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SHORT COMMUNICATION

STATUS OF IODINE DEFICIENCY AMONGST SCHOOL CHILDREN IN TWENTYFOUR DISTRICTS IN SOUTHERN INDIA

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Abstract : The central legislation banning sale of non-iodized salt for edible purposes in the entire country was withdrawn by the Government in the year 2000. The present study was conducted in the year 2001 immediately after lifting the central ban to establish the baseline urinary iodine excretion levels in twenty four districts of Southern India. In each district all the senior secondary schools were enlisted and one school was selected by random sampling. About 120 children in the age group of 11 to 18 years were selected using the random number tables. The urinary iodine excretion levels were analysed using the wet digestion method. It was found that districts Rangareddy, Kolar, Yanam and Perambalour had median UIE levels less than 100 µg/1, indicating iodine deficiency. The findings of the present study highlights the success of Universal salt iodisation programme. The Government of India should reinitiate the process of central ban on sale of non iodised salt in the country to prevent the iodine deficiency disorders.

Key words : iodine deficiency disorders, urinary iodine excretion, iodised salt, central legislation

INTRODUCTION

Iodine deficiency disorders (IDD) is a single largest preventable cause of mental retardation in the world today. In India, surveys conducted in 34 states and 4 union territories have revealed that out of 312 districts, 254 districts are endemic to IDD (1). WHO/UNICEF/ICCIDD recommends that the most feasible, reliable and cost-effective method for assessing the progress towards prevention of iodine deficiency disorders is monitoring the urinary iodine excretion (UIE) levels in the community. UIE is an indicator of the current iodine nutriture of the community (2). Government of India (GOI) adopted the policy of Universal Salt lodization (USI) in 1984 under which the entire population of the country is to receive edible salt with a minimum of 15 ppm

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of iodine (3). To bring uniformity in implementation and to ensure the further success of USI in all states, the GOI in 1998 implemented a central legislation banning sale of non-iodized salt for edible purposes in the entire country. However, in the year 2000, due to political compulsions, the GOI withdrew this central legislation (4). The present study was conducted in the year 2001 immediately after lifting the central ban on sale of non iodized salt to establish the baseline UIE levels in twenty four districts of Southern India so that subsequently in future, the impact on iodine status due to lifting of central ban on the sale of non iodised salt can be assessed.

METHODS

The study was conducted in twenty four districts of Andhra Pradesh [12]; Karnataka [4]; Pondicherry [2]; Tamil Nadu [6]. These districts were selected by random sampling, keeping in view the geographical distribution in southern India. The sample size for urine samples to be collected per district was calculated keeping in view the prevalence of urinary iodine deficiency as 30%, relative precision of 15% and a confidence interval of 95 per cent. The calculated sample size was 100 per district (2) In each district all the senior secondary 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 collected in the school assembly and a lecture on health consequences of IDD was delivered. About 120 children in the age group of 11 to 18 years were selected randomly using the random number tables. The informed consent from each child was taken to participate in the study. The study was ethically' approved by Ethics Committee at AIIMS, New Delhi. All the selected children were requested to provide "on the spot" casual urine samples. The plastic bottles with screw caps were used for collection of the urine samples. The samples were stored in the refrigerator until analysis. The UIE levels were analysed using the wet digestion method (5). An internal quality control sample was run with even- batch of test samples. If 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.

Assumptions employed in study

1) We presumed that all the schools at least 40 km away from the district headquarters would be consuming salt with similar iodine content. In real life situation, the salt available to the district is provided by one or two wholesale salt dealers only.

2) We also presumed that the children from the selected schools were representative of the children of the entire district.

3) With the above two presumptions, the findings obtained from the selected school in the present study may be generalisable to the entire district.

RESULTS

In the present study, twenty four districts were included for the survey from

TABLE I: Urinary iodine excretion levels in selected districts of Andhra Pradesh, Karnataka, Tamil Nadu and Pondicherry states of India.

Name of the district	*N*	*Median (µg/l)*	*UIE levels (µg/l)*			
			<20.0	*20.0–<50.0*	*50.0–<100.0*	*≥100.0*
ANDHRA PRADESH						
Rangareddy	107	65.0	1(0.9)	23(21.5)	48(44.9)	35(32.7)
East Godavari	102	>200.0	0(0.0)	0(0.0)	0(0.0)	102(100.0)
Kurnool	103	130.0	0(0.0)	4(3.9)	18(17.5)	81(78.6)
Prakasam	102	150.0	1(1.0)	3(2.9)	14(13.7)	84(82.4)
Mehboobnagar	100	150.0	2(2.0)	5(5.0)	19(19.0)	74(74.0)
Warangal	100	>200.0	1(1.0)	0(0.0)	7(7.0)	92(92.0)
Chitoor	100	100.0	0(0.0)	4(4.0)	45(45.0)	51(51.0)
Nizambad	200	150.0	18(9.0)	11(5.5)	25(12.5)	146(73.0)
Khammam	100	200.0	0(0.0)	0(0.0)	3(3.0)	97(97.0)
Guntur	120	>200.0	0(0.0)	0(0.0)	2(1.7)	118(98.3)
Adilabad	101	125.0	0(0.0)	8(7.9)	25(24.8)	68(67.3)
Hyderabad	174	150.0	8(4.6)	22(12.6)	31(17.8)	113(64.9)
KARNATAKA						
Kolar	101	95.0	2(2.0)	7(6.9)	48(47.5)	44(43.6)
Uttar Kannada	100	100.0	11(11.0)	15(15.0)	21(21.0)	53(53.0)
Belagaum	100	100.0	1(1.0)	13(13.0)	28(28.0)	58(58.0)
Chickmanglur	100	150.0	2(2.0)	5(5.0)	19(19.0)	74(74.0)
PONDICHERRY						
Pondicherry	100	200.0	0(0.0)	0(0.0)	15(15.0)	85(85.0)
Yanam	100	65.0	5(5.0)	27(27.0)	34(34.0)	34(34.0)
TAMILNADU						
Nagapattinam	100	150.0	0(0.0)	4(4.0)	2(2.0)	94(94.0)
Madurai	107	>200.0	2(1.9)	0(0.0)	3(2.8)	102(95.3)
Cuddalore	100	>200.0	0(0.0)	0(0.0)	3(3.0)	97(97.0)
Perambalour	157	85.0	13(8.3)	31(19.7)	35(22.3)	87(49.7)
Trichi	112	>200.0	1(0.9)	0(0.0)	2(1.8)	109(97.3)
Karur	110	180.0	0(0.0)	1(0.9)	7(6.4)	102(92.7)

Figures in Parenthesis denote percentages.

the Southern India. The UIE levels in each district is depicted in Table I. It was found that only one district (Rangareddy) out of 12 districts in Andhra Pradesh, one (Kolar) out of four districts in Karnataka, one (Yanam) out of two districts in Pondicherry and one (Perambalour) out of six districts in Tamil Nadu had median UIE levels less than 100 µg/1, indicating iodine deficiency.

DISCUSSION

The findings of the present study highlights the success of USI programme in the 24 districts included in the present study. In India, the production of iodised salt has increased from 3 lakh tonnes (1983) to 44 lakh tonnes (2001) (6). The National Family Health Survey-2 conducted in 1998-

1999 has also revealed that 70% of the population was consuming iodised salt in the country (7). In the present study, the high level of iodisation of salt has been reflected as adequate iodine nutrition in more than 80% of the districts surveyed. Only 4 districts out of 24 had iodine deficiency as per UIE levels.

The districts Rangareddy, Kolar, Yanam and Perambalour had iodine deficiency possibly due to their close vicinity to the coastal region where the salt is produced by solar evaporation of sea water and is generally consumed in non iodised form.

The iodine deficiency reappears if the efforts for universal salt iodisation are not sustained This has been documented in earlier studies conducted in India and other iodine deficient regions of the world (8, 9). It would take 3–4 years before the population in the southern region of India would start consuming non iodised salt. This would be due to lower production of iodised salt and poor legal enforcement by the Government system on sale of non iodised salt and due to low demand of iodised salt by the traders.

With the change in the environment of the political system, Government of India should reinitiate the process of central ban on sale of non iodised salt in the country to prevent the iodine deficiency disorders.

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