



RESEARCH ARTICLE

Survey on salt iodine content at household level of Chidambaram, Cuddalore district, TamilnaduAravindan.J¹, N.Ethirajan², John William Felix³, T.K.Senthil Murugan⁴

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Received 28 September 2014; Accepted 7 October 2014**ABSTRACT**

INTRODUCTION: Around 43% of the population does not consume adequate amounts of iodine which make them vulnerable to physical and mental disorder. UNICEF estimates that less than 20% of households in the developing world were using iodized salt in the early 1990s, and by 2000, the average had jumped to some 70%. By 2006, around 120 countries were implementing salt iodization programs.

Objective: 1.To estimates the salt iodine content at the household level. 2. To find out the iodine level in different types of salt.

Methodology: A descriptive cross sectional study in the age group of 6-18 years old school going children was done in randomly selected higher secondary school from our medical college field practicing area. The present study was conducted in Cuddalore District of Tamilnadu State. The district is located in northern part of Tamilnadu State.

Results: Out of 1668 salt samples tested, 88.67% of the samples were adequately iodized (>15ppm) and 6.11% of the samples are iodized but not at the recommended level (<15ppm). Nearly 80% of the crystal salts and 98% of the powder salts are adequately iodized.

Conclusion: The present study indicates that the iodine content of salt found adequate at household level.

Key words: Iodine, Salt, Chidambaram, School children.

INTRODUCTION:

In India the entire population is prone to IDD due to deficiency of iodine in the soil of the subcontinent and consequently the food derived from it. Of these, an estimated 350 million people are at risk of IDD as they consume salt with inadequate iodine. A number of advocacy measures were initiated to promote the consumption of iodized salt by the beneficiaries. Around 43% of the population does not consume adequate amounts of iodine which make them vulnerable to physical and mental disorder. A recent national demographic health survey conducted by the department health services, stated that only 53% of the country's household consume enough amount of iodine although 94% of the population used iodized salt.¹ ICMR, and medical institutes have clearly demonstrated that not even a single state is free from the problem of IDD.² The most common and visible adoptive response is increase in thyroid gland, known as goitre.³

UNICEF estimates that less than 20% of households in the developing world were using iodized salt in the early 1990s, and by 2000, the average had jumped to some

70%. By 2006, around 120 countries were implementing salt iodization programs.⁴In 2007, worldwide 12 countries have optimal iodine status and iodine intake is more than adequate or even excessive.⁵

In 1983, compulsory iodization of all table salt was introduced in India in an attempt to eliminate iodine deficiency. Government of India has re-launched National Iodine Deficiency Disorders Control Programme (NIDDCP) in the year 1992 with a goal to reduce the prevalence of IDD to non-endemic level. After implementation of NIDDCP, India has made considerable progress towards IDD elimination. Less than 5% total goiter rate was found in 9 out of 15 districts studied in 11 states by an Indian Council of Medical Research (ICMR).NIDDCP included IDD surveys, supply of iodized salt, re-surveys every five years, monitoring iodized salt consumption, laboratory monitoring of iodized salt, urinary iodine concentration and health education.

In the current context of increasing awareness about the importance of consumption of iodized salt, availability of double fortified salt in the public distribution system, and the availability of subsidized iodized salt would have

made some impact. The cuddalore district is one of the backward districts in tamilnadu, according to educational status. In order to assess the current scenario of extent of consumption of iodized salt, this study was attempted among the selected school children in our field practice area.

OBJECTIVES:

1. To estimate the salt iodine content at the household level.
2. To find out the iodine level in different types of salt.

METHODOLOGY:

A descriptive cross sectional study in the age group of 6-18 years old school going children was done in randomly selected higher secondary school from our medical college field practicing area. The present study was conducted in Cuddalore District of Tamilnadu State. The district is located in northern part of Tamilnadu State.

The study was conducted in 1338 students. The students were selected according to their residing location, so that majority of the surrounding area of Chidambaram would have covered.

On the day of examination the students were given an empty plastic cover. A label was affixed on the cover which mentioned the name, roll number, standard & section of the students. The students were asked to bring salt on the next working day which is used for cooking purpose in their house.

The iodine content of the salt samples was measured on the same day by rapid MBI test kit and expressed as iodine in ppm. One or two drops of the solution on a small salt sample (one teaspoon is adequate). The intensity of the blue color which develops indicates the salt iodine level.

Iodine level of salt was adequate when its level was 15 PPM or more. Iodine level of the salt was determined by a rapid test kit. The test can be used semi -quantitatively to measure iodine in salt at 0, 7, 15, and ≥ 15 ppm depending on the intensity of the color obtained.

RESULTS:

Table no 1 show that 38.6% of the students have reported that in their families they are using only crystal salt, and 32.8% of the students have reported that they are using both the salt (crystal and powder).

Out of 517 students whose family consume only crystal salts only 478 students have given the salt samples for iodine testing. [Table no 2] Out of 478 samples 73.86% of the samples have more than or equal to 15ppm iodine level. Out of 382 students whose families consume only powder salts only 352 students have given the salt samples for iodine testing. [Table no 2] Out of 352 samples 96.88% of the samples have more than or equal

to 15ppm iodine level. Out of 439 students whose families consume both the salts only 419 students have given the salt samples for iodine testing. [Table no 2] Out of 419 crystal samples 87.84% of the samples have more than or equal to 15ppm of iodine level. Out of 419 powder samples 99.54% of the samples have more than or equal to 15ppm of iodine level.

In the present study out of 897 crystal samples 80.39% of the samples were adequately iodized (>15 ppm) and 10.36% of the samples were inadequately iodized. 9.25% of the samples were not at all iodized. Out of 771 powder salt samples 98.34% were iodized adequately and 1.16% of the salts were inadequately iodized. Only 0.5% of the samples were not at all iodized. [Table no 3]

In current study out of 1668 salt samples tested, 88.67% of the samples were adequately iodized (>15 ppm) and 6.11% of the samples are iodized but not at the recommended level (<15 ppm). Consumption of iodized salt with less than 15ppm indicates that the salt was iodized but because of poor storage and due to transportation, there has been gradual loss of iodine in salt. 5.21% of the samples were not at all iodized. [Table no 4]

DISCUSSION:

In India, IDD can be eliminated by increasing the use of iodized salt. This preventable measure of fortification of salt with iodine which has been proved to be low cost and successful intervention throughout the world must be strictly adhered to. In NFHS-3, it showed that 51% population of the country was using adequate iodized salt (>15 ppm) and 24% were using non iodized salt. The goal of USI is to cover more than 90% of household to consume iodized salt.

Out of 786 boys nearly 7% of the boys haven't given the salt samples and out of 552 girls 6.15% of the girls haven't given the salt samples for testing iodine. The response rate among the girls is slightly better as compared to that of boys.

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A study conducted by Biswas et al⁶ among school children in Malda district of west Bengal in 2002 showed the same pattern of results that 85.1% of households had adequate iodine content (≥ 15 ppm), 13.6% consumed salt without iodine.

According to Naresh R Makwana et al⁷ in Jamnagar (2009) 81.9% of salt samples had more than 15 ppm iodine content, 8.5% of samples contained less than 15 ppm salt, and 9.6% of samples were not iodized.

According to Gurudeepsinghet al⁸ in R S Pura block in Jammu (2013) showed that out of total 1610 children, 1367 (84.9%) children were belonging to households consuming iodized salt (≥ 15 ppm).

In the present study out of 897 crystal samples 80.39% of the samples were adequately iodized (>15 ppm) and 10.36% of the samples were inadequately iodized. 9.25% of the samples were not at all iodized.

Out of 771 powder salt samples 98.34% were iodized adequately and 1.16% of the salts were inadequately iodized. Only 0.5% of the samples were not at all iodized.

Present study revealed that the iodine content is more in powder salt compared to crystal.

A study by Jayashreet al⁹ in Karnataka 2000 revealed powdered salt had maximum iodine retention (91.16%) followed by brown crystal salt (84.24%) and white crystal salt (76.71%). Even though the iodine content was found to decrease during storage, the powdered salt and brown crystal salt had iodine in the recommended level. On the contrary, white crystal salt contained only half (7 ppm) that recommended at the retail level (15 ppm).

Another study by LeventeL Diosady and Joseph O Alberti (1998)¹⁰ analyzed five types of Indian salt (including powder and crystal) showed loses from powder salt appear lower. Findings demonstrate the utility of the use of sodium carbonate as stabilizer.

Table 1: Type of salt consumed. (As reported by the students)

TYPE OF SALT	FREQUENCY	PERCENTAGE
CRYSTAL	517	38.6
POWDER	382	28.6
BOTH	439	32.8
TOTAL	1338	100.0

Table 2: Iodine content in salt

IODINE CONTENT	ONLY CRYSTAL SALT CONSUMERS		ONLY POWDER SALT CONSUMERS		BOTH SALT CONSUMERS			
					CRYSTAL		POWDER	
	N	%	N	%	N	%	N	%
NIL	62	12.97	3	0.85	21	5.01	1	0.23
7PPM	63	13.17	8	2.27	30	7.15	1	0.23
15PPM	242	50.63	71	20.17	224	53.47	54	12.89
30PPM	111	23.23	270	76.71	144	34.37	363	86.65
TOTAL	478	100.00	352	100.00	419	100.00	419	100.00

Table 3: Iodine content in different types of salt samples

IODINE	TOTAL CRYSTAL SALT SAMPLES		TOTAL POWDER SALT SAMPLES	
	N	%	N	%
NIL	83	9.25	4	0.50
7PPM	93	10.36	9	1.16
15PPM	466	51.97	125	16.21
30PPM	255	28.42	633	82.13
TOTAL	897	100.00	771	100.00

Table 4: Iodine content in total salt samples

IODINE		TOTAL SALT SAMPLES		
		N	%	
INADEQUATE	NIL	87	5.21	11.33
	<15PPM	102	6.11	
ADEQUATE (>15PPM)		1479	88.67	
TOTAL		1668	100.00	

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