Iodine supplementation in mildly iodine-deficient pregnant women does not benefit infant or child neurodevelopment


This is the first randomized placebo-controlled trial investigating the impact of iodine supplementation of mildly iodine-deficient pregnant women on child neurodevelopment. It was done in areas where other population groups have sufficient iodine intakes.

An essential component of thyroid hormones, iodine is needed for normal fetal health and development. At week 4 of pregnancy, maternal thyroid hormone promotes neuronal proliferation and migration in the developing brain (1). Fetal thyroid hormone synthesis begins at about week 20 (1); thereafter, both maternal and fetal thyroid hormones support fetal neurodevelopment (1, 2). To maintain maternal and fetal euthyroidism, iodine requirements during pregnancy increase by about 65%. In randomized controlled trials in regions of severe endemic goiter, iodine supplementation during pregnancy improved maternal thyroid status and child neurodevelopment (2). Although severe iodine deficiency now only rarely occurs in most countries, mild iodine deficiency during pregnancy remains common (3).

In this randomized, placebo-controlled trial, 832 healthy pregnant women aged 18–40 years in Bangalore, India, and Bangkok, Thailand, were randomly assigned (1:1) to receive 200 μg iodine orally once a day or placebo until delivery. Primary outcomes were verbal and performance I.Q. scores on the Wechsler Preschool and Primary Scale of Intelligence Third Edition (WPPSI-III) and the global executive composite score from the Behavior Rating Inventory of Executive Function-Preschool Version (BRIEF-P) in children aged between 5 and 6 years.

Results
Maternal urinary iodine concentration (median UIC) at baseline was 131 μg/L (IQR 81–213), indicating mild iodine deficiency. Mean compliance with supplementation was 87%. The median UIC was significantly higher in the iodine group than in the placebo group during pregnancy (p<0.0001) but not at 6 weeks post-partum (p=0.61). Iodine supplementation had minimal effects on maternal thyroid function; there were no differences in thyroid disorders between the iodine and placebo groups, and nearly all women were euthyroid.

There was no detrimental effect of iodine supplementation, consistent with previous supplementation studies in pregnant women (4).

At age 5.4 years, 313 children were analyzed for verbal and performance I.Q. with WPPSI-III, and 315 for overall executive function with BRIEF-P (see Figure 1). Investigation at this age allows assessment of a wider array of cognitive functions, and I.Q. scores are a better predictor of adult intelligence than tests given during infancy (5). No significant differences were evident between groups in the children’s mean...
The women began iodine supplementation at a mean gestational age of 10.7 weeks. Beginning supplementation earlier might have resulted in different findings, because the fetal brain rapidly develops in the first trimester (1, 2). However, the study did not find an effect of gestational age at entry on any of the developmental outcomes. These findings are similar to previous studies of iodine supplementation in mild-to-moderately iodine-deficient pregnant women (4), in which iodine did not improve concentrations of maternal or newborn thyroid hormones, which are likely to be the best biomarker for healthy fetal development. The study suggests that pregnant women might be able to physiologically adapt to mildly low iodine intakes during pregnancy, draw from intrathyroidal iodine stores, and maintain fetal euthyroidism allowing for normal in utero development (4). This conclusion is consistent with current WHO recommendations (11) that iodine supplementation is unlikely to be of harm, but might not be justified in mildly iodine-deficient pregnant women residing in countries with effective iodized salt programs where other population groups have sufficient iodine intakes. Future intervention trials in pregnant women with more severe iodine deficiency (e.g., with a median UIC <100 μg/L) and in settings where women of reproductive age are clearly iodine deficient would be valuable.

"Iodine supplementation is unlikely to be of harm, but might not be justified in mildly iodine-deficient pregnant women in countries with effective iodized salt programs where other population groups have sufficient iodine intakes."

References