

Nutrition in pregnancy.

Healthy pregnancy. •

- A healthy pregnancy has often been defined by the birth weight of the newborn , because infant mortality , or death , is low for infants with birth weights of 3500 to 4500 gm.
- The two key factors that predict infant birth weight are:
 1. maternal preconception weight and ,
 2. weight gain during pregnancy .
- Nutrition and other lifestyle factors affect maternal weight and weight gain , many of these factors, particularly nutrition, are modifiable or may be controlled by the pregnant woman.

Weight gain in pregnancy.

- The basal metabolic rate (BMR) rises during pregnancy by as much as 15% to 20% by term.
- This increase is caused by the increased oxygen needs of the fetus and the maternal support tissues .
- There are alterations in maternal metabolism of protein, carbohydrate and fat.
- There are three components for maternal weight gain.
 1. Maternal body composition changes including increased blood and extracellular fluid volume.
 2. The maternal support tissues such as the increased size of the uterus and breasts
 3. The products of conception, including the fetus and the placenta.
 - Poor weight gain by the mother during pregnancy may then lead to growth retardation in the infant .
 - Infant born small for gestational age (SGA) or low birth weight are more likely to require prolonged hospitalization after birth or be ill or die during the first year of life .

Low birth weight : weight less than (2500 gm) at birth

Nutritional demands of pregnancy.

Pregnancy is associated with increased nutritional needs due to the physiologic changes of the woman and the metabolic demands of the embryo/fetus.

In fact, energy requirements increase by an estimated 300 kcal/day during pregnancy and 500 kcal/day during lactation.

Micronutrient	RDA
Biotin	30 mcg/day (AI)
Folic Acid	600 mcg/day
Niacin	18 mg/day
Pantothenic Acid	6 mg/day (AI)
Riboflavin	1.4 mg/day
Thiamin	1.4 mg/day
Vitamin A	750 mcg (2,500 IU)/day
Vitamin B ₆	1.9 mg/day

Vitamin B ₁₂	2.6 mcg/day
Vitamin C	80 mg/day
Vitamin D	15 mcg (600 IU)/day
Vitamin E	15 mg (22.5 IU)/day
Vitamin K	75 mcg/day
Calcium	1,300 mg/day
Chromium	29 mcg/day
Copper	1 mg/day
Fluoride	3 mg/day

Iodine	220 mcg/day
Iron	27 mg/day
Magnesium	400 mg/day
Manganese	2 mg/day
Molybdenum	50 mcg/day
Phosphorus	1,250 mg/day
Potassium	4,700 mg/day
Selenium	60 mcg/day
Sodium	1,500 mg/day
Zinc	12 mg/day
Choline	450 mg/day

Principles of nutritional therapy during pregnancy

1. Prevention of the weight extremes , underweight or obesity .
2. Correction of any dietary deficiencies and maintenance of optimal nutritional status during pregnancy
3. Management of any related coexisting disease such as diabetes mellitus or hyperlipidemia

Energy needs

- The DRI standard recommends an additional amount of energy of approximately 340 kcal /day during the second trimester and,
- 450 kcal/day during the third trimester of pregnancy to supply needs during this time of rapid growth.

The calories must be enough to:

1. Supply the increased energy and nutrient demands created by the increased metabolic workload, including some maternal fat storage and fetal fat storage to insure an optimal newborn size for survival.
2. Spare protein for tissue building.

Protein, Fat, And carbohydrate need.

- The total amount of protein recommended for a pregnant woman is 71gm./day .
- an increase of 25 gm./day based on the woman non pregnant.
- More protein is necessary for demands posed by the following :-
 1. Rapid fetal growth
 2. Enlargement of the uterus , mammary glands, and placenta
- 1. Increase in maternal circulating blood volume and for increased plasma proteins to maintain colloidal osmotic pressure and circulation of tissue fluids.
- 2. Formation of amniotic fluid.
- 3. Storage reserves for labor, delivery and lactation
 - Carbohydrate intake at least 175 g/ day during pregnancy is important for an adequate supply of glucose and non-protein energy .
 - Whole grain breads and cereals and fresh fruits and vegetables should be consumed to meet maternal and fetal glucose needs, as well as provide fiber for satiety and bowel regulation .
 - In general, total daily dietary k-calorie intake should comprise 15% protein

,30% fat and 55% carbohydrate.

Mineral need

All the major and trace minerals play roles in maternal health . Four that have special functions in relation to pregnancy , calcium , iodine , iron and zinc.

Mineral	Daily requirement	importance
Calcium	1000 mg of calcium per day	<ul style="list-style-type: none"> • Construction and maintenance of bone and teeth. • important factor in the blood-clotting mechanism. • used in normal muscle action
Iodine	increase by 70 mg/day during pregnancy	<ul style="list-style-type: none"> • Iodine is vital for thyroid hormone synthesis and prevention of goiter. • support changes in maternal thyroid economy. • increased maternal renal clearance
Iron	27 mg of iron per day	
Zinc	7 mg/day	

Vitamin	Daily requirement	importance
Vitamin A	770 µg	<ul style="list-style-type: none"> • Vitamin A is an essential factor in cell differentiation , organ formation. • maintenance of strong epithelial tissue. • tooth formation and normal bone growth
Vitamin C	85 mg/day	<ul style="list-style-type: none"> • Vitamin C is essential to the formation of intercellular cement substance in developing connective tissues and vascular systems . • It also increases absorption of iron , which is needed for the increasing quantities of hemoglobin
Vitamin D	5µg cholecalciferol (200 IU/day)	vitamin D is used to promote the absorption and utilization for these minerals

General dietary problems

Nausea and vomiting .1

- Symptoms of nausea and vomiting are usually mild and short term , is called " morning sickness " of early pregnancy.
- At least 50% of all pregnant women , most of them in their first pregnancy , experience this condition , beginning during the fifth or sixth week of the pregnancy and usually ending about the fourteenth to sixteenth week .
- This problems occur because some physiologic factors and hormonal changes in pregnancy or on low blood sugar which can be relieved by carbohydrate foods, but which will return within 2 to 3 hours after a meal .
- **Hyperemesis:** Severe vomiting during pregnancy , this persistent condition causes severe alterations in fluids and electrolytes, weight loss , and nutritional deficits , sometimes requiring hospitalization and alternative feeding by enteral parenteral methods to sustain the pregnancy .

2- Constipation .

Placental hormones relax the gastrointestinal muscles , and the pressure of the enlarging uterus on the lower portion of the intestine may make elimination somewhat difficult .

- Increased fluid intake and the use of naturally laxative foods containing dietary fiber , such whole grains , fruits and vegetables fruits and juices.
- Laxatives should be avoided .
- Appropriate daily exercise is essential for overall health during pregnancy .

3- Heartburn or Gastric pressure .

- These discomforts occur especially after meals and are usually caused by the pressure of the enlarging uterus crowding the stomach .
- Gastric reflux of some of the food mass, now a liquid chyme mixed with stomach acid , causing an irritation and a burning sensation .

Small meals, avoiding eating large meals at any time , and not lying down after meal

Effects of iron supplements

- The effect of iron supplement may include gray or black stools and sometimes nausea , constipation , or diarrhea .
- The iron supplement should be taken 1 hour before a meal or 2 hours after with liquid such as water or orange juice but not with milk or tea .
- The absorption of iron is increased with vitamin C and decreased with milk , other dairy foods , eggs , whole grain bread and cereal , and tea.