

Iodised salt and hyperthyroidism

We should insist on iodisation of salt

In 1995 the Government of Sri Lanka made it mandatory, by gazette notification, that all salt for human consumption be iodised to contain at least 50 mg of iodine/kg salt, as there was evidence that the prevalence of iodine deficiency disorders (IDD) in the country was high. During the past two years doubts have been raised regarding the advisability of such a policy. A recent study has shown a high, age-related prevalence of TgAb in a small sample of the population (1). This raises serious concerns about the deleterious effects of over-iodisation, as the high prevalence of TgAb may reflect an exuberant immune response to over-iodination of Tg molecules (1). More than half the samples of salt examined in this study were found to be iodised above the level stipulated by the gazette notification. However, urinary iodine was within normal limits.

If salt is iodised to 50 mg iodine/kg salt when it leaves the factory, due to our hot humid conditions and to inadequate packing, at the household level the amount of iodine could be expected to fall to about 35 mg/kg salt. If salt consumption is 5 g per day, for an individual to receive 150 µg daily, the salt should contain 50 mg/kg, whereas the iodine content need only be 25 mg/kg salt if salt consumption is 10 g daily.

Let us see what action has been taken in other countries regarding this problem. A recent WHO publication gives information on programs designed to eliminate IDD in some European countries (2).

Switzerland

Iodisation commenced in 1922 in Switzerland. By 1952 iodised salt was available throughout the country. In 1962 the iodine content was raised from 3.75 to 7.5 mg/kg salt, and in 1980 to 15 mg/kg salt. Because the urinary iodine was found to be decreasing in the 1990s, due probably to the importation of food prepared with non-iodised salt, the iodisation level in salt was raised to 25 and 30 mg/kg salt in 1998. The price of both iodised and non-iodised salt is kept the same. In 1989 a survey showed that 92% of households were using iodised salt despite both types of salt being freely available. If (in compliance with liberalisation of international trade) the salt monopoly in Switzerland has to be abolished, steps will be taken to assure that imported salt is adequately iodised (2).

Germany

Germany is an iodine deficient land, and goitre is endemic. Since the 1980s prophylactic measures have been introduced, which differed in East and West Germany. In East Germany, "general prophylaxis" was able to supply sufficient iodine. In West Germany, use of iodised salt was optional. After re-unification, the principle of voluntary action was applied throughout the country and iodine intake decreased. In December 1993 new regulations were

enforced. There was an increase in the use of iodised salt, especially in the food industry as well as in mineral mixtures for livestock. The iodine content of milk increased to 82 µg/litre. In 1990 baby food was enriched with potassium iodate. The iodine content of breast milk increased from 36 in 1992 to 95 mg/l in 1995. The thyroid volumes of neonates decreased and renal iodine excretion increased, both clear indications of improved iodine supplies. The desired target values have, however, not been reached.

As an expected side-effect of improved iodine supply the prevalence of hyperthyroidism nearly doubled. However, the symptoms were mild, transitory and, as from 1989, have been receding (2).

Austria

Salt iodisation commenced in Austria in 1963, the amount added being 10 mg potassium iodide (7.5 mg iodine) per kg of salt. This level was found to be too low. Urinary iodine was low and goitre in adults remained unchanged, at 15 to 30%. Therefore, in 1990 the iodine content of salt was doubled. The annual incidence of different types of hyperthyroidism (HT) increased after 1990. Data from 14 nuclear medicine centres in the country, obtained between 1987 and 1990, were compared with data obtained from 1990 to 1995, covering a population of 5.4 million, nearly 70% of the total population of the country. Less than 8% of the population were found to have HT.

HT and the type of HT were defined by clinical examination, serum TSH, thyroid hormone levels in blood, ultrasonography, scintigraphy and serum autoantibody titres. HT was classified into immunogenic HT (Graves' disease, GD) and HT with intrinsic thyroid autonomy (uni-multi-nodular or disseminated Plummer's disease, PD).

The results of this comprehensive study indicate the following.

- i. A increase in incidence of HT occurs when iodisation of salt is introduced, the peak incidence being 1 to 4 years after iodisation.
- ii. There is a subsequent decrease in incidence, the only exception being subclinical GD.
- ii. PD accounts for 75% of all cases of HT, and GD for 19%. Other types of HT were seen in 6%.
- iv. The effect of iodisation is more pronounced in GD than in PD.
- v. PD shows an age and gender dependence over time; GD does not. A high relative risk of PD was observed in persons over 50 years of age, particularly men.

India

Iodine deficiency disorders are present throughout India, IDD being endemic in 235 out of 275 districts surveyed. In 1984 all salt for human consumption was iodised.

As in Sri Lanka, doubts have been raised recently of the advisability of universal iodisation. As a result of this controversy, a National Consultation was convened on 21 April 1999 to discuss the cumulative epidemiological and other evidence on the benefits and safety of iodised salt. More than 10 medical and other professional organisations, 9 departments of the Government of India, UNICEF, USAID, WHO, CARE and the World Bank were represented in the Consultation. Their recommendations were as follows.

- i. A safe daily intake of iodine lies between minimum of 50 µg and a maximum of 1000 µg. The generally accepted desirable dietary iodine intake by an adult is 100 to 300 µg daily.
- ii Long term animal and human experiments show that doses comparable to those used in prophylaxis have failed to produce toxic signs.
- iii Iodine-induced HT represents a transient increase, which disappears in due course with the correction of the iodine deficiency. From a public health point of view, the benefits of correcting IDD through universal iodisation greatly outweighs the risk of iodine-induced HT (3,4).

The studies quoted above and many others indicate that HT in the present generation is the price we have to pay for safeguarding the well-being of future generations. In none of the countries where doubts have been raised, have steps been taken to stop iodisation of salt. No studies have been carried out in Sri Lanka before and after compulsory iodisation of salt, to enable a comparison of prevalence of HT in the population.

It has been suggested that, as in Switzerland, we make both iodised and non-iodised salt available to the public, keeping the price of both forms the same, and making the non-iodised salt available at pharmacies and on prescrip-

tion only. Producing iodised salt is expensive. Now that salt manufacture has been privatised, there is nothing to prevent manufacturers from creating a shortage of iodised salt and making a greater profit from the non-iodised salt. Neither the general public nor the administration is as disciplined as the Swiss to ensure that the interest of future generations will be safeguarded.

We should insist that all salt manufactured locally for human consumption be iodised. The packing material should be of the correct standard to minimise losses during transport and storage. The Sri Lanka Standards Institute should carry out periodical tests for the quality of salt, locally produced as well as imported. The small amount of non-iodised salt that might be considered necessary could be imported and made available through pharmacies.

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