The re-emergence of iodine deficiency in Australia

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Until the late 1990s adequate iodine intake had been maintained in the Australian population for many decades by the unregulated contribution of iodine to dairy milk from iodophors used as sanitisers in the dairy industry. Natural dietary sources of iodine included seafood, eggs and discretionary use of iodised salt contributed less than iodophors. In the late 1990s it became apparent in Sydney, Melbourne and Tasmania that urinary iodine excretion levels in children were declining dramatically without obvious reason (1). A large representative study of school children, measuring urinary iodine excretion and thyroid volume by ultrasound, called the National Iodine Nutrition Study (NINS), was undertaken in 2003-2004 by a nationwide collaboration of scientists and Doctors, coordinated by the Institute of Clinical Pathology and Medical Research from Westmead Hospital in Sydney and supported by the Australian Thyroid Foundation. Tasmania and the Northern Territory were studied separately. Data was collected on urinary iodine excretion levels (acting as a surrogate measure of iodine intake) and thyroid volume measured by ultrasound. The NINS results confirmed that Australian schoolchildren were mildly iodine deficient according to WHO criteria with a national median urinary iodine excretion level of less than 100 ug/l – the cut-off level for iodine deficiency in a population - and that thyroid gland size was larger than in children living in iodine replete countries (2). While there is no nationally representative study of iodine nutrition in pregnant Australian women, multiple studies in several States have all reported subnormal urine iodine excretion values consistent with iodine deficiency.

What has caused the re-emergence of iodine deficiency in Australia?

When iodine deficiency re-emerged in the 1990s it took most by surprise. As milk was the major dietary source of iodine our investigations of iodophor usage in the dairy industry confirmed a declining usage of these sanitisers in Australia and this fact, coupled with the knowledge that less than 10% of household salt purchased in Australia was iodised, provided the explanation for the re-emergence of iodine deficiency (1). Unlike many other countries in the world the food industry in Australia has avoided using iodised salt for manufacturing and preserving foods.

Have there been any adverse effects from the re-emergence of iodine deficiency in Australia?

First, we need to emphasise that iodine deficiency in Australia has been categorised as mild except for parts of the NT, Victoria and Tasmania where it is most severe. Second, outcome data documenting adverse effects from iodine deficiency in mothers and children have come largely from observational studies and not from randomised controlled trials.

What has emerged is:

- In the NINS data there was a statistically significant increase in thyroid volumes in Australian children compared with those living in iodine sufficient countries, consistent with the early development of endemic goitre in Australia.
- Monitoring of neonatal thyroid function in Victoria has revealed a consistent pattern over the past decade, suggestive of maternal iodine deficiency.
In a recent Tasmanian longitudinal follow-up study of 9 year old children born to iodine deficient mothers, results of NAPLAN tests in these children showed reductions of 10% in spelling, 7.6% in grammar and 5.7% in English literacy compared with children born to iodine sufficient mothers (3).

What have we done about correcting iodine deficiency in Australia?

The NINS data was the major driver in developing the policy for fortification of food with iodine to correct population iodine deficiency. The ideal outcome would have been Universal Salt Iodisation (USI), where all salt for human consumption is mandatorily iodised. In the face of strong opposition from the food industry, the best that could be achieved in 2009 was mandatory fortification of iodised salt in commercial baking of bread and bread products. The expectation was that it would correct iodine deficiency in children and adults, but not pregnant and breast feeding women. The NHMRC responded by recommending “that women who are pregnant or breastfeeding or considering a pregnancy, except those with pre-existing thyroid disorders, take an iodine supplement of 150 ug each day”.

Results of the 2011-2013 Australian Health Survey

Data was recently released from the 2011-2013 National Health Measures Survey (NHMS) providing results of urinary iodine excretion levels in 11,000 respondents from across Australia. The good news is that there has been a dramatic improvement in iodine intake, as median urinary iodine excretion levels in Australia are now well above the 100 ug/l, having almost doubled since the implementation of mandatory iodine fortification of salt in bread. As predicted, most women of reproductive age (62.2%) had urinary results below the recommended level, confirming iodine intake remains inadequate in pregnant women in Australia (4). This survey confirms that mandatory fortification of salt in bread is enough to meet the iodine requirements of most adults and children in Australia. The exceptions are pregnant and breastfeeding women whose intake remains deficient. We know iodine supplementation of 150 ug daily corrects the situation, but recent research tells us that 50% of pregnant women are not taking a supplement during pregnancy (5). This is the issue we must address. In addition, children who do not eat bread or do not drink milk may need to be given a daily supplement. A national monitoring program is required to eliminate iodine deficiency that threatens current and future generations of Australian children.

References: