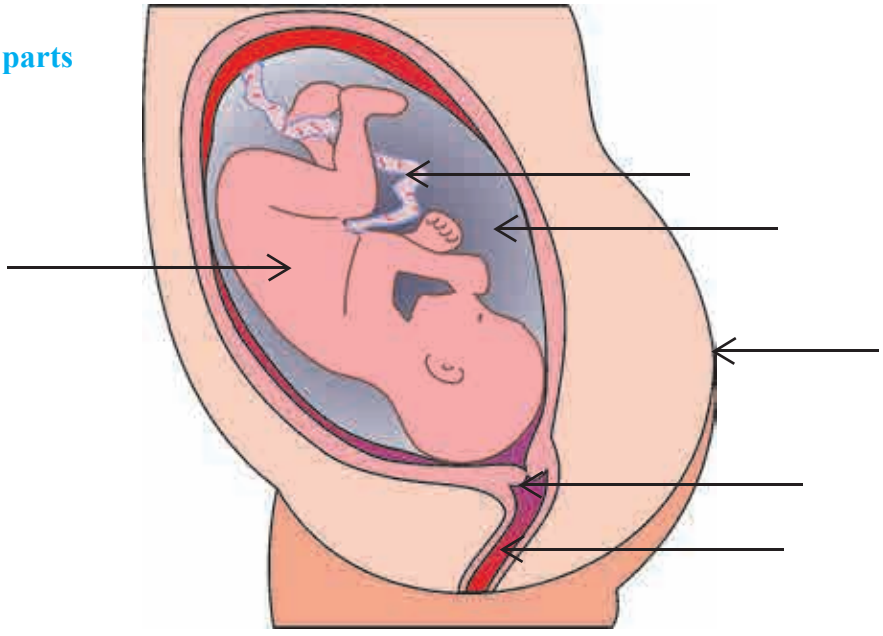
Importance of Period of Foetal Development :

Major parts of the body are completed in a rudimentary form. Since the nervous system is maturing, mental growth may be affected if there are any adverse conditions. Any deficiency in nutririon may cause defects in the foetus. Similarly the risk of miscarriage depends on a wide range of prenatal conditions.

The attitude of the mother, her anxiety and other such factors affect birth and delivery process. The educational level, socio-economic conditions, emotional state and whether it is hospitalized delivery or home delivery can affect the process of delivery and ultimately affects the infant.

Activity :

Label the different parts



Pregnancy and Gestation :

Gestation refers to a period of foetal development from the time of conception until birth. Full gestation period is usually nine months. Pregnancy refers to changes in the mother during this period.

4.3 Signs and symptoms of Pregnancy

- Amenorrhea
- Nausea
- Tiredness
- Changes in breast
- Micturition
- Enlargement of uterus
- Quickening

Signs and symptoms of Pregnancy

a) Signs and Symptoms :

1 Amenorrhea :

Absence of menstrual cycle during active sexual periods of life.

2. Nausea :

Most but not all pregnant women may have sensation of vomiting. Nausea may be experienced at any time of the day.

3. Tiredness :

In early pregnancy many women may feel more sleepy and tired, hence sufficient rest is necessary.

4. Changes in breast :

Breast becomes enlarged, tender and more noticeable as soon as pregnancy occurs. The area around the nipple (areola) darkens and from the 12th week, colostrum, a clear yellow fluid, is secreted from the nipple.

5. Micturition or frequent urination :

The enlarging uterus presses on the bladder resulting in frequent urination. During pregnancy many women feel thirsty which results in an increased intake of fluids, thereby resulting in frequent urination.

6. Enlargement of uterus :

Enlargement of uterus is rapid and uniform due to the growing foetus.

7 Quickening

Movement of the foetus felt by the mother is usually around 4 months.

8. In some women increased vaginal discharge secretions may be seen. Additionally pigmentation of the face and abdominal region may occur.

b) Diagnostic tests :

i) Biological pregnancy test or Urine test :

6-8 weeks from the last menstrual cycle (LMC), the gonadotrophic hormone is seen in sufficient quantity. The first urine in the morning has to be tested for accurate results.

ii) Foetal heart sounds :

One is able to detect this by 5th month. The rate of heart beat is approximately 120-140 per minute. In boys it is below 130 and in girls above that.

iii) Sonography, Ultra Sound and Ultrascan :

Sonography is used to observe growth and development of the foetus during pregnancy. Physical development and brain development of foetus is seen with the help of this. A picture of the developing embryo can be obtained by 5-6 weeks after LMC. By 8 weeks a clear picture of the embryo with its hearts beating is visible. It is widely used now.

In India sex determination test is illegal and a punishable offence.

Fig. 4.7 : Sonography / Ultra Sound / Ultra Scan

Do you know?

The government has launched **'Pradhan Mantri Surakshit Matritva Abiyan'** (PMSMA) a new scheme to provide comprehensive and quality antenatal care to pregnant women on the ninth of every month. The scheme is estimated to help over 3 crore pregnant women across the country in order to detect and prevent high risk pregnancies.

4.4 Danger Signals during Pregnancy :

a) Minor disturbances during pregnancy

i) Morning sickness and Nausea :

Many women suffer from nausea and vomiting. The condition may be due to hormonal changes during pregnancy, decreased glucose levels and increased levels of ketone bodies in the body. It can affect a mother's daily routine. Eating smaller portion at regular intervals throughout the day helps instead of overeating or forcing oneself with big meals. The pregnant woman can have biscuits, fruit juices, toast or sugary drink for energy. Cutting down on fried foods also helps relieve nausea.

ii) Back ache :

Hormones secreted during pregnancy soften the ligaments and joints especially those of the lower back. The enlarging uterus changes the posture of the pregnant woman. Increased pressure on the back causes shoulder to be pressed backwards while walking. This results in backache. Supporting the lower back with a cushion while sitting and not standing for long periods can bring some relief. Comfortable footwear, preferably flat ones can give a good amount of relief.

iii) Frequent urination :

The enlarged uterus puts pressure on the bladder resulting in pregnant women having frequent urination. This is more evident in the first and last trimester of pregnancy. Pregnant women could aviod drinking any fluid or water two hours prior to sleeping.

iv) Varicose veins :

A pregnant woman has more blood in circulation, which causes the dilation of blood vessels leading to varicose veins. Most varicose veins disappear in 2-3 months after delivery. The pregnant woman can avoid standing for too long or can wear support tights if suggested and prescribed by doctor. While sitting she must keep legs on a raised stool or cushion for additional support.

v) Constipation :

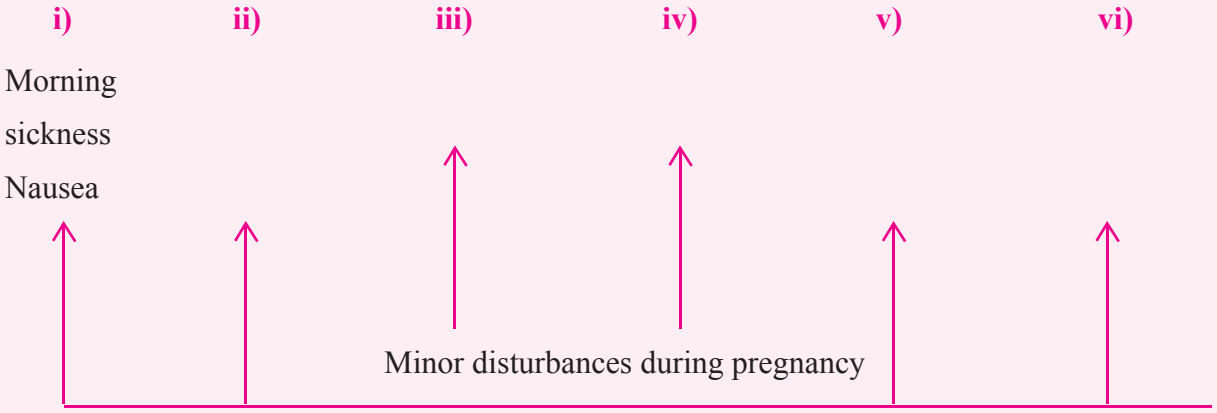
This could be due to lack of dietary fibre , poor intake of water, lack of exercise, changes in the pregnant woman's internal system (bowels are sluggish) and irregular bowel habits. This may cause nausea, headache and restlessness. The pregnant woman can drink more fluids i.e. atleast two litres a day. She can also add bran oatmeal, porridge, fresh green leafy vegetables to her diet.

vi) Heart burn or indigestion :

Due to enlargement of uterus there is pressure on the stomach. This affects the functioning of the digestive system. Acid secretions from the stomach come to the lower part of the gullet or food pipe causing a sensation of heartburn. A few sips of cold milk, eating small meals more often, avoiding lying flat on back, avoiding bending or sitting in a hunched position can relieve some of the heartburns.

Activity :

Write down the main points to see if you remember. The first one has been done for you.



b) Major disturbances :

i) Toxemia :

It is a complication that may occur around the 26th week of pregnancy. This could be seen in women with multiple pregnancies, in women with a family history of high blood pressure. Swelling of face, feet, body, generalized fluid retention, weight gain, high BP, headache, blurred vision , spots before eyes are symptoms of Toxemia. The condition, if mild , can be treated by proper diet with salt restriction and rest. In severe cases anti hypertensive drugs may have to be given to prevent convulsions or Eclampsia in the mother. This may result in the death of the foetus.

ii) Anaemia :

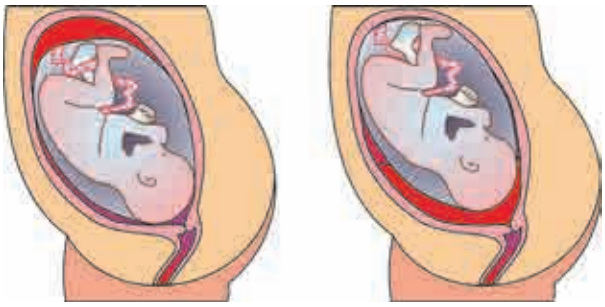
Anaemia is iron deficiency. Few causes of anemia are less intake of iron, lack of folic acid (a constituent of vitamin B) and decreased amounts of haemoglobin in the blood. The woman feels weak, there is loss of appetite, fatigue and breathlessness on slight exertion. A diet rich in leafy vegetables, eggs and meat is highly recommended. Iron tablets can be taken after consulting a doctor as her requirement of iron is 35 mg per day.

India has the highest number of anaemic women between the ages of 15 and 49 years. Globally, anaemia affects a whopping 614 million women in that age bracket.

iii) Vaginal bleeding :

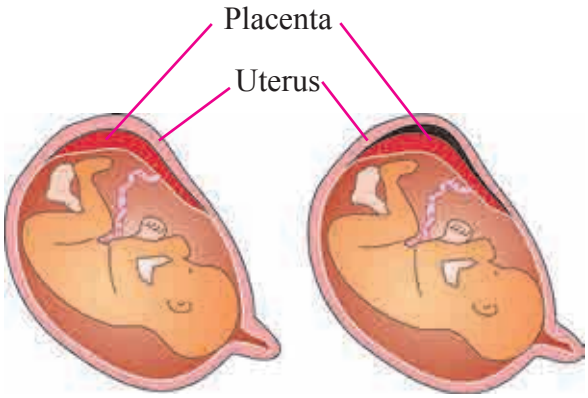
Vaginal bleeding in pregnancy is any discharge of the blood from the vagina. Vaginal bleeding during first three months of pregnancy may be a sign of miscarriage or ectopic pregnancy. During 4-9 months of pregnancy, bleeding may be a sign of placenta previa, placenta abruption, miscarriage, early labour and infection of the cervix. It can be a risk for pregnant women and her baby.

In placenta previa, placenta is attached to lower part of uterus (cervix). This condition can cause severe bleeding before or during labor. This could put the mother to be and the baby in danger. In placenta abruption, placenta gets separated from walls of uterus. This can be dangerous to baby due to lack of supply of oxygen. This may result in to death of foetus or abnormalities in the foetus. (fig. 4.8 a & b)



Normal placenta position | Placenta previa

Fig. 4.8 (a) Placenta previa



Attached placenta | Detached placenta

Fig. 4.8 (b) Placenta abruption

iv) Urinary Infection :

Urinary infection during pregnancy is due to high level of hormones in the blood causing an ideal medium for the growth of bacteria. Increased intake of water is usually advised. Any medication should be as per doctor's suggestion only.

v) Prolong d vomitting

Many women during pregnancy continue to have vomiting which affects their intake of food, resulting in weakness and dehydration. Doctor's advice in such cases is urgently required.

vi) Insomnia :

The pregnant woman may feel tired but is usually unable to go to sleep. However, drug treatment should be avoided at any cost. Insomnia may be due to worry, restlessness or anxiety.

Reflection / Darpan

Find out from your mother or any other family member.

(a) What kind of major or minor disturbances did she have during pregnancy?

(b) What type of delivery did she have?

(c) Does she have any record of the antenatal check up.

Activity

Find the given words hidden in the grid. The words maybe vertical, horizontal, diagonal.

K	E	T	O	N	E	A	O	G	A	R	T
L	Y	O	F	A	S	N	R	N	M	X	O
A	Z	X	D	U	O	I	E	I	G	F	M
T	R	E	S	S	C	M	A	N	P	E	P
A	N	M	A	E	I	T	I	E	W	O	D
N	T	I	K	A	R	E	V	K	L	T	J
E	F	A	L	Q	A	C	E	C	H	I	Y
T	G	M	O	K	V	A	R	I	S	R	Z
N	J	K	N	O	I	T	P	U	R	B	A
A	C	U	Y	E	S	O	Z	Q	I	U	N
W	V	I	C	U	l	J	A	V	R	E	P
E	R	Q	S	A	Q	M	R	T	O	X	I

1. Ketone
2. Antenatal
3. Nausea
4. Varicose
5. Toxemia
6. Anemia
7. Previa
8. Abruption
9. Quickening

4.5 Care During Pregnancy

i) Diet :

A woman's diet before conceiving can affect her child's future health. Her diet during pregnancy is even more important. A well balanced diet helps in giving birth to a healthy baby. Pregnant women who gain at least 20 pounds are less likely to miscarry or have babies who are still born or underweight. Her diet must incorporate foods rich in calories, proteins, folic acid ,calcium, iron and other essential minerals to meet the needs of the growing foetus. Food must be adequate in quality and quantity.

ii) Physical Care :

Physical care during this period is essential. It includes bathing, care of teeth, care of breast and clothing.

a) Bathing :

A daily bath is necessary. Use of very cold or very hot water should be avoided. Warm water should be used for bathing.

b) Care of teeth :

Care of teeth should be taken in this period. The diet should be enriched with calcium and vitamins. Regular dental checkup is essential.

c) Care of breast :

The breast and nipples should be kept clean by washing and drying with a soft towel. It should be cleaned with lukewarm water. Massage with cold cream is good to prevent cracks in the skin.

iii) Rest and Exercise :

A pregnant woman should take rest during the day if possible. She should lie down in a comfortable position. Rest reduces fatigue and blood supply to the foetus is enhanced. Moderate exercise will be helpful. An expectant mother can jog, swim, cycle etc. Regular exercise helps in preventing constipation, improves circulation, respiration, skin elasticity and muscle tone, all of which contribute to an easier and safer delivery. Being employed does not necessarily entail any risk. However having strenuous working conditions or long working hours may result in premature birth.

iv) Antenatal Checkup (ANC) :

This is to ensure that the mother to be is fit and healthy and there are no complications during pregnancy. Even if there were, an antenatal check up can help prevent the same. In the checkup the urine is examined and tested for protein and glucose. This is to rule out the possibility of developing diabetes during pregnancy or pre-eclampsia. Urine test is also taken to see if any urinary infection is present.

A blood test is done for finding out the blood group and haemoglobin levels. Clinics also do a HIV screening test. Further foetal heart sound and its movement can be monitored to indicate any irregularities. Antenatal visits help the woman get familiar with the hospital, the gynaecologist / obstetrician, and the unit who will help her during labor.

Info Hub :

- The World Health Organisation recommends that all pregnant women receive at least four ANC visits.
- More than one in seven Indian women do not receive antenatal care during their pregnancy.
- According to National Family Health Survey there is a need to sensitise men about women's rights to healthcare.
- Antenatal care (ANC) constitutes :
    - Monitoring for signs of complications, detection and treatment of hypertension and diabetes, provide iron and folic acid tablets, vaccination and counsel on preventive care, diet during pregnancy, delivery and postnatal care.

v) Personal and environmental hygiene :

It is very important to maintain personal and environmental hygiene. Pregnant women should undergo all the above mentioned tests, keep herself healthy by taking good rest, exercise in moderation, have a balanced diet and wear loose clothes as her pregnancy advances.

She must go for walks in fresh air and sunlight. To ensure a healthy child she must also be cheerful and not be anxious or stressed.

vi) Immunization and regular health check up :

Going for regular checkup is essential during pregnancy to ensure a healthy baby. Regular immunization of Tetanus injection usually in the third trimester is advised to pregnant women. Before pregnancy begins the woman can take a rubella vaccine if she is not immune to it.

vii) Attitude :

One of the most influential factors that can affect the prenatal life is the attitude of the pregnant women as well as other people in the family. For example an unwanted pregnancy can lead to a lot of friction and unpleasantness. If the husband blames the woman for the pregnancy it is likely to bring about a lot of resentment and later may make the child feel unwanted. A positive attitude towards pregnancy and motherhood is ideal. Knowing the sex of the child before hand or having a very idealistic image about how the child should be, can color the attitude of both the mother and the family members.

4.6 Types of Birth :

An easy birth plan is ideal. However even the most carefully planned birth can take twists and turns. In those cases, it is important to prepared for the alternative delivery methods. Different kinds of childbirth and delivery methods are as follows –

a) Natural Delivery (Vaġ nal Delivery):

In a natural birth, the baby is born through the birth canal. It is difficult to know when exactly women go into labor, but most women give birth at around 38-41 weeks of pregnancy. Benefits of natural delivery are :

i) Shorter hospital stay

ii) Lower infection rates

iii) Quicker recovery

iv) Babies born naturally have a lower risk of respiratory problems

b) Caesarean Section :

When complications arise, the caesarean method of delivery is imperative. A cesarean section or C-section is the delivery of baby through a surgical incision in the mother's abdomen and uterus.

c) Forceps Delivery :

Forceps are used when the baby is on its way via birth canal but fails to fully emerge out. Forceps are used when there is any small obstruction or the mother is tired and loses consciousness. If the rate of labor pain slows down and the woman is not able to push down, then also the doctor uses forceps to hold the skull of the baby and pull the head out. The forceps are specially designed for this delivery.

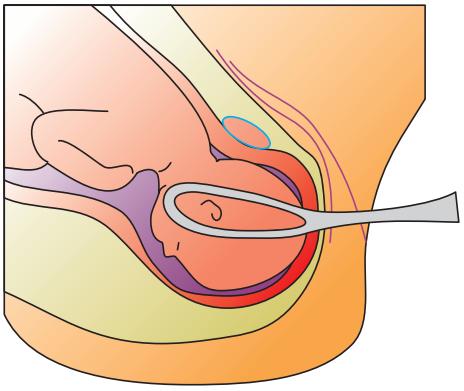


Fig. 4.9 Forceps Assisted Birth

d) Vaccum Extraction :

Similar to forceps delivery method, this type of delivery technique is again used in the case of a vaginal birth. The baby is on its way out but somehow has stopped moving any further through the canal.The doctors then make use of a specialized vacuum pump which is inserted up to the baby via the canal. The vacuum end has a soft cup which is placed on the top of the baby's head. Vacuum is created so that the cup holds the head and the baby is gently guided outwards through the canal.

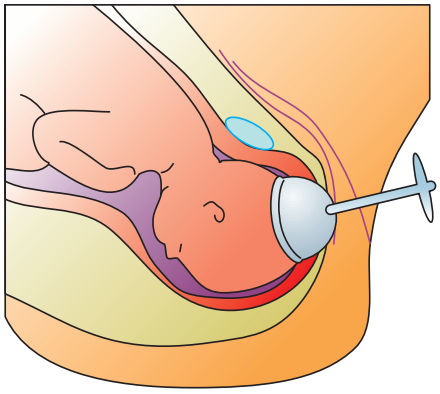


Fig. 4.10 Vacuum Assisted Birth

e) Breech Delivery :

In a Breech birth the bottom of the baby emerges first instead of the head. Nowadays a caesarean section is advised to ensure a safe delivery.

Activity :

Correct the statements given below :

1. In forceps delivery a vacuum pump is used to deliver the baby.
2. A pregnant woman requires 30 mg of iron per day.
3. When the head emerges out first it is called a breech birth.
4. In vacuum birth, surgical incision is done on the pregnant woman's abdomen.

4.7 Factors affecting prenatal development:

i) Age of the mother :

The best age for a woman to bear a child is 23-29 years. If younger, then the girls' reproductive organs are not well developed and hormones have not reached optimum level of functioning. If above 35 years then more chances of miscarriage, abnormalities and still birth.

ii) Maternal nutrition :

Good nutrition helps in growth and development of the foetus. Under weight and malnourished mothers have greater chance of premature births. Mothers who are overweight and have toxemia, may deliver stillborns. A pregnant woman should have healthy food and rest. She must ideally gain at least about 10-12 kilos of weight during pregnancy.

iii) Rhesus factor (Rh Factor) :

Blood comprises of two primary elements they are as follows

i) Blood groups namely 'A', 'B', 'AB', 'O'

ii) Rhesus factor (Rh factor)

The presence of this factor in the blood is referred to as Rh Positive (Rh +ve). The absence of this factor is in the blood is referred to as Rh negative (Rh -ve)

- A mother who is Rh -ve with a partner who is Rh +ve has higher chances of her baby being Rh +ve. This is because a very high percentage of the population is Rh +ve.
- In case of Rh incompatibility between the mother and the baby, antigens from the baby are likely to enter the blood stream of the mother. To fight these antigens, antibodies are produced in the mother's blood. The Rh incompatibility does not pose any threat to the first born. However with subsequent pregnancies there is a definite danger of the baby's blood cells being rapidly destroyed before its birth.
- The destruction of the baby's blood cells are likely to develop a miscarriage, retardation, severe jaundice, anemia (erythroblastosis) or death.
- In order to avoid complications the mother must be given an injection known as an 'anti D' injection within 72 hours after the birth of the baby.

iv) Medicines :

A pregnant woman should not consume any medicine without consulting a doctor. Medicines taken without consultation have hazardous effects on the foetus such as fetal abnormalities, deafness, visual impairments, bone deformities. Regular medicines are not prescribed to pregnant women for fever, common cold, aches or pains.

v) Illness :

Illness of mother affects the foetus. If the mother has diabetes, there is increased possibility of the foetus having diabetes or physical abnormalities or getting aborted. Jaundice damages the liver of the foetus and may

result in prematurity. If mother is suffering from chicken pox, it may affect the ear and heart of the foetus. Mothers with rubella results in bitot's spot, deafness, and affects heart, ear and brain of the foetus.

vi) Maternal emotions :

Extreme emotions felt by the mother may bring about hormonal changes which are communicated through the blood stream to the foetus and can affect its development.

vii) Radiation :

It is a well known fact that X rays can cause gene mutation. The greatest damage seems to occur in early pregnancy. Therefore, exposure to radiation of any kind should be avoided. With the use of ultrasound, X-rays are not necessary.

viii) Alcohol :

Moderate drinking can affect and harm the foetus, resulting in growth retardation. Babies suffer from foetal alcohol syndrome i.e. facial and bodily malformation, disorders of the central nervous system, short attention span, poor sucking response and motor defects.

ix) Smoking

Excessive smoking has an effect on the foetal heart, circulatory system and other organs. Children whose mothers smoke during pregnancy were found to be more hyperactive, shorter, generally less well developed and are less well adjusted socially. Women who smoke during pregnancy risk having babies with congenital defects and spina bifida.

x) AIDS and Sexually Transmitted Diseases (STD) :

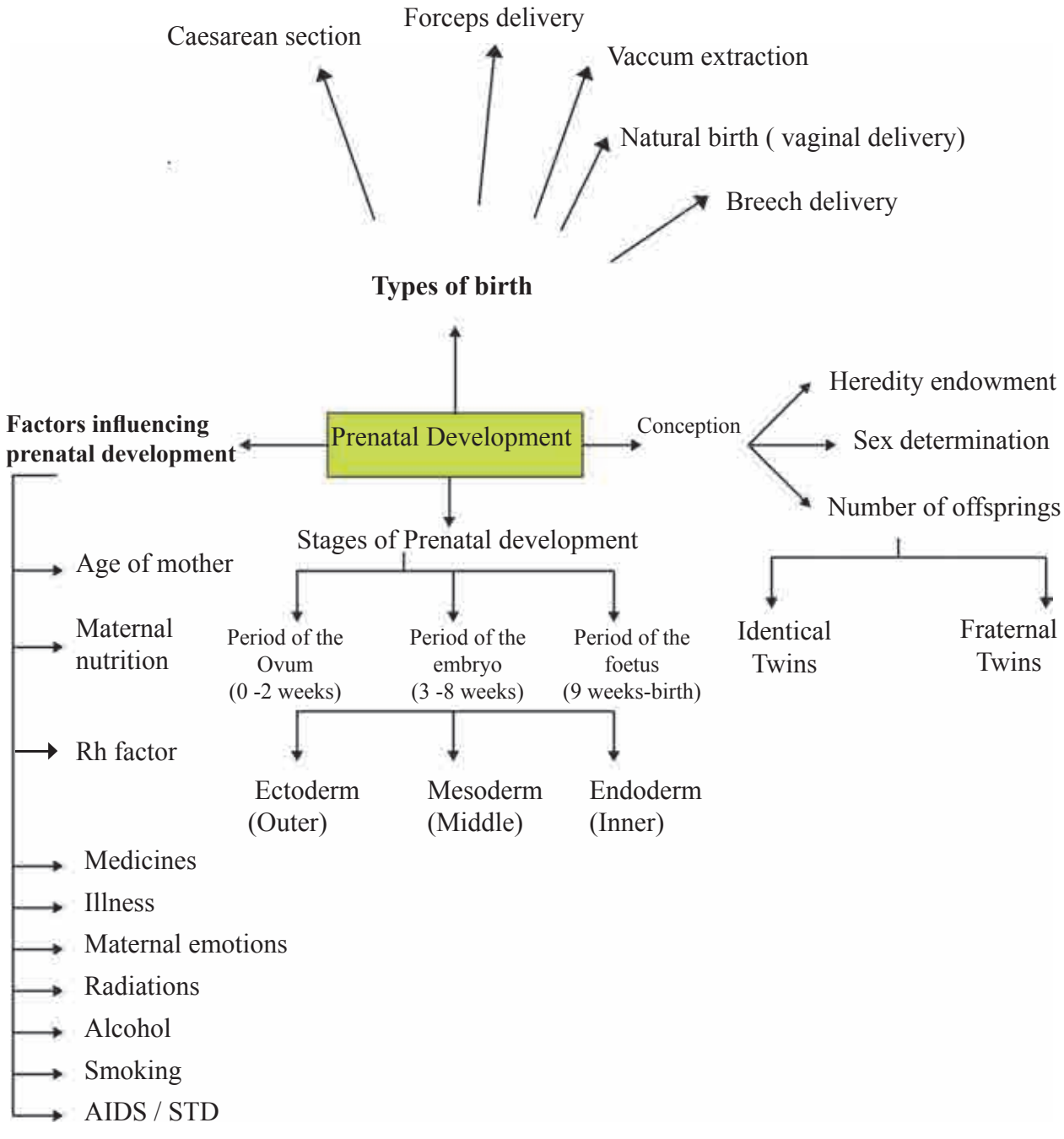
It is Acquired Immune Deficiency Syndrome. It is a disease caused by the human immunodeficiency virus (HIV) which affects the functioning of our immune system. A foetus can be infected with HIV as it can be passed via the placenta or after birth through breast milk. Sexually transmitted diseases and its effects on mother and foetus are given in the table below :

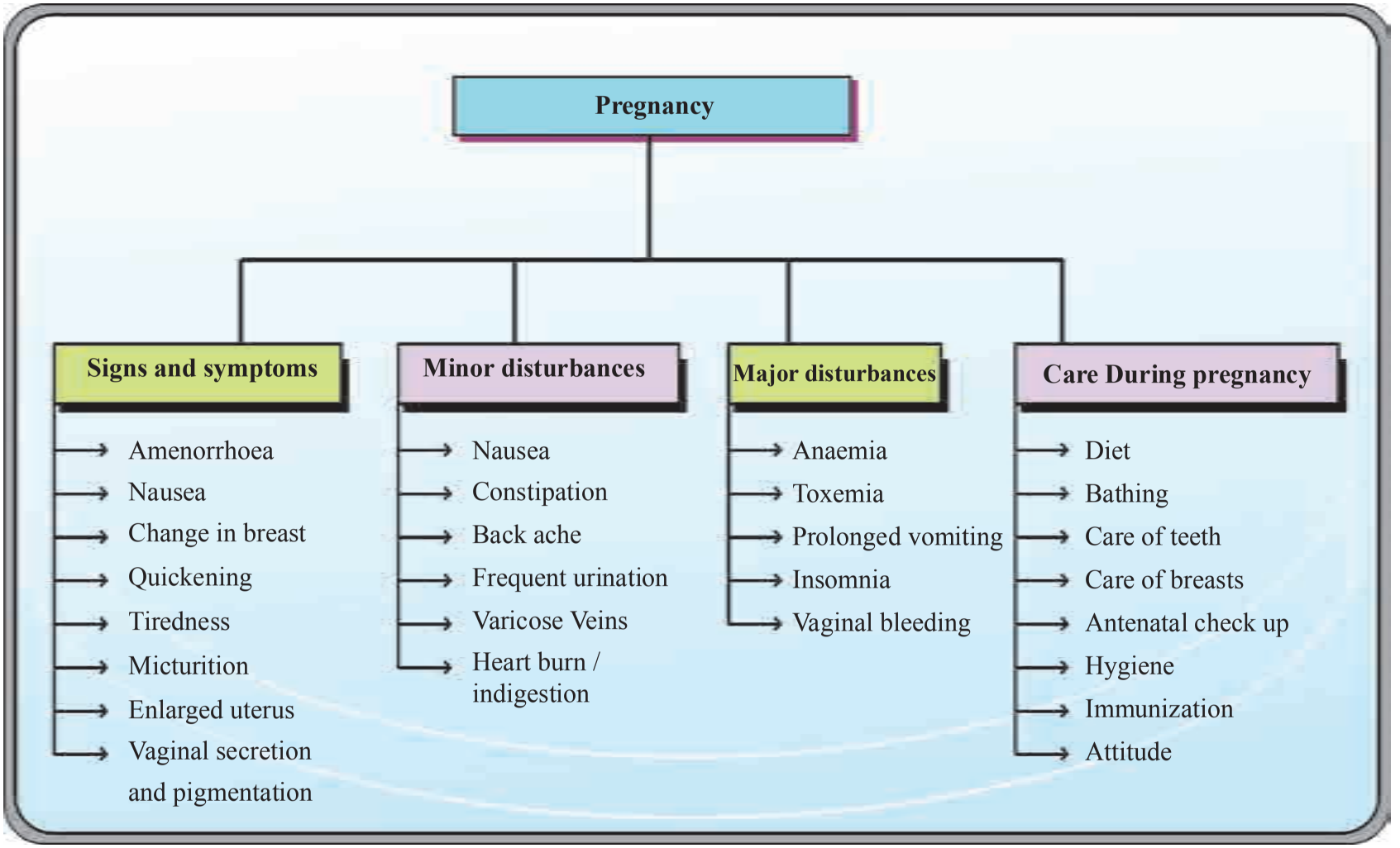
Table 4.4 : Sexually Transmitted Diseases

STD	Effect on the mother	Effect on the foetus
Gonorrhea	• Infertility, Miscarriage • Ectopic pregnancy • Pelvic inflammatory disease	• Pass the disease to their baby while in the womb or during delivery • Premature birth
Herpes	• Pregnancy complications and miscarriage	• Infection of the skin, mouth and eyes • Open sores, cause brain damage, blindness or death of the newborn
Syphilis	• Affect the central nervous system - brain and spinal cord, • Can lead to seizures, blindness, and hearing loss, dementia, psychosis, and eventually death	• Skin sores, rashes, fever • Still-birth or neonatal death • Weakened or hoarse crying sounds • Swollen liver, spleen, yellowish skin (jaundice), anaemia and various deformities

Chlamydiah,	• Can spread into the uterus causing damage to the fallopian tubes, uterus and surrounding tissues • Can experience an ectopic pregnancy and miscarriage	• Eye infection,pneumonia

Revise the points





Revise the points

Exercises

Q. 1 Select and write the most appropriate answer from the alternatives given

1. Conception takes place at the time of ……..…..

   a) pregnancy *b) Implantation*
   c) birth

2. Fertilisation of an egg by a sperm normally occurs in .....

   a) fallopian tube *b) uterus*
   c) ovary

3. Fertilised egg cell is called .....

   a) zygote *b) morula*
   c) conception

4. Sex of the child is confirmed at the time of .....

   a) birth *b) conception*
   c) pregnancy

5. Period of foetus is from .....

   a) 0 to 2 weeks *b) 3 to 8 weeks*
   c) 9 weeks to birth

6. Implantation of ovum to uterine walls is known as .....

   a) menopause *b) conception*
   c) fertilization

Q. 2 State whether the following sentences are True or False.

1) Period of ovum is from conception to 2 weeks.
2) Fertilized egg cell is released during menstruation.
3) Identical twins have different placenta
4) Placenta maintains stable temperature in the womb

Q. 3 Match the column

A	B
1. Period of foetus	a. Iron deficiency
2. Anaemia	b. Diabetes
3. AIDS	c. 9 weeks to birth
4. Amenorrhea	d. Sign of pregnancy
5. Period of embryo	e. Formation of internal body parts
6. Endoderm	f. 3 weeks to 8 weeks
	g. HIV

Q. 4 Answer the following in one or two sentences.

1. Which layer of embryo forms skin, nails, hair?
2. What are diagnostic tests of pregnancy?
3. What is ectopic pregnancy?
4. What is Morulla stage?
5. What is gestation?

Q. 5. List the following

1. Prenatal stages
2. Embryo's life support system
3. Minor disturbances in pregnancy
4. Factors affecting prenatal development.

Q. 6 Write short notes.

1. Toxemia
2. Importance of fertilisation
3. Uterus
4. Anemia
5. Antenatal checkup
6. Signs of pregnancy
7. Types of birth
8. Rh factor

Q. 7. Differentiate between

1. Period of ovum and period of embryo.
2. Placenta and Amniotic Sac

Q. 8. Complete the given table.

Identical Twins	Fraternal / Non identical Twins
1) ____ _____ fertilizes single ova	1) Two different sperms fertilizes two different ova.
2) Uni Zygotic	2) ____ Zygotic
3) _____ genetic make-up	3) Different genetic make-up
4) E.g. Boy-Boy or -----	4) E.g. Boy-Boy, Boy ____, ____

Q. 9. Unscramble the word to get the answer from the given clue.

Clue : Process in which sperm and ova combine to create a single cell called zygote.

Word : rzfanitloiei

Q. 10. Arrange the stages in serial order : period of embryo, period of ovum, period of fetus.

Q. 11. Write in detail signs of pregnancy.

Q. 12. Discus any three factors affecting prenatal development.

Q. 13. Read the following paragraph and answer the questions.

Fertilization is the process by which sperm and ova combine to create a single cell called a zygote. It occurs within 24 hours after the ovum descends to the tube. The sperms are contained in a fluid called semen. Semen is deposited at the neck of the uterus during intercourse. The sperms are drawn up into the fallopian tube by hormonal attraction and muscular contraction. The sperms secrete an enzyme which disperses the wall from around the ovum. Once it reaches the ovum it penetrates the cytoplasm. This leads to change in the membrane of the ovum in such a way that no other sperm can now enter it .The nuclear material in the head of the sperm now fuses with the nucleus of the ovum to get 46 chromosomes from both the parents. The cell then begins its mitotic division through the different stages of prenatal development. Fertilized ovum (zygote) slowly travels to uterus and moves for 5-6 days in uterus and it gets implanted to the wall of uterus. This process is known as implantation. Yolk sac is formed around the ovum cells till implantation process completes and it nourishes the ovum. Once implantation process is over, the yolk sac continues to nourish the ovum.

1. What do you mean by fertilization?
2. How many chromosomes does the individual child get from the parents?
3. What is the function of yolk sac?

4. Complete the passage by choosing the appropriate words given in the bracket:

Semen is deposited in the ..... . Semen contains ..... . By hormonal attraction and contraction of ....., they are transferred to ..... . Once it reaches the ovum, it penetrates ..... . Nucleus of sperm unites with the nucleus of ..... . Fertilized ..... is formed. The zygote then begins its ..... division and it starts moving to the ..... for implantation

(uterus, mitotic, cytoplasm, muscles, fallopian tube, ovum, Zygote, sperms, cervix)

Project / Self Study

- Visit to Maternity home and collect the information regarding antenatal checkup, care and services.