# **Original Research Article**

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# A study on the iodised salt use pattern amongst the slum dwellers in Kolkata

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# **ABSTRACT**

**Background:** Iodine deficiency disorders (IDD) are most important causes of preventable brain damage all over the world. Iodization of salt is used as a weapon to prevent IDD through national iodine deficiency disorders control programme and food safety and standards act, 2006 and regulations, 2011. Climatic condition, knowledge about storage and culinary practices pose a problem in maintaining adequate iodine level in salt at the consumer level.

**Methods:** An observational, cross-sectional, descriptive study was carried out in the slum of Baghbazar under the service area of urban health and training centre, R.G. Kar medical college and hospital, Kolkata from 18 April to 30 April 2018. Households were chosen using simple random sampling and one adult representative from each household was interviewed with pre-designed pre-tested schedule.

**Results:** 100% of the households were found to use iodised salt. 19.2% were aware that they were using iodised form of salt. 96.2% people keep the salt in covered container but only 7.7% of them knew that if kept uncovered iodine vaporises from salt. Moreover 40.4% of the respondents were found to keep salt open close to the oven during cooking with 86.5% of them not believing that this practice can have effect on the quality of the salt.

**Conclusions:** Awareness regarding the effect of iodised salt on health, proper storage and use pattern should be initiated for desired sustainable change in practice and strict enforcement of law for curbing sale of non-iodised salt must be implemented so that IDD cease to be a serious public health problem.

Keywords: Iodized salt, Slum dwellers, Kolkata, Salt use pattern

# INTRODUCTION

IDD constitutes single largest cause of preventable brain damage in India as well as all over the world and is the prototype of the 'hidden hunger' worldwide.<sup>1</sup> Flood, rampant deforestation, changing courses of the rivers, etc have been the main causes behind the surface of salt in

India devoid of Iodine which in turn leads to less iodine level in the crops grown. Previously this micronutrient deficiency has only been linked to goitre and cretinism but later on findings confirmed its deficiency to a variety of diseases like hypothyroidism, brain damage, psychomotor deficiency, still birth, abortion, mental

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retardation, hearing and speech impairment, etc posing serious mass scale social problems.<sup>2</sup>

All over the world preschool children and pregnant women are the most vulnerable to IDD, mostly in the setting of poor socioeconomic status where use of noniodised salt is quite common. Globally around two billion people are at risk of IDD. Of the 130 countries which acknowledged IDD in 2006, 47 of them recognised it to be of public health concern.3 In India almost whole population is prone to develop IDD due to deficiency of iodine in the major portion of land soil of the subcontinent and consequently the food derived from it. It has been estimated that 350 million people are at risk of IDD as they consume salt with inadequate iodine. Every year nine million pregnant women and eight million newborns are at risk of IDD in India. These estimates are based on the household-level coverage of adequately iodized salt as reported in coverage evaluation survey (CES) 2009.4 Surveys conducted by the central and state health directorates, Indian council of medical research (ICMR) and medical institutes since 1950s have showed that IDD is a public health problem in all states and union territories in India. Of the 325 districts surveyed in India so far, 263 districts are IDD endemic, i.e. the prevalence of IDD is above 10 per cent in the population. Notification regarding banning of sale of non-iodised salt for human consumption is already out under the food safety and standards act, 2006 and regulations, 2011.<sup>5</sup> As a result only iodised salt shall be available in the market for human consumption with recommended iodine level 30 ppm at the manufacturing and packaging level and 15 ppm at the consumer level. The implementation process is ongoing well all over the country but the problem lies with the way iodised salt is being used and stored at the household level in India. As per coverage evaluation survey, 2009 around 83.2% of urban households use adequately iodised salt. The humid weather of tropical countries may cause loss of around 30% to 98% loss of iodine from the salt.6 Also the traditional culinary practice in India envisages addition of salt in the beginning and middle of cooking when food is fully heated or being boiled or being cooked which may result in loss of 20 to 70% loss of iodine from the salt<sup>7</sup>. If kept in uncovered container loss of iodine from the salt due to vaporisation cannot be limited in the climate we live in our country. So, the cumulative effect of climatic condition, storage and culinary practices take a toll on the iodine level of salt and the amount of iodine uptake in the cooked food is a question mark here in this country. Also, availability of cheap non-iodised salt in the market cannot be ruled out which can make its way to our kitchen anytime. It seemed imperative to know the present knowledge and practice of population regarding iodised salt so that gap specific or targeted intervention can be taken up, sustainable desired behavioural pattern may be instilled and awareness can be generated regarding the use of iodised salt in the population. With this background, a study was carried out in the area at Baghbazar, Kolkata to estimate the prevalence of iodised salt use amongst slum dwellers of Kolkata and to study the knowledge regarding use of iodised salt among them.

## **METHODS**

An observational, descriptive study with cross sectional design was carried out in the slum at Baghbazar, Kolkata under the service area of urban health and training centre (UHTC) of R.G. Kar medical college and hospital, Kolkata between 18 April to 30 April 2018. According to the register maintained in the UHTC, Baghbazar there are 450 households in its service area which were of interest in the study. Households were selected using simple random sampling without replacement. Sample size was determined with finite correction of population, with the help of the following formula:

$$n = Nz^2pq/\{d^2(N-1) + z^2pq\}$$

where n=sample size, N=total population (total no. of household), z=1.96 at the 95% confidence level, p=prevalence of using iodized salt in urban households(83.2%)<sup>1</sup>, q=(1-p), d=Absolute precision (10%).

With the above formula used the sample size was calculated to be 47. Considering 10% non-response rate the final sample size was calculated to be 52. From each selected household any one adult respondent was chosen who is oriented about the cooking process and salt use in that particular household. Those respondents were interviewed using a Pre-designed pre-tested schedule after taking informed consent from them. Study variables were socio-Demographic information like age of the respondents of the households, gender, religion, educational qualification of the respondents, socioeconomic status of the family according to updated Prasad's scale, 2018, knowledge and practice of different aspects of Iodised salt use pattern amongst the respondents like type of salt they use, storage process of salt, etc.8 Data analysis were carried out using MS excel 2010 spread sheet and SPSS version 20 software.

# **RESULTS**

There were total 52 adult respondents from the 52 different households in the study area. Out of the respondents there were only one Male person rest 51 being adult female. Respondents were from various age groups minimum being 19 years and maximum 64 years with mean age of 36.4 years. There were 20 (38.5%) of them with each middle and high school certificate, 02 (3.8%) with graduation certificate, 03(5.8%) with primary school education and only 07 (13.5%) were illiterate in this study. Table 1 shows statistically significant association of awareness regarding Iodised salt with the educational level of the respondents above middle school certificate (p value=0.000,  $\alpha$ =5% and DF=1) but other calculations show that Socio-economic status has no significant relation with the variable.

Table 1:  $2\times2$  contingency table of relationship of educational status of the respondents with the awareness regarding iodised salt (p=0.000 with  $\alpha$ =5% and DF=1).

Educational qualification of the respondents	Whether heard of 'Iodised salt'		Total	P value
Up to middle school education	19	11	30	0.000
Above middle school	2	20	22	
Total	21	31	52	

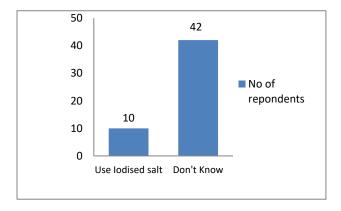


Figure 1: Bar diagram of awareness of the respondents regarding the type of salt they were using.

Mass media is the main source of information (53.8%) for awareness for using iodized salt (Figure 2).

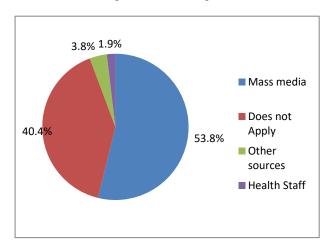


Figure 2: The pie chart of distribution of the sources of information regarding knowledge of iodised salt amongst the respondents.

Even though the findings confirm 100% of our respondents use pre-packed iodised salt as demonstrated to the author during interviewing in practicality only 19.2% knew that they were using Iodised form of salt in the form of pre-packed salt. This knowledge has

significant association (p=0.000,  $\alpha$ =5%, DF=1) with educational level above middle school certificate level as shown in the Table 2.

Table 2:  $2\times2$  contingency table of relation between educational status of respondents and knowledge regarding the type of salt they were using (p=0.000 with  $\alpha$ =5% and DF=1).

Educational level of the respondents	Knowled regarding of salt us Iodised salt	g the type	Total	P value
Up to middle school	1	29	30	
Above middle school	9	13	22	0.000
Total	10	42	52	

Educational level again above middle school level has got statistically significant association with the knowledge amongst the respondents regarding whether iodine in salt has some effect on health or not (Table 3). Source of information regarding iodised salt in most cases (53.8%) is mass media like TV, radio as depicted in (Figure 2) with only 3.8% respondents got the information directly from any health staff.

Table 3: 2x2 contingency table of the relationship between the educational status and the knowledge regarding the role of iodine in maintaining health (p=0.005,  $\alpha$ =5% and DF=1).

Educational status of the respondents	Whether iodised salt helps in maintaining health or not		Total	P value
Up to middle school	<b>No</b> 26	4	30	
Above middle school	11	11	22	0.005
Total	37	15	52	

The study revealed in around 96.2% cases salt used to be stored in any form of closed container but surprisingly educational status or SES has no statistical relationship with why they are practising this. In 86.5% of household, it was believed to be the problem of any foreign body (living or non-living) getting into the stored salt that forced them to keep the salt container closed where only 7.7% of them believed that keeping the salt container open can cause loss of iodine by vaporization.

Moreover, it was found that 40.4% (Figure 3) of the respondents used to keep the salt open close to the oven during cooking and interestingly around 86.5% of them

do not believe that keeping salt away from the cooking place can have effect in maintaining the quality of salt in any form, not even educational qualification having any bearing.

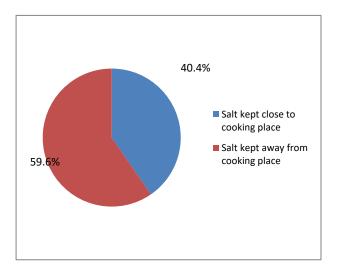


Figure 3: Distribution of the respondents on the basis of practice of storing salt nearer to or away from cooking place.

During the taken-up study it was found that in 75% of the household's salt used to be added in the middle of the cooking. Very interestingly only 15.40% of the respondents think it is right to add salt at the end of the cooking while majority (around 61.50%) of them think it is right to add salt during cooking in the middle (Figure 4).

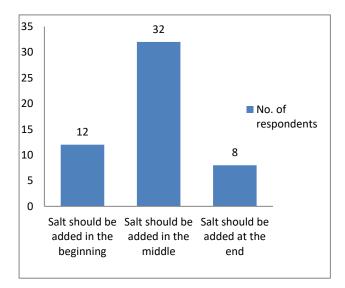


Figure 4: Distribution of respondents on the basis of knowledge regarding the time at which salt is best added during cooking.

And last but not the least is the finding that 26.9% of the respondents confirm that non-iodised salt is still available in their locality in some form raising a great concern (Figure 5).

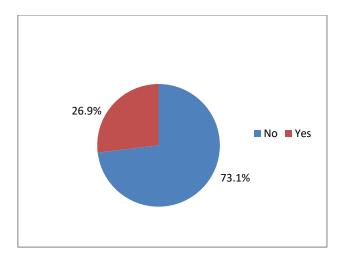


Figure 5: Availability of non-iodized salt in the area.

## **DISCUSSION**

India is one of the first countries all over the world to address IDD as a public health problem and roll out goitre control programme in 1962 based on iodised salt use. Later on, this programme changed its name to national iodine deficiency disorder control programme. Study conducted by Agarwal et al on consumption of iodized salt among slum households of North-East Delhi identified that three-fourth households of were consuming adequate iodized salt and the level of understanding on benefits of iodized salt among them was extremely low.<sup>10</sup> Another study conducted by Roy et al at in the villages of Gautam Budh Nagar, Noida, found that 93.7% households were using iodised salt and more than half of the households were not aware about the benefits of iodized salt. No association was observed between the socioeconomic status and type of salt used in the household.<sup>11</sup> In our study 100% of the households were found to use iodised salt. 19.2% were aware that they were using iodised form of salt. 96.2% people keep the salt in covered container but only 7.7% of them knew that if kept uncovered iodine vaporises from salt. Moreover 40.4% of the respondents were found to keep salt open close to the oven during cooking with 86.5% of them not believing that this practice can have effect on the quality of the salt. There was statistically significant association of awareness regarding Iodised salt and its health benefits with the educational level of the respondents above middle school certificate. So out of the study the following recommendations can be made. As it was revealed in the study availability of non-iodised salt is there and people have not much awareness regarding the effect of iodised salt on the health, always there is a possibility to deviate to the use of cheaper non-iodised salt any time with law enforcement being a bit loose. So strong programme is needed to make people aware about the utility and importance of using iodised salt, may be through school education, mass campaign, etc. For desired sustainable pattern of use and storage of iodised salt awareness should be increased among general

population. Strict enforcement of the law so that availability of non-iodised salt can be absolutely curbed.

#### Limitations

This study was carried out in only one slum area in Kolkata, a large cross-sectional study involving other arears may provide a better picture of the current scenario of the iodised salt use pattern amongst the slum dwellers in Kolkata. Estimation of the iodine content in the salt at consumer level may help us to understand the gap between knowledge and practice with respect to iodised salt.

## **CONCLUSION**

Though considerable progress has been made in the implementation of national iodine deficiency disorders control programme over the years the study revealed some striking facts about the knowledge at the household level regarding proper use and storage of iodised salt, some of which are even prevalent in persons with higher education raising question about the actual status of Iodine level of salt at the consumer end with the amount of Iodine being consumed practically. Also, the revelation that non-iodised salt is still available in the market in some form can be of concern as this practice is banned under food safety and standards act 2006 and regulations 2011.

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