U.S. dietary iodine status remains sufficient overall, but pregnant women may be mildly iodine-deficient

Caldwell KL et al. Iodine status of the U.S. population, National Health and Nutrition Examination Survey, 2005–2006 and 2007–2008. Thyroid 2011;21:419-27.

The iodine nutritional status of the U.S. population has been assessed periodically since 1971 by the National Health and Nutritional Examination Survey (NHANES). Major sources of iodine in the U.S. diet include iodized salt, dairy foods, and some grain products. The World Health Organization has determined that a median urinary iodine (UI) level of 100 to 199 µg/L reflects optimal iodine nutrition for populations of nonpregnant adults. During pregnancy, because dietary iodine requirements and renal iodine excretion are both increased, a median UI of 150 to 249 µg/L is considered optimal.

Spot urinary iodine measurements were obtained in about one third of the 5000 participants in the 2005–2006 NHANES and in all of the 5000 participants 6 years of age or older in the 2007–2008 NHANES. Sampling was designed to be nationally representative. Pregnant women were identified on the basis of urine testing.

Overall, population median UIs were 164 µg/L (95% CI, 154 to 174) in 2005–2006 and 164 µg/L (95% CI, 154 to 173) in 2007–2008. These values have not changed substantially in NHANES surveys since 2000. Children had higher UIs than adults; the median UI for children 6 to 11 years of age was 239 µg/L (95% CI, 193 to 279) in 2005–2006 and 215 µg/L (95% CI, 194 to 240) in 2007–2008. Non-Hispanic black individuals had lower UI (2007–2008 median UI, 137 µg/L; 95% CI, 123 to 155) than non-Hispanic white individuals (2007–2008 median UI, 168 µg/L; 95% CI,154 to 180) and Mexican Americans (2007–2008 median UI; 174 µg/L; 95% CI, 162 to 190).

In the combined dataset from 2005–2006 and 2007–2008 there were a total of 184 pregnant women. Their median UI was 125 µg/L (95% CI, 86 to 198). The combined dataset also included 1578 non-pregnant women of child-bearing age (15 to 44 years); the median UI for this group was 130 µg/L (95% CI, 116 to 139).

The authors concluded that iodine nutrition in the United States remains adequate overall, and U.S. dietary iodine intake has remained stable since 2000. However, although the sample size of pregnant women is too small to draw firm conclusions, it appears pregnant U.S. women are mildly iodine-deficient.

Commenting on this article in the July 2011 issue of 'Clinical Thyroidology', Dr. Elizabeth N. Pearce of Boston University Medical Center and ICCIDD Board Member wrote:
„The 2007–2008 NHANES survey is the first in which UI values were measured in all participants, and it represents the largest dietary iodine assessment in the United States to date.

In light of the 50% drop in urinary iodine values between NHANES I (1971–1974) and NHANES III (1988–1994) (1), it is reassuring that U.S. urinary iodine values have since stabilized and that overall U.S. iodine intake is adequate. However, the fact that pregnant women in the samples from 2005–2006 and 2007–2008 were mildly iodine-deficient is quite worrisome.

Because thyroid hormone is essential for normal neurodevelopment in utero and in early life, the groups most vulnerable to the effects of iodine deficiency are pregnant and lactating women and their offspring. Decreases in maternal and fetal free T4 associated with even mild iodine deficiency in pregnancy may have adverse effects on cognitive function in children (2,3). While larger than in previous NHANES datasets, the sample size of 184 is far too small to be truly representative of all pregnant U.S. women. More information is needed about risk factors for low dietary iodine intake among pregnant U.S. women. Data about regional and racial/ethnic variations in urinary iodine concentrations would be useful in this regard. To achieve a sample size adequate to allow for more subgroup analyses, oversampling of pregnant women should be carried out during the next NHANES survey. Until we are better able to identify particular U.S. women at risk for iodine deficiency, all pregnant and lactating women in the United States are best advised to take a prenatal multivitamin containing 150 μg of iodine daily (4).

In all of the NHANES surveys to date, children have had higher median urinary iodine concentrations than adults. This is most likely explained by children's higher dairy intakes. Whether the marginally excessive iodine intake among U.S. children will predispose them to higher rates of thyroid autoimmunity and/or thyroid dysfunction later in life is unknown. More studies are needed to better understand the effects of different levels of iodine ingestion throughout the life cycle."

References

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