Iodine deficiency in pregnancy

A cohort study suggests that iodine deficiency during early pregnancy might negatively affect the child’s cognitive development.

**Overview:** Iodine is an important component in the synthesis of thyroid hormones, which are key for neurological development during gestation. Severe iodine deficiency in pregnancy is known to result in adverse cognitive outcomes in children (Zimmermann 2009), but the effects of mild-to-moderate deficiency are not known. Evidence suggests that pregnant women in the UK do not have sufficient iodine levels (Pearce et al. 2010).

**Current advice:** NICE guidance on antenatal care recommends that pregnant women should take nutritional supplements during pregnancy. The guidance recommends routine supplementation with folic acid (before conception and during the first 12 weeks of pregnancy) and vitamin D, but does not make any recommendations on iodine supplementation.

The NICE Pathway on antenatal care brings together all related NICE guidance and associated products on the condition in a set of interactive topic-based diagrams.

**New evidence:** A cohort study by Bath et al. (2013) evaluated the link between iodine levels in pregnancy and child cognitive development in a group of 1040 mother–child pairs who had taken part in the Avon Longitudinal Study of Parents and Children (ALSPAC). Iodine and creatinine concentrations were measured in spot urine samples taken during the first trimester of pregnancy, and a urinary iodine-to-creatinine ratio of 150–249 microgram/litre was used to define adequate iodine level. Child IQ at 8 years was assessed using an abbreviated form of the Wechsler Intelligence Scale for Children, and reading speed, accuracy and comprehension at 9 years were measured with the Neale Analysis of Reading Ability.

The median iodine-to-creatinine ratio among the 958 women included in the analysis, after exclusions for abnormal values, was 110 microgram/litre (interquartile range 74 to 170 microgram/litre), indicating mild-to-moderate iodine deficiency in this group. After adjustment for 21 socioeconomic, parental and child confounders, children of women with an iodine-to-creatinine ratio of less than 150 microgram/litre in pregnancy were more likely to have a verbal IQ score in the bottom quartile than were children of women with a ratio of 150 microgram/litre or more (odds ratio [OR] 1.58, 95% confidence interval [CI] 1.09 to 2.30, p=0.02). Children of women with iodine deficiency were also more likely to have suboptimum reading accuracy (OR 1.69, 95% CI 1.15 to 2.49, p=0.007) and comprehension (OR 1.54, 95% CI 1.06 to 2.23, p=0.02). Children’s verbal IQ, reading accuracy, and reading score (sum of real words correctly identified) worsened with decreasing iodine-to-creatinine ratio.

The authors concluded that their findings show an association between mild-to-moderate iodine deficiency in pregnancy and suboptimum child cognitive development at 8–9 years, and
recommended a UK-wide review of iodine deficiency in pregnant women. The observational nature of the study means that residual confounding is a possibility, and the data are from a cohort study that started 22 years ago, which might limit the applicability of the evidence to women currently pregnant. In addition, the use of a single urine measurement taken at 1 time point might provide a limited picture of a woman’s iodine status throughout pregnancy.

Commentary: “In this relatively large sample of pregnant women, 67% were found to be iodine deficient, which is probably an underestimate given the attrition of the sample and the consequent overrepresentation of the sample with women with markers of higher socioeconomic status.

“The ALSPAC data originate from 1991, but the results echo the findings of several recent smaller studies (Kibirige et al. 2004, Rayman et al. 2008, and Lazarus and Smyth 2008) and the larger school-girl study (Vanderpump et al. 2011). The body of evidence strongly suggests that the majority of pregnant women in the UK are consuming inadequate levels of iodine. The added value of the ALSPAC data is the clear dose-response trend shown between low maternal urinary iodine levels and neurodevelopment compromise of offspring.

“Iodine deficiency in UK pregnant women is an important public health issue. However, the Scientific Advisory Committee on Nutrition advised last year that the health implications of mild to moderate iodine deficiency and consequences of the current iodine intakes of young women are not fully understood, due to insufficient evidence. Current advice states that individuals should be able to get all the iodine they need from a balanced diet. Whether prophylaxis should be offered and which is the best and safest method of ensuring an adequate iodine intake should be addressed (for instance, concurrent selenium and iron deficiencies would also need to be considered).” – Fiona Williams, Co-Director of Population Health Sciences, University of Dundee

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