IOSR Journal of Nursing and Health Science (IOSR-JNHS)
e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 2, Issue 1 (Sep. – Oct. 2013), PP 22-26
www.iosrjournals.org

Prevalence of Goitre and Iodine Intake in Kanpur

Shailja Singh[1], Rashmi Singh[2]
[1](*Department of food science & nutrition, college of home science/ C.S.A.univ. of Agriculture & Tech.,Kanpur(U.P.) India)*
[2](*Department of food science & nutrition,college of home science/ C.S.A.univ. of Agriculture & Tech.,Kanpur(U.P.) India)*

***Abstract*:** *Iodine is an essential element in the chemical structure of thyroid hormones. The human body requires around 150 μg of iodine everyday, which works out to be a teaspoonful (5gm) over a life span of 70 years. Iodine deficiency is the most common cause of brain damage. The magnitude of IDD in India includes 167 million people at risk and goitre is being considered as important public health problem. Therefore, a study was conducted to assess prevalence of goitre and iodine intake in 3 areas of Kanpur viz. urban, rural and slum areas. There was no visible or palpable goitre was found in the studied population. Results of the survey revealed that 92.0 per cent of the urban respondents were consuming branded packaged salt while 18.0 per cent of the rural and 4 per cent of the slum population were consuming crystalline. In urban area, salt consumption per person per day ranged from 8.6 to 9.9 gm. In slums, per capita salt consumption was 9.9 to 11.0 gm. per day. On an average, daily salt consumption was found to be 9.9 ± 0.87. gm Iodine content in salt samples ranged between 15.9 ppm to 31.7 ppm. Iodine intake per person per day was found 247.7 μg.*
The study concludes that the prevalence of goitre was nil among studied population. Salt consumption was found to be higher in rural and slum areas and iodine intake was found to be more than the recommended value.
Key Words: *Goitre, Iodine deficiency, Iodine intake, Salt consumption.*

I. Introduction

Iodine is an essential element in the chemical structure of thyroid hormones. The human body requires around 150 μg of iodine everyday, which works out to be a spoonful (5gm) over a life span of 70 years. Iodine deficiency leads to a reduction in the secretion of these hormones and it is the most common cause of preventable brain damage. WHO estimated that 2.2 billion people are at risk in 130 countries. It refers to all the effects of iodine deficiency in growth and development in human and animal population, which include goitre, abortion, still birth, neonatal and other type of hypothyroidism, but the major consequences are fetal brain damage and varying degree of cretinism- The magnitude of IDD in India include 167 million suffering from neurological disorder, 54 million suffering from goitre and 11 millions are cretins.

A number of advocacy measures were initiated to promote the consumption of iodized salt by the beneficiaries. Around 43% of the population do 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 fee from the problem of IDD [2]. The most common and visible adoptive respose is increase in thyroid gland, known as gotire.

A study conducted reported that median urinary iodine excretion of children was normal, indicating an iodine sufficient nutriture in Kanpur [1]

Therefore, the present study was conducted on the basis of above facts with the following specific objectives:-

1) To assess the prevalence of goitre in Kanpur
2) To assess per capita salt consumption among the population.
3) To estimate iodine content in salt samples.

II. Materials and Methods

The study was a cross-sectional community based field survey and laboratory work. Three areas of Kanpur viz. urban, rural and slum were selected randomly through stratified random sampling. 100 families were selected from each area. Total 300 families were selected and their demographic profile and information regarding their practices of storage of salt was collected through pre-tested and structured questionnaire. To estimate iodine content in salt samples 30 gm (2 tablespoon) of salt from respondent's kitchen was collected in self-sealing polythene bags and their coding was done. The iodine estimation of salt samples was done in laboratory within two days after collection of samples through idiomatic titration method [3].

Amount of salt being consumed by the population was assessed by total amount of salt purchased divided by total number of family members.

Goite is considered as public health problem in India. Therefore, total of 1875 number of people were examined for the assessment of goitre prevalence through standard palpation method.

According to WHO classification, Goitre is classified in three grades:-

- Grade O : No Palpation or visible goiter
- Grade I : Goitre palpation but not visible
- Grade II : Goitre visible with neck in normal position

III. Results and Discussion

In rural area 6.9% of the population were illiterate and only 2.9% of the slum population were graduate (TABLE-1). Maximum respondents (92.0%) from urban area were using branded packaged iodized salt, like Tata, Annapurna, Captain Cook and Nirma. 18.0 per cent of the rural respondents were using both crystal and branded salt(TABLE-2).

In Jammu region, 74.5 per cent of households were consuming powdered salt whereas 25.53 per cent studied population were consuming crystalline salt[4].It was revealed that 22.0 per cent of the studied population were consuming both crystalline and powdered salt whereas 7.9 per cent of the respondents were not sure about the type of salt they were consuming[5].

It was revealed that 68.0 per cent of the urban population were purchasing 2 kg salt for one month, 73.0 per cent of the rural population were purchasing 2 kg. salt for one month. Majority (65.0%) of the population were purchasing 2 kg. salt in a month. The χ^2 value was found to be positively significant at 5% level. (TABLE-3) Salt intake ranged from 8.6gm to 11.1 gm per person per day with an average 9.9 gm ± 0.87. Daily salt consumption was found to be higher in rural and slums areas. The iodine intake in urban area was ranged from 18.9 ppm to 31.7 ppm with an average 28.10 ppm. Thus, it was found that on an average per person iodine consumption was 247.7 μg.

The mean individual daily consumption of salt is 12.4 gm. for adult male and 8.3 gm for adult female[6]. The human body requires around 150 μg of iodine everyday[7].

Iodized salt is considered as the most appropriate measure for iodine supplementation. According to PFA, iodized salt should contain at least 30 ppm iodine at distribution level and 15 ppm iodine at household level. It was found that approximately 10gm. of salt is consumed per day thus when amount of salt consumed (10gm.) is divided by recommended amount of iodine (15ppm), provide 150μg of iodine per day, which is sufficient for normal physical and mental development. [8].

It was revealed that iodine content in selected salt samples ranged between 15.9 to 31.7 ppm.(TABLE-4). A study conducted in Uttar Pradesh revealed that out of 3112 powdered salt samples, only 3.4 per cent had nil iodine content and 56.6 per cent had iodine content of 15ppm or more[1]

It was revealed that in urban, maximum respondents (47%) were using glass containers for salt storage. (Fig.-1).

It was found that material of salt container affected the iodine content of the salt. The mean iodine content in salt stored in glass container was found to be higher (28.10 ppm). In earthenware pot, iodine content in salt were found to be least (21.99 ppm). The F value was found to be positively significant at 5% level(Fig.2). It was supported by that highest per cent of retention of iodine was noticed in salt stored in glass jars (97.97%) [9].

Within a month and a half, the iodine content of salt stored in earthenware pot is reduced to about 23.0%[10]It was found that the mean iodine content of the salt, stored at maximum distance from cooking area was found to be higher (28.83ppm) (Fig. 3)

It was supported that iodine is a volatile substance. Improper storage and careless domestic handling of iodized salt leads to loss of iodine from salt-iodine mixture[5].

The mean iodine content in salt was found to be least (20.89ppm) collected from families when the housewives were illiterate (TABLE-5) as rate of literacy and level of education allowed the population to understand and act upon information regarding iodized salt. There was significant difference in mean of iodine was found in different income groups. This was due to more exposes of high income group to media from where improved practices of handling of salt are observed (TABLE-. 6). A similar study in Ludhiyana revealed that high level of iodine was found in high income[10].

Total 1,875 number of population examined for goitre prevalence but no visible or palpable goitre was observed in the studied population. A study conducted in Kanpur (U.P.), concluded that the median urinary iodine exertion of children was 10.5μg/dl, indicating an iodine sufficient nutriture in the area[1].

IV. Conclusion:

The amount of salt consumed was sufficient. The Iodine consumption by the studied population was found to be adequate. All the salt samples were iodized but the improper storage practices and low education level affect adversely iodine content of salt. No visible and palpable goitre was found among the population. The careless domestic handling & storage were specially observed in rural & slum areas because of unawareness so there is need to focus on these areas specially.

It is therefore, time that some plan or projects are undertaken by the Government to improve the purchasing, storage & usage practices of the population for proper utilization of iodized salt by demonstration through mass media

References

[1] Kapil, U. Progress made in elimination of iodine deficiency disorders and possible impact of lifting ban on sale of non iodized salt. *Journal of Academy of Hospital Administration.12 : 2.* 2001.http://www.indiamedia.com

[2] ICMR Task force study. Epidemiological study of endemic goiter and endemic cretinism. Indian Council of Medical Research. 1989.

[3] Tyabji, R. The use of iodated salt in the prevention of iodine deficiency disorders (IDD). In: A handbook of monitoring and quality control, UNICFE/ROSCA, New Delhi, India. 1985.*18-29*

[4] Bhat, I.A. ;Pandit,I. M.; Mudassar,S. Study on prevalence of iodine deficiency disorder and salt consumption pattern in Jammu region. *Indian Journal of Pediatrics*. *33:* 2008.111-14.

[5] Satapathy, D.M.; Bahera, T.R. and Sahu, T.A study on goiter prevalence, knowledge and use of iodized salt in South Orissa. *The Indian Journal of Nutrition and Dietetics*. 41 : 4; 2004.390

[6] Yamada, C.; Oyunehimeg,D.; Igari,T.; Buttumur, D. Oyunbileg M. and. Umenai, T. Knowledge attitudee, and practices of people in Ulaanbaatar, Mongelia, with regard to iodine deficiency disorders and iodized salt. *Food and Nutrition Bulletin. 18:4;* 2008.353-358.

[7] Delange, F. and Hetzel, B. The iodine deficiency Disorders. Thyroid disease manager2006.. *www.thyroidmanager.org*

[8] Jayashree, S. and Naik, R.K. Iodine losses in iodized salt following different storage methods. *Indian Journal of Pediatrics*. 67: 8; 2002.559-561

[9] Patowary, A.C.; Kumar, S.; Patowary, S. and Dhar, P. Iodine deficiency disorder and iodized salt in Assam : A few observation. *Indian Journal of Public Health*. *39 : 4;* 1995.135-140.

[10] Singh, S.; Benjamin, A.I.; Panda, P. and Zachariah,P..A study on salt consumption in Ludhiyana, Punjab .*Indian Journal of Maternal and Child Health*.*7 : 9*; 1996.99-101.

Table1: Education of the subject

S. No.	Area	Age-group	School going	Non-school going	Illite-rate	Prim-ary	Junior Seco-ndary	10th to 12th	Grad-uate	Total
1.	Urban	Adult	-	-	12	42	37	26	85	202
		Adolescent	-	-	-	18	74	49	11	152
		Children	164	52	-	-	-	-	-	216
		Total	164 (75.9)	52 (24.1)	12 (3.4)	60 (16.9)	111 (31.4)	75 (21.2)	96 (27.1)	570
2.	Rural	Adult	-	-	29	58	40	24	65	216
		Adolescent	-	-	2	31	98	88	12	231
		Children	172	81	-	-	-	-	-	255
		Total	172 (67.9)	81 (32.1)	31 (6.9)	89 (19.9)	138 (30.9)	112 (25.0)	77 (172)	700
3.	Slum	Adult	-	-	69	104	22	10	8	213
		Adolescent	-	-	22	57	29	27	2	137
		Children	169	86	-	-	-	-	-	255
		Total	169 (66.3)	86 (33.7)	91 (26.0)	161 (46.0)	51 (14.5)	37 (10.6)	10 (2.9)	605
		Grand Total	505 (69.8)	219 (30.2)	134 (11.6)	310 (26.9)	300 (26.1)	224 (19.5)	183 (15.9)	1875

(Figures in Parenthesis denotes percentage value)

Table 2: Distribution of the respondents according to the use of type of salt.

S. No.	Type of Salt	Urban		Rural		Slum		Total	
		N	%	N	%	N	%	N	%
1.	Branded salt	92	92.0	80	80.0	79	79.0	251	83.7
2.	Crystal salt	2	2.0	2	2.0	4	4.0	8	2.7
3.	Both branded and crystal	6	6.0	18	18.0	17	17.0	41	13.6
	Total	100	100.0	100	100.0	100	100.0	300	100

Table 3: Monthly purchasing of salt by the respondents

S. No.	Amount of salt purchased	Urban		Rural		Slum		Total	
		N	%	N	%	N	%	N	%
1.	1 kg.	28	28.0	12	12.0	28	28.0	68	22.7
2.	2 kg.	68	68.0	73	73.0	65	65.0	206	68.7
3.	> 2 kg.	4	4.0	15	15.0	7	7.0	26	8.6
	Total	100	100.0	100	100.0	100	100.0	300	100.0
									$\chi^2 = 6.11$

Table 4: Iodine content in collected salt samples

S. No.	Iodine in salt (ppm)	Urban		Rural		Slum		Total	
		N	%	N	%	N	%	N	%
1.	0 – 15	-	00	-	00	-	00	-	00.0
2.	15 – 30	96	96.0	99	99.0	100	100.0	295	98.3
3.	> 30	4	4.0	1	1.0	-	-	5	1.7
	Total	100	100.0	100	100.0	100	100.0	300	100.0

Table 5: Effect of housewife's education on iodine content of salt.

S. No.	Education of Housewife	N	Range of Iodine (ppm)	Mean of Iodine content of salt (ppm)	SE	F
1.	Illiterate (G_1)	56	15.9–26.5	20.98	0.63	40.72**
2.	Upto 8th (G_2)	80	15.9–28.6	20.40	0.52	
3.	10^{th} to 12^{th} (G_3)	69	18–28.6	25.08	0.57	
4.	Graduate (G_4)	95	20.1–31.7	28.86	0.49	
	Total	300		25.03	0.27	
CD = G_1 and G_2 = 0.90, G_1 and G_3 = 0.83, G_1 and G_4 = 0.76, G_2 and G_4 = 0.71, G_3 and G_4 = 0.73						

Table 6: Effect of income on iodine content of salt.

S. No.	Income (Rs./Month)	N	Range of Iodine (ppm)	Mean of Iodine content of salt (ppm)	SE	F
1.	$\leq$ 1500 (G_1)	92	15.9–28.6	20.76	0.47	40.72**
2.	1600–80001500 (G_2)	93	15.9–30.7	23.80	0.47	
3.	9000–16000 (G_3)	72	18.0–29.6	26.73	0.63	
4.	$\geq$ 16000 (G_4)	43	19–31.7	28.81	0.69	
	Total	300		25.03	0.69	
CD = G_1 and G_2 = 0.29, G_1 and G_3 = 0.31, G_1 and G_4 = 0.37, G_2 and G_3 = 0.31, G_2 and G_4 = 0.37, G_3 and G_4 = 0.38						

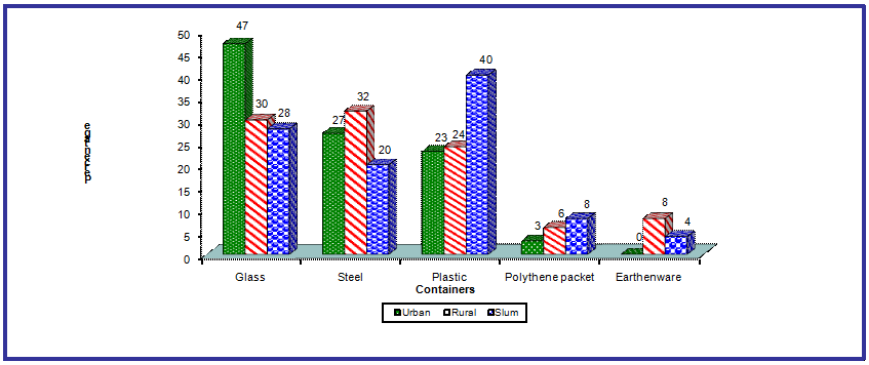

Fig.1 Salt storage containers used by population

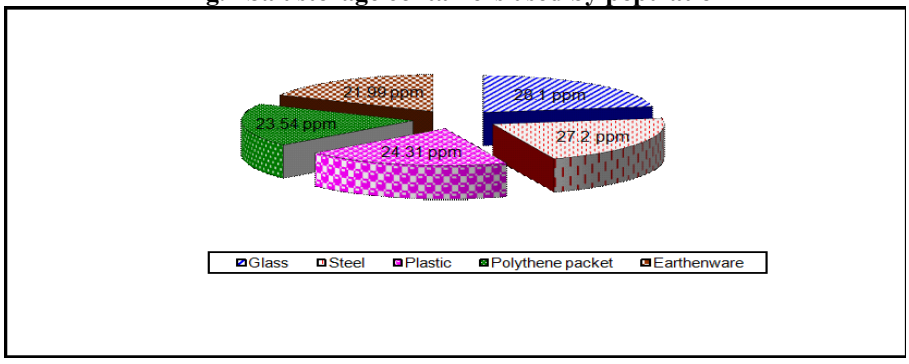

Fig. 2: Effect of different containers on iodine content of the salt

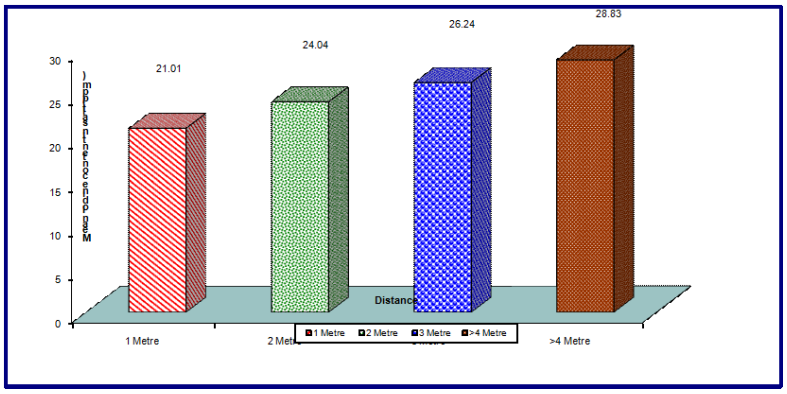

Fig. 3: Effect of distance on iodine content of the salt