SURVEY AND DETECTION OF IODINE DEFICIENCY

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I-AVAILABLE DATA IN THE SOCIETY

1-NEONATAL SCREENING PROGRAMS

Initial screening programs for TSH and T4 among Palestinian newborns delivered in Makassed Hospital estimate the number of neonatal hypothyroidism around 1/3000 newborns.

2-GOITER SURVEYS

GRADE	DESCRIPTION OF THYROID
0	No goiter
1a	Thyroid lobes larger than ends of thumbs
1b	Enlarged, visible with head extension
2	Enlarged, visible with neck in normal position
3	Greatly enlarged, visible from distance

3-ULTRASONOGRAPHY OF THYROID

Thyroid ultrasound was used to measure thyroid volume in children and compared with thyroid palpation for the assessment of the prevalence of goiter in an area of mild iodine deficiency. It was found that:
1) Thyroid volume in children, as assessed by ultrasound, increases with age and is closely related to the parameters of body growth.
2) In every age group, thyroid ultrasound shows greater thyroid volume in an IDA group than in controls.

3) **A discrepancy between palpation and ultrasound is found in 23.9% of children living in an IDA, confirming that palpation is relatively inaccurate for assessing the prevalence of goiter in mild iodine deficiency**. These data indicate that thyroid volume measurement by ultrasound in children provides a useful tool for the assessment of goiter in mild iodine deficiency (1).

4-IODINE URINARY SECRETION

Measurement of iodine in urine provides a good index of urinary intake. A urinary iodine level of less than 50 micrograms per day is an indicator of iodine deficiency. Iodine status can be evaluated by measurement of urinary iodine concentration in either 24-h urine collection or in casual samples.

It is often impossible to make 24-h collections. Therefore, iodine concentration in casual samples is often expressed in terms of urinary creatinin, assuming creatinin excretion to be constant between and within individuals. Iodine-creatinin ratio in casual urine samples is considered an unsuitable indicator-by some authors- for evaluating iodine status in areas where large inter- and intra-individual variations in urinary creatinin excretion exist.

II-IDD PREVALENCE INDICATORS AND PROPOSED CRITERIA FOR DEFINING IODINE DEFICIENCY AS A PUBLIC HEALTH PROBLEM AND RECOMMENDATIONS.

1-Measurement of the Extent of IDD (2).

Measurement of the extent of iodine deficiency disorders in a population indicates the extent and severity of the problem. It also indicates progress in the elimination of these disorders. IDD is so pervasive and often so subtle and also so important to community health that detection cannot be left to uncertainty. Its presence or absence must be ascertained by measurement.

2-Measuring the Presence of Iodine Deficiency Disorders

Thyroid size by palpation of the thyroid
Thyroid size by ultrasonography
Urinary excretion of iodine
Thyroglobulin concentration in the blood
Thyrotropin (TSH) concentration in the blood
Thyroid hormones
Radioiodine uptake

3-Measurement of the Severity of an IDD Endemic as Public Health Problem (Table)

The traditional method for measuring an endemic of iodine deficiency disorders to assess goiter prevalence is by palpating the thyroid gland of a representative sample of the population, usually school children. This technique lacks precision and is being replaced by other methods, including ultrasonography, measurement of urinary excretion of iodine, and assays of thyroid-related hormones. Measurement of the urine excretion of iodine is perhaps the most useful and reliable method. The severity of an endemic is assessed by the results of surveys, especially those using the excretion of iodine.

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

A-Iodine Requirements

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

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

B-Recommendations

The following facts are also pertinent:

1-The amount of iodine lost between salt production and the household is 20%.

2-Another 20% of iodine is lost during cooking (before consumption).

3-The average salt intake per capita is 10 g/day.

4-In order to provide 150 micrograms/day of iodine via iodized salt, iodine concentration in the salt at the point of production should be within the range of 20-40 milligrams (or 34-66 mg potassium iodate) per kg of salt.

5-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 micrograms/L.

6-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 the salt is produced until it is actually consumed, thus median urinary iodine levels could fall below the recommended range (100-200 micrograms/L).

7-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.

8-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

C-Requirements for Monitoring Iodine Status and Adequacy of Iodine Levels in Salt

A national monitoring program should include:
1-Establishing an IDD committee of qualified individuals who are responsible for program monitoring and evaluation.
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 rechecked by titration.
3-Setting up independent laboratories capable of carrying out salt iodine titration and urine iodine analysis to ensure external quality control.
4-Designating sentinel sites to carry out the following activities:
-Monitoring periodically salt iodine levels in retail shops and households using reliable test kits.
-Conducting occasional goiter prevalence surveys.
-Measuring regularly urinary iodine.
-Adjusting salt iodine levels based on monitoring results, especially of iodine in urine.

Indicator	**Survey population**	**Severity of public health problem**		
		Mild	**Moderate**	**Severe**
Total Goiter Rate	SAC	5-19.9%	20-29.9%	>30%
Thyroid volume >97th centile by ultrasound	SAC	5-19.9%	20-29.9%	>30%
Median Urinary iodine level (microg/dl)	SAC	5-9.9	2-4.9	<2
TSH > mU/L Whole blood	Newborns	3-19.9%	20-39.9%	>40%
Median Tg (ng/ml serum)	C/A	10-19.9	20-39.9%	>40%

SAC=School aged children. C/A =Children and adults.

5-Alerting health workers to possible occurrence of hyperthyroidism and ensuring access to appropriate treatment when necessary.

6-Establishing a health notification system for cases of hyperthyroidism at selected hospitals in areas of former severe/moderate iodine deficiency.

REFERENCES

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2-The State of the World's Children, UNICEF, 1994.