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PREVALENCE OF CLINICAL GOITER IN 6-12 YEAR OLD SCHOOL CHILDREN RESIDING IN RURAL AREAS OF BAGALKOT DISTRICT, KARNATAKA, INDIA

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ABSTRACT **INTRODUCTION:** Iodine is an important micronutrient for normal human growth and mental development. Iodine deficiency disorders (IDD) are the single largest cause of preventable brain damage worldwide. Most of the effects of IDD are preventable but irreversible in chronic deficiency. Iodine Deficiency Disorders are the easiest and least expensive of all nutrient disorders to prevent. Salt iodization is currently the most widely used strategy to control and eliminate Iodine Deficiency Disorders .The objective of this study was to know the prevalence of goiter among 6-12 year old school children residing in rural areas of Bagalkot district. **METHODOLOGY:** A cross sectional study among 6-12 year old rural school children was conducted in Bagalkot District in 2018. Cluster sampling and surveillance for iodine deficiency disorders as recommended by WHO/ICCIDD were used. The study included 2700 rural school children of Bagalkot district with equal proportion of girls and boys. **RESULTS:** The prevalence of goiter among 6-12 year old rural school children was found to be 21.96% and was observed to increase with age.(P=0.0016). In male children it was 19.91% and in female children it was 24.02%.. **CONCLUSION:** Study showed poor implementation of Iodine deficiency Disorder Control Programme (IDDCP) in Bagalkot district. There was poor universal salt iodization which seems to be the reason of endemicity for IDD in surveyed district. The necessary action needs to be implemented through concerned District administration.

KEYWORDS : Goiter, Iodine Deficiency Disorders (IDD), Prevalence, Rural School Children

INTRODUCTION:

The most common cause of Endemic goiter is Iodine deficiency. It is defined as a condition when "each of the lateral lobes of the thyroid gland is larger than the terminal phalanges of the thumb of the person examined" [1]. Iodine is absorbed in the gut of humans in the form of iodide. The iodine content in the food depends on the iodine content of the soil where the food is grown. Sea water and seafood are rich sources of Iodine. Iodine in the mainland is often leached out by repeated flooding and glacial activity and carried to the sea [2]. Iodine deficiency can have a profound effect on production of the thyroid hormones. Thyroxine (T3) and Triiodothyronine (T4), as it is an essential component of T3 and T4. Growth and mental development in all age groups can eventually be affected by persistent iodine deficiency [3].Inspection and palpation are the methods used generally to detect and evaluate Goiter. With the increase in severity of Iodine deficiency, the prevalence of goitre also increases and it becomes endemic in populations where the intake of Iodine is less than 10 µg per day [4]. Goitre can be used as a baseline assessment of a region's Iodine status, a reflection of chronic Iodine deficiency and it is also a sensitive long-term indicator for the impact of an Iodine programme. Since the inception of the program, inspection and palpation methods have been used to assess the severity of endemic goitre in populations [1]. The total goitre rate (TGR) is currently used to assess and quantify the prevalence of goitre, which is equivalent to the number of goiters of grades 1 and 2 detected in a population divided by the total number of individuals examined. In addition to inspection and palpation, Endemic Goitre is most often measured in school-age children (6–12 years of age) because of accessibility and high physiologic vulnerability. A TGR of 5% or more in school-age children is used to signal a public health problem. Out of 324 districts surveyed in India, 263 districts have been identified as endemic to iodine deficiency [5].

Methodology:

The survey was conducted from June 2018 to August 2018 using Population Proportionate to Size (PPS) sampling in the age group of 6-12 years old school children. As per 2011 census, the total population of Bagalkot district was 18, 89,752. Using list of villages as per 2011 Census of Bagalkot district and by calculating cluster interval, 30 villages were selected. Permission from authorities of Education Department and District Health and Family Welfare Office was obtained. Permission was obtained from Institutional ethics committee. In selected villages, primary schools were visited and a sample of 90 children (45 boys and 45 girls) in the age group of 6-12 years were selected and examined. If required number of children was not covered, then schools in adjacent villages were visited to ensure 90 children were examined in that cluster. A total of 30 villages (one school in a village) were selected and 2700 school children were examined clinically for endemic goitre. The children were made to stand upright in a well lit room. For assessing the visibility of the enlarged gland, the head of the child was kept steady so that the eyes and external aural meatus were on a plane. Examiner was positioned so that one's eyes were approximately at the level of the subject's neck. Each child was examined in presence of a teacher by a team of trained doctors. Grading was done as per guidelines issued by Government of Karnataka. Grade 0: No palpable or visible goiter/No goiter. Grade I: A mass in the neck that is consistent with an enlarged thyroid, that is palpable but not visible, when neck is in normal position. It moves upward as the subject swallows. Grade II: A swelling in the neck that is visible when neck is in normal position and is consistent with an enlarged thyroid when neck is palpated/goiter visible and palpable. Schools were intimated about visit on the previous day and written and Informed Consent was taken from Headmasters of respective schools. Data was documented in the school and entered in MS excel 2013 and analyzed using SPSS 20.

RESULTS:

Out of 30 villages, 2700 school children between 6-12 years were examined for presence of clinical goiter.

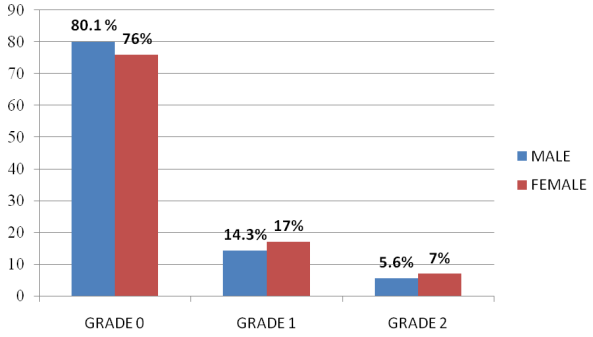
Table 1: Prevalence of goiter in children aged 6 to 12 years in Bagalkot district

Age Group (Years)	Total Examined	Grades of Goiter			(%)
		0 Grade	1st Grade	2nd Grade	
6-7	732	597	106	29	18.44
8-9	810	644	115	51	20.49
10-11	781	596	129	56	23.69
12	377	270	72	35	28.38
Total	2700	2107	422	171	21.96

Chi Square =21.2 DF= 6 P-Value=0.0016

Prevalence of goiter among 6-12 year old children was found to be 21.96% and was found to increase with age.(p=0.0016).

In the present study, 19.91% male children and 24.02% female children had clinical Goiter (p= 0.0099).



Graph 1: Prevalence of goiter among 6-12 years old children by gender

In the present study, prevalence was maximum in Badami (34.2%) and lowest in Jamakhandi Taluk (12.5 %)

Table no 2: Prevalence of Goiter among children in the taluks of Bagalkot district

TALUK	GRADE 0	GRADE 1	GRADE 2	Total
BAGALKOT	282(78.3%)	64(17.7%)	14(3.8%)	360
BILAGI	296(82.2%)	53(14.7%)	11(3.1%)	360
BADAMI	355(65.7)	119(22%)	66(12.3%)	540
HUNGUND	345(76.7%)	75(16.6%)	30(6.7%)	450
JAMAKHAND	472(87.4%)	47(8.7%)	21(3.8%)	540
MUDHOL	357(79.3%)	65(14.4%)	28(6.2%)	450
TOTAL	2107(78.1%)	423(15.6%)	170(6.3)	2700

DISCUSSION:

To evaluate severity of IDD in a region, most widely accepted marker is prevalence of endemic goitre in school children. WHO/UNICEF/ICCIDD12 on the basis of IDD prevalence, recommended criteria to understand severity of IDD as a public health problem in a region. Accordingly, a prevalence of 5.0-19.9% is considered as mild; 20- 29.9% as moderate and above 30% considered as a severe public health problem. In the present study, goiter prevalence was 21.96%, indicating that IDD is a moderate public health problem. It was observed that 19.91% male children and 24.02% female children had clinical goiter.. In a study conducted in Rajnandgaon District of Chattisgarh, prevalence of Goiter was found to be 17.56%. In males, Goiter prevalence was 17.59% and in females 17.51%, which was similar to findings in our study [3].A study done in Kalburgi district of Karnataka reported goitre prevalence of 4.32% which was low when compared to the present study. Goitre prevalence in girls (5.19%) was slightly more when compared to boys (3.46%) [5]. In a study done in Ethiopia , total goiter rate was 59.1% (Grade 1: 35.2%; Grade 2: 23.9%), which was very high in comparison to our study [6].In a study done in Ramanagara, Karnataka, prevalence of goiter among 6 - 12 years old children was found to be 8.6% which was lower than our study findings. Females had higher prevalence compared to males in all the age groups but the difference was not statistically significant (0.437) which was similar to our study but in our study the difference was statistically significant (p = 0.009) [7].A similar study conducted in a district of Gujarat reported goitre prevalence of 20.5%, which is comparable to our study findings [8].In a study done in Chattisgarh, high prevalence of goiter (19.97%) was found in the age group 8-9 years. In our study highest prevalence was found in the age group of 12 years (28.4%), which was followed by 10-11 years age group children (23.7%). Taluk wise prevalence was maximum in Manpur (28.88%) and lowest in Chowki (12.77%) [3]. In our study, Taluk wise prevalence was maximum in Badami (34.2%) and lowest in Jamakhandi (12.5 %) [3].

CONCLUSION:

Study showed poor implementation of Iodine Deficiency Disorder Control Programme (IDDCP) in Bagalkot district. Findings point towards urgent attention to overcome this public health problem by initiating health education to utilize iodized salt. Officials involved in the program, community leaders, headmasters and teachers in schools should be trained repeatedly about Iodine deficiency disorders and its prevention. Parent- teacher meetings should be conducted regarding the importance of iodized salt in a child's daily diet.

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Conflict of interest: Nil

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