Iodine deficiency during pregnancy may adversely affect children's mental development

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A study of around 1,000 UK mothers and their children, published in *The Lancet*, has revealed that iodine deficiency in pregnancy may have an adverse effect on children's mental development. The research raises concerns that the iodine status of pregnant women is a public health issue that needs to be addressed.

Iodine – which is consumed mainly via dairy products and seafood – is essential for producing the hormones made by the thyroid gland, which have a direct effect on fetal brain development. Although the potentially harmful effects of severe iodine deficiency on brain development are well-established, very few studies have examined the effect of mild or moderate iodine deficiency during pregnancy on cognitive development in the child. The recent recognition of mild-to-moderate iodine deficiency in some UK population groups, including pregnant women, has allowed this effect to be investigated.

A group of researchers from Surrey and Bristol universities, led by Professor Margaret Rayman of the University of Surrey, in Guildford, UK, used samples and data from Bristol-based Avon Longitudinal Study of Parents and Children (ALSPAC), also known as 'Children of the 90s'. This is a long-term health research project in which more than 14 000 mothers enrolled during pregnancy in 1991 and 1992; the health and development of their children has been followed in great detail ever since.

The researchers measured the iodine concentration in urine samples taken in the first trimester from 1040 pregnant women. Following World Health Organisation (WHO) guidelines on recommended concentrations of iodine during pregnancy, they classified women who had an iodine-to-creatinine ratio [1] of less than 150 ?g/g as being iodine deficient, and those with a ratio of 150 ?g/g or more as iodine sufficient. Over two thirds (67%) of the women fell into the category of less than 150 ?g/g.

Mental development of the women's children was assessed by measuring child IQ at age 8, and reading ability at age 9. Adjusting the results for external factors likely to affect these scores, such as parental education and breast-feeding, the researchers found that children of women in the iodine-deficient group were significantly more likely to have low scores (lower quartile) of verbal IQ, reading accuracy, and reading comprehension. Moreover, the lower the mother's concentration of iodine, the lower were the average scores for IQ and reading ability in the children.

According to Professor Rayman, "Our results clearly show the importance of adequate iodine status during early pregnancy, and emphasise the risk that iodine deficiency can pose to the developing infant, even in a country classified as only mildly iodine deficient."

Dr Sarah Bath, a co-author and registered dietitian, points out that "Pregnant women and those planning a pregnancy should ensure adequate iodine intake; good dietary sources are milk, dairy products and fish. Women who avoid these foods and are seeking alternative iodine sources can consult the iodine fact sheet that we have developed, which is available on the web-sites of the University of Surrey and the British Dietetic Association. Kelp supplements should be avoided as they may have excessive levels of iodine."

According to another co-author, ALSPAC founder Professor Jean Golding OBE, "This study provides further strong evidence of the importance of eating iodine-rich foods like fish during pregnancy."

Previous results from ALSPAC indicated that a mother's consumption of seafood during pregnancy was associated with her child's mental development, with lower seafood consumption associated with poorer scores in reading and IQ tests. At the time, researchers speculated that this might be due to higher levels of omega-3 fatty acids in seafood, but the current study – which also adjusted for mothers' intake of omega-3 fatty acids as a possible confounder on the effects on cognitive development – suggests that these effects could have had more to do with iodine concentrations than previously realised.

Writing in a linked Comment, Alex Stagnaro-Green of George Washington University, Washington DC, USA, says that the findings "should be regarded as a call to action to public health policy makers in the UK. Absence of a public health policy in the face of clear documentation of moderate iodine deficiency and strong evidence of its deleterious effect on the neurodevelopment of children is ill advised. Nor should unmonitored and adventitious dietary iodine sources continue to be relied on. Until measures are taken to ensure that iodine needs can be met by usual dietary sources, pregnant and breastfeeding women should insist that the prenatal vitamins they are prescribed contain iodine."

More information: Paper: www.thelancet.com/journals/lan … (13)60436-5/abstract

[1] Because only a single iodine measurement was taken, and absolute iodine concentration varies with the volume of urine produced, the researchers also measured concentration of a substance called creatinine, which gives an indication of how dilute the urine sample is. Iodine concentrations were then recorded as the ratio of iodine to creatinine, expressed in micrograms of Iodine per gram of creatinine.

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