

## Urinary Iodine Excretion Levels Amongst Schoolchildren in Haryana

UMESH KAPIL

*From the Department of Human Nutrition, All India Institute of Medical Sciences, Ansari Nagar, New Delhi 110 029, India.*

*Correspondence to: Dr. Umesh Kapil, Professor, Department of Human Nutrition, All India Institute of Medical Sciences, Ansari Nagar, New Delhi 110 029, India. E-mail: umeshkapil@yahoo.com.*

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This study was conducted in 2006 to assess the current iodine nutriture of the population in Haryana by assessing the urinary iodine excretion levels amongst the school age children between 6-12 years. Altogether 3,019 urine samples were collected from all the 19 districts in Haryana. The urinary iodine was analyzed by using wet digestion method. Less than 1 % of children had urinary iodine excretion levels below 20 mcg/L. Percentage of children with urinary iodine concentration 21-50 mcg/L, 51-99 mcg/L, and 100 mcg/L were 0.8%, 6.2% and 92.6%, respectively. We conclude that the Universal Salt Iodization program is being successfully implemented in the state as the population has adequate iodine status at the time of the survey.

**Keywords:** India, iodine deficiency.

Whether or not a universal salt iodisation program (USI) is providing an adequate amount of iodine to the target population, can be reliably assessed by reference to measurements of urinary iodine excretion (UIE)(1). However, a single urinary iodine measurement is not representative of individual nutritional iodine status; UIE levels are useful, when used in cross-sectional, epidemiological surveys in population samples of appropriate size (2).

The Government of Haryana has adopted a policy of Universal Salt Iodization (USI) since 1986, under which all the edible salt is iodized for the state's population. The effectiveness of this policy was assessed through an analysis of urine samples collected from 3019 children families from 19 districts in 2006.

### METHODS

The study was conducted in the year 2006 in all the 19 districts of Haryana state. The sample size for urine samples to be collected per district ( $n=100$ )

was calculated keeping in view the prevalence of urinary iodine excretion deficiency as 30%, relative precision of 15% and a confidence interval of 95%(2).

In each district, all the primary schools were enlisted and one school, which was at least 40 km away from the district headquarters, was selected by random sampling. All the children attending the school on the day of the survey were assembled and a lecture on health consequences of IDD was delivered. From each school 150 children in the age group of 6-12 years of age were included. If the sample size could not be covered from the identified school, then the nearest primary school was included in the study. An informed consent for participation was taken from parents of all children. All the selected children were requested to provide "on the spot" casual urine samples. Plastic bottles with screw caps were used for collection of the urine samples. The samples were stored in a refrigerator until analysis. UIE levels were analyzed using the wet digestion method(3). An internal quality control sample was run with every batch of test samples. If

**TABLE I** URINARY IODINE EXCRETION LEVEL IN DISTRICTS OF HARYANA

District	n	Urinary Iodine Excretion Level (mg/L)				Median
		< 20.0 (%)	20.0 – 49.9 (%)	50.0 – 99.9 (%)	100.0 (%)	
Sonipat	152	1 (0.7)	3 (2.0)	8 (5.3)	140 (92.1)	200
Panipat	190	1 (0.5)	5 (2.6)	28 (14.7)	156 (82.1)	150
Karnal	152	0 (0.0)	0 (0.0)	1 (0.7)	151 (99.3)	200
Yamuna Nagar	152	0 (0.0)	0 (0.0)	3 (2.0)	149 (98.0)	210
Kurukshetra	152	0 (0.0)	2 (1.3)	7 (4.6)	143 (94.1)	200
Ambala	152	0 (0.0)	1 (0.7)	5 (3.3)	146 (96.1)	182
Panchkula	151	0 (0.0)	0 (0.0)	1 (0.7)	150 (99.3)	210
Kaithal	168	0 (0.0)	5 (3.0)	12 (7.1)	151 (89.9)	200
Jind	152	0 (0.0)	0 (0.0)	7 (4.6)	145 (95.4)	210
Sirsa	202	0 (0.0)	5 (2.5)	46 (22.8)	151 (74.8)	150
Fatehabad	152	0 (0.0)	0 (0.0)	14 (9.2)	138 (90.8)	200
Hissar	152	1 (0.7)	1 (0.7)	17 (11.2)	133 (87.5)	191
Bhiwani	159	0 (0.0)	1 (0.6)	11 (6.9)	147 (92.5)	200
Mahendragadh	152	0 (0.0)	0 (0.0)	1 (0.7)	151 (99.3)	210
Rewari	152	0 (0.0)	0 (0.0)	4 (2.6)	148 (97.4)	210
Jhajar	152	0 (0.0)	0 (0.0)	1 (0.7)	151 (99.3)	210
Rohtak	149	0 (0.0)	1 (0.7)	0 (0.0)	148 (99.3)	210
Gurgaon	152	0 (0.0)	0 (0.0)	16 (10.5)	136 (89.5)	200
Faridabad	176	0 (0.0)	0 (0.0)	4 (2.3)	172 (97.7)	200
Total	3,019	3 (0.09)	24 (0.8)	186 (6.2)	2,806 (92.6)	200

the results of the internal quality control sample was within the range, then the test was deemed in control and if the results were outside the range, then the whole batch was repeated. The urinary iodine concentration was expressed in  $\mu\text{mol}$  iodine/L urine.

## RESULTS

The UIE levels in each district are depicted in **Table I**.

## DISCUSSION

In the present study, all districts of Haryana were found to have adequate iodine nutriture as shown by UIE levels. The findings of the present study also highlights the success of universal salt iodization program in all the 19 districts included in the present study. The urinary iodine excretion rates recorded in our study agree with those reported in adjoining state

of Delhi, where the median urinary iodine value was 120 mcg/L. Similar findings are reported from other studies conducted in India(4-10).

Our study has some limitations. We presumed that all the primary schools which were at least 40 km away from the district headquarters, would be consuming salt with similar iodine content (in real life situation, the salt is marketed in the entire district mainly by three-four wholesale salt traders only). We also presumed that the children from the selected schools were representative of the children of the entire district. With the above two presumptions, the findings obtained from the selected schools in the present study may be generalized to the entire district.

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*Competing interests:* None stated.

### WHAT THIS STUDY ADDS?

- Iodine status of primary school children in Haryana is adequate.

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