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Prevalence of Goitre and Salt Utilization pattern among Children aged 6-12 years in Rajnagar block of Madhubani

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Abstract
Introduction: Iodine is an essential micronutrient required in small amounts on a daily basis for the body to function normally. IDD (Iodine Deficiency Disorders) is a worldwide major public health problem and present on all continents.
Objectives: The primary objectives of this study was to determine the prevalence of goitre among the children of age group 6-12 years of Rajnagar block of Madhubani, to check the salt consumption patterns of the respondents.
Methodology: The sampling strategy used for this study was the two staged cluster sampling using PPS (Probability Proportionate to Size) method. Children were classified into Grade 0, Grade 1, or Grade 2. The data collected was entered in SPSS and analyzed using appropriate statistical techniques**.**
Results: On physical examination, 9% school children, were found to have goitre. The prevalence of Goitre was higher when the family practiced storing the salt in an open container/packet (10.5%) as compared to storage in closed container (8.4%).
Conclusion: This area in the zone of mild public health problem. Since, almost all respondents claimed to be using iodized salt, this figure is worrisome. Focus must be given towards imparting education to the public regarding the faulty practices of salt storage and adding salt during cooking through mass media.

Keywords: goitre, iodine deficiency disorders, salt consumption, cluster sampling, probability proportionate to size

Introduction
Iodine is an essential micronutrient required in small amounts on a daily basis for the body to function normally. The recommended daily allowance is 100-150mcg [1]. The requirement increases during pregnancy, lactation and childhood. Main reservoir of Iodine is the soil from which it is absorbed by the crops grown and it also gets naturally mixed in the water. Humans derive iodine naturally from these indirect sources. Increase in population, deforestation, increasing trends of floods and other natural calamities has been a major contributor in loss of Iodine from the soil hence, leading to consumption of iodine deficient water and foods. Iodine deficiency leads to a spectrum of diseases affecting all age groups. IDD (Iodine Deficiency Disorders) is a worldwide major public health problem and present on all continents. Currently, 1.5 billion people are at risk In India. Prevalence of IDD in India is 10% and 14 districts in Bihar are endemic [1]. Universal Salt Iodization by the Government is an important step towards combating the problem of Iodine deficiency among the population.

Methodology
The primary objectives of this study was to determine the prevalence of goitre among the children of age group 6-12 years of Rajnagar bock of Madhubani and to check the salt consumption patterns of the respondents.
The present study was conducted in the month of September 2017. The sampling strategy used for this study was the two staged cluster sampling using PPS (Probability Proportionate to Size) method. Selection of respondents followed the guidelines provided by 'IDD & Nutrition Cell, Directorate General of Health Services, Ministry of Health & Family Welfare, Government of India, New Delhi', in its October, 2006 edition of 'Revised Policy Guidelines on National Iodine Deficiency Control Program'.
The list of villages along with population was obtained from the data provided in Census 2011 and 30 clusters (villages) were selected by PPS method in the first stage. The selected clusters were approached. Mukhiya/ward members were informed about the study and were taken into confidence. The ASHA belonging to the selected cluster assisted in identifying

the children and in conducting the survey. In each cluster, 10 children were selected from school and households based on the school enrolment rate of the district. Hence, a total of 300 children were involved in the study, 266 of which were from the schools and 34 children from the household (Primary School Enrolment Rate – 88.6% in Madhubani).

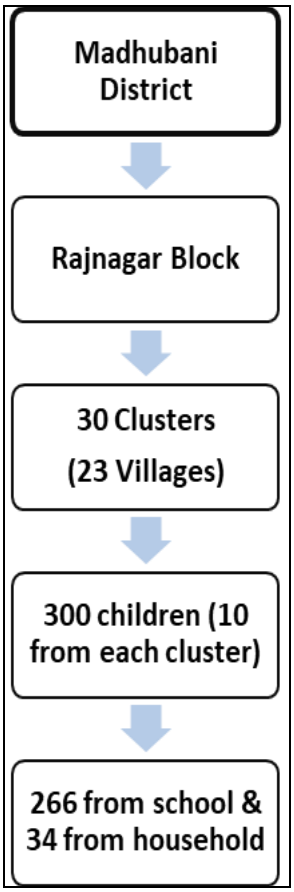

Fig 1: Sampling Method

A pre-tested, semi structured, questionnaire was administered to the guardians of the children with prior consent. Trained field investigators assessed the goitre status by clinical examination (Inspection & Palpation of thyroid gland) among the children. Enlargement was regarded as significant in a child when the size of the lateral lobes were found to be greater than the terminal phalanx of his/her thumb as recommended by WHO/UNICEF&ICCIDD [1]. Children were classified into Grade 0: No palpable or visible goitre/no goitre; Grade 1: Enlarged thyroid which is palpable but not visible and moves upwards with deglutition; or Grade 2: Enlarged thyroid visible and palpable.

Consumption pattern of the salt was enquired and salt samples collected from every 5th child for estimation of Iodine. The data collected was entered in SPSS and analyzed using appropriate statistical techniques.

Results

The present cross-sectional study was conducted in 30 clusters of Rajnagar block of Madhubani among 10 children from each cluster in the age group of 6-12 years. Details regarding demographic profile, salt consumption and presence and grade of goitre was noted. Average age of children was 9.2 years. Males were more (54%) as compared to females. Average family size was six. Hindus constituted 98.7% of study population.

On physical examination, 9 % school children, were found to have goitre, of which Grade 1 was 7.6% and Grade 2 was 1.3%. The prevalence of Goitre was higher in the age group of 8 - 9 years i.e., 11.1%, but p value was not significant ($\chi 2$ – 1.6582; p- 0.7983 with 95% precision). The sex wise difference was also not found to be significant. Prevalence was more among males (9.2%) as compared to females (8.6%). Also, the prevalence of Goitre was higher when the family practiced storing the salt in an open container/packet (10.5%) as compared to storage in closed container (8.4%). Most of the parents have heard about iodized salt and have also used the same. All the respondents used packed salt. Maximum respondents practiced adding of salt during the process of cooking.

Table 1: Age and grade specific prevalence of Goitre in Rajnagar, Madhubani

Age	Grade 0	Grade 1	Grade 2	Total	Total Examined	Prevalence
6 – 8 yrs.	57	5	1	6	63	9.5 %
8 – 10 yrs.	88	10	1	11	99	11.1 %
10 – 12 yrs.	128	8	2	10	138	7.2 %
Total	273	23	4	27	300	9 %

Table 2: Gender and Grade specific prevalence of Goitre in Rajnagar, Madhubani

Gender	Grade 0	Grade 1	Grade 2	Total	Total Examined	Prevalence
Male	147	13	2	15	162	9.2 %
Female	126	10	2	12	138	8.6 %
Total	273	23	4	27	300	9 %

Table 3: Storage of salt and Grade specific prevalence of Goitre in Rajnagar, Madhubani

Storage	No Goitre	Goitre Present (Grade 1/2)	Total Examined	Prevalence
Open Container	68	8	76	10.5 %
Closed Container	205	19	224	8.4 %
Total	273	27	300	9 %

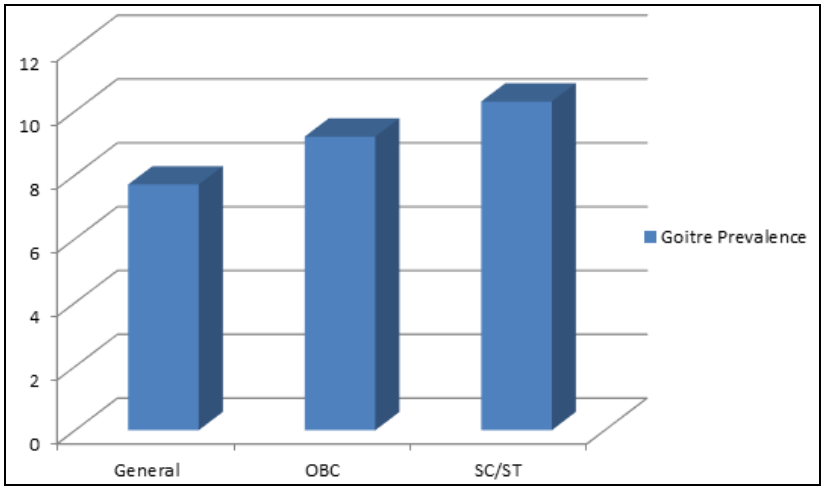

Fig 2: Goitre Prevalence with respect to category

Discussion

Total prevalence of goitre was 9 %.This is less compared to findings of Sambit Das *et al.* In their study, which detected it to be 15.1% [2]. Though the findings by Imtiyaz A bhat *et al.* are comparable with the finding, as they have detected the prevalence of goitre to be of 11.9% in Jammu region, with a range from 3.5 to 21.2% [3]. The study prevalence rate is more compared to an international study, a study in Tanzania by Assey *et al.*, where the prevalence rate was found to be 6.9% [4]. Tanzania like India, has Iodinization of salt since last 13 years. However, the state of Jharkand has, as mentioned by B.K. Patro *et al.*, very low prevalence of Goitre (0.9%) [5]. Goitre rate in our district is little higher than the prevalence rate of Goitre as mentioned by Chudasama RK *et al.* in Rajkot district of Gujarat (8.8 %) [6].

When age groups are concerned, it was found that the prevalence is highest (11.1%) in age group of 8 - 9 years, whereas lowest (7.2%) in age group of 10 – 12 years. Sambit Das *et al.* had detected higher prevalence among adolescents (13 to 16 yr.) as compared to young children (6 to 12 yr.) (17.7 and 13.9%, *P*=0.03). Imtiyaz *et al.* also had found the prevalence to be higher in 9-12 year age group. The prevalence was found to be more in males (9.2%) as compared to females (8.6%). While in Jammu, The prevalence of goitre was higher in females than in males (16.12% v/s 10.10%).

Conclusion & Recommendations

A prevalence of 9 % total goitre rate in the block of Rajnagar, Madhubani district of Bihar places this area in the zone of mild public health problem. Since almost all respondents claimed to be using iodized salt, this figure is worrisome. Attention is required to be paid in the age group of 8-9 years who have a higher prevalence rate. Focus must be given towards imparting education to the public regarding the faulty practices of salt storage and adding salt during cooking through mass media.

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