Iodine deficiency in pregnant women in Europe

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The adverse effects of iodine deficiency in populations (decreased IQ, goiter, hypothyroidism, and hyperthyroidism) are easily corrected with salt iodisation.[1] However, these adverse effects continue to be a problem in many countries, with an estimated 1·9 billion people at risk worldwide.[2] All European countries endorsed the goal of elimination of iodine deficiency at the 1992 World Health Assembly (WHA), and the 2005 WHA again called on all Member States to regularly monitor iodine nutrition. WHO recommends use of the median urinary iodine concentration in national or regional surveys to classify iodine nutrition in populations.[4] Adequate iodine nutrition in the general population is shown by a median urinary iodine concentration for school-age children (aged 6–12 years) of 100–299 µg/L.[4] Despite calls to monitor and eliminate Iodine deficiency, during the past decade, compared with other WHO regions, Europe has had the highest percentage of iodine-deficient school-age children,[3] despite its wealth and its high standards of health care. In 2015, in the WHO European region, only 47·9 million (66%) of the region's 72·1 million school-age children have adequate iodine intakes.[3]

Iodine deficiency is especially problematic in pregnant women, who have a higher iodine requirement (250 µg per day) than non-pregnant women (150 µg per day) because they need to synthesise additional thyroid hormone to cover maternal and fetal needs, and pass iodine to the fetus for fetal thyroid hormone production.[4] Iodine deficiency in utero can cause fetal hypothyroidism and irreversibly impair cognitive development, and data from observational studies in Europe suggest that even mild-to-moderate iodine deficiency during pregnancy can have long-term adverse effects on child cognition.[6] The median urinary iodine concentration in school-age children should not be used as proxy to assess iodine nutrition of pregnant women, who should be separately monitored.[5] Adequate iodine nutrition in pregnant women is shown by a median urinary iodine concentration between 150 and 499 µg/L.[4]

To estimate the prevalence of iodine deficiency during pregnancy at the national level in the countries of the WHO European region, we searched PubMed, the WHO Vitamin and Mineral Nutrition Information System database,[7] the Multiple Indicator Cluster Surveys (UNICEF) database, and the iodine deficiency disorders newsletters. To be included, studies had to have used a cross-sectional population-based sample frame and standard assay techniques to determine urinary iodine concentration. For each country, we selected the most recent national survey of pregnant women within 15 years (2000–15). For countries where a national survey was not available, we pooled all eligible subnational studies that sampled at least 100 women and presented these as a weighted national estimate. We used the median urinary iodine concentration obtained from the survey data to classify iodine nutrition in pregnant women in countries according to WHO criteria: insufficient median urinary iodine concentration less than 150 µg/L and adequate concentration between 150 and 499 µg/L.[4]

In 2015, 58% of pregnant women in Europe are covered by national or pooled subnational surveys; the more populous countries that still do not have data are Germany, Uzbekistan, Kazakhstan, Hungary, and Sweden. In ten countries, iodine intakes are adequate during pregnancy, in 21 countries intakes are deficient, and 23 have no data available (figure, appendix). Of European countries that have assessed iodine nutrition during pregnancy, two-thirds have reported inadequate iodine intakes.

See Online for appendix

Why has iodine deficiency, especially during pregnancy, received such little attention on the European public health agenda? Many health officials might still equate iodine deficiency with visible goitre, a disorder that has disappeared in most of Europe, and are unaware of its more subtle adverse effects on cognitive and motor development. A randomised controlled trial in European school-age children has shown moderate iodine deficiency

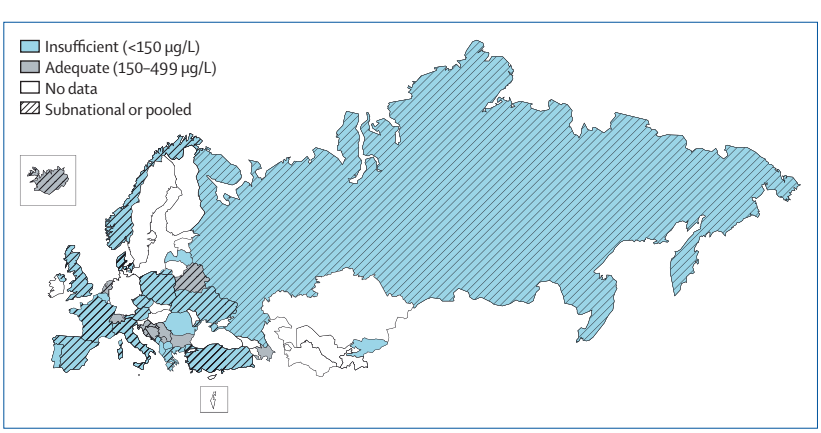

Figure: **Iodine nutrition during pregnancy in the countries of the WHO European Region and Kosovo, based on urinary iodine excretion (µg/L)**

impairs cognition.[8] However, no large trials have been done in pregnant women with mild-to-moderate iodine deficiency to assess the effects of iodine repletion on infant development or post-partum maternal outcomes. This paucity of data could contribute to the reluctance of health officials to prioritise iodine nutrition during pregnancy. However, thyroid experts emphasise that, until additional physiological data are available to make a better judgment, pregnant women (and women planning a pregnancy) should ensure they are using iodised salt and should consider taking a prenatal supplement that contains 150 mcg iodine once a day.[9]

Several actions should be implemented to improve iodine intakes in pregnant women in Europe. WHO has repeatedly emphasised that an effective iodised salt programme with high household coverage is the best strategy to provide adequate iodine to pregnant women, partly because it ensures thyroidal iodine stores are full in women of reproductive age.[4] In Europe, an increasingly smaller amount of consumed salt is added to foods in the household (eg, in the UK only about 15% of all salt consumed).[10] Thus, for iodised salt programmes to be successful, processed foods need to contain iodised salt.

Iodine supplementation for pregnant women might be useful when there is insufficient iodised salt, and all prenatal vitamin-mineral supplements should contain iodine. However, because most women become aware they are pregnant towards the end of the first trimester, supplementation often does not cover the first trimester, when the developing fetal brain is especially vulnerable.[11] In most European countries, like in the USA,[11] most prenatal vitamin supplements do not contain iodine (unpublished data). Also, supplements often do not reach poorer, less educated women, making supplementation a less equitable approach than salt fortification. Therefore, use of iodised salt by the food industry should be strongly encouraged. Denmark and Belgium have instituted compulsory iodisation of salt used in bread; however, this strategy does not seem to meet the needs of the higher iodine requirement during pregnancy.[4] Iodisation of all food-grade salt is preferable, as in Croatia and Serbia, where iodised salt programmes cover the needs of pregnancy.[4] In Belarus, adequate iodine intakes during pregnancy have been achieved thanks to a national strategy that combines mandatory use of iodized salt by the food industry and promotion of iodised table salt directly to consumers.[12]

Education of health authorities and the public on the need to prevent iodine deficiency by consuming iodised salt should take into account policies to reduce salt consumption.[13] The recent Series in *The Lancet* on child development,[14] and the World Bank,[15] recommend that governments put a high priority on salt iodisation to promote health and economic development. Although this recommendation was aimed at low-income and middle-income countries in the developing world, it also applies to Europe.

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