Nutrition during pregnancy
15-4-2026

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Objectives

- To educate on meeting increased nutrient needs,
- Promoting healthy fetal development,
- Maintaining maternal health to ensure favorable pregnancy outcomes.

PREPARATION OF PREGNANCY

- A mother brings to her pregnancy, all of her previous life experiences; diet, food habits, attitudes.
- Birth defects occur before the 10th week of pregnancy.
- The outcome of her baby's health depends on mother's nutritional state.
- Prepare body 2 years ahead.
- If nutrients are lacking the mother suffers first and then the baby suffers.

Weight Gain

- 25-30 pounds Total (average weight)
- Two and five pounds in the first trimester
- About one pound per week for the rest of your pregnancy.

Distribution of weight gain during pregnancy

- **Baby:** 7 to 8 lbs (≈ 3–3.6 kg)
- **Fat Stores:** 6 to 8 lbs (≈ 2.7–3.6 kg)

- **Blood Volume:** 3 to 4 lbs (≈ 1.4–1.8 kg)
- **Increased Fluid Volume:** 2 to3 lbs (≈
- 0.9–1.4 kg)
- **Uterus Growth:** 2 to 5 lbs (≈ 0.9–2.5
- kg)
- **Amniotic Fluid:** 2 to 3 lbs (≈ 0.9–1.4 kg)
- **Placenta:** 1.5 lbs (≈ 0.7 kg)
- **Breast Tissue:** 1 to 3 lbs (≈ 0.5–1.4 kg)

Affect on body

- Increased clumsiness
- Backache are the most common.
- Many women complain of leg- and ankle-swelling (edema), but this symptom is actually caused by the extra amount of blood in your body, not fat.

Pre pregnancy Weight

Pre pregnancy weight is an important factor for both mothers and their babies

Women who are underweight before pregnancy, especially younger adolescents, have a higher risk of giving birth to a low-birth-weight infant than women who begin pregnancy at normal weight for height.

Changes during pregnancy

1. ↑Basal metabolic rate (BMR):

Fetal growth & development increases the BMR by 5% during 1st trimester and 12% during 2nd & 3rd trimester.

This increases the total energy requirement.

2. Gastrointestinal changes: There is an alteration in GI functions which causes nausea, constipation & vomiting.

In later trimester of pregnancy absorption of nutrients like vitamin B12, iron and calcium increases in order to meet the increased needs of the mother & fetus.

Changes during pregnancy

3. Changes in body fluid:

- Mother's blood volume increases so as to carry the appropriate amount of nutrients to the fetus and metabolic waste away from the fetus.
- With increase in the blood volume the concentrations of plasma proteins, hemoglobin and other blood constituents is lowered.
- RBC mass increase by (20-35%) while Plasma volume increases over the course of

pregnancy by about (40-50%), physiological Dilutional anemia of pregnancy is

caused by rise in plasma volume.

Starts at 1st trim. But accelerates throughout 2nd and 3rd trim.

Changes during pregnancy

4. Nausea and vomiting in early phase of pregnancy
5. Food aversions and cravings may impact the food intake and preferences

Vitamin and mineral supplements for various reasons, including:

1.Nutrient deficiencies:

- Some people may need a supplement after a blood test reveals a deficiency in a vitamin or mineral.
- Correcting deficiencies is critical, as a shortage of nutrients like folate has been linked to birth defects.

2. Hyperemesis gravidarum:

- This pregnancy complication is characterized by severe nausea and vomiting. It can lead to weight loss and nutrient deficiencies.

3. Dietary restrictions:

Women who follow specific diets, including vegans and those with food intolerances and allergies, may need to supplement with vitamins and minerals to prevent micronutrient Deficiencies

4. Smoking:

Although it's critical for mothers to avoid cigarettes during pregnancy, those who continue to smoke have an increased Need Trusted Source for specific nutrients like vitamin C and Folate because smoking depletes the stores which lead to low birthweight , supplementation of vitamin C 500 mg daily improve newborn lung function and reduce wheeze.

5. Multiple pregnancies:

Women carrying more than one baby have higher micronutrient needs than women carrying one baby.

Supplementing is often necessary to ensure optimal nutrition for both the mother and her babies.

INCREASED NUTRITIONAL NEEDS

Pregnant women who are:

- Drug or alcohol abusers
- Vegetarians
- Smokers
- Anorexic or bulimic, underweight, or obese

INCREASED NUTRITIONAL NEEDS

Pregnant women with:

- Hyperemesis
- Poor weight gain or weight loss
- Dehydration, constipation
- Pre-existing medical conditions

Obesity during pregnancy is associated with many complications, including:

1. gestational diabetes
2. gestational hypertension, preeclampsia.
3. birth defects
4. cesarean birth.
5. fetal Macrosomia
6. Perinatal deaths
7. postpartum anemia

- High pre-pregnancy body mass index (BMI) is a significant risk factor for postpartum anemia.
- Obese women having up to 2.8 times higher risk compared to those with a normal BMI.
- Obesity induces chronic low-grade inflammation, raising hepcidin levels, which impairs iron absorption and utilization, causing "anemia of inflammation

- Hepcidin is a peptide hormone produced by the liver that acts as the master regulator of iron homeostasis in humans.

Weight gain during pregnancy

The recommended weight gain during pregnancy:

- **10–16 kg for those with a normal BMI**
- **13–18 kg for those who are underweight**
- **7–11 for those who are overweight**
- **5–9 kg for those who are obese.**

Both excessive and insufficient weight gain during pregnancy have negative impacts.

With every additional kilogram that a mother gains over that recommended, the risk of the child for being obese during adulthood increases by 8%.

Effects of Poor Nutrition During Pregnancy

In adequate nutrition during pregnancy can lead to

- Difficult pregnancy,
- Labor difficulties,
- Slower recovery.
- Preterm labor.

RDA/ OUNCE(28.3 gram)

Recommended Daily Allowance:

	Normal		Pregnant
	F	M	
Calories	2,200	2,800	+300
▪ Bread	9	11	9-11
▪ Vegetables	4	9	4-5
▪ Fruit	3	4	3-4
▪ Milk	3	3	3-4
▪ Meat	2 (6oz)	3 (7oz)	2-3

critical nutrient needed during pregnancy

1. folic acid
2. Protein
3. vitamin B 12 B6
4. Zinc
5. Iron
6. Calcium and vitamin D
7. Minerals (Magnesium, Sodium)
8. Omega 3 fatty acid
9. Calories
10. Carbohydrate
11. Fiber
12. Vitamin C
13. Vitamin A
14. Minerals
15. Iodine
16. Water
17. Caffeine

❑ folic acid

Vitamin B (water soluble) important for growth of the placenta and the development of the fetal spinal cord during the first month of pregnancy.
to prevent serious birth defect
Pregnant women should take a folic acid supplement of 400µg per day during the first 12 weeks of pregnancy , Inadequate in take cause neutral tube defect, cleft lip and palate and congenital heart disease(ASD,VSD), premature birth and low birth weight.

diet rich in folic acid: eggs, leafy green, beets, broccoli , banana, avocado etc…


(a)
(b)

❑ Protein :

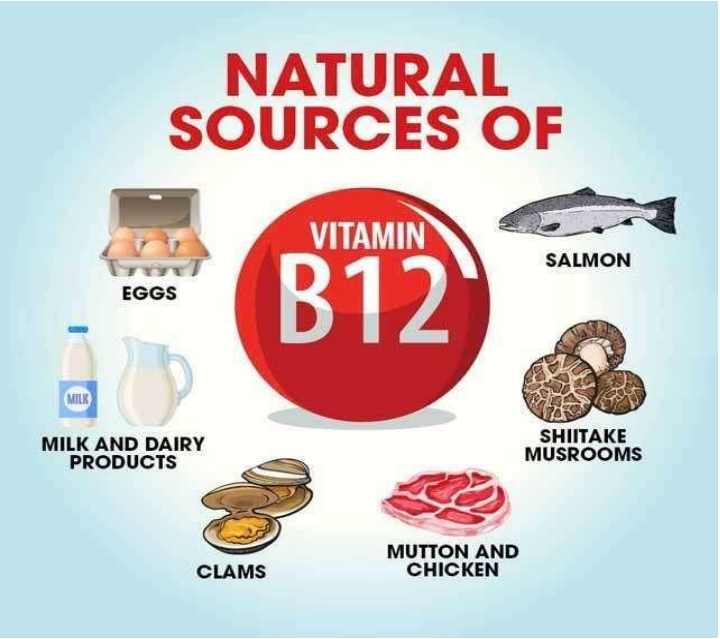
During pregnancy additional protein is required for

1. Growth of fetus
2. Development of placenta
3. Enlargement of maternal tissues
4. Increased maternal blood volume
5. Formation of amniotic fluid
6. Protein reserves prepares the mother for delivery and lactation
7. Requirements are lowest in the first trim (~0.8-1g/kg) and increase during the second and third trimesters (approx. 1.1–1.2g/kg or an additional 10-30g daily).
8. Diet : meats , beef, chicken, duck, birds, fish and seafood , eggs, dairy products – milk, cheese.

Vitamin B12

Vitamin B12 supplementation during pregnancy helps in brain & nervous system development of the fetus. Need : 2.6 mcg per day

Deficiency of vit B12 cause: miscarriage , stillbirth.



Vitamin B6 (pyridoxine)

Vitamin B6 helps to reduce nausea and vomiting. The main dietary sources are meat (beef and chicken), fish (tuna, salmon), legumes, oats, bananas, plums, avocado and potatoes. No supplementation is required during pregnancy.

Zinc.

Zinc is necessary for the synthesis of DNA and RNA, and important in reproduction.

zinc deficiency may cause poor pregnancy outcomes and abnormal deliveries including preterm birth, congenital malformation.

The needs for zinc during pregnancy is 12 mg, or an increase of 3 mg over pre pregnancy needs.

Iron

Pregnancy causes a surge in the volume of blood in the body; the expanded volume may go up by 50%

Iron is also required for the normal development of the growing baby and the Placenta.

Iron requirements in pregnancy go up from 18 to 27 mg per day.

Because iron is not easily absorbed from the diet, it is recommended to take an iron supplement

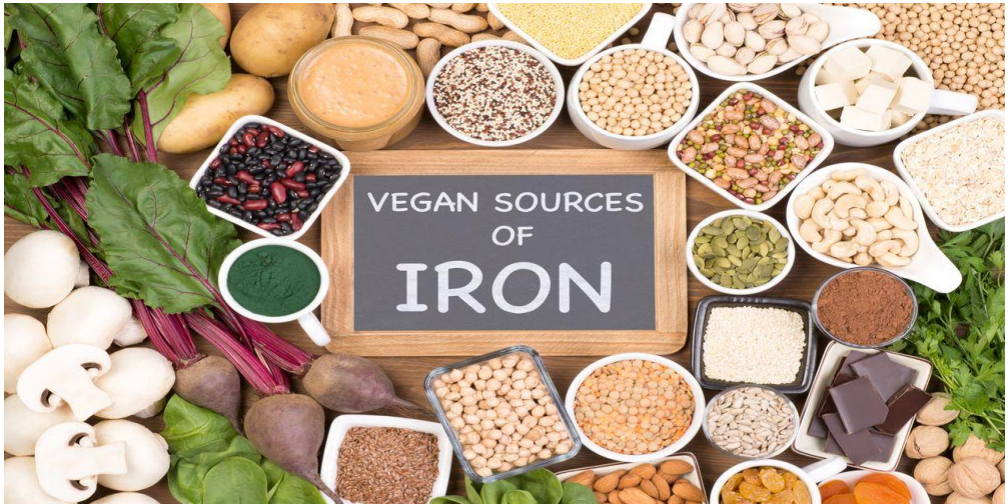
Not getting enough iron could cause anemia

Essential for normal infant brain development

Iron helps create blood that is necessary for fetal demands and blood loss during delivery.

Anemia before conception and during the early stages of pregnancy is associated with:

- Impaired fetal development,
- Premature birth
- Low birth weight.
- An important means of reducing anemia in newborns is to delay cord clamping.



1- Calcium

During pregnancy additional calcium is needed for:

Growth and development of bones as well as teeth of the fetus.

Calcium intake decreases risk of hypertension, pre-eclampsia in mothers and low birth weights and chronic hypertension in newborns.

WHO recommend 1500-2000 mg for preeclampsia prevention

Maintaining bone strength

Proper muscle contraction

Blood clotting

If calcium intake is inadequate during pregnancy then calcium is mobilized from maternal bones to meet the fetal calcium needs and this demineralization of maternal bones leading to easy fractures.

Recommended daily allowance (RDA) for calcium during pregnancy is **1g.**

Importance of calcium during pregnancy

Calcium is necessary to protect the bone health of the mother and to provide the developing fetus with the calcium needed for the healthy development of their skeleton.

Although the requirement for calcium does not increase during pregnancy. Pregnant adult women require **1,000mg calcium** every day. Pregnant teenage girls require **1,300mg**

Vitamin D

vitamin D is required for the development of the fetal skeletomuscular system, brain and immune system.

Vitamin D deficiency may have a negative effect on the development of the child; such as:

- Osteoporosis,
- Low birth weight,
- Neonatal hypocalcemic tetany (muscle spasms/seizures),
- Hypokalemia.
- Cardiovascular disease
- Diabetes mellitus type I
- Lifelong risk for cancer.

Vitamin D

- For the mother, vitamin D deficiency is associated with risks for
- pre-eclampsia,
- premature delivery,
- Insulin resistance,
- Gestational diabetes,
- Dysfunction of the immune system
- and bacterial vaginosis(Premature birth or low birth weight during pregnancy)
- supplementation (e.g., 2000 IU/day) can help eliminate BV, particularly in asymptomatic cases

Recommended 600 IU of Vitamin D per day

Magnesium

During gestation, the fetus accumulates 1 g/day of magnesium, and pregnant women should have sufficient quantities of magnesium to prevent leg cramps and preeclampsia. Nuts, wholegrain products and dark-green leafy vegetables are sources of magnesium.

Sodium

- During pregnancy, the maternal blood volume increases, resulting in a higher glomerular filtration rate, in which the water and electrolyte balance is maintained by compensatory mechanisms.
- Strict reduction of sodium in the diet during pregnancy is not recommended, nor is use of diuretic agents.
- It is advisable to cut down on salt in the diet and to use iodized salt.
- The recommended quantity is 1.5–2.3 g of sodium per day, equivalent to 4–5 g of cooking salt.
- This quantity of salt and an adequate volume of liquids ensure a sufficient blood volume for preventing dehydration and premature contractions.

Sodium Rich Foods–Healthoic.com

Omega fatty acids during pregnancy

Omega-3 Fatty Acids

Important for brain development and preventing preterm birth

Essential for visual development

Reduces the incidence of heart disease and heart related death of the infant

Recommended 300 milligrams per day

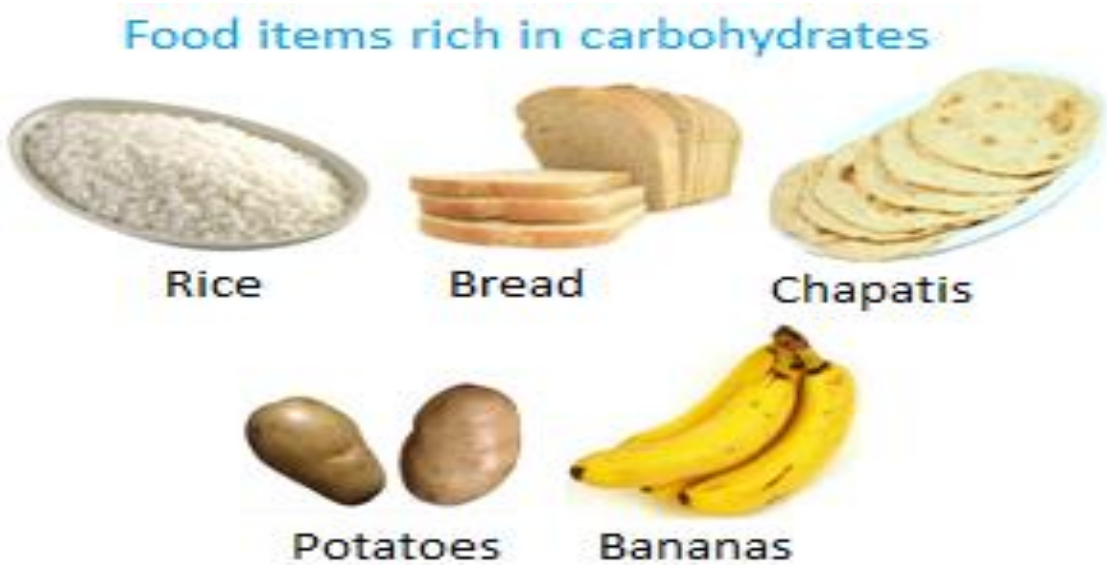
Carbohydrates

Carbohydrates are a source of energy for both the mother and the fetus. **During pregnancy additional energy is required to support**

The growth of fetus, Development of placenta & maternal tissues, meet the needs for increased basal metabolic rate

The amounts required are the same as those recommended for the general population (50–60% of energy). Appropriate amounts of suitable carbohydrates help to control blood glucose levels and provide protection against ketosis. 340 additional calories recommended per day during the second trimester

450 additional calories recommended per day during the third trimester (175g)



Fibre

The required intake of fibre 30–35 g.

Fibre is required to:

- Prevent constipation and thus reduce the risk for haemorrhoidal vein disease;
- Reduces the risks for gestational diabetes and preeclampsia. Furthermore, fibre-rich products contain minerals, vitamins and other biologically active substances.

The main sources of fibre are wholegrain products (e.g. wholegrain bread, pasta), legumes, dried and fresh fruit, vegetables, nuts and seeds.

A. calories:

1. Requirement during pregnancy needs by 300 calories / day.
2. extra calories are needed to

- ❑ support maternal _ fetal tissue synthesis
- ❑ provide optimal use of protein and tissue growth .

Vitamin C (ascorbic acid)

It increase iron absorption and also helps in fetal growth. Deficiency of vitamin C increases the chances of preterm delivery. Good sources of vitamin C are cabbage, tomatoes, paprika, broccoli, strawberries, pineapple, citrus fruit, blackcurrants and kiwi. Requirement **(60mg/d):**

Vitamin A

Vitamin A is required for the development of the skin, mucous membranes (including those of the gastrointestinal and respiratory systems), skeletal system and teeth and for visual and immune functions.

While vitamin A deficit is undesirable, **excessive amounts (3000 µg or 10 000 IU of vitamin A) may be teratogenic.**

Pregnant women and those planning to conceive should avoid high-dose supplements, such as fish liver oil, and keep daily intake below 10,000 IU or 3,000 microgram

Vitamin A is found in foods of animal origin, e.g. fish, seafood, eggs, milk and dairy products, especially cheese. Liver contains particularly high quantities of vitamin A and is therefore not advised during pregnancy.

Iodine.

1. Iodine is essential for the formation of thyroxin.
2. If iodine deficiency occurs, it can cause hypothyroidism and thyroid enlargement (goiter) in a woman, it can cause the same symptoms in a fetus.
3. Thyroid enlargement in a fetus at birth is serious because the increased pressure of the enlarged gland on the airway could lead to early respiratory distress.
4. Deficiency of iodine during brain development can have permanent effect such as mental retardation.
5. The needs for iodine is 220 g daily during pregnancy.


Natural News
IODINE RICH FOODS
Seaweed (kelp, nori, kombu)
Oysters
Eggs
Cranberries
Yogurt
Navy beans
Strawberries
Fish (sardine, salmon, cod, tuna)
Turkey breast
Baked potato
Pink Himalayan salt

Water

The volume of liquid required per day is 2–2.5 L, mostly in the form of water.

The volume should be increased gradually as the pregnancy progresses and the expectant mother gains weight.

During the last months of pregnancy, the volume required increases by 300 mL/day.

WATER

- An adequate volume of water
- Ensures the vital functions .
- Reduce the risks for urinary infections,
- Reduce urinary calculi .
- Reduce constipation.

Caffeine

- High caffeine intake during pregnancy has been associated with potential risks to the fetus,.
- High intake is linked to restricted fetal growth, low birth weight, and an increased risk of miscarriage or stillbirth..
- Caffeine crosses the placental barrier, and because a fetus's metabolism is still maturing, it may not break down caffeine as efficiently as an adult, causing it to accumulate.
- it is recommended by the American College of Obstetricians and Gynecologists **ACOG** that pregnant women below 200 mg/day.
- Caffeine causes vasoconstriction in the placenta, potentially restricting blood flow to the fetus by as much as 25% after consuming 200 mg.
- The amount of caffeine in foods and drinks varies; however, two cups of coffee or four small mugs of tea contain 200 mg caffeine.
- Caffeine-containing energy drinks should be avoided during pregnancy.

Foods to avoid or minimize when pregnant

1. Alcohol
2. Caffeine from coffee, tea, soft drinks, energy beverages, and other sources
3. Raw or undercooked food of animal origin

Exercise during pregnancy(benefits)

- Reduces back pain
- Eases constipation
- May decrease risk of gestational diabetes, preeclampsia, and cesarean birth
- Promotes healthy weight gain during pregnancy
- Improves overall fitness and strengthens heart and blood vessels
- Helps to lose weight after delivery.

Pregnancy safe exercise

- Walking.
- Swimming and water workouts
- Stationary bicycling
- Modified yoga.
- Modified Pilates