

Iodine deficiency uncovered in the UK

A national study finds more than 2/3rds of schoolgirls have low iodine intakes



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The United Kingdom (UK) currently has no national program of food or salt iodization, and there has been no national survey of iodine nutrition in the country in over 60 years. Vanderpump and colleagues from the British Thyroid Association recently assessed iodine status of the UK population. As reported in *The Lancet* (2011;377:2007-12), they performed a cross-sectional survey in 2009 in girls aged 14-15 years attending secondary school in nine UK centers (Aberdeen, Belfast, Birmingham, Cardiff, Dundee, Exeter, Glasgow, London and Newcastle-upon-Tyne), with three different sampling clusters in each center. Urinary iodine (UI) concentrations were measured in 737 girls. Although the WHO and ICCIDD recommend sampling 6-12 year-old children in iodine surveys, older girls were chosen for this survey because they might proceed to pregnancy in the short-to-medium term.

Median UI excretion was 80.1 µg/L (IQR 56.9-109.0). The WHO/ICCIDD cut-off for the median UI that indicates iodine deficiency is <100 µg/L. UIs indicative of mild iodine deficiency were present in 51% (n=379) of participants, moderate deficiency in 16% (n=120), and severe deficiency in 1% (n=8). Prevalence of iodine deficiency was highest in Belfast (85%, n=135). Tap water iodine concentrations were low or undetectable and were not positively associated with UIs. Low UIs were predicted by sampling in summer, geographical location and low intakes of milk (the main source of iodine in the UK).

Thus, the study findings suggest the UK is currently iodine deficient and the authors of the paper conclude there is "...an urgent

need for a comprehensive investigation of UK iodine status and implementation of evidence-based recommendations for iodine supplementation." The UK is now in the top 10 iodine-deficient countries (based on national median UIC <100 µg/L in children) with the greatest numbers of school-age children with insufficient iodine intake (UIC < 100 µg/L) (see Figure 1).

Health authorities in the UK and those in many other industrialized countries have been slow to grasp that iodine deficiency is not confined to developing countries. In Australia, the UK and the US, three countries previously iodine sufficient, iodine intakes are falling. Australia and the UK are now mildly iodine deficient, and in the US, iodine intakes are about 50% lower than intakes 30 years ago (1). Subgroups

ning iodized salt) and dairy products. But some of the iodine in bread (from iodized dough conditioners) and nearly all of the iodine in dairy products is adventitious: dietary iodine supplements given to cows and residues of disinfectant iodophors used for cleaning teats and milk storage containers end up in milk and can sharply increase its low native iodine content. A recent study in Canada found iodine concentrations in milk often exceeds 450 µg/L if lactating cows are given high-dose iodine supplements (2). Over the past few decades, adequate dietary intakes in many industrialized countries have depended on these 'accidental' and unregulated iodine sources. But intake from these sources may be falling, for commercial and legislative reasons.

Vanderpump and colleagues concluded:

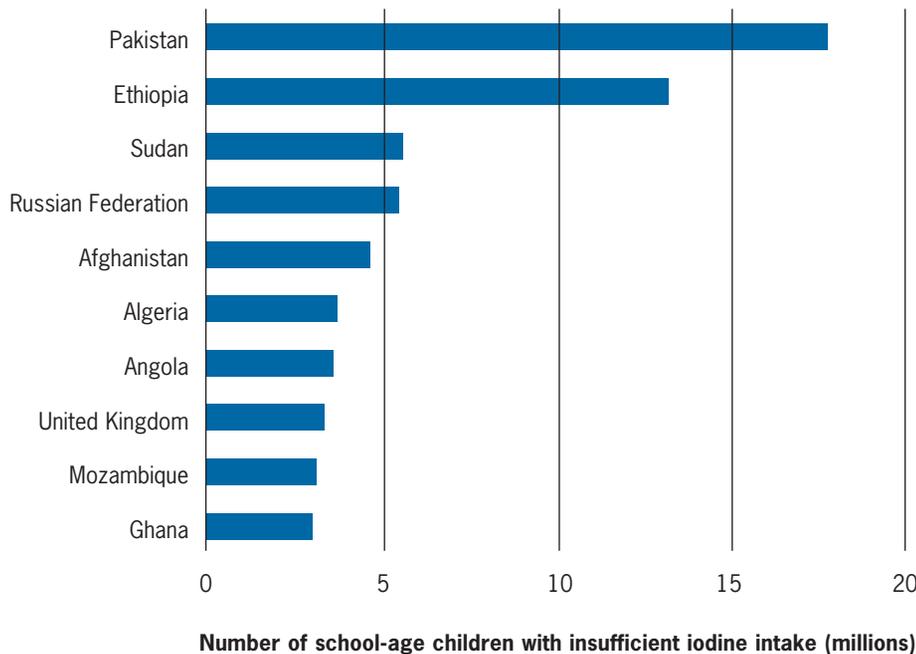
"There is an urgent need for a comprehensive investigation of UK iodine status and implementation of evidence-based recommendations for iodine supplementation."

of reproductive age women in the US are now at risk for iodine deficiency (see following article in this issue of the IDD NL).

There are several reasons why iodine intakes in these industrialized countries are falling. The major dietary sources of iodine in typical 'Western' diets are bread (contai-

For example, in Australia in 1975, the mean iodine concentration in cows' milk was nearly 600 µg/L. Concerned about potential toxicity, the government specified a milk iodine limit of 500 µg/L in 1982. This led to the replacement of many iodophors by chlorine-containing sanitizers.

Figure 1 The UK is now number 8 on the list of the top 10 iodine-deficient countries (based on national median UIC <math><100 \mu\text{g}/\text{L}</math> in children) with the greatest numbers of school-age children with insufficient iodine intake (UIC <math><100 \mu\text{g}/\text{L}</math>) in 2011.



By 2001, median iodine content of milk samples in Sydney had fallen to $140 \mu\text{g}/\text{L}$. In 2004, a national survey found children in southeastern Australia were iodine deficient (3) and 9% of girls had goiter by thyroid ultrasound, leading to the introduction of a national program in 2009 to iodize all salt used in bread making.

In the U.K., historically a ‘goiter belt’ extended through much of north-central England and Wales. In these areas in the 1940s and 50s, goiter was present in up to 50% of older girls and young women, but in the 1960s, endemic goiter disappeared. Phillips suggested this “accidental public health triumph” resulted from increasing use of iodophors in dairying and higher milk intake (4); iodine-containing bread conditioners may also have contributed. Mainly due to these adventitious sources, dietary iodine intakes in the U.K. increased between 1952 and 1982 from $80 \mu\text{g}$ to $255 \mu\text{g}/\text{day}$. However, since then milk intakes have fallen while less than 5% of household salt in the UK is iodized.

What can be done to prevent iodine deficiency in industrialized countries? In most industrialized countries, because greater than 80% of salt consumption is from purchased processed foods, if only household salt is iodized, it will not supply adequate iodine. Thus, to successfully control ID in industrialized countries, it is critical to convince the food industry to use iodized salt in their products (see article later in this issue of the IDD NL). Fortunately, iodine at ppm levels in foods does not cause any sensory changes, and, in most countries, the price difference between iodized and noniodized salt is negligible, so there are no major barriers to its use in foods. In Denmark and the Netherlands, nearly all salt used by the baking industry is iodized, and this controls ID. Switzerland’s long-running iodized salt program has been successful because ca. 60% of salt used by the food industry is iodized on a voluntary basis. The current global push to reduce salt consumption to prevent chronic diseases and the policy of salt iodization to control

ID do not conflict: iodization methods can fortify salt to provide adequate iodine even if per capita salt intakes are reduced to $<5 \text{ g}/\text{day}$, as long as all salt consumed is iodized.

References

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