

Supporting Healthy Pregnancies and Healthy Children

Pregnancy strains the mother's physical and nutritional resources, and prenatal multivitamins with minerals are commonly recommended to help ensure that the baby's and mother's nutritional needs are met. The effect of multivitamins with folic acid in protecting against neural tube birth defects such as spina bifida is discussed in the previous section; but there are many other benefits of adequate nutrition in supporting healthy pregnancies and healthy children.

“Whatever the limitations of our current state of knowledge, it is apparent that pregnancy and lactation are periods during which good nutrition is exceptionally important. The infant is not protected from the inadequate diet of the mother.” (Zeisel, 2009) Some of the nutrients known to be in short supply and critical to the health of the mother and the development of the infant include folate, choline, iodine, and DHA, among others. “We already know that a dollar invested in nourishing pregnant and lactating women results in a many-fold return in better infant outcomes. We are now uncovering some of the mechanisms responsible. While we are searching for specific supplements that optimize development, we should not forget to continue to invest in assuring that pregnant and lactating mothers have access to a good diet.” (Zeisel, 2009)

MULTIVITAMIN SUPPLEMENTATION

The recommended intakes for many essential vitamins and minerals increase during pregnancy, and “health care providers generally recommend that pregnant women consume a standard prenatal multivitamin and multimineral supplement as insurance against inadequate micronutrient intake.” (Picciano & McGuire, 2009) Because of the evidence that a multivitamin



with folic acid taken for a few months before and after conception can reduce the incidence of neural tube birth defects such as spina bifida, such supplementation is recommended for women of childbearing age by the Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics, the Institute of Medicine, and the National Healthy Mothers, Healthy Babies Coalition. Because of the known need for additional iron during pregnancy, the World Health Organization and the CDC recommend daily iron supplementation. In addition, the American Thyroid Association recommends that pregnant women get 150 mcg per day of supplemental iodine. (Picciano & McGuire, 2009)

The following table shows Recommended Dietary Allowances (and Adequate Intakes) for a number of vitamins and minerals, many of which are needed in higher amounts during pregnancy and lactation.

RECOMMENDED DIETARY ALLOWANCES FOR WOMEN 19-50, SHOWING INCREASED RECOMMENDATIONS FOR MANY VITAMINS AND MINERALS DURING PREGNANCY AND LACTATION

| VITAMINS & MINERALS | NON-PREGNANT | PREGNANT | LACTATING |
|---------------------|-----------------|-----------------|-----------------|
| Vitamin A | 700 mcg | 770 mcg | 1300 mcg |
| Vitamin C | 75 mg | 85 mg | 120 mg |
| Vitamin D | 15 mcg (600 IU) | 15 mcg (600 IU) | 15 mcg (600 IU) |
| Vitamin E | 15 mg | 15 mg | 19 mg |
| Thiamin | 1.1 mg | 1.4 mg | 1.4 mg |
| Riboflavin | 1.1 mg | 1.4 mg | 1.6 mg |
| Niacin | 14 mg | 18 mg | 17 mg |
| Vitamin B-6 | 1.3 mg | 1.9 mg | 2.0 mg |
| Folate | 400 mcg | 600 mcg | 500 mcg |
| Vitamin B-12 | 2.4 mcg | 2.6 mcg | 2.8 mcg |
| Pantothenic acid* | 5 mg | 6 mg | 7 mg |
| Biotin | 30 mcg | 30 mcg | 35 mcg |
| Choline* | 425 mg | 450 mg | 550 mg |
| Calcium | 1000 mg | 1000 mg | 1000 mg |
| Chromium* | 25 mcg | 30 mcg | 45 mcg |
| Copper* | 900 mcg | 1000 mcg | 1300 mcg |
| Iodine | 150 mcg | 220 mcg | 290 mcg |
| Iron | 18 mg | 27 mg | 9 mg |
| Selenium | 55 mcg | 60 mcg | 70 mcg |
| Zinc | 8 mg | 11 mg | 12 mg |

* Nutrients with Adequate Intakes rather than RDAs are marked with an asterisk

In a study of pregnancy outcomes in more than 400 low-income women, researchers at the University of Medicine and Dentistry of New Jersey found that women who took multivitamins with minerals during pregnancy were less likely to suffer a preterm delivery or to have a low-birth-weight infant. The authors conclude that “in low income, urban women, use of prenatal multivitamin/mineral supplements may have the potential to diminish infant morbidity and mortality.” (Scholl, Hediger, et al., 1997)

IODINE SUPPLEMENTATION

“The fetus is totally dependent in early pregnancy on maternal thyroxine for normal brain development.” (Becker, Braverman, et al., 2006) Thus, adequate io-

dine intake by the mother during pregnancy is critical for neural development in the fetus, and insufficiency can result in brain damage to the infant. *Average* iodine levels in women of childbearing age appear to be adequate in the U.S., but many women have inadequate levels. The American Thyroid Association “recommends that women receive 150 microgram iodine supplements daily during pregnancy and lactation and that all prenatal vitamin/mineral preparations contain 150 mcg of iodine.” (Becker, Braverman, et al., 2006)

The Recommended Dietary Allowance (RDA) for iodine for women of childbearing age is 150 mcg per day, but the RDA for iodine during pregnancy is 220 mcg per day—almost 50 percent more. Thus, a woman who becomes pregnant is suddenly faced with an

increased need for iodine to support her own health as well as that of the fetus. The RDA for iodine during lactation is even higher—290 mcg per day. Iodine is a component of the thyroid hormone, which is necessary for neural development. Severely low maternal thyroid levels during pregnancy can cause “irreversible brain damage with mental retardation and neurologic abnormalities” in the infant. “Whether mild-to-moderate maternal iodine deficiency produces more subtle changes in cognitive and/or neurologic function in the offspring is uncertain,” but many researchers believe even moderate deficiency “may affect the cognitive and motor function of children.” (Zimmermann, 2009)

Researchers in New Zealand studied the effects of mild iodine deficiency in children 10 to 13 years of age. Iodine deficiency in New Zealand has recently re-emerged as a problem due to “lower concentrations of iodine in milk because of the discontinuance of iodine-containing sanitizers in the dairy industry, declining use of iodized salt, and an increased consumption of processed foods not made with iodized salt.” In the study, 184 children were given an iodine tablet (150 mcg iodine) or a placebo for 28 weeks. The iodine supplement significantly improved scores on cognitive tests, suggesting “that mild iodine deficiency could prevent children from attaining their full intellectual potential.” (Gordon, Rose, et al., 2009)

IRON SUPPLEMENTATION

In a study of 513 low-income pregnant women in Cleveland, iron supplementation (30 mg iron as ferrous sulfate) during pregnancy led to higher average birth weights and a lower incidence of low-birth-weight infants. The authors suggest that prenatal iron supplementation “deserves further examination as a measure to improve birth weight and potentially reduce health care costs.” (Cogswell, Parvanta et al., 2003)

An analysis of data from the Third National Health and Nutrition Examination Survey showed that 73 percent of pregnant women and 60 percent of lactating women had used supplements containing iron during the previous month. This compared to very low levels of use among nonpregnant women—only nine percent among adolescents and 23 percent among women over 18. Use of supplements that contain iron was associated with a lower prevalence of iron deficiency among women 19 to 50. (Cogswell, Kettel-Khan, et al., 2003)

“In the United States, the prevalence of third trimester anemia among low-income pregnant women is 29 percent and has not improved since the 1980s.” The authors studied whether low-income women would adhere to advice to use iron-containing prenatal multivitamin/mineral supplements. Among 244 pregnant women receiving care at a public prenatal clinic, 74 percent took the supplements as prescribed. (Jasti, Siega-Riz, et al., 2005)

COMPLIANCE WITH RECOMMENDATIONS FOR PRENATAL SUPPLEMENTS

While prenatal supplements are routinely recommended or prescribed, not all pregnant women comply with these recommendations, especially among women who are African-American or Hispanic. Researchers convened 12 focus groups to explore motivators and barriers to prenatal supplement use among minority women. Motivators for supplement use included experiencing positive effects, having access to a convenient supply, affordability of the supplements, reinforcement by health care providers, and having a social network that reinforced the importance of daily intake. (Tessema, Jefferds, et al., 2009)

Bottom Line

Nutrient needs are increased during pregnancy and lactation, and a prenatal multivitamin with minerals is commonly prescribed to ensure that needs are met. Support from the healthcare provider as well as from a woman's social network is needed to help ensure compliance with this recommendation.

REFERENCES

- Becker, D. V., Braverman, L. E., Delange, F., Dunn, J. T., et al. (2006). Iodine supplementation for pregnancy and lactation-United States and Canada: recommendations of the American Thyroid Association. *Thyroid*, *16*(10), 949-951.
- Cogswell, M. E., Kettel-Khan, L., & Ramakrishnan, U. (2003). Iron supplement use among women in the United States: science, policy and practice. *J Nutr*, *133*(6), 1974S-1977S.
- Cogswell, M. E., Parvanta, I., Ickes, L., Yip, R., et al. (2003). Iron supplementation during pregnancy, anemia, and birth weight: a randomized controlled trial. *Am J Clin Nutr*, *78*(4), 773-781.
- Gordon, R. C., Rose, M. C., Skeaff, S. A., Gray, A. R., et al. (2009). Iodine supplementation improves cognition in mildly iodine-deficient children. *Am J Clin Nutr*, *90*(5), 1264-1271.
- Jasti, S., Siega-Riz, A. M., Cogswell, M. E., Hartzema, A. G., et al. (2005). Pill count adherence to prenatal multivitamin/mineral supplement use among low-income women. *J Nutr*, *135*(5), 1093-1101.
- Picciano, M. F., & McGuire, M. K. (2009). Use of dietary supplements by pregnant and lactating women in North America. *Am J Clin Nutr*, *89*(2), 663S-667S.
- Scholl, T. O., Hediger, M. L., Bendich, A., Schall, J. I., et al. (1997). Use of multivitamin/mineral prenatal supplements: influence on the outcome of pregnancy. *Am J Epidemiol*, *146*(2), 134-141.
- Tessema, J., Jefferds, M. E., Cogswell, M., & Carlton, E. (2009). Motivators and barriers to prenatal supplement use among minority women in the United States. *J Am Diet Assoc*, *109*(1), 102-108.
- Zeisel, S. H. (2009). Is maternal diet supplementation beneficial? Optimal development of infant depends on mother's diet. *Am J Clin Nutr*, *89*(2), 685S-687S.
- Zimmermann, M. B. (2009). Iodine deficiency in pregnancy and the effects of maternal iodine supplementation on the offspring: a review. *Am J Clin Nutr*, *89*(2), 668S-672S.