Assessment of the Magnitude of Goiter in the Age Group of 6-12 Years in district Bandipura of Kashmir Division

Malik Waseem Raja[1], Malik Shakir Hussain[2], Asif Jeelani Hanga[3]

ABSTRACT

Introduction: Iodine deficiency disorders (IDD) has been recognized as a public health problem in India Enlargement of thyroid gland is the common manifestation of the IDD and goiter prevalence survey is used as diagnostic tool for identifying areas of IDD. Failure to undertake early detection and intervention measure results in secondary disabling conditions. Aim: In the present study we have estimated the prevalence of goiter in the age group of 6-12 years in district Bandipura of Jammu and Kashmir state, India and have assessed type of salt consumed by the population.

Material and Methods: This was a Cross-sectional study conducted in Bandipura district of J and K state and the study was conducted between July 2018 to October 2018. Sampling method was Gender stratified cluster sampling technique and the sample size was based on a goiter prevalence of 30% and 95% confidence interval. 30 clusters were selected and each cluster included 90 children. Data was entered in Microsoft excel and then analyzed using appropriate statistical software. Data was interpreted using percentages, means and SD.

Results: The prevalence of grade 1 and grade 2 goitre in males was 35.6% and 15.1% respectively whereas it was 30.8% and 15.1% in females and the prevalence was more in males to the extent of 52.08% and in girls it was 49.23%. Goitre was found to be highest (51.7%) in subjects 12 years of age and lowest (40.6%) in subjects aged 7 years of age. There was a significantly higher goitre prevalence in children who consumed crystalline/non-iodised salt than in children consuming iodised salt. The TGR was 61.4% and 46.9% in children consuming non-iodised and iodised salt respectively

Conclusion: We conclude our study with the finding that population of Bandipura district in the north Kashmir is severely iodine deficient. We recommended a major thrust in the implementation of NIDDCP in the said district with regular and continuous monitoring of iodine status.

Keywords: Goitre, Iodine, WHO Grading, Iodized Salt

INTRODUCTION

Iodine deficiency disorders (IDD) has been recognized as a public health problem in India. Surveys conducted in various states showed that no state in the country is free from IDD. Sample surveys conducted in 25 states and 5 Union territories of the country revealed that out of 282 districts surveyed so far, IDD is a major public health problem in 241 districts where the prevalence is more than 10%. It has been estimated that in India 200 million people are living in iodine deficient areas, 71 million persons are suffering from goiter and other IDD.[1,2] Enlargement of thyroid gland is the common manifestation of the IDD and goiter prevalence survey is used as diagnostic tool for identifying areas of IDD. Failure to undertake early detection and intervention measure results in secondary disabling conditions**.** Universal Salt Iodization (USI) is a strategy to ensure sufficient intake of iodine by all individuals was recommended by the WHO and UNICEF Joint Committee on Health Policy in 1994.[3] Some experts believe 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 on the basis of indicators 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/litre. In the present study we have estimated the prevalence of goiter in the age group of 6-12 years in district Bandipura of Jammu and Kashmir state, India and have assessed type of salt consumed by the population.

MATERIAL AND METHODS

After getting ethical clearance from our Institutional Ethical committee, this cross-sectional study was conducted in Bandipura district of J and K state in the time period between July 2018 to October 2018. Sampling method was Gender stratified cluster sampling technique and the sample size was based on a goiter prevalence of 30% and 95% confidence interval. 30 clusters were selected and each cluster included 90 children.[6] Thirty villages/wards were selected from the entire district employing PPS after line-listing all the villages/wards in the district. After a district selection, 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 size 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 is met. A total of 2700 children were

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screened for goiter in the district. The diagnosis of goiter is based entirely on inspection and palpation of the neck. It is done as per the prescribed procedure. Every 5th child was also asked to get a sample of the salt used in cooking from the home in sealed envelopes and they were labeled as per the number of cluster to which they belong. The goiter is classified as per the WHO grading into three stages Grade 0, Grade 1, Grade 2. Grade 0 is taken as absence of goiter whereas Grade 1 and 2 meant presence of goiter.[6]

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-1: Distribution of subjects by age and gender

STATISTICAL ANALYSIS

Data was entered in Microsoft excel and then analyzed using appropriate statistical software. Data was interpreted using percentages, means and SD. Chi square test was used wherever appropriate.

RESULTS

While analysing the relationship of goitre status with gender males had a higher (50.7%) prevalence of goitre in comparison to females (45.9%) (Table 1/Fig.1). While analysing the relationship of goitre in relation to type of salt consumed at homes there was a significantly higher

		Gender of subject		Total n(%)
		Male n(%)	Female n(%)	
Type of salt consumed	Crystalline	122 (9%)	137 (10.2%)	259 (9.6%)
	Iodised	1232 (91%)	1209 (89.8%)	2441 (90.4%)
Total		1354 (100%)	1346 (100%)	2700 (100%)

Table-2: Distribution of subjects on the basis of type of salt consumed

Type of salt consumed	Grade of the goiter			Total
	0	1	2	
Crystalline	100 (38.6%)	106 (40.9%)	53 (20.5%)	259 (100%)
powdered	1296 (53.1%)	791 (32.4%)	354 (14.5%)	2441(100%)
Total	1396 (51.7%)	897 (33.2%)	407 (15.1%)	2700 (100%)
*Pearson Chi-Square = 20.138, *P value < 0.001				

Table-2a: Relationship of goitre with type of salt consumed

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

Table-3: Prevalence of goitre in the study population

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-3a: Relationship of goitre grade with 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%)

Table-4: Goitre prevalence in relation to age in female gender

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 males

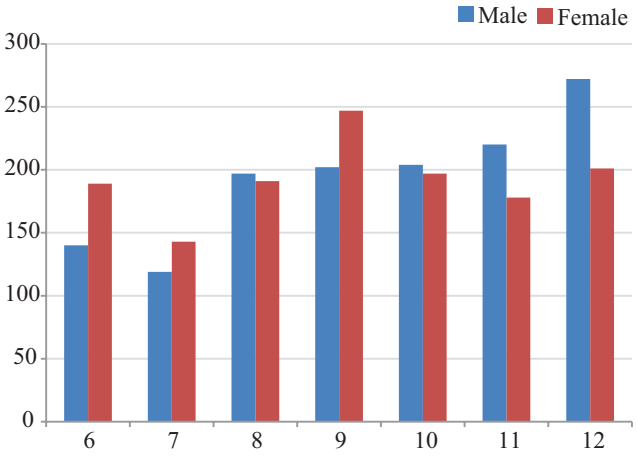

Figure-1: Distribution of subjects by age and gender.

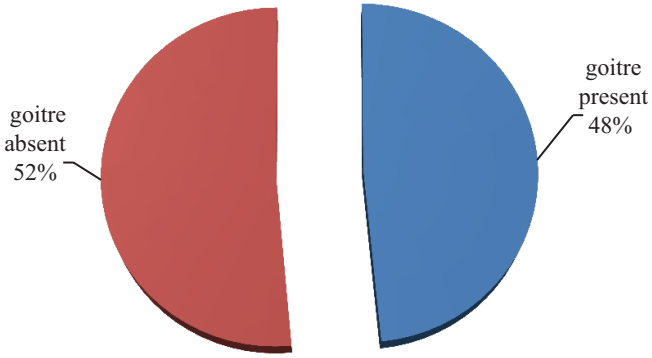

Figure-2: Total goitre rate in the study population

goitre prevalence in children who consumed crystalline/ non-iodised salt than in children consuming iodised salt. The TGR was 61.4% and 46.9% in children consuming non-iodised and iodised salt respectively (Table 2 and Table 2a). The prevalence was more in males to the extent of 52% and in girls it was 48% (Fig. 2).The prevalence was more in males to the extent of 52.08% and in girls it was 49.23% (Table 3).The prevalence of grade 1 and grade 2 goitre in males was 35.6% and 15.1% respectively whereas it was 30.8% and 15.1% in females (Table 3a). In females the prevalence was highest (51.7%) subjects aged 12 years while it was lowest (40.6%) in subjects 7 years of age (Table 4). In males the prevalence was highest (55.9%) subjects aged 11 years while it was lowest (41.4%) in subjects 6 years of age (Table 5).

DISCUSSION

Iodine deficiency, through its effects on the developing brain, has condemned millions of people to a life of few prospects and continued underdevelopment. On a worldwide basis, iodine deficiency is the single most important preventable cause of brain damage. On the other hand, IDD 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 goitre 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 simplest method of preventing IDD is consuming iodised salt. 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.122 (9%) of boys and 137 (10.2%) of girls reported consumption of crystalline salt for cooking in the homes. The thyroid gland was examined using standard procedure and was categorised into three stages in accordance to world health organization stages.[6] The total goitre rate (TGR) came out to 48.3%. The study findings are consistent with a study by Zargar AH et (1997) in Baramulla district of Kashmir valley who estimated the TGR to be 52.08%.[10]

While analysing the relationship of goitre status with gender males had a higher (50.7%) prevalence of goitre in comparison to females (45.9%). The prevalence of grade 1 and grade 2 goitre in males was 35.6% and 15.1% respectively whereas it was 30.8% and 15.1% in females. The study findings are consistent with a study by Zargar AH et (1997) in Baramulla district of Kashmir valley who estimated the

TGR to be 52.08% with G1 in 41.95% and G2 of 10.1%. The prevalence was more in males to the extent of 52.08% and in girls it was 49.23%.[10] In another study by the same authors in 1995 among school children aged 5-15 years in Kashmir valley found a TGR of 45.2% (43.9% in boys and 46.23 in girls). 37.74% of children had grade 1st goiter while as 7.44% had grade 2nd goiter.[11] The prevalence is much higher than multiple other studies[12-14] which is an indication of iodine deficiency being a grave public health problem in this part of the world. It can be due to higher proportion of subjects using non-iodised salt (9.5% of children in our sample). 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 analysing the relationship of goitre 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.

While analysing the relationship of goitre in relation to type of salt consumed at homes there was a significantly higher goitre prevalence in children who consumed crystalline/ non-iodised salt than in children consuming iodised salt. The TGR was 61.4% and 46.9% in children consuming non-iodised and iodised salt respectively.

CONCLUSION

We conclude our study with the finding that population of Bandipura district in the north Kashmir is severely iodine deficient (TGR more than 30%).We recommended a major thrust in the implementation of NIDDCP in the said district with regular and continuous monitoring of iodine status. 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. Iodine level of salt at distributor, retailer and consumer level should be done continuously.

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