Al Ameen J Med Sci 2013; 6(2):183-188 ● US National Library of Medicine enlisted journal ● ISSN 0974-1143

SHORT COMMUNICATION CODEN: AAJMBG

# Age, sex, religion and caste specific goitre prevalence among school children in Berhampore sadar sub-division of Murshidabad District, West Bengal

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**Abstract:** *Objectives*: The objective of the present study is to find out the prevalence of endemic goitre among school children of Berhampore sadar sub-division of Murshidabad district. Attempt has also been made to find out the interaction of host factors, viz, age, sex, caste, religion in influencing goitre prevalence among school children during post-salt iodization phase. *Background*: In post salt iodization phase, endemic goitre was found prevalent all over the India including West Bengal. Prevalence of goitre has been reported in many districts except Murshidabad. Present study is thus undertaken in Murshidabad district. *Method*: A total of 1566 school children (6-12 yr) were clinically examined for goitre from five C.D.Blocks of the studied region. Age, sex, religion and caste specific goitre prevalence was reported. Body height and body weight is also recorded to observe the growth pattern of the studied school children. *Result*: Overall result showed that mild degree of goitre endemicity (17.4%) was found. Girls (18.9%) were more affected than boys (15.7%). Goitre was most prevalent in Hindus (19.6%) than Muslim (16.0%) communities. Among the Hindus, general caste (20.4%) students suffered more than scheduled caste and scheduled tribe (18.6%). *Conclusion*: Present study indicates that goitre is still persist in the region. Result showed that girls were more affected than boys. It may be due to increase physiological demand in females at puberty. Result also showed that goitre was most prevalent in Hindus than Muslim communities and among the Hindus, general caste students suffered more than scheduled caste & scheduled tribe. It might be due to their different environmental adaptability and different dietary habit. Age specific data showed that in initial stage (6 yr) growth pattern is comparably better in boys than girls. The growth rate is high among the girls than boys at the age of 9 yr to 12 yr. It may be due to the high demand of steroid hormones among the girls before menarche.

**Keywords:** Goitre, School children, Murshidabad

## Introduction

Iodine deficiency disorders are still a major public health problem in India. The major consequences of iodine deficiency are goitre (enlargement of thyroid gland than normal), mental defect, deaf mutism, stillbirth and miscarriage, weakness and paralysis of muscles as well as lesser degree of physical and mental function [1]. Effects on brain function occur at all stages of life, from foetal damage or hypothyroidism in the neonate, child or adult. Considerable progress has been made in the implementation of the universal salt iodization programme in the countries affected by IDD. IDD is now not restricted in the classical hilly sub-Himalayan goitre endemic belt in india. It has also been repoted from sub-Himalayan flat lands (tarai), plains (especially those subjected to annual flooding), riverine areas, deltas and even in coastal regions [2-3]. The northern part of the state of West Bengal is hilly and located in the classical iodine deficient goitre endemic belt in India [4], while its major southern region is in the Gangetic basin where the land is plain, fertile and thickly populated. Prevalence of goitre has been reported in many districts like South 24-Parganas, North 24-Parganas, Howrah, Malda, Purulia, Dakhin Dinajpur and Birbhum in West Bengal [5-12]. The systemic studies about the prevalence of goitre among school children of the Gangetic regions of Murshidabad district are not available. Present study is thus undertaken to evaluate the present state of goitre prevalence among the school children of Berhampore sadar Sub-division in Murshidabad district as per

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WHO/UNICEF/ICCIDD recommendation. In the present study attempt has also been made to find out the interaction of host factors, viz, age, sex, caste, religion in influencing goitre prevalence among school children during post-salt iodization phase.

## Material and Methods

Murshidabad district is a district of West Bengal in Eastern India. It is one of the 18 district of West Bengal. There are 26 C.D.Blocks under 5 sub-division in Murshidabad district. The study region Berhampore sadar subdivision is one of them consisting with 5 C.D.Blocks. Murshidabad district is situated on the left bank of the river Ganges. Total area of the district is 5341 sq.km. This district is well known for his historical importance. The plight of whole Bengal changed with the plight of Murshidabad. But at present despite there has been much more progress of West Bengal in every way but there is no significance change of Murshidabad district. Poverty and illiteracy have not been eradicated to the possible extent. Most of the people are engaged in agricultural activities. To get proper representation five areas were selected from five C.D. Blocks taking one from each by random purposive sampling method [13]. In each selected areas one primary school and nearest adjoining secondary school were selected at random [6] where the students of the age group 6-12 yr. of both sexes were available as recommended by WHO/UNICEF/ICCIDD [14]. The entire study was conducted in between February 2011 and November 2011. A total of 1566 students were clinically examined for goitre. Goitre grading was done according to the criteria recommended by joint WHO/UNICEF/ICCIDD (1994) (grade 0: no goitre; grade 1: thyroid palpable but not visible; and grade 2: thyroid visible with the neck in normal position) [15]. The age of the students was recorded from the school register and was rounded off to the nearest whole number.

Anthropometric data mainly height and weight of a national population or a particular segment represent its health status in relation to heredity and environment. In iodine deficient region physical growth is retarded. To evaluate the physical growth pattern height and weight pattern is also recorded. The age of the subjects was determined from their dates of birth recorded in the school register. The age was rounded off to the nearest whole number (e.g., age of the students ranging from 13.50 to 14.49 yr was expressed as 14$\pm$). Standing body height was measured by anthropometric rod and weight was taken by standard weighing machine. All measurements were taken according to the method described by Damon et al [16].

## Results and Discussion

Prevalence of endemic goitre in school children is the most widely accepted marker to evaluate the severity of IDD in the region [15]. According to WHO/UNICEF/ICCIDD recommended criteria, a prevalence rate of 5.0 – 19.9 % is considered mild; 20.0 – 29.9 % as moderate and above 30 % is considered as a severe public health problem [15]. The overall goitre prevalence of 17.4 % indicates that IDD is a mild degree of endemicity as a public health problem in the studied region (Table 1).

**Table-1: Goitre prevalence in different study areas of Berhampore sadar subdivision in Murshidabad district**

| Sl No. | Study areas (C.D. Blocks) | Total number of children examined | Number of children with goitre | | | Severity as public health problem |
|---|---|---|---|---|---|---|
| | | | Grade-1 | Grade-2 | Total (1+2) | |
| 1 | Berhampore | 263 | 53 (20.1) | 12 (4.6) | 65 (24.7) | Moderate |
| 2 | Beldanga - I | 299 | 45 (15.0) | 04 (1.3) | 49(16.4) | Mild |
| 3 | Beldanga - II | 353 | 60(17.0) | 05 (1.4) | 65 (18.4) | Mild |
| 4 | Hariharpara | 383 | 55 (14.4) | 04(1.0) | 59 (15.4) | Mild |
| 5 | Nawda | 268 | 30(11.2) | 04 (1.5) | 34 (12.7) | Mild |
| **Total** | | **1566** | **243(15.5)** | **29 (1.8)** | **272 (17.4)** | **Mild** |

Severity of public health problem: 5.0-19.9% mild; 20.0-29.9% moderate; >30% Severe (Parentheses indicate percentage)

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**Table-2: Prevalence of goitre in boys, girls, and overall studied population of Berhampore sadar sub-division of Murshidabad district.**

| Age (years) | BOYS | | | | GIRLS | | | | TOTAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. of Children examined | Grades of Goitre | | | No. of children examined | Grades of Goitre | | | No. of children examined | Grades of Goitre | | |
| | | 1 | 2 | Total | | 1 | 2 | Total | | 1 | 2 | Total |
| 6 | 150 | 13 | 2 | 15 (10.0) | 180 | 30 | - | 30 (16.7) | 330 | 43 | 2 | 45 (13.6) |
| 7 | 134 | 29 | 2 | 31 (23.1) | 156 | 27 | - | 27 (17.3) | 290 | 56 | 2 | 58 (20.0) |
| 8 | 144 | 19 | 1 | 20 (13.9) | 140 | 20 | 2 | 22 (15.7) | 284 | 39 | 3 | 42 (14.8) |
| 9 | 123 | 23 | 3 | 26 (21.1) | 98 | 10 | 2 | 12 (12.2) | 221 | 33 | 5 | 38 (17.2) |
| 10 | 106 | 17 | 2 | 19 (17.9) | 109 | 16 | 8 | 24 (22.0) | 215 | 33 | 10 | 43 (20.0) |
| 11 | 69 | 09 | - | 9 (13.0) | 108 | 30 | 7 | 37 (34.2) | 177 | 39 | 7 | 46 (26.0) |
| 12 | 37 | - | - | - | 12 | - | - | - | 49 | - | - | - |
| **Total** | 763 | 110 (14.4) | 10 (1.3) | 120 (15.7) | 803 | 133 (16.6) | 19 (2.4) | 152 (18.9) | 1566 | 243 | 29 | 272 (17.4) |

(Parentheses indicate percentage)

**Table-3: Age specific religion wise goitre prevalence among school children of Berhampore sadar sub-division of Murshidabad district**

| Age (years) | HINDUS | | | | MUSLIM | | | |
|---|---|---|---|---|---|---|---|---|
| | No. of Children examined | Grades of Goitre | | | No. of children examined | Grades of Goitre | | |
| | | 1 | 2 | Total | | 1 | 2 | Total |
| 6 | 142 | 24 | 2 | 26 (18.3) | 188 | 19 | - | 19 (10.1) |
| 7 | 92 | 14 | - | 14 (15.2) | 198 | 42 | 2 | 44 (22.2) |
| 8 | 112 | 19 | 2 | 21 (18.9) | 172 | 20 | 1 | 21 (12.2) |
| 9 | 88 | 19 | 2 | 21 (23.9) | 133 | 14 | 3 | 17 (12.8) |
| 10 | 73 | 8 | 3 | 11 (15.0) | 142 | 25 | 7 | 32 (22.5) |
| 11 | 68 | 18 | 7 | 25 (36.8) | 109 | 21 | - | 21 (19.3) |
| 12 | 28 | - | - | - | 21 | - | - | - |
| **Total** | 603 | 102 (16.9) | 16 (2.6) | 118 (19.6) | 963 | 141 (14.6) | 13 (1.3) | 154 (16.0) |

Parentheses indicate percentage

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Though most of the goitre was found palpable (15.5%) but the prevalence of visible goitre (1.8%) among the children of 6-12 yr. also exist. The multifactorial nature and complex interactions of host factors (age, sex) with region-specific environmental conditions in the pathogenesis of endemic goitre constitute a major challenge in the understanding and control of the problem of goitrogenic substances in endemic areas [17]. Age specific sex wise goitre prevalence in overall studied students is given in Table 2. A gradual increase in goitre rate is found from the age of 6 yr till the age of 11 yr except a short decline in the age of 8 and 9 yr. Age wise overall goitre rates in boys and girls were in the ranges of 10% - 23% and 12.2% - 34.2% excluding the age group of 12 yr as the number of sample is poor in this group. The overall result showed that girls (18.9%) were more affected in goitre than boys (15.7%). The prevalence of grade 2 goitre is also found higher in girls (2.4%) than boys (1.3%). The higher prevalence in females has been generally attributed to increase physiological demands at puberty [18]. Earlier works showed that thyroid disorders (endemic goitre) are common in women than men especially in iodine deficient region [19]. This is because estrogens appear to enhance the response to TRH (thyrotropin releasing hormone) possibly by increasing the number of TRH receptors in the thyrotrophic cells in pituitary [20].

**Table-4: Age specific caste wise goitre prevalence among Hindu school children of Berhampore sadar sub-division of Murshidabad district**

| Age (years) | GENERAL | | | | SC/ST | | | |
|---|---|---|---|---|---|---|---|---|
| | No. of Children examined | Grades of Goitre | | | No. of children examined | Grades of Goitre | | |
| | | 1 | 2 | Total | | 1 | 2 | Total |
| 6 | 75 | 19 | - | 19 (25.3) | 67 | 5 | 2 | 7 (10.4) |
| 7 | 53 | 6 | - | 6 (11.2) | 39 | 8 | - | 8 (20.5) |
| 8 | 37 | 6 | - | 6 (16.2) | 75 | 13 | 2 | 15 (20.0) |
| 9 | 41 | 5 | - | 5 (12.2) | 47 | 14 | 2 | 16 (34.0) |
| 10 | 45 | 6 | 2 | 8 (17.8) | 28 | 2 | 1 | 3 (10.7) |
| 11 | 38 | 13 | 6 | 19 (50.0) | 30 | 5 | 1 | 6 (20.0) |
| 12 | 19 | - | - | - | 9 | - | - | - |
| Total | 308 | 55 (17.8) | 8 (2.6) | 63 (20.4) | 295 | 47 (15.9) | 8 (2.0) | 55 (18.6) |

Parentheses indicate percentage

Overall goiter prevalence in respect of religion is shown in Table 3. It showed that goitre was most prevalent in Hindus (19.6%) than Muslim (16.0%) communities. Among the Hindus, general caste (20.4%) students suffered more than Scheduled caste & Scheduled tribe (18.6%) (Table 4). The observed result is almost consistent with the earlier observation of Chandra and Ray (2001) [21]. The people of all caste and religion were exposed under uniform system of iodine supply and consume foods namely beans, turnip, sweet potato, cabbage, cauliflower, radish, mustard, etc containing naturally occurring goitrogens

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available in the region. But these variations in goitre prevalence among different castes might be due to their different environmental adaptability and dietary habit, as has been observed in a similar study conducted in Africa by Biassoni et al, 1998 [22], where it was found that minute difference in iodine deficiency between two populations induces to tally different pattern of goitre and thyroid function probably for the differences in diet. Body weight and body height of the studied school children is shown in Table 5. Age specific data showed that in initial stage (6 yr) growth pattern is comparably better in Boys than girls. The growth rate is high among the girls than boys at the age of 9 yr to 12 yrs. It may be due to the high demand of steroid hormones among the girls before menarche.

**Table-5: Age and sex specific body weight and body height of school children of Berhampore sadar sub-division of Murshidabad district (Data are only mean)**

| Age (years) | BOYS | | | GIRLS | | |
|---|---|---|---|---|---|---|
| | No. of Children Examined | Weight (Kg) | Height (c.m.) | No. of Children Examined | Weight (Kg) | Height (c.m.) |
| 6 | 150 | 15.79 | 107.24 | 180 | 14.96 | 106.89 |
| 7 | 134 | 17.93 | 113.67 | 156 | 16.87 | 113.63 |
| 8 | 144 | 19.27 | 118.46 | 140 | 19.06 | 118.64 |
| 9 | 123 | 20.38 | 121.8 | 98 | 21.02 | 122.56 |
| 10 | 106 | 22.5 | 125.79 | 109 | 21.71 | 124.46 |
| 11 | 69 | 23 | 128.54 | 108 | 23.62 | 129.02 |
| 12 | 37 | 28 | 132.61 | 12 | 28.25 | 134.75 |

The present result indicates that goitre is still persist in this region. To prevent and control this public health problem, it is essential to observe the present state of iodine nutritional status in the studied region.

**Acknowledgements**

The financial assistance by the University Grants Commission (PSW-080/10-11) is gratefully acknowledged. The authors acknowledge the cooperation received from the staff and students of the schools studied.

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