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RECOMMENDED IODINE LEVELS IN SALT AND GUIDELINES FOR MONITORING THEIR ADEQUACY AND EFFECTIVENESS

World Health Organization

United Nations Children's Fund

ICCIDD
International Council for the Control of Iodine Deficiency Disorders

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Geneva

Recommended iodine levels in salt and guidelines for monitoring their adequacy and effectiveness

Based on a joint WHO/UNICEF/ICCIDD consultation
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Background

1 Introduction

1.1 Universal salt iodization is the recommended intervention for preventing and correcting iodine deficiency.

1.2 In the past, recommendations for iodine levels in salt were made on the assumption that, from producer to consumer, iodine losses from iodized salt were commonly between 25% and 50%, and that average salt intakes were commonly between 5 and 10 g/person/day.

1.3 Substantial experience has been gained in the last decade in implementing universal salt iodization and assessing its impact on iodine deficiency disorders (IDD) (1).

1.4 A major achievement is the spectacular reduction of IDD in countries that have implemented universal salt iodization.

1.5 However, it appears that some people in some countries now have iodine intakes that are unnecessarily high and that may occasionally be associated with iodine-induced hyperthyroidism (2).

1.6 For this reason, WHO, UNICEF and the International Council for Control of Iodine Deficiency Disorders carried out a study in seven African countries to examine the relationship between salt iodization and population iodine status.

1.7 Previous recommendations for iodine levels in salt have been reconsidered as a result of this study, and in the light of other technical and scientific developments.

2 Iodine requirements

2.1 To meet iodine requirements, the current recommended daily iodine intakes are:

- 50 μg for infants (first 12 months of age).
- 90 μg for children (2–6 years of age).
- 120 μg for school children (7–12 years of age).
- 150 μg for adults (beyond 12 years of age).
- 200 μg for pregnant and lactating women.

3 Risk of iodine-induced hyperthyroidism

3.1 Iodine-induced hyperthyroidism is an iodine deficiency disorder which may occur—primarily in older people—when severely iodine-deficient populations increase their iodine intake, even when the total amount is within the usually accepted range of 100–200 μg/day.

3.2 On a population basis, iodine-induced hyperthyroidism represents a transient increase in the incidence of hyperthyroidism, which will disappear in due course with the correction of iodine deficiency.

3.3 Iodine-induced hyperthyroidism occurs in some subjects who have pre-existing autonomous nodular goitre. It appears likely that some patients with latent Graves' disease are also at risk.

3.4 The number of people at risk of iodine-induced hyperthyroidism is directly proportional to the number of subjects with nodular goitre.

3.5 The occurrence of iodine-induced hyperthyroidism is probably related to the relative increase, and rapidity of increase, of iodine intake, which occurs when iodized salt is introduced in populations that are severely iodine deficient.

3.6 An increase in the incidence of hyperthyroidism may follow relatively small increments in iodine intake, but the risk is most likely to be greatest following ingestion of larger increments.

3.7 There is no level of iodine in salt that offers complete protection against some increase in the incidence of hyperthyroidism in a previously iodine-deficient population.

3.8 On a population basis, the benefits of correcting iodine deficiency through universal salt iodization vastly outweigh the risks of iodine-induced hyperthyroidism.

Recommendations

4 Required iodine levels in salt

4.1 Taking into account the following revised assumptions, which are based on new information:

- iodine lost from salt is 20% from production site to household,
- another 20% is lost during cooking before consumption,
- average salt intake per capita is 10 g/day,

in order to provide 150 μg/day of iodine via iodized salt, iodine concentration in salt at the point of production should be within the range of 20–40 mg of iodine (or 34–66 mg potassium iodate) per kg of salt. When all salt used in processed food is iodized, the lower limit (20 mg) is recommended. Under these circumstances, median urinary iodine levels will vary from 100–200 µg/l.

4.2 In many situations in developing countries, however, despite improvements in salt production and marketing technology, the quality of available salt is poor, or salt is incorrectly iodized, or salt that has been correctly iodized deteriorates due to excessive or long-term exposure to moisture, light, heat and contaminants. Under these circumstances, iodine losses can be 50% or more from the moment salt is produced until it is actually consumed, and median urinary iodine levels could thus fall below the recommended range (100–200 µg/l). In addition, salt consumption is sometimes considerably less than 10 g/person/day. All these factors should be taken carefully into account, particularly when establishing the initial level of iodine in salt.

4.3 If median urinary iodine levels from a representative sample of the population at risk are not within the recommended range, salt iodization levels and factors affecting its utilization should be reassessed focusing on:

- Salt quality and iodization procedures.
- Factors affecting iodine losses in salt, e.g. packaging, transport. storage, cooking.
- Food habits in relation to salt intake and cooking practices.

5 Risk of iodine-induced hyperthyroidism associated with iodine levels in salt

5.1 Where severe iodine deficiency has been a long-term problem, in the light of the risk factors for iodine-induced hyperthyroidism noted in part 3, especially points 3.5 to 3.7, iodine levels in salt should be set at the lowest level that will prevent all manifestation of iodine deficiency disorders while minimizing the risks of iodine-induced hyperthyroidism.

5.2 Periodic surveys of urinary iodine are necessary to monitor actual iodine intake. Iodine levels in salt should be adjusted accordingly to progressively ensure a median of 100–200 μg/l.

6 Requirements for monitoring iodine status and adequacy of iodine levels in salt

6.1 A national monitoring programme should include:

6.1.1 Establishing an IDD committee of qualified individuals who are responsible for programme monitoring and evaluation.

6.1.2 Ensuring regular quality control of iodine concentration in salt at the point of production by using titration methods or, in the case of imported salt, at the point of entry by using reliable test kits. Consignments with suspect iodine levels should be re-checked by titration.

6.1.3 Setting up independent laboratories capable of carrying out salt iodine titration and urine iodine analysis to ensure external quality control.

6.1.4 Designating sentinel sites to carry out the following activities:

- Monitoring periodically salt iodine levels in retail shops and households using reliable test kits.