Pregnancy: Nutritional Strategies for Healthier Babies

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Objectives: At the end of the lecture, the participant should be able to:

- Identify physiologic and nutritional alternations specific to pregnancy
- Understand the need for development of a nutritional plan during pregnancy
- Identify disease processes which any affect nutritional needs

Suggested Reading:


I. Introduction
A. Traditional beliefs
   1. Cultural
   2. "Non-scientific"
B. Scientific
   1. Suggested by Prowchownick in 1889
      a. Idea was to stunt the growth of the fetus to facilitate a vaginal delivery
      b. Commonly used until after World War I
   2. Used to try to reduce the incidence of preeclampsia
   3. As late as the 1960's suggested weight gain was 20-25 pounds
   4. In 1990, recommendations for pregnancy women were updated

II. Prerequisites for Optimal Maternal Reproductive Performance
A. Biological Maturity
B. Preconceptual Intervention
C. Protection from preventable diseases
D. Tight control of all chronic metabolic states
E. Eradication of all habits harmful to the fetus
F. Frequent and early prenatal care
G. Body weight in acceptable range
H. Adequate nutrient intake and transport system
I. Working placental transfer and lactation delivery system

III. Major Physiological Alterations of Pregnancy
A. Increased plasma volume
B. Increased red cell volume
C. Increased cardiac output
D. Increased body water
E. Increased glomerular filtration rate
F. Increased respiratory volume
G. Decreased GI and GU motility

IV. Prenatal Nutritional Alterations
A. Decreased hematocrit
B. Increased white blood cell count
C. Decreased serum albumin
D. Decreased Vitamin C, folic acid, and B12
E. Increased serum carotene
F. Increased serum tocopherol level
G. Vitamin A levels unchanged

V. Prenatal Metabolic Alterations
A. Increased plasma T3 and T4
B. Increased plasma insulin
C. Increased insulin resistance
D. Increased calcium and Iron absorption
E. Increased nitrogen retention
G. Increased triglyceride, cholesterol and fibrinogen levels

VI. Prenatal Nutritional Assessment
A. Eating habits
   1. Pica
   2. Eating Disorders
   3. Exercise
B. Potential Nutritional Risk
   1. Previous low birth weight deliveries
   2. High parity
   3. Medical diseases
      a. Diabetes mellitus
      b. Chronic Renal Disease
      c. Anemia
      d. PKU
   4. Substance abuse

VII. Evaluation of Maternal Weight gain
A. Calculation of the body mass index
B. Evaluation of weight at each visit
C. Rule of thumb---average weight gain approximately 30 lbs (for a singleton gestation)
D. Weight loss during pregnancy is not recommended
VIII. Components of Weight Gain in a Normal Pregnancy
A. Maternal
   1. Uterus -- 2 lbs
   2. Breasts -- 1 lbs
   3. Blood -- 3 lbs
   4. Water -- 4 lbs
   5. Fat -- 8 lbs
B. Fetus
   1. Fetus -- 8 lbs
   2. Placenta-- 2 lbs
   3. Fluid -- 2 lbs

IX. Diet
A. Recommend approximately 200-300 additional kcal per day
B. Vitamins and minerals supplementation
   1. Sodium
      a. Not restricted
      b. Excessive use discouraged
   2. Iron
      a. 2001 RDA : 27 mg iron per day
      b. 60 -120 mg per day in patients with iron deficiency anemia
      c. Supplementation prevents depletion of iron stores
   3. Calcium
      a. 2001 AI: 1000 mg per day aged > 19
      b. Lactose-intolerant women and those under 25 years of age may need supplementation
   4. Folic Acid
      a. Inadequate intake may lead to megaloblastic anemia
      b. Inadequate intake associated with neural tube defects
      c. 2001 RDA: 600 micrograms per day
      d. folate now fortified in food supply
   5. Vitamin A
      a. Excess can result in birth defects
      b. 2001 RDA 770 micrograms/day, Upper Level: 3000 mcg/d preformed Vit A
   6. Other Minerals
      a. Iodine
      b. Mercury

X. Common Clinical Problems
A. adolescent Pregnancy
   1. Under 17 years of age
   2. Within 2 years of menarche
   3. Socioeconomic factors
B. Nausea and Vomiting
C. Bed rest
D. Constipation
E. Vegetarian Diets

Xi. Postpartum
   A. Excess caloric needs of breast-feeding
   B. Weight loss counseling
   C. Re-enforcement of healthy lifestyle issues

General Guidelines for Maternal Nutritional Care

PRECONCEPTION
1. Assess weight status, exercise habits, eating disorders, laboratory values and other parameters of nutritional status
2. Offer guidance regarding a healthful diet, exercise and avoidance of substance abuse
3. Address individual care issues such as obesity, anemia, diabetes, PKU or a previous child with birth defects

PREGNANCY
1. Assess dietary intake
2. Monitor weight
3. Encourage moderate exercise
4. Counsel to avoid exposure to certain drugs and to harmful substances
5. Supplement with prophylactic iron; other nutrients based on assessment
6. Nutritional counseling for those at risk
7. Provide education on pregnancy, weight gain and postpartum issues

POSTPARTUM
1. Provide assistance with the institution of breast-feeding
2. Encourage a varied diet and exercise program
3. Provide realistic advice regarding weigh loss

Bibliography


**Review Questions**

1. The following are determinants of fetal weight
   - A. Vitamin supplementation
   - B. Amount of calories consumed
   - C. Total weight gain during pregnancy
   - D. Exercise

2. The strict vegetarian diet
   - A. Is compatible with pregnancy
   - B. May be deficient in B vitamins and calcium
   - C. Requires no supplementation
   - D. Will control maternal weight gain

3. The amount of calories required during pregnancy
   - A. May be determined by the weight of the patient
   - B. Should be reduced so that obese patients may lose weight
   - C. Is approximately 35 kcal for each kilogram of ideal body weight, plus 300 kcal
   - D. Should be reduced during the lactation period

4. Pica
   - A. May be the sign of a deficiency
   - B. Is of little consequence
   - C. Is seen more frequently in women of upper socioeconomic status
   - D. Is associated with birth defects

5. Neural tube defects
   - A. May be caused by Vitamin A
   - B. Are caused by contaminated water
   - C. Are increased in patients of Asian decent
   - D. May be prevented by the addition of folic acid

**Answers:** 1-c, 2-b, 3-c, 4-a, 5-d