USANA Technical Bulletin

Iodine

Technical Background

- Iodine (I2) is a key component of the hormone thyroxine, which is produced by the thyroid gland. Thyroxine is important for both general metabolism regulation and the promotion normal fetal development.[1]
- Iodine deficiency can lead to an enlargement of the thyroid gland (goiter), as well as other related disorders.[1,2,3]
- It is well-documented that iodine is essential to organ development and especially brain development.[4] Severe iodine deficiency during pregnancy can lead to cretinism. Less severe deficiencies during pregnancy can lead to lesser degrees of neurological damage, which are generally manifested as poor cognitive performance[5] and hearing impairment.[6,7] Such impairments are easily preventable[8] and can generally be ameliorated by iodine supplementation.[9]

Sources and Recommended Intake

- The Recommended Dietary Allowance (RDA) of iodine is 150 micrograms/day for men and women. The RDA for pregnant women is 220 micrograms/day.[10]
- Dietary sources of iodine include seaweed, shell fish, and iodized salt. Low levels of iodine in the soil exist in certain areas of the country, particularly the Midwest ("Goiter-Belt").
- In Japan, goiter has been associated with excessive dietary iodine intake. For this reason it is important to talk with your health care professional about the need for or avoidance of iodine.

Abstracts

Santiago-Fernandez P, Torres-Barahona R, Muela-Martinez JA, Rojo-Martinez G, Garcia-Fuentes E, Garriga MJ, Leon AG, Soriguer F. Intelligence quotient and iodine intake: a cross-sectional study in children. J Clin Endocrinol Metab. 2004 Aug;89(8):3851-7. The association between iodine deficiency and poor mental and psychomotor development is known. However, most studies were undertaken in areas of very low iodine intake. We investigated whether a similar association is found in schoolchildren from southern Europe with a median urinary iodine output of 90 microg/liter. Urinary iodine levels were measured in 1221 children who also completed a questionnaire about their usual dietary habits. Intelligence quotient (IQ) was measured by Cattell's g factor test. IQ was significantly higher in children with urinary iodine levels above 100 microg/liter. The risk of having an IQ below the 25th percentile was significantly related to the intake of noniodized salt and drinking milk less than once a day. As expected, the risk of having an IQ below 70 was greater in children with urinary iodine levels less than 100 microg/liter. In conclusion, this study demonstrates that the IQ of schoolchildren in a developed country can be influenced by iodine intake. The results support the possibility of improving the IQ of many children from areas with mild iodine deficiency by ensuring an iodine intake sufficient to achieve a urinary iodine concentration greater than 100 microg/liter.

References

[1] Ziegler and Filer, eds. Present Knowledge in Nutrition, 7th Edition. ILSI Press, Washington, DC. 1996.
[2] Ali O. Iodine deficiency disorders: a public health challenge in developing countries. Nutrition 1995 Sep-Oct;11(5 Suppl):517-20.
[3] Dunn JT. Seven deadly sins in confronting endemic iodine deficiency, and how to avoid them. J Clin Endocrinol Metab 1996 Apr;81(4):1332-5.
[4] Sethi V, Kapil U. Iodine deficiency and development of the brain. Indian J Pediatr. 2004 Apr;71(4):325-9.
[5] Qian M, Wang D, Watkins WE, Gebski V, Yan YQ, Li M, Chen ZP. The effects of iodine on intelligence in children: a meta-analysis of studies conducted in China. Asia Pac J Clin Nutr. 2005;14(1):32-42.
[6] Stanbury, JB, Ed. The Damaged Brain of Iodine Deficiency. Cognizant Communication Corp, New York. 1994.
[7] Kretchmer N, Beard JL, Carlson S. The role of nutrition in the development of normal cognition. Am J Clin Nutr 1996 Jun;63(6):997S-1001S.
[8] Delange F. The disorders induced by iodine deficiency. Thyroid 1994 Spring; 4(1):107-28.
[9] Becker DV, Braverman LE, Delange F, Dunn JT, Franklyn JA, Hollowell JG, Lamm SH, Mitchell ML, Pearce E, Robbins J, Rovet JF. Iodine supplementation for pregnancy and lactation - United States and Canada: recommendations of the American Thyroid Association. 2006. Thyroid 16(10):949-951.
[10] Institute of Medicine, Food and Nutrition Board. Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc (2000). National Academy Press: Washington, D.C.