PREGNANCY

- Pregnancy is the most beautiful phase in a woman's life. It brings about emotional and physiological changes as well as poses extra demands on the body. In this phase the body needs extra nutrition for the developing fetus, pregnant woman herself and the lactation period to follow. These nutritional demands have to be met for a healthy child and mother.
- The diet during, even before, pregnancy has to be rich in calories, proteins, vitamins & minerals and balanced.
- The needs vary in the three trimesters.

  1st trimester (1 to 12 weeks) - **10 kcals/day**
  2nd trimester (13 to 27 weeks) - **90 kcals/day**
  3rd trimester (27 to 40 weeks) - **200 kcals /day**.

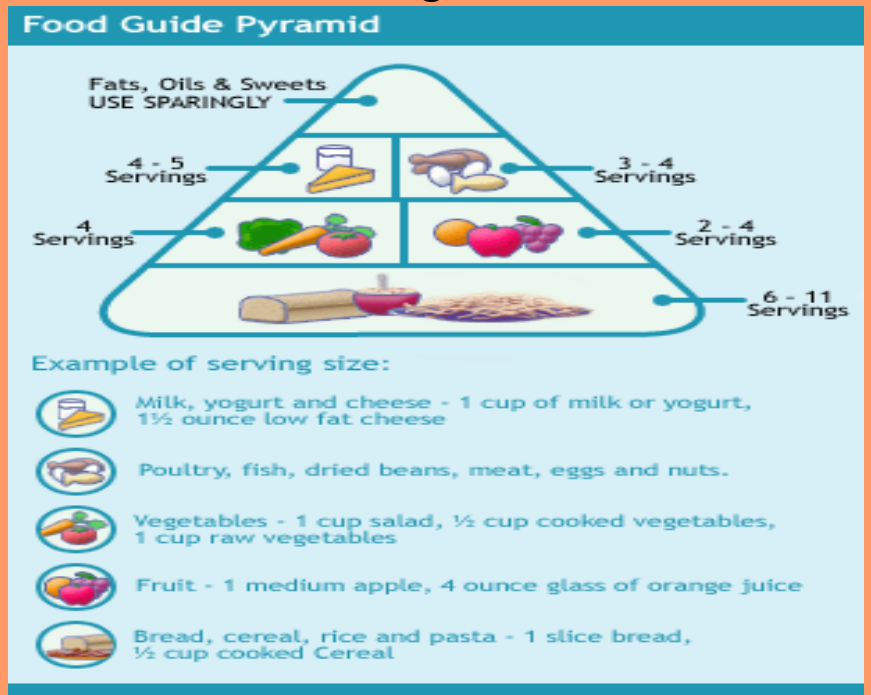
- These calories are needed to cater to the growing demands of the fetus and the mother as well as to accumulate fat stores which act as reserves during lactation and when otherwise needed. Considerable weight gain about 10-14 kg during pregnancy is desirable.

  Foetal development is accompanied by many physiological, biochemical and hormonal changes occurring in the maternal body which influences the need for nutrients and the efficiency with which the body uses them. **These changes include**:

- **Increase basal metabolic rate:** 5% in 1st trimester to 12 during later stage.
- **Gastrointestinal changes:** GIT function altered during pregnancy. Nausea, vomiting and constipation occur which reduced gastric tone, motility, and secretion.
- Secretion of acid and pepsin is less there is regurgitation of stomach contents in the oesophagus leading to sensation of heart burn and vomiting.
- It has been observed that the pregnant woman often show craving for some other foods such as clay, starch etc. and this habit is known as 'PICA'.
- **Hormonal changes**: increase secretion of aldosterone by adrenal gland, growth hormone by pituitary gland, thyroxin (metabolism) by thyroid gland, parathormone by parathyroid gland (ca ,ph ,mg metabolism).
- **Changes in body fluid**: 40 %increase in the blood volume at the end. Therefore capacity of heart to pump increases by 33%.there is an increase in the fluid within circulatory system, intracellular water also increases.
- With the increase in the blood volume, the concentration of plasma proteins, hemoglobin and other constituents is lowered. Thus women during pregnancy woman having haemoglobin level below 11/100ml are considered anaemic.
- **Altered renal functions:** there is an increased production of various metabolites like creatinine, urea and other waste products with a subsequent increase in the rate of glomerular filtration in the nephrons .

DEVELOPMENT STAGES OF PREGNANCY:

- **IMPLANTATION:** (first two weeks of gestation) poor nutritional status of the mother can be one of the factors resulting in pregnancy failure at this stage.
- **ORGANOGENESIS: (next 6 weeks)** presence or absence of specific nutrients may be crucial for the continued growth of normal foetus. Inadequate nutrition in this period may result in a number of congenital abnormalities in the foetus.
- **GROWTH: (remaining 32 weeks)** requirement of nutrients at this stage is high , both quantitatively and qualitatively. Nutritional deficiencies during this period will result in premature deleveries or low birth weight infants.



RECOMMENDED ALLOWANCE:

- **ENERGY:** additional energy intake of **300kcal/day** is required to support the growth of foetus, development of placenta and maternal tissue and to meet the needs for increased BMR. Any decrease in the activity of the mother decreases the caloric requirement. The fat that accumulate during the pregnancy act as energy reserve. When the supply of energy is inadequate the fat may be used to provide high energy needs of the rapidly growing foetus and to spare proteins for tissue growth
- **PROTEINS:** the normal protein requirement of an adult woman is 50g/day.ICMR
  - prescribed for a pregnant woman is **65 g/day**. Additional protein is required for:
  - Rapid growth of foetus.
  - The enlargement of uterus, mammary glands and placenta.
  - Formation of aminotic fluid and storage reserves for labour, delivery and lactation.
  - The transfer of amino acids from the mother to foetus. Sources rich in protein :**Egg, Milk, Meat, Cheese, Pulses, Cereals, Beans, Nuts.**
- **If protein requirement are not met during pregnancy**
  - There is increased risk of pregnancy.
  - The foetus may grow at the expense of mother.
  - Maximum growth of baby can't be obtained.
  - No. of cells in tissue particularly in brain may be less.
  - Milk, meat, egg and cheese are complete proteins and of high biological value. Additional proteins may be obtained from legumes and whole grains, nuts and oil seeds.

- **FATS:** The fetal organs already have stores of fat and so additional fat is not required. Nevertheless, essential fatty acids (EFA) should be supplied during pregnancy. ICMR has suggested **30 gm** of visible fat/day during pregnancy. (linoleic requirement increases)
  MINERALS: Calcium, phosphorus, iron, zinc, sodium and iodine should be taken during pregnancy. The deficiency of these minerals leads to complications during pregnancy and has adverse effects on the fetus-infant.
- **CALCIUM:** Requirement of adult woman is **400 mg/day** which increases during pregnancy to 1000mg/day.Needed for growth and development of bones as well as teeth of the foetus. if the mother does not take adequate quantities of calcium through her diet to meet the foetal needs, calcium from the mother ‘s bones is mobilised resulting in demineralization of maternal bones leading to fractures.
- **IRON:** normal iron intake of an adult woman is 30 mg/day. ICMR requirements during pregnancy are **38mg/day.** To avoid iron deficiency a woman should enter pregnancy with a store of at least 300 mg of iron.

- **SODIUM:** during pregnancy there is an increase in the extra cellular fluid which calls for an 80% increase in the body sodium. Sodium deficiency causing an increased risk of eclampsia, prematurity and low birth weight infants. Sodium is restricted when there is oedema or hypertension.
- **IODINE:** due to increase in BMR additional requirmant of **25ug** during pregnancy to the adult requirement of 100-200ug. Iodine deficiency lead to abortion, still births,congenital abnormalities, cretinism.
- **ZINC:** zinc has an important role in pregnancy. It participates in the synthesis of nucleic acids DNA and RNA.
- **VITAMINS** - these nutrients have special roles to play in the physiological state of the mother and fetus.

  Vitamin A improves vision and maintains the integrity of cells.

  Vitamin D is essential for maternal calcium absorption and calcium metabolism of infant.

- **Vitamin E** helps in preventing abortions.
- **Vitamin K** helps in preventing neo natal haemorrhages.

  Vitamin B6 or Folic acid is very important to prevent anaemia and promote normal fetal growth, as it prevents serious birth defects.

- **PYRIDOXINE:** during pregnancy ,pyridoxine needs are increased therefore ICMR has suggested a level of **2.5mg** of vitamin B6/day.
- **FOLIC ACID:** because of increase blood formation, folic acid requirement increases during pregnancy. ICMR has recommended an additional intake of 300ug a part from the normal requirement of 100ug making a total of 400ug/day.
- **FIBRES** - A common problem during pregnancy is constipation. Therefore the diet should contain plenty of
  fibres in the form of whole fruits and vegetables, whole grain cereals, vegetable soups and whole pulses.

- **WATER** - a very important nutrient it keeps the body hydrated, prevents constipation, haemorrhoids, oedema and flushes out any toxins that might be produced.

Recommended Dietary Allowances : (moderate worker)

	Non pregnant	Pregnant
Net Calories	22 25 Calories	+ 300 Calories
Protein	50 g/d	50 + 15 g/d
Fats	20 g/d	30 g/d
Carbohydrates		
Ca	400 mg/d	1000 mg/d
Iron	30 mg/d	38 mg/d
Vitamin A (Retinol)	600 IU	600 IU
Vitamin A (Beta-carotene)	2400 IU	2400 IU
Thiamine	1.1 mg/d	+ 0.2 mg/d
Riboflavin	1.3 mg/d	+ 0.2 mg/d
Nicotinic Acid	14 mg/d	+ 2 mg/d
Pyridoxine	2 mg/d	25 mg/d
Vitamin C	40 mg/d	40 mg/d
Folic Acid	100 mg/d	400 mg/d
Vitamin B 12	1 mg/d	1 mg/d

COMPLICATION DURING PREGNANCY.

- Despite all precautions some women may experience certain complications which are:

❖ **NAUSEA and VOMITING:** commonly called morning sickness , this start during 5 or 6 week and last only 10 to 16 week. Some physiological and psychological factors i.e excessive harmone production which disturb physiological and biochemical balances which lead to GIT disturbance oters are tension or anxieties, poor food habits etc,

- This can be overcome by the use of high carbohydrate food , small frequent meals, fluids, water soluble vitamins . fatty and rich foods , highly seasoned and flavoured foods may be restricted.

❖ **CONSTIPATION :** common during later half of pregnancy .harmonal changes tend to increase relaxation of GIT muscles . limited activity and exercise , insuffient fluid intake , insuffient bulk of the diet can also cause constipation

- Liberal intake of fluids,wholegrains, husked pulses , fibrous vegetables and fruits is therefore important.

❖ **HEART BURN OR GASTRIC PRESSURE**:

- Usually due to pressure of the enlarging uterus crowding the stomach , causing difficulty after meals. Since, the feeling of fullness comes from general gastric pressure , lack of space or gas formation therefore it can ve avoided by taking small frequent meals .

❖ **PREGNANCY INDUCED HYPERTENSION** : **(toxaemia)**

- Hypertension may occur which may be mild or severe. **In mild hypertension** the blood pressure is slightly raised 140/90mm. there may be slight odema of ankles and traces of albumin in urine .
- **Severe hypertension:** the blood pressure is over 1 60/100mm, excessive odema which extends to hands , face, and abdomen.

❖ **ANAEMIA:** too little space between births or too many infections and too little intake of nutrients during pregnancy leads to anaemia.

❖ **Carvings and aversions** are powerful urges towards or away from food which women experience .

❖ **Other consideration:**

❖ Pregnant women who are heavy coffee drinkers and smokers are considered at risk for miscarriages, premature deliveries therefore intake of caffeinated foods, beverages , tobacco and medication should be curtailed.

❖ Avoid use of alcohol during pregnancy.

MOTHER		INFANT
ENERGY and	: absorption	: pre – mature infant
PROTEINS	: Complication during delivery	: low birth weight infant
	: Ketosis and low birth wt.	: less brain cells
LINOLEIC ACID	: -----	: retarded foetal growth
CALCIUM:	:mascular cramps	:calcification of bones and teeth decreased
	osteomalacia	: Under weight due to decreased bone growth
IRON:	Complications during delivery anaemia:	: born with less stores of iron
IODINE:	Goitre	: chance of getting goiter
	Increase rate of miscarriage and Still birth.	:Cretinism
Zinc:	Foetal mortality	:reduced intra uterine growth rate
	Foetal malformations including central Central nervous system	: low birth weight & preterm baby

MOTHER	INFANT
VITAMIN A: Mortality	: decreased level in fetus so suscepitable to vit.A def.
VITAMIN D: decreased calcium absorption	: calcium metabolism of foetus is affected
VITAMIN K : increase loss of blood during delivery	: increased case of neonatal haemorrage
VITAMIN B12 : anaemia	: premature baby
THIAMINE , defeciency symptoms	: foetal malformation
RIBOFLAVIN,	**:** neural tube defects spinal bifida, congenital abnormilities i.e cleft palate,hare lip
NIACIN ,	
FOLIC ACID	

Supplements:

- **Daily supplements of iron (60mg /day) and folic acid (400ug /day)**

DIET AND FEEDING PATTERN:

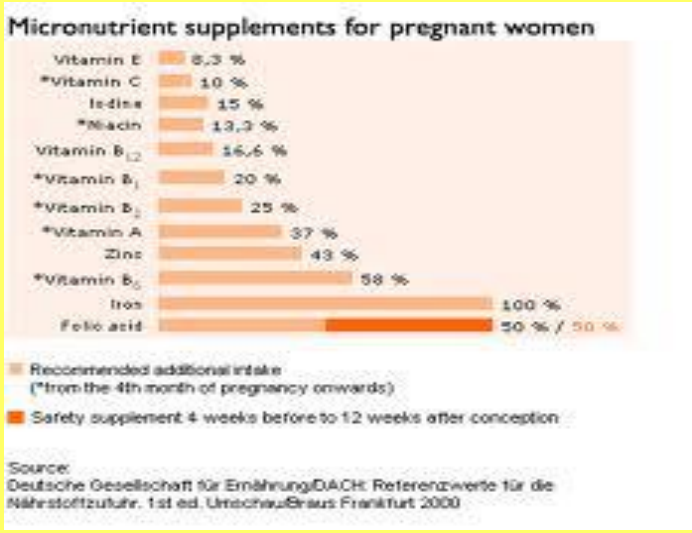
- Nutritious and well balanced diet. Avoid fasting and missing meals.
- To meet the increased requirements during second and third trimester , some snacks should be given in between the main meals rather than large meals thus, Feeding pattern should be 5-6 meals a day
- Small amount of foods with increased frequency to minimize the effect of morning sickness and nausea of early pregnancy.
- Avoid rich, fried, strongly flavored and highly spiced foods.
- Increased protein needs by including good quality of protein like meat, milk, eggs, fish, pulses, groundnuts, soyabean etc.
- Iron rich foods should be taken to prevent anaemia and to build up iron stores in foetal. To meet iron needs, foodstuffs like whole grain cereals, whole pulses, and green leafy vegetables should be consumed.
- Large quantity of food rich in dietary fibre with plenty of fluids need to be included in her diet.
- Diet should be rich in calcium to prevent osteomalacia, and optimum amount of sodium.
- Adequate amount of calories should be taken so that enough fat is deposited during pregnancy which is required for lactation.

Diet and feeding pattern

- **Omega-3 fatty acids** can increase blood flow to reproductive organs and may help regulate reproductive hormones. Consumption is also known to help prevent premature delivery and low birth weight. The best dietary source of omega-3 fatty acids is oily fish. Some other omega-3 fatty acids not found in fish can be found in foods such as flaxseeds, walnuts, pumpkin seeds, and enriched eggs.

Folic acid supplementation, or dietary requirement of foods containing it for the regular growth of the follicle .

Regular Vitamin D supplementation decreases the chances of deficiencies in adolescence. More importantly, it is known to reduce the likelihood of rickets with pelvic malformations which make normal delivery impossible.



- **Folate**: Green leafy vegetables such as palak, broccoli, cabbage, amaranth, liver, etc.
- **Vitamin C**:Citrus fruits (amla, orange, musambi, lime), tomatoes, capsicum,cauliflower, cabbage, etc. • Vitamin B12: Found in animal products suchas milk, meat, paneer and curd.
- **Vitamin B6**: Palak, drumstick leaves, other keeras, watermelon, tomatoes, carrots, brinjal, etc.
- **Vitamin B2**: Cereals, legumes, oil seeds, roots, vegetables, milk eggs, fish meat, skim milk powder, etc.
- **Vitamin A**: Dark green and yellow vegetables and fruits such as palak, capsicum, papaya, pumpkin, curry leaves, etc.

Minerals like copper, selenium, zinc act as antioxidants and are essential for the mother and the growing baby. Other minerals like magnesium helps in the tissue growth and bone formation and iodine is important for the production of hormones.

Some good sources of minerals are:
Copper: Shell fish, whole grains, beans, nuts, potatoes and meat.
Zinc: Meat, chicken, fish, peanuts, legumes.
Selenium: Vegetables, grains, fish, shellfish, eggs, meat, etc.
Iodine: Fish, iodized salt.