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Prevalence of Goiter in School Age Children (6-12 years) in a Rural District (Bandipura) of Kashmir Valley

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Abstract: ***Background: Iodine deficiency disorders (IDD) has been recognized as a public health problem in India. Surveys conducted in various states show that no state in the country is free from IDD. Since the program of Salt Iodization has been in progress for many decades, it is imperative to carry out Goiter surveys in the community on periodic basis to see the impact. The current study is part of a survey sponsored by the Government of India in the of Kashmir valley. Methods: School children in the age 6-12 years were surveyed for thyroid enlargement by clinical examination. Subjects were selected using the 30-cluster technique. Goiter was graded as per the classification given by WHO/ICCIDD/UNICEF Results: The overall prevalence of Goiter was 48.3%, the prevalence of Goiter was 45.9% in females and 50.7% in males. The Grade I goiter was found to be more common in males as compared to females even though the prevalence of Grade II goiter was same in two groups. Conclusions: We conclude from the study that population of Bandipura district in north Kashmir is severely iodine deficient (TGR more than 30%). A major thrust in the implementation of NIDDCP in the said district with regular and continuous monitoring of iodine status is urgently needed.***

Keywords: Iodine, Goiter, School Age Children, Prevalence

1. Introduction

Iodine deficiency disorders (IDD) is a known public health problem in India. Studies from various states have shown that no state in the country is free from IDD. Sample surveys conducted in as many as 25 states and 5 Union territories of the country have reported that out of 282 districts surveyed so far, IDD is a major public health problem in 241 districts with the prevalence of more than 10%. Estimates show that in India 200 million people are living in iodine deficient areas, 71 million persons have recognizable goiter and other IDD.[1,2] Thyroid gland Enlargement is the common manifestation of the IDD and goiter prevalence survey is used as a diagnostic tool for identifying areas of IDD. Inability to undertake early detection and intervention measure results in secondary disabling conditions. Universal Salt Iodization (USI) recommended by the WHO and UNICEF Joint Committee on Health Policy in 1994 is an established strategy to ensure sufficient intake of iodine by all individuals.[3] Experts in the field are of the view that universal salt iodization may be the most successful public health effort of the past two decades[4] and a remarkably cost-effective public health goal.[5] Districts are divided into areas with mild, moderate or severely iodine deficiency on the basis of either total goiter rate or median urinary iodine excretion (UIE) in micrograms/ liter. It is imperative to carry out Goiter surveys in the community on periodic basis to see the impact. The current study is part a survey sponsored by the Govt. of India in the valley of Kashmir.

2. Material and Method

Study design: Cross-Sectional Study

Study area: Bandipura district of Kashmir valley. Bandipura a rural district in the state of Jammu and Kashmir is situated at a distance of 45 Kms from the state capita Srinagar. Most of the area is covered by hills and mounds with few low lying villages. The district is home to the famous Wular and Mansbal lakes.

Study duration: Study was conducted from July 2012 to October 2012

Sampling method: Gender stratified cluster sampling technique

Sample size estimation: Sample size is based on a goiter prevalence of 30% and 95% confidence interval. 30 clusters were selected and each cluster included 90 children.[6]

Selection of children: 30 villages/wards were selected from the entire district employing Population Proportion to Size after line-listing all the villages/wards in the district. After a village was selected a school was randomly selected in the village and an attempt was made to include 45 boys and 45 girls between age groups of 6 to 12 years. The sample was selected in a way so as to ensure equal representation from all the age groups. If the first school could not provide the required number of children a second school in the same district was included till the required number was met. A total of 2700 children were screened for goiter in the district.

Procedure: The diagnosis of goiter was based entirely on inspection and palpation of the neck. It was done as per the prescribed procedure.

3. Interpretation of Results

The goiter was classified as per the WHO grading into three stages Grade 0, Grade 1, Grade 2. Grade 0 was taken as absence of goiter whereas Grade 1 and 2 meant presence of goiter.[6]

Grade Description	
Grade 0	No palpable or visible goiter/ no goiter
Grade 1	A mass in the neck that is consistent with an enlarged thyroid, that is palpable but not visible when the neck is in normal position. It moves upward in the neck as the subject swallows. Nodular alteration can occur even when the thyroid is not enlarged/goiter palpable but not visible
Grade 2	A swelling in the neck that is visible when the neck is in a normal position and is consistent with an enlarged thyroid when the neck is palpated / goiter visible and palpable.

Statistical Analysis

Data was entered in Microsoft excel and then analyzed using appropriate statistical software. Data was interpreted using percentages.

4. Observations

Table 1: Distribution of subjects by age and gender

Age in years	*Girls n (%)*	*Boys n (%)*	*Total n (%)*
6	189 (14.0%)	140 (10.3%)	329 (12.2%)
7	143 (10.6%)	119 (8.8%)	262 (9.7%)
8	191 (14.2%)	197 (14.5%)	388 (14.4%)
9	247 (18.4%)	202 (14.9%)	449 (16.6%)
10	197 (14.6%)	204 (15.1%)	401 (14.9%)
11	178 (13.2%)	220 (16.2%)	398 (14.7%)
12	201(14.9%)	272 (20.1%)	473 (17.5%)
TOTAL	1346 (49.9%)	1354 (50.1%)	2700 (100%)

Table 2: Prevalence of goiter in the study population

Goiter status	*n*	*(%)*
Present	1304	48.3%
Absent	1396	51.7%
Total	2700	100%

Table 3: Relationship of goiter grade with gender

Gender	*Grade of the Goiter*			*Total*
	0	*1*	*2*	
Males	668 (49.3%)	482 (35.6%)	204 (15.1%)	1346 (100%)
Females	728 (54.1%)	415 (30.8%)	203 (15.1%)	1354 (100%)
Total	1396 (51.7%)	897 (33.2%)	407 (15.1%)	2700 (100%)

Table 4: Goiter prevalence in relation to age in males

Age of the subject	*Grade of the goiter n(%)*			*Total*
	0	*1*	*2*	
6	82 (58.6%)	46 (32.9%)	12 (8.6%)	140 (100%)
7	63 (52.9%)	44 (37.0%)	12 (10.1%)	119 (100%)
8	99 (50.3%)	68 (34.5%)	30 (15.2%)	197 (100%)
9	106 (52.5%)	77 (38.1%)	19 (9.4%)	202 (100%)
10	99 (48.5%)	70 (34.3%)	35 (17.2%)	204 (100%)
11	97 (44.1%)	79 (35.9%)	44 (20.0%)	220 (100%)
12	122 (44.9%)	98 (36.0%)	52 (19.1%)	272 (100%)
Total	668 (49.3%)	482(35.6%)	204(15.1%)	1354(100%)

Table 5: Goitre prevalence in relation to age in female gender

Age of the subject	*Grade of the Goiter n(%)*			*Total*
	0	*1*	*2*	
6	103 (54.5%)	67 (35.4%)	19 (10.1%)	189 (100%)
7	85 (59.4%)	42 (29.4%)	16 (7.9%)	143 (100%)
8	111 (58.1%)	64 (33.5%)	16 (8.4%)	191(100%)
9	128 (51.8%)	95 (38.5%)	24 (9.7%)	247 (100%)
10	114 (57.9%)	52 (26.4%)	31 (15.7%)	197 (100%)
11	90 (50.6%)	41 (23%)	47 (26.4%)	178 (100%)
12	97 (48.3%)	54 (26.9%)	50 (24.9%)	201(100%)
Total	728 (54.1%)	415(30.8%)	203(15.1%)	1346 (100%)

5. Discussion

On a worldwide basis, iodine deficiency is the single most important preventable cause of brain damage. On the other hand, Iodine Deficiency Disorders are among the easiest and least expensive of all nutrient disorders to prevent. The addition of a small, constant amount of iodine to the salt that people consume daily is all that is needed.[7]The elimination of IDD is a critical development issue, and should be given the highest priority by governments and international agencies. Recognizing the importance of preventing IDD, the World Health Assembly adopted in 1991 the goal of eliminating iodine deficiency as a public health problem. In 1990, world leaders had endorsed this goal when they met at the World Summit for Children at the United Nations. It was reaffirmed by the International Conference on Nutrition in 1992.

In 1993, WHO and UNICEF recommended universal salt iodization (USI)[8] as the main strategy to achieve elimination of IDD.[9]

Realizing the magnitude of the problem the government of India launched a 100% centrally assisted National Goiter Control Programme (NGCP) in 1962. In August 1992, the NGCP was renamed as National Iodine Deficiency Disorders Control Programme (NIDDCP) with a view to cover a wide spectrum of iodine deficiency disorders.[6]The essence of this programme is salt iodization, ensuring thereby that all salt available for human consumption is adequately iodized. In order to assess the impact of this programme periodic population surveys are envisaged to ensure continuity and quality.

The present study is the based on the report of such survey conducted in the Kashmir valley covering a remote district. The study sample consisted of 2700 children in the age group between 6 to 12 years. It comprised of 1354 boys and 1346 girls. The median age of boys was 10 years with an inter-quartile range of 3 years whereas the same for girls was 9 years with IQR of 3 years. The thyroid gland was examined using standard procedure and was categorized into three grades in accordance to World Health Organization recommended grading.[6] The total goiter rate (TGR) came out to be 48.3%. **The study findings are in sharp contrast to findings from recent studies on goiter prevalence in the region Masood Sr et al reported an overall prevalence of only 3.8 % in this age group, this difference could be due to extreme poverty in the area of our study, lack of awareness about the benefits of iodized**

salt, easy availability of crystalline salt and sale of some local brands of salt the source of which could not be verified. While analyzing the relationship of goiter status with gender males had a higher (50.7%) prevalence of goiter in comparison to females (45.9%). The prevalence of grade 1 and grade 2 goiter in males was 35.6% and 15.1% respectively whereas it was 30.8% and 15.1% in females. The finding needs to be further tested by quantitative estimation of iodine status in the study group by using tests like urinary iodine estimation to estimate the iodine status of the population.

When analyzing the relationship of goiter with age of the subject, it was found to be highest (51.7%) in subjects 12 years of age and lowest (40.6%) in subjects aged 7 years of age. In males the prevalence was highest (55.9%) subjects aged 11 years while it was lowest (41.4%) in subjects 6 years of age. In females the prevalence was highest (51.7%) subjects aged 12 years while it was lowest (40.6%) in subjects 7 years of age.

6. Conclusion and Recommendations

1) We conclude our study with the finding that population of Bandipura district in the north Kashmir is severely iodine deficient (TGR more than 30%)
2) Lack of awareness about the benefits of iodized salt and easy availability of precarious brands of poor quality could be the reasons for high prevalence
3) We would recommend a major thrust in the implementation of NIDDCP in the said district with regular and continuous monitoring of iodine status.
4) As a good proportion of children reported use of crystalline salt, there is a need for massive IEC activities to promote people consume only iodized salt
5) Titremetric estimation of Iodine level of salt at distributor, retailer and consumer level should be done regularly.

7. Conflict of interest

None declared.

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