Iodine nutrition: recent research and unanswered questions

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Many adverse consequences of iodine deficiency have long been known, but new associations are still being studied and uncovered.

1. Mild iodine deficiency and neurocognitive outcomes
Observational cohorts have demonstrated that mild iodine deficiency in pregnant women may be associated with lower child IQ and poor language development (1–3). Studies have also suggested a link between mild maternal iodine deficiency and symptoms of attention-deficit hyperactivity disorder in offspring (4). Recent data also suggest that iodine deficiency may be associated with decreased fertility in women (5).

2. Thyroglobulin: a new population biomarker
Thyroglobulin is a thyroidal protein that is released into the circulation with thyroid hormone. Levels are elevated in populations with both inadequate and excessive iodine intakes. The use of dried blood spot (DBS) thyroglobulin measurements is of interest for population iodine assessment because samples can be stored at room temperature, and are simple to transport. Unlike goiter rates, thyroglobulin levels change relatively rapidly in response to changes in iodine intake. International standards have been developed for use of DBS thyroglobulin as an index of iodine status in populations of school-aged children (6), and studies to develop this as a biomarker in pregnancy are ongoing (7). In lactating women, it has recently been determined that UIC measures should not be used in isolation, but should be interpreted in conjunction with assessment of breast milk iodine concentrations (8).

3. Best interventions for IDD prevention
Salt iodization programs that are able to achieve optimal UIC levels in school-aged children frequently result in mildly low UIC in pregnant women in the same populations (9). A recent multicenter cross-sectional study aimed to determine whether USI alone can achieve optimal iodine intakes in all vulnerable population groups (10). It concluded that, as long as a high proportion of the salt that is consumed is iodized at 25 mg/kg, USI can provide sufficient dietary iodine for all population groups, with the exception of borderline low intakes during pregnancy. Finally, a recent clinical trial demonstrated that in severely iodine-deficient regions it is more effective to supplement lactating women with iodine than to directly supplement their breastfed infants (11).

Robust data is lacking on whether iodine supplementation for non-severely iodine deficient pregnant women improves child cognition

What do we need to know in the future?
In many regions of the world there are currently no data regarding iodine status in pregnancy, and in most regions there are no data regarding the iodine status of lactating women. An adequately powered randomized clinical trial is needed to establish whether iodine supplementation for mildly/moderately iodine deficient pregnant or lactating women improves child cognitive outcomes. One such trial was previously attempted but had to be halted when funding was withdrawn (12). Another was recently completed, but women in one of the two study sites proved to be iodine sufficient prior to the intervention (13). While there are some recent data available (14, 15), a better understanding of the effects of iodine excess is needed to inform safe upper exposure thresholds, especially in vulnerable groups. As many governments work to reduce population sodium intakes, efforts are needed to understand how best to harmonize USI monitoring with salt reduction goals (16). Finally, more work is needed to establish best practices for balancing the different iodine requirements of pregnant women and school-aged children within populations.

References