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Vitamin D: Screening and Supplementation During Pregnancy

ABSTRACT: During pregnancy, severe maternal vitamin D deficiency has been associated with biochemical evidence of disordered skeletal homeostasis, congenital rickets, and fractures in the newborn. At this time, there is insufficient evidence to support a recommendation for screening all pregnant women for vitamin D deficiency. For pregnant women thought to be at increased risk of vitamin D deficiency, maternal serum 25-hydroxyvitamin D levels can be considered and should be interpreted in the context of the individual clinical circumstance. When vitamin D deficiency is identified during pregnancy, most experts agree that 1,000–2,000 international units per day of vitamin D is safe. Higher dose regimens used for treatment of vitamin D deficiency have not been studied during pregnancy. Recommendations concerning routine vitamin D supplementation during pregnancy beyond that contained in a prenatal vitamin should await the completion of ongoing randomized clinical trials.

Vitamin D is a fat-soluble vitamin obtained largely from consuming fortified milk or juice, fish oils, and dietary supplements. It also is produced endogenously in the skin with exposure to sunlight. Vitamin D that is ingested or produced in the skin must undergo hydroxylation in the liver to 25-hydroxyvitamin D (25-OH-D), then further hydroxylation primarily in the kidney to the physiologically active 1,25-dihydroxyvitamin D. This active form is essential to promote absorption of calcium from the gut and enables normal bone mineralization and growth. During pregnancy, severe maternal vitamin D deficiency has been associated with biochemical evidence of disordered skeletal homeostasis, congenital rickets, and fractures in the newborn (1, 2).

Recent evidence suggests that vitamin D deficiency is common during pregnancy especially among high-risk groups, including vegetarians, women with limited sun exposure (eg, those who live in cold climates, reside in northern latitudes, or wear sun and winter protective clothing) and ethnic minorities, especially those with darker skin (3–5). Newborn vitamin D levels are largely dependent on maternal vitamin D status. Consequently, infants of mothers with or at high risk of vitamin D deficiency are also at risk of vitamin D deficiency (5–6).

For the individual pregnant woman thought to be at increased risk of vitamin D deficiency, the serum

concentration of 25-OH-D can be used as an indicator of nutritional vitamin D status. Although there is no consensus on an optimal level to maintain overall health, most agree that a serum level of at least 20 ng/mL (50 nmol/L) is needed to avoid bone problems (7–10). Based on observations of biomarkers of vitamin D activity, such as parathyroid hormone, calcium absorption, and bone mineral density, some experts have suggested that vitamin D deficiency should be defined as circulating 25-OH-D levels less than 32 ng/mL (80 nmol/L) (11). An optimal serum level during pregnancy has not been determined and remains an area of active research.

In 2010, the Food and Nutrition Board at the Institute of Medicine of the National Academies established that an adequate intake of vitamin D during pregnancy and lactation was 600 international units per day (12). Most prenatal vitamins typically contain 400 international units of vitamin D per tablet. Summarizing recent observational and interventional studies, the authors of a recent clinical report from the Committee on Nutrition of the American Academy of Pediatrics suggested that a daily intake higher than that recommended by the Food and Nutrition Board may be needed to maintain maternal vitamin D sufficiency (13). Although data on the safety of higher doses are lacking, most experts agree that supplemental vitamin D is safe

in dosages up to 4,000 international units per day during pregnancy or lactation (12).

At this time there is insufficient evidence to support a recommendation for screening all pregnant women for vitamin D deficiency. For pregnant women thought to be at increased risk of vitamin D deficiency, maternal serum 25-OH-D levels can be considered and should be interpreted in the context of the individual clinical circumstance. When vitamin D deficiency is identified during pregnancy, most experts agree that 1,000–2,000 international units per day of vitamin D is safe. Higher dose regimens used for the treatment of vitamin D deficiency have not been studied during pregnancy. Recommendations concerning routine vitamin D supplementation during pregnancy beyond that contained in a prenatal vitamin should await the completion of ongoing randomized clinical trials. At this time, there is insufficient evidence to recommend vitamin D supplementation for the prevention of preterm birth or preeclampsia.

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