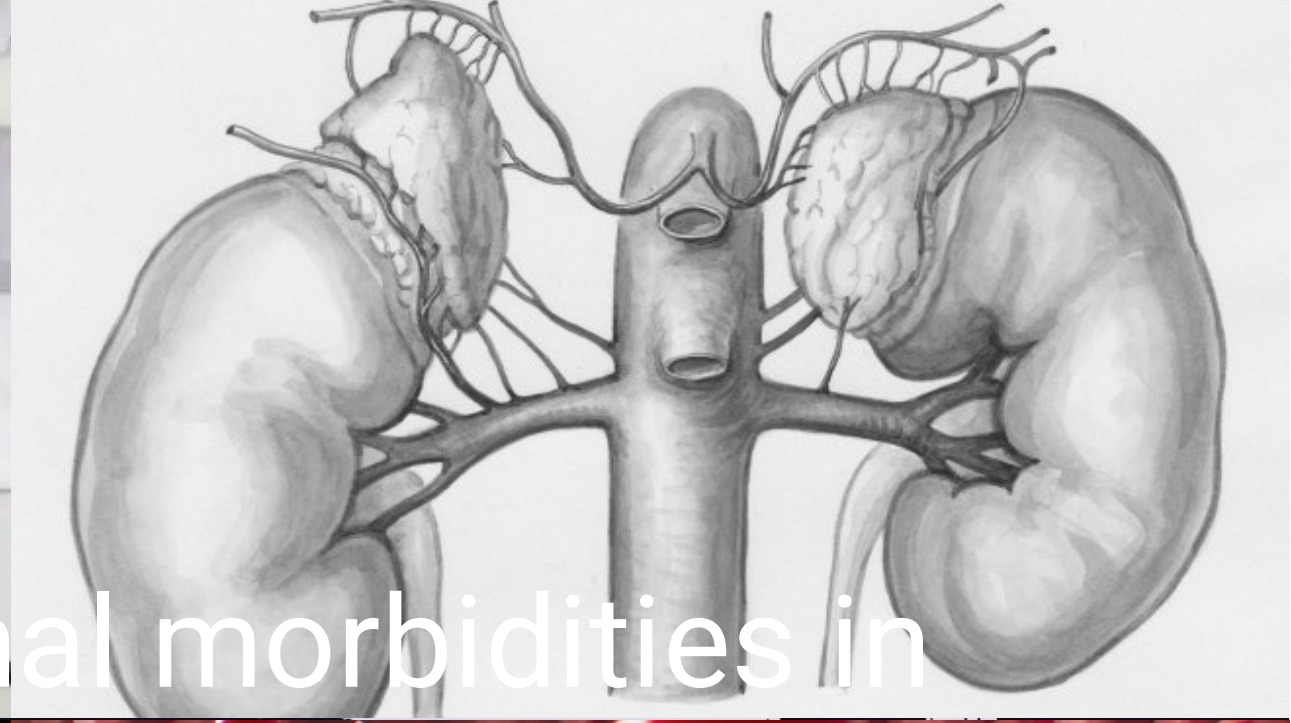
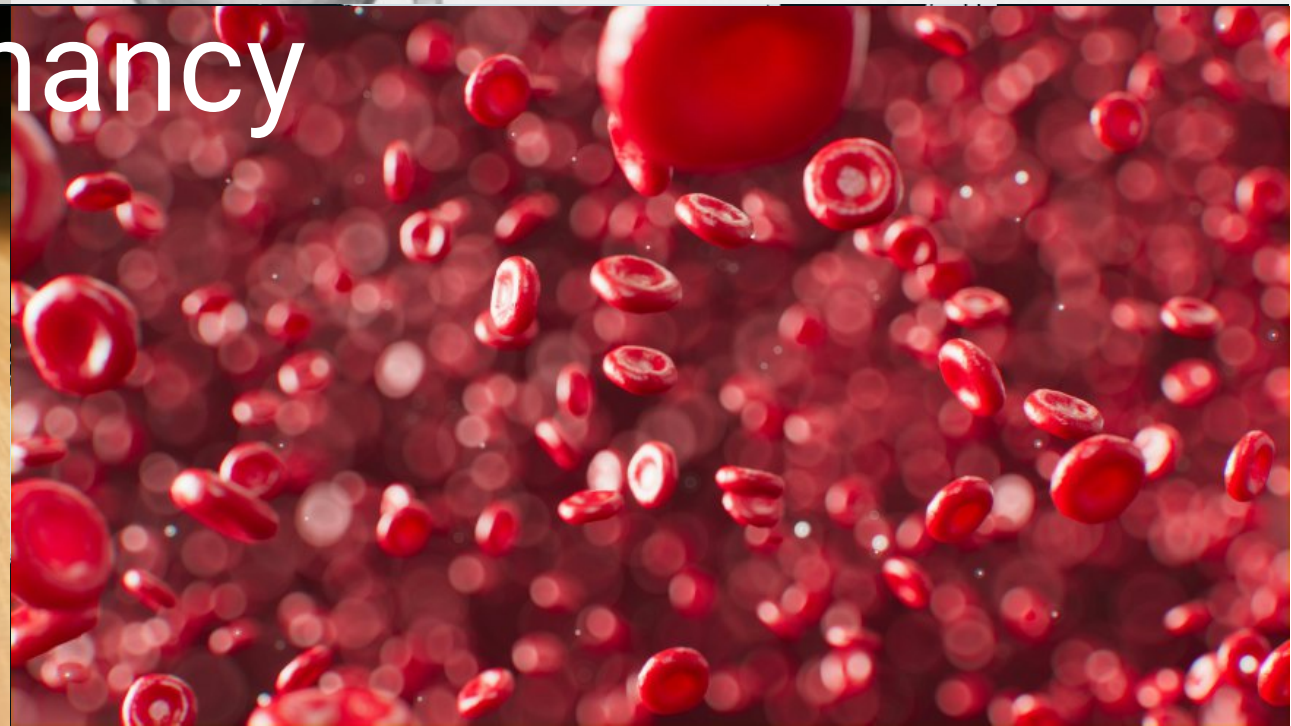


Common maternal morbidities in pregnancy



I. Anemia during pregnancy

- Anemia is a reduction in one or more of the major red blood cell measurements (Hemoglobin concentration, hematocrit, or RBC count).
- Pregnant women are at a higher risk for developing anemia due to the excess amount of blood the body produces to help provide nutrients for the baby.
- Anemia during pregnancy can be a mild condition and easily treated if caught early. However, it can become dangerous, to both the mother and the baby, if goes untreated

Prevalence of anemia

- An estimated 30% of reproductive-age females are anemic[1].
- The World Health Organization (WHO) estimates that over 40% of pregnancies are complicated by anemia[2].
- Variations in regional and global prevalence of anemia during pregnancy reflect socioeconomic status and associated nutritional deficiencies

Anemia in pregnancy can be defined as follows, based mostly on data in nonpregnant individuals [1,2]:

- First trimester – Hemoglobin <11.0 g/dL
- Second trimester – Hemoglobin <10.5 g/dL
- Third trimester – Hemoglobin <11.0 g/dL
- Postpartum – Hemoglobin <10.0 g/dL

Common causes of anemia in pregnancy

1. Physiologic (dilutional): Increased RBC production begins at approximately 16 weeks of gestation and progressively accelerates, reaching a 25% increase above the pre-pregnancy level by 34 weeks. Since plasma volume expansion is greater than the increase in total RBC volume, hematocrit/hemoglobin is modestly reduced, a dilutional anemia termed "physiologic anemia of pregnancy." Peak hemodilution occurs at 24 to 26 weeks

2. Iron Deficiency: The most common pathologic cause of anemia in pregnancy. Responsible for 95% of anemia of pregnancy. Iron deficiency is very common in reproductive-age females, even if never pregnant.

Common causes of anemia in pregnancy

3. Folate Deficiency: Is the most common cause of megaloblastic anemia during pregnancy, often associated with diets low in animal proteins, fresh leafy vegetables, and legumes. Recommended daily folate intake is 400 to 800 mcg beginning at least one month prior to attempting conception and continuing throughout pregnancy for all women planning to or becoming pregnant to prevent neural tube defects.

Factors that contribute to iron deficiency in pregnant women:

- Individuals in some parts of the world, especially in resource-limited settings, may have insufficient dietary iron.
- Blood loss from previous pregnancies and/or menstruation, as well as a short interpregnancy interval, may lead to iron deficiency or borderline iron stores.
- Iron requirements increase dramatically through pregnancy due to the expanding blood volume of the mother and the iron requirements for fetal RBC production.
- Certain underlying conditions that preclude adequate iron intake or impair iron absorption can increase the risk of iron deficiency during pregnancy, especially if the woman has not received adequate supplementation. Examples include nausea and vomiting of pregnancy, inflammatory bowel disease, bariatric surgery (eg, gastric bypass), and other conditions.

COMMON RISK FACTORS FOR IRON DEFICIENCY ANEMIA IN PREGNANCY

1. Previous diagnosis of iron deficiency
2. Diabetes
3. Smoking
4. Multiparas, especially those with an interpregnancy interval <6 months
5. Body mass index (BMI) above or below the normal range
6. Vegetarian or vegan diet
7. Decreased access to health care, which may correlate with decreased screening for heavy menstrual bleeding and infections and reduced access to healthy foods

Routine screening for anemia and/or iron deficiency is supported by the following observations of adverse outcomes associated with anemia

1. Placental abruption[1]
2. Preterm birth[1]
3. Severe postpartum hemorrhage[1]
4. Increased risk of maternal mortality (WHO)[2]

II. Urinary Tract Infections (UTIs)

Urinary tract infections (UTIs) are common in pregnant women.

Asymptomatic bacteriuria (it is the presence of significant bacterial counts in the urine without symptoms) occurs in 2%-7% of pregnant women.

It typically occurs during early pregnancy.

Without treatment, as many as 20% to 35% will develop symptomatic UTI.

This risk is reduced by 70 to 80% if bacteriuria is eradicated

Etiologies [1]

Hormonal changes: causes the smooth muscles in the urinary tract to relax.

This relaxation can reduce bladder tone, slow down urine flow, and cause urine stasis , which helps bacteria grow and spread.

Enlarging uterus: As the uterus grows, it can press on the ureters, partially blocking urine flow.

This mechanical obstruction increases the risk of urinary stasis and infection.

Changes in vaginal flora: Hormonal shifts can alter the natural balance of bacteria in the vagina, potentially increasing the presence of bacteria that cause UTIs.

Immune system adjustments: Pregnancy leads to a decrease in immunity, which may weaken the body’s defenses against infections, including UTIs.

Screening & pregnancy outcome

- Screening for asymptomatic bacteriuria is performed at 12 to 16 weeks gestation.
- Untreated bacteriuria has been associated with an increased risk of preterm birth, low birth weight, and perinatal mortality

III. Gestational Diabetes mellitus (GDM)

- GDM is hyperglycemia that develops during second or third trimester of pregnancy
- It occurs due to increasing insulin resistance during gestation.
- GDM usually resolves after pregnancy. However, women who had GMD, has a higher risk of developing type 2 diabetes in the future.

PREVELANCE OF GDM

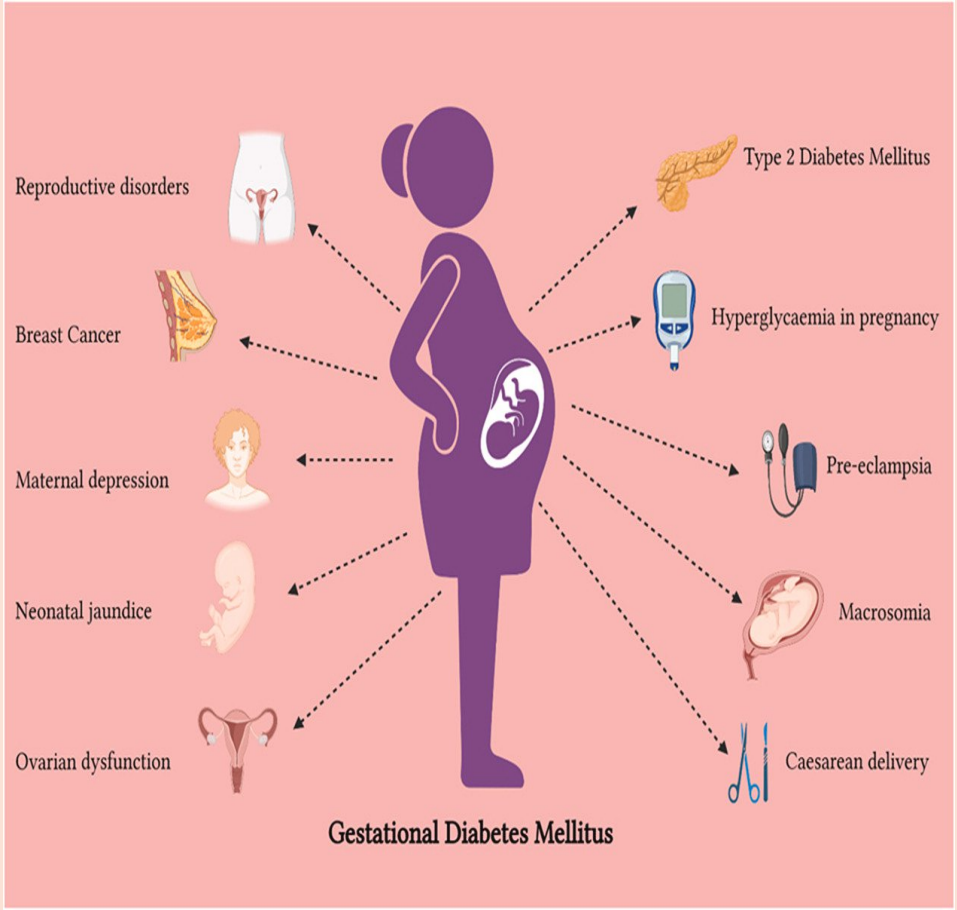
- The global prevalence of GDM has been estimated to be 17.0 %.[1]
- Worldwide prevalence varies because of differences in population characteristics (e.g., average maternal age and body mass index [BMI]) and choice of screening and diagnostic criteria.

GDM RISK FACTORS

- GDM in a previous pregnancy (associated with a 40% risk of recurrence)
- Family history of diabetes, especially in a first-degree relative.
- Prepregnancy BMI ≥30
- Medical condition/setting associated with development of diabetes (e.g., polycystic ovary syndrome [PCOS]).
- Older maternal age (≥35 years of age).
- Previous birth of an infant ≥4000 g.

GDM complications (Maternal)

1. Cesarean section.
2. Pre-eclampsia.
3. Higher future risk of cardiovascular disease, stroke, dyslipidemia.
4. Type 2 diabetes: 50% mothers develop T2DM within 5-10 years of delivery.

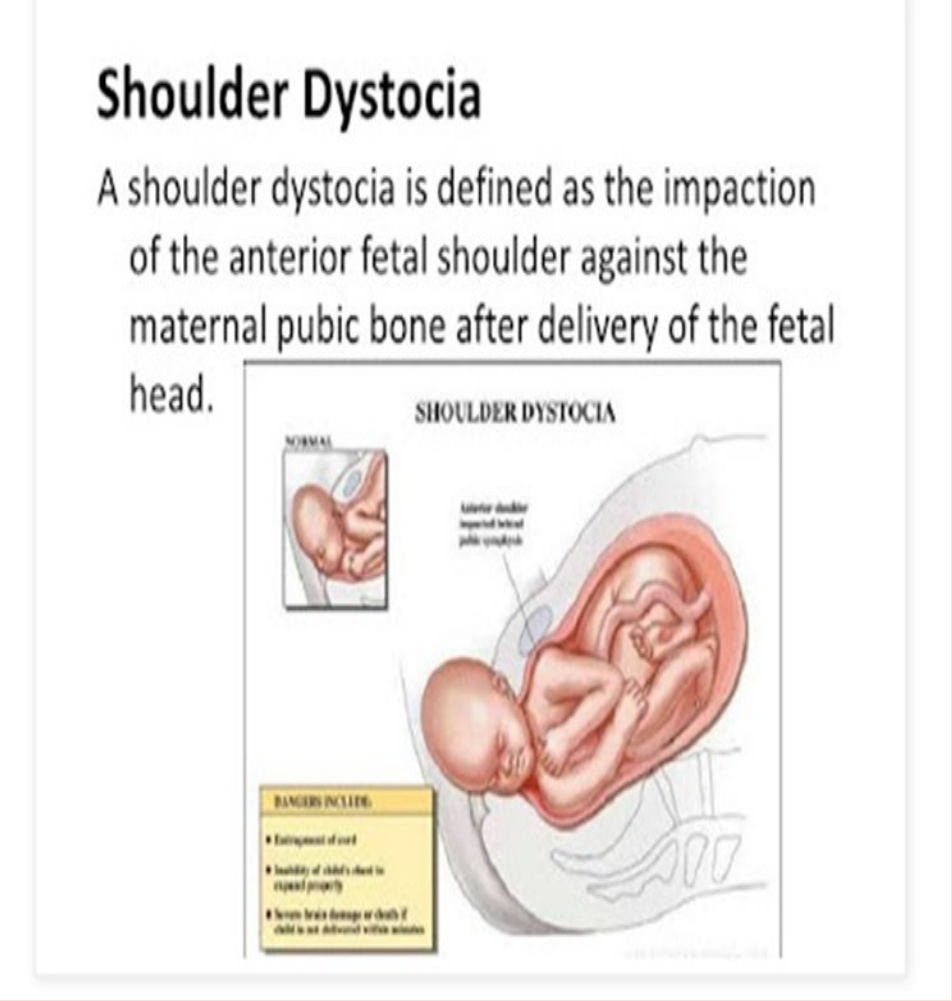


GDM Complications (Fetal)

1. An increased risk of macrosomia

Increased risk of shoulder dystocia, birth trauma

2. Neonatal respiratory problems and metabolic complications (e.g. hypoglycaemia)
3. Stillbirth
4. Medically-indicated preterm birth
5. Long-term risks: childhood obesity, type 2 diabetes,



Hypertensive disorders of pregnancy

- Chronic hypertension is defined as blood pressure exceeding 140/90 mm Hg before pregnancy or before 20 weeks' gestation.
- When hypertension first is identified during a woman's pregnancy and she is at less than 20 weeks' gestation, blood pressure elevations usually represent chronic hypertension.

IV. Preeclampsia (PE)

- PE is a multisystem, pregnancy-specific disorder that is characterised by the development of hypertension and proteinuria after 20 weeks of gestation.
- PE is a leading cause of maternal, and neonatal mortality and morbidity worldwide.

PE prevalence

- Preeclampsia occurs in approximately 5% of all pregnancies, 10% of first pregnancies, and 20-25% of women with a history of chronic hypertension.

Preeclampsia (PE)

- Clinically, PE presents as new-onset hypertension in a previously normotensive woman, with systolic and diastolic blood pressure readings of ≥140 and ≥90 mmHg, respectively, on 2 separate occasions that are at least 6 hours apart, together with proteinuria that develops after 20 weeks of gestation

Preeclampsia (PE)

- Although the exact physiologic mechanism is not clearly understood, preeclampsia can be thought of as a disorder of endothelial dysfunction with vasospasm.

Preeclampsia (PE)

- PE can evolve into eclampsia which is a severe complication that is characterised by new-onset of epileptic seizures, due to angiospasms in the brain and brain edema.

Risk factors for PE

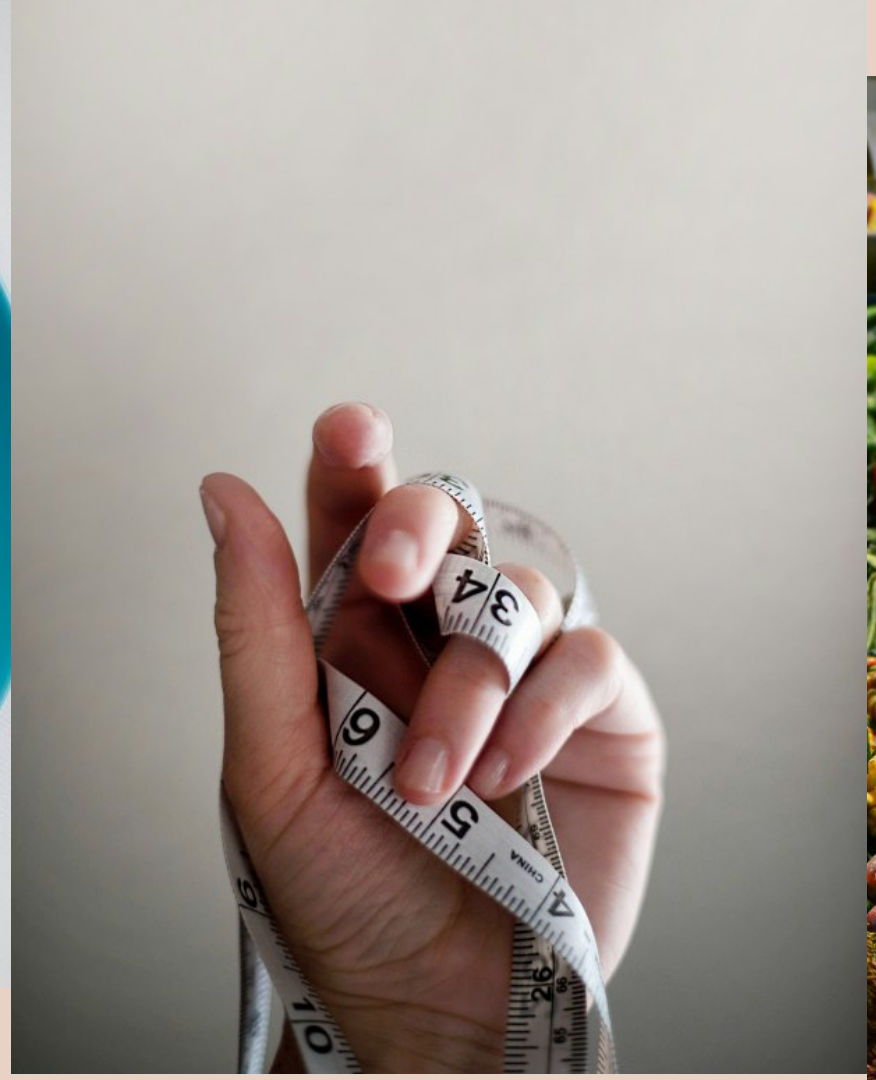
A. Maternal risk factors:

1. First pregnancy
2. Age <18 years or >35 years
3. History of preeclampsia
4. Family history of preeclampsia in a first-degree relative
5. Black race

RISK FACTORS FOR PE

B. Medical risk factors

1. Chronic hypertension
2. Diabetes (type 1 or type 2).
3. Renal disease
4. Systemic lupus erythematosus
5. Obesity



Maternal weight gain and nutrition[1,2]

Maternal weight gain

- It is recommended that women enter pregnancy with a normal BMI (18.5–24.9 kg/m²)[1.]
- A healthy pre-pregnancy weight supports normal fetal development and reduces maternal risks.
- Pre-pregnancy obesity is associated with:
  - Preeclampsia, gestational diabetes, intrauterine growth restriction (IUGR)

Physiologic Weight Gain During Pregnancy

- All women gain a minimum of ~8 kg from:

  Fetal growth, placenta and amniotic fluid, increased maternal blood volume, uterine and breast tissue growth, maternal fat stores for lactation support

- This is known as the obligatory weight gain .

Clinical and Public Health Implications

- Excessive or inadequate weight gain affects:
  - Maternal health (risk of hypertension, diabetes)
  - Neonatal outcomes (growth restriction or macrosomia)
  - Postpartum recovery and long-term obesity
- Emphasis should be on:
  - Balanced nutrition
  - Appropriate physical activity
  - Continuous health provider guidance

Maternal nutrition

- Pregnancy increases demand for: Energy, Macronutrients (protein, carbohydrates, fats), Micronutrients (vitamins, minerals)
- Caloric Intake: Caloric needs remain the same in the first trimester but increase by approximately 340 and 450 calories per day in the second and third trimesters, respectively. Actual needs vary based on age, height, weight, and activity level.

Macronutrient Requirements

1. Protein (15–25%)

Function: Supports maternal tissue accretion, placental growth, and fetal tissue development.

2. Carbohydrates (45–65% of daily calories)

Function: Primary energy source for the fetus.

3. Fats (20–35% of daily calories)

Function:

- First half of pregnancy: maternal fat deposition.
- Second half: mobilization to support fetal energy needs.
- Postpartum: supports lactation.

Micronutrient Requirements

Nutrient	Physiologic Role
Iron	Prevents anemia, supports fetal and placental growth
Folate	Prevents neural tube defects
Calcium	Bone formation, prevents preeclampsia
Vitamin D	Enhances calcium absorption, bone health
Vitamin B12	DNA synthesis, fetal nervous system
Choline	Fetal brain and cognitive development
Iodine	Fetal brain and thyroid development

Dietary Restrictions and Food Safety

Substance/Food	Potential Risk
High-mercury fish	Neurodevelopmental impairment
Caffeine	May prolong metabolism and affect fetus
Alcohol	Fetal alcohol spectrum disorders
Unsafe/contaminated foods	Listeriosis, toxoplasmosis, salmonellosis

Nutrition During Lactation

Energy and Nutrient Demands

- Energy: ~500 kcal/day more than nonlactating women
- Carbohydrates: essential for milk production; low intake causes fatigue and dehydration
- Continue prenatal vitamins to prevent deficiencies

Dietary Guidance for Lactating Mothers

- Consume a balanced, diverse diet rich in:
  - Fruits and vegetables
  - Lean proteins
  - Whole grains and dairy
- Limit:
  - Added sugars and trans fats
  - High-mercury fish
  - Caffeine, as both caffeine and mercury can pass into breast milk