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## Assessment of Iodine Deficiency in Pondicherry

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As per information available, more than 1.5 billion population of the world are at the risk of Iodine Deficiency Disorders (IDD) out of which, it is estimated that about 200 million people are in our country. The survey conducted by the Central and State Health Directorates. Indian Council of Medical Research and Medical Institutes have clearly demonstrated that not even a single State/UT is free from the problem of IDD. Out of 275 districts surveyed so far, IDD is a major public health problem in 235 districts(1,2). No data is however available from the Union Territory (UT) of Pondicherry on the prevalence of iodine deficiency(1). Hence the present

pilot study was conducted in the year 1997 to establish the prevalence of iodine deficiency in the UT where there is no ban on sale of non iodized salt in the UT(1).

### Subjects and Methods

The study was conducted in the UT of Pondicherry. The UT has a total population of 8,07,785(2). The expected total population of children in 6-11 years was 12% (96,924). The Indian Council of Medical Research has suggested that approximately 1% of the population can provide valid estimates in a large homogenous population(3). Hence, in the present study a sample of more than 2% of the total (2065) children in the age group of 6-11 years constituted the study population. All children were examined by the first author for different goitre grades. The children in 6-11 years of age were selected as this age group is representative of the community for assessment of iodine deficiency because of their combined high vulnerability and representativeness(2).

Pondicherry state was divided into 5 geographical zones and from each zone 1 school was randomly selected for the detailed survey. In each school, all children in the age group of 6-11 years who attended the school on the day of the survey were studied. In each class, children were assembled and briefed about the study objectives. All the children were clinically examined for goitre by the palpation method. Goiter

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size was graded according to the criteria recommended by the WHO(4). The sum of Grades 1 and 2 goiter provided the total goiter prevalence in the study population.

Casual urine samples were collected from every tenth child included in the study and analyzed for urinary iodine excretion (UIE) level using the standard laboratory method (5).

Autoseal polyethylene pouches were given to every tenth child and they were requested to bring 20 g of salt which was routinely consumed by their family. A total of 201 salt samples were collected. The iodine content was estimated using the standard iodometric titration method(6).

## Results

A total of 2065 school children in the age group of 6-11 years were included in the study. Fifty four children had Grade I goitre; none had Grade II enlargement. The total goitre prevalence was 2.6%. The prevalence was highest among children of 10 year of age group.

Casual urine samples could only be collected from 187 children. These were analyzed utilizing the standard methods. The proportion of children with < 2 mcg/dl, 2-4.9 mcg/dl, 5-9.9 mcg/dl and 10 and above mcg/dl of urinary iodine excretion (UIE) levels were 1.6, 3.2, 24.1 and 71.1%, respectively (Table I).

Table II depicts iodine content of salt samples collected from school children. One hundred and fifty eight (78.6%) salt samples were powdered and 43 (21.4%) were of crystalline variety. Sixty nine per cent of salt samples had iodine content of less than 15 ppm.

Amongst the children consuming powdered salt, no sample had nil iodine but 61.4% salt samples had less than 15 ppm of

**TABLE I** *Urinary Iodine Excretion Levels (UIEL) in 187 Subjects*

Iodine deficiency status	UIEL (mcg/dl)	No	%
Severe	< 2	3	1.6
Moderate	2.0 - 4.9	6	3.2
Mild	5.0 - 9.9	45	24.1
No deficiency	≥ 10	133	71.1

**TABLE II** *Iodine Content of Salt Samples (n = 201)*

Iodine Content (ppm)	Powdered Salt Samples		Crystalline Salt Samples	
	No	%	No	%
< 15	97	61.4	41	95.3
≥ 15	61	38.6	2	4.7

iodine. Of the total crystalline salt samples, none had nil iodine but 95.3% had an iodine content of less than 15 ppm. The difference in the iodine content of two salt samples was highly significant ( $p < 0.001$ ).

## Discussion

According to WHO-UNICEF-ICCIDD, if more than 5% of the school age children have goiter then the area should be classified as endemic for iodine deficiency(2). In the present study, the goiter prevalence in school children was 2.6% indicating no iodine deficiency. This finding was further supported by the level of UIE (median value of 14.5 mg/dl) indicating no iodine deficiency. The prevalence of goitre in school children indicates the past iodine status while urinary iodine excretion level indicate current iodine status of the subjects. The findings of the present study suggested that the population has sufficient iodine nutriture. A higher percentage of crystalline salt samples had iodine content less than 15 ppm as compared to powdered salt

samples. Earlier findings have also reported similar results(7,8). Loss of iodine from crystalline salt stored in bags kept under improper storage conditions has been documented.

The IDD prevalence was found to be low inspite of use of crystalline salt which had low iodine content. These findings indicated that the dietary intake of iodine was possibly adequate in the subjects studied.

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