

Plenary 3: Micronutrients - Iodine

The current status of iodine nutrition in Australia

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Iodine of maternal origin is essential for brain development during foetal and early neonatal life. Globally, iodine deficiency is the leading cause of preventable mental handicap. Individually, the developing brain is extremely vulnerable to even minor degrees of maternal hypothyroxinemia secondary to iodine deficiency. Even mild, clinically unrecognisable, hypothyroxinemia can cause serious irreversible neuromotor deficits rendering a child handicapped for life. The invisibility of the deficiency makes it all the more dangerous. WHO estimates that 2 billion people worldwide, comprising over 300 million children in 54 countries, still have inadequate iodine intake, with over 41 million newborns not protected annually from iodine deficiency. Meta-analyses of IQ studies in children, born to mothers who are moderately to severely iodine deficient during pregnancy, show an IQ loss of 10 to 15 points.

The recommended daily intake of iodine in the child and the adult non-pregnant state is 150 ug, increasing to 250 ug during pregnancy. The increased daily requirement represents the need to satisfy increased maternal T4 production, transfer of both T4 and iodine to the foetus and increased maternal renal iodide clearance. The infant requires around 90 to 100 ug iodine per day, mandating a requirement of 250 ug iodine daily in the breastfeeding mother. Iodine content of human breast milk varies with maternal iodine intake, emphasising the need to ensure iodine intake is optimised during lactation to protect the infant from hypothyroxinemia.

Several localised, regional studies in South Eastern Australia and Tasmania have recently documented the re-emergence of mild to moderate iodine deficiency. To provide a comprehensive snapshot of iodine nutrition throughout Australia we undertook a National Iodine Nutrition Study between mid 2003 and end 2004. The survey was a cross-sectional study of 8 to 10 year old school children, randomly selected from government and non-government primary schools, in the 5 mainland Australian states of New South Wales, Victoria, South Australia, Western Australia and Queensland. The sample consisted of 1,709 students from 88 schools, comprising 881 boys and 828 girls. 1) Urinary iodine excretion levels (UIE) were determined and compared with WHO/ICCIDD criteria for the severity of iodine deficiency. 2) Thyroid volumes measured by ultrasound were compared with new international reference values (WHO/ICCIDD). On a State basis, NSW and Victorian children are mildly iodine deficient with median UIE levels of 89ug/L and 73.5ug/L, respectively. South Australian children are borderline iodine deficient with a median UIE of 101ug/L. Both Queensland and Western Australian children are iodine sufficient with median UIE levels of 136.5 ug/L and 142.5 ug/L, respectively. Thyroid volumes were significantly larger in Australian children compared with the iodine-replete international reference range. Ongoing studies of iodine nutrition in pregnant women in NSW, and their offspring, confirm mild to moderate iodine deficiency is widespread throughout the State.

The results of this study confirm the existence of inadequate iodine intake in the Australian population and call for the implementation of mandatory iodisation of all edible salt in Australia. In the interim, we recommend iodine supplementation be considered for pregnant women, those contemplating a pregnancy, and breastfeeding mothers.