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Status of Iodine Nutriture and Salt Iodization in Union Territory of Pondicherry, India

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Abstract: Deficiency of iodine causes a wide spectrum of disabilities including the implications on reproductive functions and lowering of IQ levels in school age children. The present study was conducted to assess the status of iodine nutriture and salt iodization in the entire Union Territory of Pondicherry, India. The study was conducted in all the four districts of Pondicherry. In each district 150 salt samples were collected by utilizing the uniform sampling methodology. The iodine content of salt samples was analyzed using the standard iodometric titration method. On the spot casual urine samples were collected from at least 80 children from the same school selected randomly The urinary iodine excretion (UIE) levels were analyzed using the wet digestion method It was observed that 59.7% of the families were consuming iodized salt with more than 5 ppm . It was found that 3 out of 4 districts had adequate iodine nutriture (median UIE levels more than 100 Fg/l) possibly due to consumption of iodized salt by majority of the population. This study revealed the success of the salt iodization program in Pondicherry. However, there is a need for strengthening the existing monitoring and distribution system to ensure that adequately iodized salt is available for human consumption to eliminate IDD from the state.

Key Words : Iodine deficiency disorders, goitre, urinary iodine excretion levels, iodized salt

Introduction

India is the second most populated country in the world, with a population of more than 1000 million persons exposed to risk of Iodine Deficiency Disorders (IDD). Deficiency of iodine causes a wide spectrum of disabilities including the implications on reproductive functions and lowering of IQ levels in school age children (Vir, 1994).

Pondicherry is a coastal union territory (UT) and it is wrongly believed that populations residing in coastal areas do not suffer from IDD as they consume sea foods which are incorrectly believed to be rich in iodine. We conducted the present study to assess the status of iodine nutriture and salt iodization in the entire UT of Pondicherry.

Materials and Methods

The study was undertaken in all the 4 districts of Pondicherry during 2001. The guidelines recommended by WHO/UNICEF/ICCIDD for a rapid assessment of salt iodization in a district was adopted (WHO/UNICEF/ICCIDD, 1994). In each district 150 salt samples were collected by utilizing the uniform sampling methodology. All Senior Secondary schools in the district were enlisted and one school was randomly selected for the detailed study. All the children were briefed about the objectives of the study during the morning assembly. One hundred and fifty children belonging to different villages attending the school on the day of the survey were identified and were provided with auto seal polythene pouches with an identification slip. They were requested to bring four tea spoons of salt (about 20 g) from their family kitchen. The iodine content of salt samples was analyzed using the standard iodometric titration method (Karmarkar *et al.,* 1986).

At least 80 children from the same school were randomly selected and were requested to provide "on the spot" casual urine samples. Plastic bottles with screw caps were used to collect the urine samples. The samples were stored in the refrigerator until analysis. The urinary iodine excretion (UIE) levels were analyzed using the wet digestion method (Dunn *et al*., 1993).

Results

A total of 600 salt samples were collected from four districts of Pondicherry. The district wise distribution of iodine content of salt is depicted in Table 1. It was observed that 59.7% of the families were consuming iodized salt with more than 5 ppm .

Table 2 depicts the district wise distribution of UIE levels. It was found that district Yanam had median UIE less than 100.0 Fg/l along with more than 20% of the urine samples with less than 50 Fg/l of iodine. These findings indicated deficient iodine nutriture in the district. In this district more than 75% of the families were found to be consuming salt with less than 5 ppm of iodine.

Table 1: Iodine content of salt samples collected at beneficiaries level in Pondicherry (n=600)

Name of the District	Iodine Content in ppm			
	N	<5	5-<15	15 & more
Karaikal	150	61 (40.7)	86 (57.3)	3 (2.0)
Pondicherry	150	100 (66.7)	40 (26.7)	10 (6.7)
Yanam	150	37 (24.7)	92 (61.3)	21(14.0)
Mahe	150	44 (29.3)	37 (24.7)	69 (46.0)
Total	600	242 (40.3)	255 (42.5)	103 (17.2)

Figures in parenthesis denote percentages

Table 2: Urinary Iodine Excretion levels in the study subjects in Pondicherry (n=377)

Name of the District	N	Median (Fg/l)	UIE levels ((Fg/l)				Comments D/N
			<20.0	20.0- <50.0	50.0- <100.0	≥100.0	
Karaikal	80	150.0	0 (0.0)	3 (3.8)	9(11.3)	68(85.0)	N
Pondicherry	100	200.0	0 (0.0)	0 (0.0)	15(15.0)	85(85.0)	N
Yanam	100	65.0	5 (5.0)	27 (27.0)	34(34.0)	34(34.0)	D
Mahe	97	200.0	0 (0.0)	2 (2.1)	7(7.2)	88(90.7)	N
TOTAL	377		5 (1.2)	32 (8.5)	65(17.2)	275(73.0)	

Figures in parenthesis denote percentages, D= Deficient iodine nutriture, N= Normal iodine nutriture

Discussion

The results of the present study revealed that 60% of the population was consuming salt with more than 5 ppm of iodine. This finding showed that the population is purchasing and consuming iodized salt indicating the success of Universal Salt Iodization programme in Pondicherry. Earlier study conducted in Pondicherry, had reported low prevalence of goitre in school children as 2.6% (Kapil *et al.,* 1998a). Similar findings were reported from the coastal districts of Ernakulum where the prevalence of goiter was found to be 1.0% (Kapil *et al*., 1998b). However, studies from other coastal districts of Kottayam, Portblair and Panaji had documented goitre prevalence rate of 7.05, 9.5 and 16.6 percent, respectively (Kapil *et al*., 2002; Kapil *et al.,* 1996; Kapil *et al*., 1998c) indicating endemicity of goiter. These studies have postulated that iodine deficiency was possibly due to goitrogens present in the food consumed by the coastal population in these districts as the percentage of population consuming iodized salt was 99.6, 51.1 and 99.5%, respectively.

WHO/UNICEF/ICCIDD have also recommended that no iodine deficiency is indicated in a population when median UIE level is 100.0 Fg/l i.e. more than 50% of the urine samples have UIE level of 100.0 Fg/l, and not more than 20% of samples have UIE level of 50.0 Fg/l (WHO/UNICEF/ICCIDD, 1994). In the present study it was found that 3 out of 4 districts had adequate iodine nutriture (median UIE levels more than 100 Fg/l) possibly due to consumption of iodized salt by majority of the population. Earlier study conducted in Pondicherry had also revealed a median UIE of 145.0 Fg/l indicating no iodine deficiency (Kapil *et al*., 1998a).

The findings of the present study revealed the success of the salt iodization program in Pondicherry as reflected by sufficient iodine nutriture in three out of four districts. However, there is a need for strengthening the existing monitoring system of the quality of salt to ensure that adequately iodized salt is available for human consumption in the union territory.

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