

Maternal Malnutrition: Nutrient Gaps and Solutions for Improved Outcomes

An infant's first 1000 days—from conception to age 2 years—are critical for organ development and can impact its immune health, cognition, and behavior. Macro- and micronutrient deficiencies during pregnancy have been shown to impact both mother and infant outcomes.^{1,2} Evidence suggests that balanced protein and energy supplementation for pregnant women with undernutrition can reduce the risk of low birth weight infants, preterm birth, small-for-gestational age, and stillbirth.³ Clinicians need to know what those nutrient deficiencies might be and how to supplement them during pregnancy.

Many women start their pregnancy low in the omega 3 fatty acid Docosahexaenoic acid (DHA) and if boosted with a supplement to equal to 1000 mg, preterm birth was lowered.⁴ Evaluating maternal intake beyond DHA in a recent study also demonstrated gaps in several key nutrients.⁵ Preventing maternal malnutrition is best for maternal health as well as support of fetal growth and development. A combination of a pre-natal vitamin supplement and a healthy diet provides most of the needed nutrition in this population. Attention to food insecurity should also be noted and food access be made available. The US Health and Human Services website can provide valuable resources.⁶



Macronutrients

Nutrient	Role in Pregnancy	Effects of Deficiency	Average Recommended Daily Intake	Foods to Supply Nutrient
Protein	Building blocks for cells	Poor fetal growth and development	1.1 g/kg/day	Meat, fish, eggs, soy, beans, nuts, dairy
Fat	Fetal neurological development	Inadequate fetal brain development	1400 mg omega-3 fatty acids (1000 mg DHA)	Fish, eggs, meats, oils but not too much saturated fats or trans fats, especially those foods high in DHA fatty fish: salmon, anchovies, tuna
Carbohydrate	Supports fetal growth and healthy digestion, provides energy to mother and fetus	Poor fetal growth and development	175 g/day	Whole grain products, like bread, rice, pasta; starchy vegetables like potatoes and corn; fiber containing foods such as cabbage, spinach, kale, berries, oranges, apples and peaches with the skin, chickpeas, black beans, lentils

Table was developed using references 1-8. DHA= docosahexaenoic acid

Alternate Sources for Nutritious Foods

Due to socioeconomic and cultural factors, nutrient rich foods may not always be available to pregnant women. Some other sources of these foods may include food banks, food pharmacies, and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).

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Micronutrients Demonstrated to be Deficient in a Recent Large Trial⁴

Nutrient	Role in Pregnancy	Effects of Deficiency	Average Recommended Daily Intake	Foods to Supply Nutrient
Potassium	Needed for normal cell function in maintaining intracellular fluid volume and transmembrane electrochemical gradients	Weakness, fatigue, muscle cramps, constipation, and abnormal heart rhythms	2800 mg	Fruits and vegetables, some legumes (e.g., soybeans), potatoes, meats, poultry, fish, milk, yogurt, nuts whole-wheat flour, brown rice
Magnesium	Strengthens baby's bones and teeth, works with calcium in muscle function, stimulates enzyme function, regulates insulin	Poor fetal growth or preeclampsia	360 mg	Almonds, spinach, cashews, peanuts, black beans, edamame, peanut butter, avocado, yogurt, kidney beans
Calcium	Bone development, nerve and muscle function	Low fetal bone density, pre-eclampsia	1000 mg	Milk, yogurt, cheese, calcium-fortified orange juice, salmon, tofu, sardines, kale and other leafy greens, broccoli
Choline	Needed for the production of neurotransmitters in the brain and phospholipid production	Inadequate choline intake during pregnancy may be associated with neural tube defects	450 mg	Eggs, lean beef, salmon, chicken, broccoli, cauliflower
Iron	Hemoglobin synthesis	Low birth weight/anemia in pregnancy	27 mg	Chicken, beef, eggs, spinach, kale, beans, edamame

Table was developed using references 1-8.

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