

## 16. NUTRITION DURING SPECIAL STAGE : PREGNANCY

Pregnancy is a temporary and specific physiological condition. Gestation is the period of embryo development from conception to birth. It is generally of 280 days or 9 months 7 days or 40 weeks. The pregnant lady carries a fertilized embryo in her uterus in pregnancy phase, whose body weight is about 3kgs. at the time of birth. It is a boon of nature, the cell formed by fusion of ovum and sperm during fertilization converts in to a fully developed healthy infant within the duration of nine months and seven days. The time period of conversion of one cell into a complete matured and developed infant is known as pregnancy.

The period of pregnancy can be divided in to three major phases, These are :

- (i) **Implantation** - Conception to first two weeks of gestation.
- (ii) **Organogenesis** - The next six weeks of gestation upto 2 months.
- (iii) **Growth** - The remaining 32 weeks of pregnancy is the period of growth.

Many changes occur in the body of the mother during pregnancy. Some changes are externally visible, along with internal changes are discussed briefly.

### Changes during pregnancy :

There is a varied change in the body structure and functioning of pregnant woman during pregnancy she has to cope up with them. The uterus provides a nutritive and protective environment after conception, in which the fetus will grow and develop. It increases

from the size of a small pear in its non-pregnant state to accommodate a full-term baby at 40 weeks of gestation. The tissues from which the uterus is made continue to grow for the first 20 weeks, and it increases in weight from about 500 gm to 1 kg. It doesn't get heavier after this time, but it stretches to accommodate the growing baby, placenta and amniotic fluid. The pregnancy has reached full term, the uterus has increased to about five times its normal size by the time. There is increase of 10 to 12.5 kg in weight in pregnancy. Rapid growth is observed in both weight and body surface in pregnancy. Metabolic rate increases by 10-12% due to consequent gestation. Increasing weight of the uterus puts pressure on the bladder which leads to increased incidence of bladder infection. There is an increase in frequency of urination during initial stage of gestation i.e. first 2-3 months.

Blood volume (the total volume of blood in the circulation, measured in liters) increases gradually by 30-50 % in the pregnant woman, so by full term she has about 1.5 ltr more blood than before the pregnancy. A higher circulating blood volume is required to provide extra blood flow through the placenta, so that nutrients and oxygen can be delivered to the fetus. At least 12-13 gm per 100 ml. hemoglobin should be present in pregnancy, which decreases to 7-8 gm per 100 ml. There is increase in chances of severe anemia due to hemodilution. Load on kidneys also increases due to increased blood volume.

Increased blood volume puts extra burden on heart which leads to high blood pressure. The veins of the legs dilate and the pulse rate increases as the blood pressure increases. Changes in respiratory process also take place as time of delivery comes nearer and this leads to shallow breathing. The demand for oxygen in the body increases. Hormonal changes also take place during pregnancy and due to that female feels irritable, sluggish, lazy and apathetic behavior, she wants to take more rest. A special likes and dislikes for particular food stuffs is expressed. Excessive thirst, frequent urination, vomiting, high blood pressure etc., are various problems occur due to change in nervous system. Muscles of the back and waist get stretched, due to which there is pain in back. As pregnancy advances, adaptations start in the body for the placement of the baby growing in uterus and for the delivery. On the other hand, the muscles of the abdomen become elastic and flexible, the uterus gets more space for growing fetus. Now, uterus takes the form of a muscular bag which contains fetus, placenta and amniotic fluid. Long stretch marks appear due to the stretching of abdominal wall. Mucus membrane of vagina and cervix thickens as a preparation for delivery, there is an increase in the number of blood vessels, skin becomes blue, elasticity and flexibility of muscles increases and along with the joints and nerves of pelvic bone loosen so as to provide enough space to the baby to come out during labor.

### **Nutrition related problems :**

Pregnancy is a normal and natural physiological process, but in this period almost all women have to undergo gestational problems because of hormonal changes. Morning sickness, dislike towards food, problems related to gastro- intestinal tract, anemia, high blood pressure, edema, cramps in extremities etc. are some problems due to which women feels irritable.

Hence, women require special care and nursing during pregnancy period. She needs to take special foods to cope up with these condition. Careful guidance of an experienced doctor is also essential to prevent her and the baby from complications. Some nutrition related problems occur during pregnancy period are :

**1. Nausea or morning sickness :** In early pregnancy (i.e. 2-3 months) or in first trimester morning sickness, giddiness, nausea are faced by pregnant lady. This is mainly due to hormonal changes and mental stress to cope with pregnancy. Lady should take carbohydrate rich foods like biscuits, toast, roasted channa etc. early in the morning as soon as she wakes up to reduce these incidences. The problems subside automatically after three months. There are chances of dehydration if vomiting persists for whole day or for longer time. Lady is not able to take proper nutrition due to nausea and vomiting which leads to malnutrition. In this condition it is advisable to consult a doctor. Fatty and rich foods, highly seasoned and flavored foods may be restricted if nausea continues.

**2. Digestive problems :** Pregnancy can bring with it digestive problems like indigestion, heartburn, flatulence, belching, constipation, and hemorrhoids. There is increased pressure on the stomach because of the increase in size of uterus. The release of hormone called progesterone is also high in this stage. This hormone causes softness and tenderness of the muscles leads to relaxation of intestinal muscles. The peristaltic movement of the intestines slows down, the food cannot move forward and stays undigested in the stomach for 40-48 hours. This causes indigestion. Sometimes the food moves from stomach into the food pipe and this causes heart burn & irritation. The rate of re-absorption of water in the large intestine increases due to which the stool is dry. There is difficulty in excretion due to lesser muscular activity and leads constipation. The raised level of blood volume during pregnancy causes veins to swell. Dry faeces exert pressure on inner lining of rectum and ruptures when hard stool is passed. The blood vessels leads to hemorrhoids.

The following changes should be made in the dietary system to reduce these digestive problems :

1. Drink lots of fluids. Water and fruit juices soften stools and keep digested waste passing through the bowel.

2. Eat fiber-rich foods. Certain foods are especially good for keeping stools soft and make sure they pass easily through the bowel. These foods include many of the highly nutritious foods recommended for a healthy diet during pregnancy: fruits, vegetables, whole grains, and legumes (dried beans and peas).
3. Don't take food in one sitting, increase frequency of food intake by 5-6 times a day.
4. Drink lemon juice in lukewarm water before going for defecation
5. Regularity in diet and time of defecation is must.
6. Exercise : Not only keep your muscles in shape, it also boosts blood circulation and supplies more oxygen to all organs (including the bowels) to help them perform their job more efficiently.
7. Light walk in fresh air in the morning helps.

### **3. Anemia, high blood pressure and odema :**

The total amount of blood also increases by one to two liters in addition to increasing body weight in pregnancy. It causes hemodilution and there is reduction in hemoglobin level. The hemoglobin level of the blood falls from normal values (12 -14 gm./100 ml.) In this case when hemoglobin level is below 11 gm/100 ml, the woman is considered to be in the state of anemia. Sometimes this level falls upto 7 to 8 grams per 100 ml. and this severe anemia has a bad effect on the nutritional level of the woman and the development of the child.

Increased blood volume increases the burden of blood circulation on the heart. Blood vessels also have to carry more blood, so to cope up with the situation, blood vessels swell up but then pressure of blood also increases in the veins. This causes problem of high blood pressure. Increasing weight of uterus causes pressure on veins and this obstructs blood flow in lower body parts - legs and feet causing fluid from the vessels comes out and accumulates in tissues and inter

cellular parts, resulted in oedema. Gradually it spreads to other body parts as face, hands etc. Doctor should be consulted if blood pressure persists for long.

Regular intake of food rich in iron is must to deal with anemia. There should be regular intake of iron and folic acid pills given by the doctor according to the medical instructions. Minimize the use of salt in food in case of hypertension and inflammation.

**4. Cramps in legs:** Sometimes cramps experienced the legs during pregnancy. This may be due to low intake of calcium because the calcium requirements of the fetus are very high and this extra calcium is not consumed by women's daily diet. In such a condition, calcium and vitamins tablets referred by doctors can be consumed to provide relief.

### **Nutritional requirements :**

Only a healthy mother is able to give birth to a healthy baby. The growth and development of the fetus during pregnancy depends on the physical health and nutrition level of the pregnant woman. To ensure it, the physical changes occurring during pregnancy are normal and problems that occur during that time are minimum. It is necessary that pregnant woman is well nourished. The nutrition during and before pregnancy affects the health of the infant. She is weak or having serious illness or the mother is suffering from disease, then she will not be able to give birth to a healthy baby. It may causes death of mother and the baby or any one out of two during parturition. Hence it is important that pregnant woman fulfills the nutritional needs of herself along with that of the foetus, from the daily diet. Daily quantity of nutritional elements for pregnant women is recommended as daily requirement of working pregnant woman of any category can be ascertained after adding additional quantities of nutrients to the daily amount of normal woman.

Additional requirements for the nutritional requirements of a low, middle and hard working women in pregnancy given in table.

**Table 16.1 : Recommended dietary allowances for pregnant women per day ( NIN-2010)**

Nutrients	Functionality			Additional requirements for pregnancy
	Sedentary	Moderate	Heavy	
Energy (K cal.)	1900	2230	2850	+350
Protein (gm.)	55	55	55	82.2
Visible fat (gm.)	20	25	30	30
Calcium (mg.)	600	600	600	1200
Iron (mg.)	21	21	21	35
Beta carotene (ug)	4800	4800	4800	6400
Thymine (mg.)	1	1.1	1.4	+0.2
Riboflavin (mg.)	1.1	1.3	1.7	+0.3
Niacin (mg.)	12	14	16	+2.0
Pyridoxine (mg.)	2	2	2	2.5
Vitamin 'c' (mg.)	40	40	40	60
Dietary Folate (ug)	200	200	200	500
Vitamin B12 (ug)	1	1	1	1.2
Magnesium (mg.)	310	310	310	310
Zinc (mg.)	10	10	10	12

Table portrays the additional quantities of almost all nutrients in pregnancy.

The extra requirement of energy in pregnancy is due to increase in body weight and size, these increases metabolic rate of the lady.

It results in increase demand of recommended extra calorie. ICMR experts suggested extra 350 Kcal in pregnancy. Grains, sugar & fat should be used in the diet to meet extra calorie requirement, but not very much. Pregnant woman should not take large amount of food at a time and should consumed 5 to 6 times a day in a small quantity.

The need for additional protein during pregnancy is to repair of the normal breakdown in the body, for the development of the fetus and for her own tissue maintenance. The pregnant women should include food of high quality such as the complete protein containing foods, milk, cheese, soy, nuts, meat, fish, egg etc.

Extra fat should not be increased during pregnancy, because fat get deposited in the uterus. Obesity occurs due to excessive fat. Many diseases arise due to the use of saturated fats such as Ghee, vegetable ghee etc. It should be used in least amount as they are harmful to health. Use of unsaturated fat is beneficial for health.

There is need of additional calcium for the formation of bones and teeth of fetus. In the absence of constant supply of calcium by daily food, mothers bone is depleted and supply calcium to the growing fetus from her own reserves. This causes weakness in bone and teeth of mother and also causes osteomalacia. Therefore, during pregnancy 1.2 gm of calcium should be consumed daily. Extra calcium supplements should be filled with adequate calcium-rich food items such as milk and milk products (milk,



curd, cheese) green leafy vegetables, cabbage, turnip should be included in the diet. Calcium tablets & tonic should be consumed to meet requirement.

Iron is essential for the production of blood and hemoglobin in the body of the fetus. In the mother's diet if there is not enough iron content, then it is absorbed from the mother blood, due to which the pregnant woman becomes severe anemic. Pregnant woman should take iron rich food such as green leafy vegetables, spinach, amaranths, fenugreek, jaggery, meat, liver, fish, eggs etc. In the last 3 months of pregnancy, demand for iron is greatly increased, so iron salts in consultation with the doctor is necessary to be taken in the form of pills or tonics. There should be sufficient amounts of folic acid in meal because it protects from megaloblastic anemia, foods like whole grain, peanut, legumes, sesame, green leafy vegetables, dried yeast, egg and liver foods etc. It is rich in folic acid & should be included in the diet of pregnant women.

Requirement of thiamine, riboflavin and niacin are increases according to the energy requirements because these three vitamin supplements are used to oxidize fat and carbohydrate. Vitamin C, Vitamin B<sub>12</sub>

or Vitamin A are required for the growth and development of the fetus. Vitamin C helps in Collagen formation. This collagen works to connect the cells of various tissues of the body. Vitamin B<sub>12</sub> is essential for the protection from pernicious anemia. The amount of red blood cells in the blood of the pregnant mother decreases in the absence of this. Vitamin-A is essential for the growth of the body and for the health of eyes, in addition to their need for pregnancy, the usual quantity is recommended every day.

Pregnant women also need water and liquids along with nutritious food. Water and fluids are helpful in maintaining fluid balance and in the excretion of waste substances. Pregnant women should drink 7 to 8 glasses of water throughout the day. The amount of water should be increased in the summer. It can be consumed in the form of fruit juice, vegetable soup, milk, buttermilk, beverages etc.

### **Dietary management :**

In order to supply all the essentials nutrients for the complete development of the baby in the womb, the woman should conform to the various food items selected in her diet from table.

**Table 16.2 : Balanced diet for pregnant women per day (NIN,2010)**

Food Groups	Quantity of food items ( gram)			
	Work activity			Additional requirement
	Low	Medium	Heavy	
Cereals	270	330	480	-
Pulses	60	75	90	-
Milk (ml.)	300	300	300	+ 200
Root & tubers vegetable	200	200	200	-
Green leafy vegetable	100	100	100	+ 50
Other vegetables	200	200	200	-
Fruits	100	100	100	+ 100
Sugar	20	30	45	-
Ghee/Oil	20	25	30	+ 10

Note: Non-vegetarian women may use 50 gm egg/meat/fish in exchange of 30 gm pulse.

Keep the following things in mind according to the table before planning a diet :

1. Pregnant woman in the stage of the first 3 months does not need extra nutrient, as pregnancy progresses, the demand for nutrients also increases, which is more in the last 3 months.
2. As soon as the pregnant woman gets up early in the morning do not give liquids to drink like tea, milk, buttermilk, etc. Instead, give them to eat solid foods such as biscuit toast, toasted gram etc.
3. The pregnant woman should not eat large meals at a times, give small amount of food five to six times.
4. Diet is thermally and chemically bland so that problem of indigestion or chest burning be avoided.
5. Reduce the consumption of gas-producing food items in the diet such as gram, black gram dal, beans, cabbage, cauliflower, radish etc.
6. Include fiber-rich foods in the diet such as whole grain flour, whole dal, whole grains, salad, fruit, which helps in activation of intestine and avoid the problems of constipation and piles.
7. Eat plenty of roughages such as amaranthus spinach, papaya etc in the diet.
8. Reduce the consumption of refined flour such as maida, naan because it can cause constipation.
9. Drink plenty of fluid like coconut water soup, milk, fruits juice Lemon water, butter milk etc. in the diet.
10. Keep spacing while eating milk and milk product, green leafy vegetables and fresh fruits so that it can meet the extra need of vitamins and mineral.
11. Include egg meat fish in the daily diet, pregnant woman who is consuming vegetarian diet should include mixed food items such as cereal+ Pulses, grains + milk, Pulses + milk etc. to increase the quality of the protein.
12. Salt intake should not be excessive in food because it increases the chance of odema.

13. Dinner should easily be digestive, light and it should be before 2-3 hours going to bed.
14. Use the tablets given by the doctor regularly.
15. Reduce the use of tea and coffee in the diet and avoid use of tobacco or alcohol.
16. Take two spoons of isabgol husk before sleeping in the night to get relief from constipation, taking four to five rasins with lukewarm milk to prevent constipation and drinking hot milk before sleeping brings sound sleep

### **Important Points :**

1. Pregnancy is a temporary physiological condition in the life of women, it is usually a period of 9 months 7 days or 40 weeks.
2. The firstly fertilized embryo finally develops in fetus during pregnancy.
3. There is rapid changes taking in mothers body along with development of fetus and she has to manage for the same. Hence, food is important in this stage.
4. Pregnancy is a normal and natural physiological process but in this period almost all women have to undergo gestational problems due to hormonal changes, so pregnant, woman requires special care and counseling.
5. The growth and development of the fetus during pregnancy depends on the physical health and nutrition level of the pregnant woman. The physical changes occuring during pregnancy should be normal. The problem faced by pregnant will be minimum, hence it is necessary that pregnant woman is well nourished.
6. The nutritional needs of the fetus should also met along with the fullfillment of nutritional needs of herself by taking nutritious diet during pregnancy. Hence daily additional nutrient for pregnant women is recommended as additional requirements.
7. In order to supply all the nutrients for the pre and post development of fetus in the womb, the woman should choose the food items in her diet in conformity with Balanced Diet. (NIN,2010)

8. Pregnant woman should not consume in one sitting, frequency of food should be 5 to 6 times. Balance and nutritious food in small amount and easily digestible food should be eaten.

**Questions :**

1. Choose the right answer of the following questions :
  - (i) Formation of 9 months 7 days fetus from a fertilized egg is known as :
    - (a) Childhood
    - (b) Pregnancy
    - (c) Infancy
    - (d) Puberty
  - (ii) Pregnancy is predominantly divided into stages:
    - (a) Two
    - (b) Three
    - (c) Four
    - (d) One
  - (iii) Sedentary pregnant women require protein?
    - (a) 78.2 gm
    - (b) 75.2 gm
    - (c) 82.2 gm
    - (d) 55.0 gm
  - (iv) Extra iron salt and folic acid are required in pregnancy for :
    - (a) Extra energy
    - (b) Maintaining hemoglobin
    - (c) The weight of mother
    - (d) All of the above

2. Fill in the blank:

- (i) Pregnancy is usually ..... week of a temporary phase.
  - (ii) The metabolic rate increases due to increase in body weight and surface area by .....
  - (iii) ..... problems are faced by pregnant mother due to hormonal changes.
  - (iv) Calcium requirement of woman during pregnancy ..... mg.
  - (v) Requirement of the.....group of vitamins increases according to the energy requirements.
3. Write a comment on the following.
- a. Anemia
  - b. Digestive problems
  - c. Morning Sickness
  - d. Requirement of balanced diet for pregnant woman.
4. Pregnancy is the specific and temporary stage of woman's life. Explain.
5. Write an Important points while planning meal for pregnant women.

**Answers :**

1. (i) b (ii) b (iii) c (iv) b
2. (i) 40 (ii) 10-25%  
(iii) Gestational (iv) 1200 (v) b