

# A cross sectional study on iodized salt usage at household level in Ulagankulam Panchayat of Tirunelveli district Tamil Nadu

P Getrude Banumathi\*, D Jaiganesh\*\*, P Parameshwari\*\*\*, R Dharani Sri\*\*\*\*, P Ravishankar\*\*\*\*\*

\*,\*\*,\*\* Assistant Professor, \*\*\*\* Tutor, Department of Community Medicine, Chengalpet Medical college, Chengalpet, Tamil Nadu, INDIA.

\*\*\*\*\* Senior Lecturer, Department of Public Health and Dentistry, Rajas Dental College, Kaavalkinaru, Tirunelveli, Tamil Nadu, INDIA.

Email: [getzpgmathi@gmail.com](mailto:getzpgmathi@gmail.com), [jai.pmd85@gmail.com](mailto:jai.pmd85@gmail.com), [dr.parameshwari@yahoo.com](mailto:dr.parameshwari@yahoo.com)

## Abstract

**Background:** Iodine deficiency disorders (IDD) still remains a major public health problems in many countries including India. Thus the Iodised salt is most economical, convenient and effective means of mass prophylaxis against Iodine Deficiency Disorders. **Objectives:** To estimate the prevalence of iodized salt usage at household level and to find out the iodine content of edible salt with MBI spot testing kit among women at household level in Ulagankulam panchayat of Tirunelveli. **Materials and Methods:** A community based cross sectional study among 306 women in households of Ulagankulam Panchayat, Thirunelveli District. A standardized, semi-structured questionnaire was applied to the women household who is in charge of kitchen to estimate the usage regarding iodized salt. Cooking salt was tested with MBI Spot testing kit for iodine content. Iodine content  $\geq 15$ ppm was considered as adequately iodised salt. Appropriate statistical tests used and analysis done using SPSS 18 software. **Results:** Among the 306 salt samples tested, 123 (40.2%) were using adequately iodized salt ( $> 15$ ppm), 66 (21.6%) – inadequate iodized salt, 117 (38.2) – uniodized salt. 135 (44.1%) were buying salt from street vendors, 102 (33.3%) from nearby petty shops, 66 (21.6%) from General provisional store and 3 (1%) from Public distribution system (PDS). 54 (52.9%) and 54 (78.3%) of salt samples from nearby Petty shops and General provisional store were adequately iodized. **Conclusion and recommendation:** Based on this study, only 40.2% were using adequately iodised salt. This is well below the WHO recommended level (90%). Iodized salt should be manufactured in small pockets and made available at low cost even in petty shops and public distribution systems of rural areas and legal measures to ban crystallized non iodized salt to be strengthened. Increased awareness and frequent inspection by health staffs to be done.

**Keywords:** Iodized, Iodine deficiency disorders, MBI spot testing kit, Salt.

## \*\* Address for Correspondence:

Dr. D. Jaiganesh, Assistant Professor, Department of Community medicine, Chengalpet Medical college, Chengalpet, Tamil Nadu, INDIA

Email: [getzpgmathi@gmail.com](mailto:getzpgmathi@gmail.com)

Received Date: 20/03/2016 Revised Date: 12/04/2016 Accepted Date: 08/05/2016

## Access this article online

Quick Response Code:



Website:

[www.statperson.com](http://www.statperson.com)

DOI: 12 May 2016

## INTRODUCTION

Iodine is an essential micro nutrient. It is required at 100-150 micrograms daily for normal human growth and development.<sup>1</sup> Iodine deficiency disorders (IDD) are a

worldwide major public health problem. More than 1.5 billion people all over the world are at risk of IDD.<sup>2</sup> Of the 130 countries which reported data for IDD in 2006, IDD was a public health problem in 47 countries.<sup>3</sup> In India it is estimated that more than 200 million people are at risk of IDD while the number of persons suffering iodine deficiency disorder is above 71 million.<sup>4</sup> Sample surveys have been conducted in 28 states and 7 union territories which have revealed that out of 324 districts surveyed so far, 263 districts are IDD endemic. The prevalence of IDD is above 10% and not even a single state are union territory is free from the problem of IDD.<sup>2</sup> In Tamilnadu goiter is prevalent in all districts. 18 districts out of 29 have more than 10% prevalence.<sup>1</sup> Universal iodization of salt is most effective cheapest available intervention available. WHO, Unicef and the

international council for the control of iodine deficiency disorders recommend it.<sup>5</sup> In 1992 India made it mandatory that salt produced human consumption has to be adequately iodized.<sup>6</sup> Under the NIDDCP in India iodization of salt is the recommended strategy, with the level of iodization fixed at a minimum of 15 (PPM) at consumer level and 30(PPM) at the production level.<sup>7</sup> Salt iodine testing is an important indicator for monitoring progress towards universal salt iodization. In this study the iodine content of the salt was being measured by MBI spot testing kit. The MBI kits are inexpensive, require minimal training and provide an immediate result, do not require any infrastructure. For single observer the sensitivity of this test is 93.3% and specificity of this test is 90.4%.<sup>[8]</sup>The consumption of iodized salt is much higher in urban areas in comparison to rural area leaving the most vulnerable and socio economically disadvantaged segments of the population at a greater risk.

**MATERIALS AND METHODS**

This community based cross sectional study was done in households of Ulagankulam panchayat, Tirunelveli in August 2012. Sample size was estimated by conducting the pilot study and estimated sample of 306 were selected by Multi stage random sampling method. Among the districts of Tamil Nadu, Tirunelveli district was chosen randomly. Tirunelveli district consist of 19 blocks. From this 19 blocks, Cheranmehadevi block was chosen randomly by lottery method. Cheranmehadevi block contains 12 panchayats. From these 12 panchayats, ulagankulam panchayat was chosen randomly. The study was cross sectional in nature and ethical clearance was obtained from the institutional ethical committee. The study conducted at ulagankulam panchayat, located near Western Ghats in tirunelveli district. The panchayat consist of totally of 846 houses. The house details were obtained from ulagankulam panchayat office. Then the required number of 306 samples was chosen from random table. After getting the consent from each selected

household, Semi structured questionnaire was administrated to the women household who is in charge of kitchen to assess the usage regarding iodized salt. Then sample of salt used for cooking purpose collected & tested using MBI kit. The data was entered in Excel sheet and analyzed using SPSS 18<sup>th</sup> version. The results were expressed as percentages.

**RESULTS**

A total of 306 women in the households, whose age ranged from 19 to 75 years were included in the study with the mean age was 40 years. The predominant religion in these households was Hindus followed by Christians accounting 213 (69.6%) and 93 (30.4%). 255 (83.3%) of the households belonged to the backward class, 27 (8.8%) were scheduled tribes, 18 (5.9%) were most backward class and 6 (2 %) were forward caste. 144 (47.1%) of the women interviewed had attended elementary school (1 to 5 std), 96 (31.4%) had attained higher secondary education, 35 (11.3%) were illiterate and 31 (10.2%) were degree holders. Most of the women 300 (98%) interviewed were housewives. 177 (57.8%) of the households lived in pucca house, 93 (30.4%) lived in semi pucca house and 36 (11.8%) lived in kutcha house. The prevalence of iodized salt usage at household level using mbi kit was shown in Table 1.

**Table 1:** Prevalence of iodized salt usage at household level using MBI kit

Type of salt	Number (306)	Percentage
Adequately iodized (>15ppm)	123	40.2%
Inadequately iodized (<15ppm)	66	21.6%
Not iodized (0 ppm)	117	38.2%

Out of the 306 households surveyed, 135 (44.1%) were buying salt from street vendors, 102 (33.3%) from nearby petty shops, 66 (21.6%) from General provisional store and 3 (1%) from Public distribution system (PDS). The iodine content of edible salt from various sources was shown in Table 2.

**Table 2:** Iodine content of edible salt

Salt	Nearby petty shops (102)	General provisional store and Public distribution system (69)	Street vendors (135)
Adequately iodized	54 (52.9%)	54 (78.3%)	15 (11.1%)
Inadequately & unionized	48 (47.1%)	15 (21.7%)	120 (88.9%)

Among the 306 households, 93 (30%) were buying Packaged crushed salt, 75 (24.5%) were buying Packaged crystal salt and 138 (45.5%) were buying Loose crystal salt. Table 3 shows the availability of adequately iodized salt with the form of salt purchased.

**Table 3:** Availability of adequately iodized salt versus form of salt purchased

Form of salt	Adequately iodized	Inadequately iodized or not iodized salt
Packaged crushed (93)	66 (71%)	27 (29%)
Packaged crystal (75)	42 (56%)	33 (44%)
Loose crystal salt (138)	15 (10.9%)	123 (89.1%)

## DISCUSSION

In this study among 306 households survey, only 123 (40.2%) households were using adequately iodized salts. This result is almost similar to the study conducted by salt commissioner office with UNICEF in 2010 across 8 states of India which was 41.9%.<sup>9</sup> But it is higher than the study conducted in general population of Kazakastan in 2004 which was 20%.<sup>10</sup> One of the WHO criteria for monitoring progress towards sustainable elimination of IDD as a Public health problem, the proportion of households using adequately iodized salts should be more than 90%<sup>5</sup> but in this study results show only 40.2% which is well below the recommended level. This could be due to less availability of iodized salt, poor awareness about benefits of iodized salt, poor socio-economic condition of the population with lower purchasing power. In Ulagankulam Panchayat, people had to buy salt from available sources- three Petty shops, General provisional store and Street vendors. 54 (52.9%) had bought salts from petty shops are adequately iodized (>15ppm) whereas only 15 (11.1%) of salts bought from street vendors are adequately iodized. 66 (21.6%) of the households bought their salt from general provisional stores (located outside the Panchayat), of which 52 (78.3%) are adequately iodized; Among the 306 households, 213 (70%) households were using crystal salts (Packaged crystal salt- 75 (24.5%) and Loose crystal salt-138 (45.5%);). In this study observed that packaged crushed salt was adequately iodized by 71% as against Packaged crystal salt was adequately iodized by 56% and Loose crystal salt was by 10.9%. When enquired, most of the women prefer to buy and use crystal salts than crushed salts because it was easy to quantify the requirement during cooking, local availability and low cost. Among the 306 households, 117 (38.2%) were not using iodized salt. The reasons are 61 (52.2%) said that it was not available, 37 (31.3%) said that they had no idea regarding iodized salt, 14 (12%) said that the cost was high and 5 (4.5%) said that the taste was not good. After testing the salt in each household, the women were educated about the benefits iodized salt usage, iodine deficiency disorders and they were also educated to use crushed packaged branded salt which retain more iodine than crystal salts. Petty shop owners were also educated about iodine deficiency disorders and to sell only iodized salt.

## CONCLUSION

In spite of the fact that the usage of iodized salt is the most effective prophylactic measure against iodine deficiency disorders, in this study it was found that out of 306

households, only 123 (40.2%) households were using iodized salt. This study result shows that non availability of iodized salt was the main reason for not using it. This study also made an important observation that packaged crushed salt is better iodized than packaged crystal salt and loose crystal salt. 135 (44.1%) of the households were buying salt from street vendors but the study revealed the fact that only 11.1% of these salts were adequately iodized.

## RECOMMENDATION

1. Iodized salt should be made available in all petty shops in rural areas.
2. Legal measures should be strengthened on ban of selling crystallized non iodized salt by street vendors and local petty shops.
3. Cost of the iodized salt should be reduced.
4. Regular community based awareness activities about the benefits of iodized salt can be conducted through media, anganwadi workers, NGOs, self help groups and schools.
5. More effective inspection and frequent testing of salts should be done by field health workers in rural households and shops.

## REFERENCES

1. J.kishore, National health programes of India 9<sup>th</sup> edition page number
2. Govt of india annual report 1997-1999, Ministry of health and family welfare
3. De Benoist B, McLean E, Andersson M, Rogers L. Iodine deficiency in 2007: global progress since 2003. *Food Nutr Bull* 2008; 29 : 195-202.
4. "Citizen Charter" National Iodine deficiency disorder control program and nutrition. Available from: <http://www.negahealth.nic.in>.
5. WHO/UNICEF/ICCIDD. Indicators for assessing iodine deficiency disorders and their control through salt iodization. Geneva, World Health Organization, 1994: 29-31.
6. Sundar Lal et al. Textbook of community medicine. 1<sup>st</sup> edition; p 180-181
7. Salt Department, Ministry of Industry. Universal Salt Iodisation (USI) – India: progress and current status. New Delhi, 1996: 8.
8. Chandrakant S. Pandav, Narendra K. Arora, Anand Krishnan, Rajan Sankar, Smita Pandav & and Madhu G. Karmarkar. Validation of spot-testing kits to determine iodine content in salt. *Bulletin of the World Health Organization*, 2000; 78(8):975-80.
9. Summary report iodized salt coverage study 2010 conducted across eight states in India
10. Unicef an assessment of the household use and adequacy of iodized salt in the republic of kazakhstan almaty, 2005.

Source of Support: None Declared  
Conflict of Interest: None Declared