

Status of Iodine Deficiency in Selected Blocks of Kangra District, Himachal Pradesh

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Kangra District, Himachal Pradesh has been documented to be endemic for iodine deficiency disorders (IDD) for the past 40 years. A study conducted in 1954 covering the entire district reported a prevalence of 41.2% in Kangra(1). The salt iodisation programme in the district was initiated in 1962 following a pioneer research study in the same area which demonstrated the effectiveness of salt iodisation in lowering the prevalence of iodine deficiency. The re-surveys conducted in the district in 1962 and 1968 revealed a marked reduction in the prevalence of goiter in the district(2). The present study was conducted in November 1995 with the objective of assessing the current status of iodine deficiency in selected blocks of Kangra district, thirty three years after the initiation of the salt iodisation programme.

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Material and Methods

In Kangra district, there were thirteen administrative blocks out of which four blocks were randomly selected for the survey. The four blocks studied had a total population of 1,02,000. Children in the age group of 8-10 years constituted 10% of the population, *i.e.*, 10,200.

The sample size for the present study was calculated utilising the following parameters; (i) estimated prevalence-15%; (n) confidence level -95%; and (Hi) relative precision - 10%. Thus a sample size of 1350 was required to be studied. The school enrollment in the blocks studied was more than 90%. In such a situation school children are representative of their age group in the community(3). Hence the school approach was used for assessing the prevalence of IDD in the selected blocks.

In each block, all primary schools were enlisted and one school was selected randomly. In each school about 270 children in the age group of 8-10 years were included in the study. Adjoining primary schools were included when the required number of subjects from one school were not available. The children in class third, fourth and fifth constituted the study population. In each class, the subjects were assembled and briefed about the objectives of the study.

Clinical examination of thyroid was done for all children and the goiter size was graded according to the recent World Health Organization (WHO) classification(3). Total goiter prevalence was derived by combining Grade I and Grade II goiter.

The casual urine samples were collected, on the spot, from a sub-sample (n=245) of children. The samples were collected in wide mouthed plastic bottles with screw caps. The samples were kept under refrigeration till they were analyzed for iodine

content utilizing the standard acid digestion method(4).

The school children were requested to bring about 20g of salt samples being routinely used in their family kitchen in the autosealed polythene pouches provided to them. A total of 372 salt samples were collected and the iodine content was estimated utilizing the standard iodometric titration method(5).

Results

In the present study, a total of 1358 children were surveyed of which 41% were ten years, 30% nine years and 29% were eight years of age. Forty six per cent of the subjects were males and 54% were females.

The goiter prevalence in different blocks of the district is depicted in *Table I*. The total goiter prevalence in the study population was observed to be 5.7%. The goiter prevalence was 4.0%, 6.6% and 7.0% in eight, nine and ten year old children, respectively. No statistically significant difference was observed in goiter prevalence between the two sexes (6.7% in boys, 4.9% in girls). Urinary iodine excretion levels were estimated in a total of 245 casual urine samples. On this basis, 2.5% of the children had severe iodine deficiency, 4.1% moderate, 17.1% mild and 76.3% had no iodine deficiency. The median urinary iodine value was 16.5 mcg/dl (*Table II*). Analysis of salt samples revealed that only 3% of the salt samples had nil iodine (*Table III*). It was

TABLE I-Total Goiter Rate in Different Blocks

Blocks	n	Goiter Cases	TGR(%)
Nurpur	253	6	2.4
Rait	541	28	5.2
Nagrota (S)	289	19	6.6
Nagrota (B)	275	25	9.0

S = Surian; B = Bhagwan
TGR-Total goiter rate.

found that nearly 77% salt samples had adequate iodine content (15 ppm and more).

Discussion

Children in the age group of 8-10 years were included in the present study as they are representative of the iodine nutriture of a community(3). Earlier studies have also recommended the evaluation of school age group children for the assessment of iodine deficiency in a community(6).

The results of the present study revealed that only 5.7% of children were suffering from goiter (which is higher than the cut-off level of 5.0%) indicating mild iodine deficiency in the blocks studied(3). The median urinary iodine excretion of the children in the present survey was 16.5 mcg/dl. According to the recent WHO recommendations, median urinary iodine levels of 10 mcg/dl and more in casual urine samples collected from school age children indicates no iodine deficiency in a community (3). The present investigation revealed that as high as 77% of the families were consuming salt with an adequate iodine content. This was possibly the reason for the low prevalence of iodine deficiency in the children surveyed.

The prevalence of goiter indicates past iodine nutriture while the urinary iodine excretion indicates the current status. In the present study, the urinary iodine excretion revealed no iodine deficiency while goiter prevalence indicated mild iodine deficiency. These findings suggest that the population studied was in a phase of transition from iodine deficient to iodine sufficient.

Environmental iodine deficiency is the primary etiological factor in the causation of goiter in Kangra district as has been documented by earlier workers(7-9). The goiter prevalence reported earlier was 41.2% in 1954, 32.1% in 1962 and 9.9% in 1968(2). The prevalence of goiter found in the

TABLE II—Age-wise Distribution of Children According to the Urinary Iodine Levels.

Urinary iodine level (mcg/dl)	Number of children			Total
	8yr	9yr	10 yr	
<2.0	3 (3.9)	2 (2.3)	1 (1.2)	6 (2.5)
2.0-4.9	7 (9.2)	1 (1.1)	2 (2.4)	10 (4.1)
5.0-9.9	11 (14.5)	16 (18.4)	15 (18.3)	42 (17.1)
>10	55 (72.4)	68 (78.2)	64 (78.0)	187(76.3)
	76	87	82	245

Figures in parentheses denote percentages

TABLE III—Iodine Content of Salt Samples Collected

Iodine content (ppm)	Powdered (n=298)	Crystalline (n=74)	Total (n=372)
Nil	10 (3.4)	1 (1.4)	11 (3.0)
<15	55(18.5)	21(28.4)	76(20.4)
>15	233(78.1)	52(70.2)	285(76.6)

Figures in parentheses denote percentages

present study cannot be compared with those of the earlier studies as the age group studied in the various surveys were different.

On the basis of the present study, it would be reasonable to conclude that by achieving the universal iodisation of salt, Iodine Deficiency Disorders can be successfully eliminated from a community.

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