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Association of Iodine and Iron with Thyroid Function

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Abstract

Iodine and iron are essential elements for healthy thyroid function. However, little is known about the association of iron and iodine with thyroid function in the general US population. We investigated iron and iodine status in relation to concentrations of thyroid hormones. We included 7672 participants aged 20 and older from three surveys (2007-2008, 2009-2010, and 2011-2012) of the National Health and Nutrition Examination Survey. Serum thyroid measures (including free and total T3 and T4, and TSH), serum iron concentration, and urinary iodine concentrations were measured. Multivariate linear regression models were conducted with serum thyroid measures as dependent variables and combinations of serum iron concentration and urinary iodine concentration as predictors with covariate adjustment. Logistic regression models were performed with TSH levels (low, normal, and high) and combinations of serum iron concentration and urinary iodine concentration. Overall, 10.9% of the study population had low iron; 32.2 and 18.8% had low or high iodine levels, respectively. Compared with normal levels of iron and iodine, normal iron and high iodine were associated with reduced free T3 and increased risk of abnormal high TSH. **Combined low iron and low iodine was associated with reduced free T3 and increased TSH.** In addition, high iodine was associated with increased risk of abnormal high TSH in females but not in males. Thyroid function may be disrupted by low levels of iron or abnormal iodine, and relationships are complex and sex-specific. Large prospective studies are needed to understand the mechanisms by which iron interacts with iodine on thyroid function.

Keywords: Iodine; Iron; Thyroid cancer; Thyroid function; Trace elements.

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