



A CROSS SECTIONAL SURVEY OF IODIZED SALT CONSUMPTION AND ASSESSMENT OF COMMUNITY KNOWLEDGE AT HOUSEHOLD LEVEL IN TRIBAL AREA OF NORTH INDIA.

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ABSTRACT **Background & Aim:** Iodine deficiency is prevalent but preventable cause of mental retardation, globally. In India, an estimated 167 million people are at risk of developing IDD. Despite of the universal salt iodization in India, only 71 % of the households were consuming this by 2009. The present survey was conducted to estimate the uptake of adequately iodized salt in the tribal district of Himachal Pradesh.

Material and Methods: A cross sectional survey was conducted in tribal Distt. Kinnaur of H.P. A total of 10 clusters were taken for survey and 18 -20 households per cluster were chosen randomly. The unit of study taken was a household.

Results: A total of 196 households in Kinnaur were surveyed for iodized salt coverage, using MBI salt Iodine detection kit. The household coverage of adequately iodized salt in current survey was found to be 75%.

Conclusion: The district Kinnaur had transformed its phase from iodine deficient to iodine sufficient. Majority of the respondents followed faulty storage practices and were not aware of right storage and cooking practices. More than half of respondents were unaware of importance of iodine / iodized salt and its role in normal growth and prevention of diseases.

KEYWORDS : Iodine Deficiency Disorders, universal salt iodization, tribal area

INTRODUCTION

The world's single greatest cause of preventable mental retardation is Iodine deficiency. The early stages of pregnancy and early childhood are especially prone to iodine deficiency¹. Iodine is an essential component of thyroid hormones, which are essential for optimal mental and physical development and regulation of body metabolism (generation and utilization of body energy). Iodine Deficiency Disorders (IDD) remains a significant public health problem in over 50 countries including India. Worldwide, nearly one and a half billion people are still not consuming adequately iodized salt; as a result they are not protected against IDD. In India, an estimated 167 million people are at risk of developing IDDs. Of these, 54 million suffer from goiter, 2 million suffer from cretinism, and 6.6 million children have neurological deficits.² The various surveys conducted in different states concluded that no state in the country is free from IDD.³ Globally, IDDs are associated with multiple thyroid related diseases like hypothyroidism, hyperthyroidism, goiter and cretinism. Besides, they also inherit real risk of coronary artery diseases, autoimmune disorders, psychiatric disorders, cognitive impairment, and cancer.^{4,5,6}

The WHO / UNICEF / ICCIDD recommended that 90% of household salts should get iodized at the recommended level of 15ppm. Though universal salt iodization (USI) was made imperative in the country from 2005, only 71% of households were consuming adequately iodized salt as per the Coverage Evaluation Survey, 2009.⁷ According to the NFHS 4³ conducted in 2015 - 2016, 93.1% households (96.5% in urban area and 91.4% in rural area) in the country consumed salt which is iodized. In the state of Himachal Pradesh, 99.1% households (99.3% in urban area and 99.1% in rural area) consumed iodized salt.

The aim of the present survey was to estimate the uptake of adequately iodized salt at the household level in a tribal area of Kinnaur District and to assess the practices with respect to storage and use of iodized salt, as well as to evaluate the knowledge related to health benefits of iodine.

OBJECTIVES

- To estimate adequate iodized salt consumption at household level in District Kinnaur.
- To assess the storage and cooking practices with respect to the current use of iodized salt.
- To assess the knowledge regarding benefits of iodized salt use, iodine deficiency diseases.

METHODOLOGY

Study design: A Cross sectional survey

Study area and period: The study was conducted in the month of January 2020 in District Kinnaur located in northeast corner of Himachal Pradesh bordering Tibet to the east.

Study population: Population residing in tribal area of Kinnaur.

Sample size: Sampling unit were households in Kinnaur. Sample size was estimated to be 196 expecting 15% of household with inadequate knowledge about iodized salt with 95% level of confidence, design effect 1.5 and 5% confidence interval.

Sampling design: 10 clusters were taken for survey and 18 -20 households per cluster were chosen randomly.

Data collection: Before doing the data collection, the survey team was given training regarding the testing for estimation of iodine in salt with the help of MBI kits and administration of the questionnaire. The data collectors obtained consent from member of household available at the time of interview and Pretested Standardized Questionnaire was administered in every selected household. After that iodine content of the salt in use was tested by using rapid salt iodine testing kit in front of family and the results were conveyed to them.

Criteria for Assessment of adequately iodized salt

S. No.	Colour of salt after adding reagent of MBI Kit	Result
1	White	No iodine
2	Purple blue	Adequate iodine
3	Grey/light blue	Inadequate iodine

Data Analysis:

The collected Data was thoroughly screened and entered in Microsoft Excel spreadsheet 2007. Statistical analysis was done by using Epi Info 7 software. Descriptive statistics, frequency percentages were determined for categorical variables with 95% confidence interval.

Ethical consideration: Objectives of study were explained to the participants during the visit. Informed consent was taken from the participants in the study. Participants were fully assured regarding the confidentiality and anonymity of the information provided by them.

RESULTS

A total of 196 households in Kinnaur were surveyed for iodized salt coverage, using MBI salt Iodine detection kit. The demographic profile of study participants has been summarized in table 1.

Table 1: Demographic Profile Of Study Participants

Variables	Kinnaur (n -196)	
	Frequency (n)	Percentage (%)
Age groups (years)		
18-30	73	37.2
31-45	70	35.7
45-60	28	14.2
> 60	25	12.7
Gender		
Female	113	56.7
Male	83	42.3
Respondents Education		
Illiterate	14	7.1
Primary	15	7.6
High school	58	29.6
Senior Secondary education	47	23.9
Graduate or above	62	31.6
Respondents occupation		
Home maker	72	36.7
Agricultural worker	74	37.7
Government job	23	11.7
Private job/Business	27	13.7
Type of family		
Nuclear	102	52.0
Joint	94	48.0

The study results showed that 84.7% (166) of households in Kinnaur were using iodized salt in current survey. The household coverage of adequately iodized salt in current survey was found to be 75% in tribal area of Kinnaur. (Figure 1)

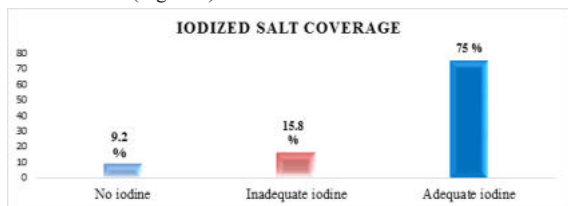


Figure 1: Iodine coverage in Kinnaur

More than half of the respondents had heard about iodine. Mass media i.e. TV/Radio/Internet and health personnel's were found the primary source of information. More than half the respondents either don't have much knowledge or had wrong knowledge about iodine or iodized salt in the area. (Table 2)

Table 2: Knowledge Of Survey Respondents Regarding Iodized Salt

Heard of Iodized salt	Yes	No	
	109 (55.6)	87(44.4)	
Source of information	Frequency	Percentage (%)	
1. Television /Radio/ Internet	35	32.1	
2. Educational Institutions	10	9.1	
3. Health personnel	34	31.2	
4. Others *	30	27.5	
*(Friends, relatives)			
Knowledge	Response		
	Yes	No	Don't Know
Every salt don't contain iodine	36(18.3%)	30(15.3%)	130(66.3%)
Iodine reduces when salt not stored properly	14(7.1%)	23(11.7%)	159(81.2%)
Iodine deficiency cause Mental retardation in children	17(8.7%)	15(7.6%)	164(83.7%)
Iodine deficiency cause Growth retardation in children	15(7.6%)	17(8.7%)	164(83.7%)
Taste of iodized salt is same of common salt	23(11.7%)	23(11.7%)	150(76.5%)

In the current survey only half the respondents in both cities were aware of importance of iodine / iodized salt and its role in normal

growth and prevention of diseases. (Table 3)

Table 3: Respondents understanding of Iodized salt

	Frequency	Percentage (%)
Important of Iodized salt		
1. To cure goiter	52	26.5
2. To prevent IDD	3	1.5
3. To remain healthy	4	2.0
4. Better than other salt	2	1.0
5. No importance at all	13	6.6
6. Don't know	122	62.2
Cooking with non-iodized salt leads to		
1. Goiter / thyroid disease	41	20.9
2. Hypertension	2	1.0
3. Stunting in children	38	19.4
4. Mental & Growth retardation	0	0
5. No effect	6	3.1
6. Don't know	109	55.6

In the present survey 53.1% of the respondents were using open steel container for storage of salt. Most of them were using wide base container. 57.7% respondents never practice exposing salt to heat and light. Most of the respondents were consuming salt within 4-8 weeks after opening of packet. (Table 4)

Table 4: Storage Practices Of Salt Among Survey Respondents

	Frequency	Percentage (%)
Type of container		
1. Air tight glass container	9	4.6
2. Open glass container	27	13.7
3. Air tight steel container	3	1.5
4. Open steel container	104	53.1
5. Air tight plastic container	27	13.7
6. Open plastic container	26	13.3
Shape of container		
1. Wide base	122	62.3
2. Narrow base	74	37.7
Dampness/moisture observed in salt		
1. Never	95	48.5
2. Some time	83	42.3
3. Often	18	9.2
Exposing moisturized salt to light or heat		
1. Never	113	57.7
2. Some time	53	27.0
3. Often	30	15.3
Average duration needed to consume salt after opening of packet		
1. Less than 2 weeks	9	4.6
2. 2 – 4 weeks	85	43.3
3. 5 – 8 weeks	88	44.8
4. More than 8 weeks	14	7.1

Combination of boiling, steaming and frying (63.3%) was the most common cooking practice found in survey. Nearly half of the respondents were adding salt at the starting time while gravy preparation, followed by during the gravy preparation while only few (6.1%) were adding at the end of cooking. Per capita salt consumption in Kinnaur was found to be 7.87±2.65 mg.

DISCUSSION

Household utilization of iodized salt was found to be 84.7% in tribal area of Kinnaur which is less than what was reported in NFHS 4 (2015-16).⁸

However, on testing the iodized salt being used in households, adequate iodine was found in only 75%, and this is almost in concordance with other studies conducted in rural areas of India.^{9,10} Regular external monitoring may encourage salt producers to achieve optimal iodization of salt.

Most people were unaware of the IDD, so did not paid any heed to manage iodized salt properly. The behavioral and environmental factors at the community level could contribute to such stance. Nearly half of the respondents had heard about iodized salt and the major source of information were mass media (TV, Radio & Internet) and health personals. In this context, behavior change communication

need to be focused to increase knowledge, bringing positive attitude toward utilization of iodized salt.

Knowledge about detrimental effects of using unionized salt like mental retardation and growth retardation was present in very small fraction of the population. This was in congruence with study conducted in rural area of Andhra Pradesh.¹⁰

Regarding storage practices, majority of the respondents of survey were using open steel container for storage of salt. Most of them were using wide base container. Most of them never practice exposing salt to heat and light. Most of the respondents were consuming salt within 4-8 weeks after opening of packet.

Nearly half of the respondents were adding salt at the time of gravy preparation, while very less proportion were adding at the end of cooking. Loss of iodine depends upon type of cooking method and time at which salt is added while cooking. Thus, to prevent iodine losses while cooking, it is advisable to sprinkle salt on food after cooking (wherever possible) rather than adding salt at the start of cooking which is done traditionally in India.

Salt consumption could be anywhere in the range of 5–12 g within a given region or country. Similarly, per capita salt consumption was found to be 7.87±2.65 which greater than the 5 mg per day as per the recommendation by W.H.O.

CONCLUSION

The tribal area of Kinnaur had transformed its phase from iodine deficient to iodine sufficient. So, sustained efforts are required in these places to consolidate the current coverage of adequately iodized salt and increase it to 100%. In spite of the continuous awareness generated through print as well as electronic media about iodized salt in community, more than half of the respondents don't have much knowledge or had wrong knowledge about iodine or iodized salt. Similarly, more than half of respondents were unaware of importance of iodine / iodized salt and its role in normal growth and prevention of diseases.

The knowledge and awareness of the respondents about the storage and usage of iodized salt was unsatisfactory as majority of the respondents of survey had faulty storage and cooking practices. Government can start public awareness campaign which should emphasize on importance of iodine in our diet along with storage and cooking practices with key messages focusing on proper methods for storage of iodized salt, keeping the salt away from flame, adding salt towards the end of cooking etc.

REFERENCES

1. United Nations Children's Fund. Sustainable Elimination of Iodine Deficiency, Progress since the 1990 World Summit for Children; May, 2008.
2. Sen TK, Das DK, Biswas AB, Chakrabarty I, Mukhopadhyay S, Roy R. Limited access to iodized salt among the poor and disadvantaged in North 24 Parganas district of West Bengal, India. *J Health Popul Nutr.* 2010;28:369–74.
3. Kamath R, Bhat V, Rao R, Das A, Ks G, Kamath A. Prevalence of goiter in rural area of Belgaum district, Karnataka. *Indian J Community Med.* 2009;34:48–51.
4. Patrick L. Iodine: Deficiency and therapeutic considerations. *Alternative Medical Rev.* 2008;13:116–27.
5. Verheesen RH, Schweitzer CM. Iodine deficiency, more than cretinism and goiter. *Med Hypotheses.* 2008;71:645–8.
6. Simone Caramel. Coronary Artery Disease and CAD Inherited Real Risk. 2010. 7. UNICEF. The State of the World's Children. Adolescence: An Age of Opportunity. New York: United Nations Children's Fund; 2011.
7. UNICEF. Coverage Evaluation Survey, All India Report. Ministry of Health and Family Welfare, Government of India, New Delhi. 2010.
8. International Institute for Population Sciences (IIPS). National Family Health Survey (NFHS-IV), India, 2015:2016 fact sheet. Available at <http://rchiips.org/NFHS/factsheetNFHS-4.html#>. Accessed on 30 March 2021.
9. Roy R, Chaturvedi M, Agarwal D, Ali H. Household use of iodized salt in rural area. *J Family Med Prim Care* 2016;5:77-81
10. Deepika PS, Rao BT, Vamsi A, Valleswary K, Sekhar MC. A cross sectional study on proper use of iodized salt in communities of rural areas and its relevant factors in Prakasam district, Andhra Pradesh, India. *Int J Community Med Public Health* 2019;6:1083-90.