

Prevalence of Goitre in Selected School Children of Himachal Pradesh

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ABSTRACT This study was conducted in Jawali and Maira in Kangra district, due to the reported high prevalence of goitre. Epidemiological survey was carried out on 1157 school children (4-18 years). An overall goitre prevalence of 50.5% was observed in the school children surveyed. The maximum prevalence of 64.3% was found in the age group of 16-18 years, followed by 57.9% in 13-15 years, 48.3% in 10-12 years, 45.5% in 7-9 years and 16.1% in 4-6 years age group. Among the goitrous children, the maximum proportion (44.2%) of children suffered from grade I₁, followed by 43.0% I₂, 12.7% II and only 0.1% had grade III of goitre.

INTRODUCTION

Iodine, an essential micro-nutrient is important for metabolic roles in normal growth and development of man (Underwood, 1977). Insufficient iodine results in Iodine deficiency disorders (IDD), a spectrum of crippling conditions, affecting the health and well being of mankind starting from early in fetal life to throughout adulthood, *e.g.* still births, abortions, congenital anomalies, endemic cretinism characterised more commonly by mental deficiency, deaf mutism, spastic diplegia, impaired mental functions and endemic goitre (Hetzel, 1983). Of these, goitre has been the most common infestation (Beckers and Delange, 1985).

In India, it is estimated that 150 million people are at risk for IDD, of which 54 million have goitre, 2.2 million are cretins and 6.6 million have a milder neurological defi-

cit (Pandav et al., 1989). In the Punjab Public Health Department Report of 1939, an incidence of 34% was reported in Kangra Valley, now in Himachal Pradesh. Higher (38%) prevalence was found in school children (Soocho and Ramalingaswami, 1965). An overall prevalence of 31% was seen in Himachal Pradesh and 50% in Simla alone, among school children (Agarwal and Agarwal, 1983).

METHODS

According to WHO (1979), a quick survey of school children is an index for declaring any area endemic, as school age is one of the most vulnerable periods for the goitre malady, because of adolescent growth spurt. An area is defined as endemic with respect to goitre if more than 10% of its child population (6-12 years) is found to be goitrous (Hetzel, 1988). As per the reports of UNICEF and AIIMS (1986), the surveys conducted in 1984-85 by the Health Department, Himachal Pradesh in Kangra district, which has historically been an area where iodated salt was supplied as early as 1957, still reports goitre rate of 20.9%. The latest survey conducted in school children of 6-10 years showed considerably high percentage of goitre, as 40 and 42% in Jawali and Maira, respectively (Personal Communication, 1989). On the basis of this evidence, the two areas *i.e.* Jawali and Maira were selected. Jawali is located at a distance of 45 km from Pathankot and Maira about 6 km

from Jawali enroute to Pathankot.

Five schools from Jawali and Maira were selected. The names and date of birth of the children were noted from the school admission records. A thorough clinical examination of all the school children in attendance on the day of survey was conducted for goitre by the technique given by WHO (1979) with the help of medical officers of that area. The identification of the degree of goitre was done with the standardized inspection and palpation, according to PAHO/WHO (1983) classification.

RESULTS

The total number of children enrolled in the school surveyed was 1364, of which 1157 (84.8%) *i.e.* 537 (82.5%) boys and 620 (87.1%) girls, were surveyed for goitre (Table 1).

Of the children surveyed, 320 boys and

278 girls belonged to Primary; 114 and 192 to Middle and 103 and 150 to High School Classes. Out of the total enrollment, the children surveyed were 95-97% of Primary, 85% of Middle and 72% of Senior Secondary School.

As presented in the table 2, of the total children surveyed the maximum number (32.8%) of children belonged to 10-12 years age group and minimum (4.8%) to 4-6 years. Sex-wise also similar trend was observed. The number of both the sexes increased with the increase in age till 12 years after which a decline was observed in the successive age groups.

Table 3 shows that the overall goitre prevalence in school children (4-18 years) was 50.5%. The most affected age group having maximum (64.3%) prevalence was 16-18 years. Goitre prevalence was less in lower age groups being minimum (16.1%) in 4-6 years age group. In boys, an overall

Table 1 : School-wise distribution of children enrolled and surveyed

School	Boys		Girls		Total	
	E	S	E	S	E	S
Primary Boys School, Jawali	143	139 (97.2)	33	31 (93.9)	176	170 (96.9)
Primary Girls School, Jawali	92	87 (94.6)	168	160 (95.2)	260	247 (95.0)
Primary School, Maira	99	94 (94.9)	92	87 (94.6)	191	181 (94.8)
Girls Middle School, Jawali	-	-	226	192 (85.0)	226	192 (85.0)
Senior Secondary School, Jawali	317	217 (68.5)	194	150 (77.3)	511	367 (71.8)
Total	651	537 (82.5)	713	620 (87.1)	1364	1157 (84.8)

E = Number of children enrolled S = Number of children surveyed

Figures in parentheses represent % of corresponding enrollment

Table 2 : Age-wise Distribution of Surveyed School Children (4-18 years)

Age (in years)	Boys ($N_1 = 537$)	Girls ($N_2 = 620$)	Total ($N = 1157$)
4-6	27 (5.0)	29 (4.7)	56 (4.8)
7-9	150 (27.9)	140 (22.6)	290 (25.1)
10-12	180 (33.5)	199 (32.1)	379 (32.8)
13-15	120 (22.3)	158 (25.5)	278 (24.0)
16-18	60 (11.2)	94 (15.2)	154 (15.1)

Figures in parentheses indicate percentages

goitre prevalence was 54.9% being maximum (68.3%) in 13-15 years age group and minimum (7.4%) in 4-6 years age group. Whereas in girls overall prevalence was found to be 46.6%, the minimum (24.1%) being in the 4-6 years age group and the incidence increased as the age advanced.

As indicated in table 4 (a), the percentage of boys having goitre of grade I_a was the maximum (30.0%) in the age group of 16-18 years and little less (25.8%) in the age group of 13-15 years whereas for grade I_b the maximum (33.3%) per cent prevalence was in the age group of 13-15 years and little less (31.7%) in the age group of 16-18 years. Grade II goitre in the age

group of 13-15 years was 9.2% and none of the subjects had Grade III goitre.

As presented table 4(b), grade I_a goitre prevalence in girls was maximum (26.6%) in the age group of 16-18 years. Grade I_b prevalence was almost the same in both the age groups *i.e.* 13-15 years (25.4%) and 16-18 years (25.5%). Prevalence of Grade II was 10.6% in the age group of 16-18 years.

DISCUSSION

In the present study the overall goitre prevalence in school children (4-18 years) was 50.5%. Almost same prevalence (51.26%) was reported in school children

Table 3 : Age-wise incidence of goitre in school children (4-18 years)

Age (in years)	Boys		Girls		Total	
	S	G	S	G	S	G
4-6	27	2 (7.4)	29	7 (24.1)	56	9 (16.1)
7-9	150	69 (46.0)	140	63 (45.0)	290	132 (45.5)
10-12	180	102 (56.7)	199	81 (40.7)	379	183 (48.3)
13-15	120	82 (68.3)	158	79 (50.0)	278	161 (57.9)
16-18	60	40 (66.7)	94	59 (62.8)	154	99 (64.3)
Total	537	295 (54.9)	620	289 (46.6)	1157	584 (50.5)

S = Surveyed G = Goitrous Figures in parentheses represent per cent

Table 4 (a) : Distribution of surveyed boys according to the grades of goitre (n = 537)

Grades of goitres	4-6	7-9	10-12	13-15	16-18
	n = 27	n = 150	n = 180	n = 120	n = 60
0	25 (92.6)	81 (54.0)	78 (43.3)	38 (31.7)	20 (33.3)
Ia	2 (7.4)	36 (24.0)	39 (21.7)	31 (25.8)	18 (30.0)
Ib	-	27 (18.0)	51 (28.3)	40 (33.3)	19 (31.7)
II	-	6 (4.0)	12 (6.7)	11 (9.2)	3 (5.0)
III	-	-	-	-	-

Figures in parentheses indicate percentages

Table 4 (b) : Distribution of surveyed girls according to grades of goitre (n = 620)

Grade of goitre	4-6	7-9	10-12	13-15	16-18
	n = 29	n = 140	n = 199	n = 158	n = 94
0	22 (75.9)	77 (55.0)	118 (59.3)	79 (50.00)	35 (37.2)
Ia	4 (13.8)	28 (20.0)	37 (18.6)	31 (19.6)	25 (26.6)
Ib	3 (10.3)	28 (20.0)	26 (13.1)	40 (25.4)	24 (25.5)
II	-	7 (5.0)	18 (9.0)	7 (4.4)	10 (10.6)
III	-	-	-	1 (0.6)	-

Figures in parentheses indicate percentage

(6-16 years) of Jawali in 1988-89 (Personal Communication, 1989). In Maharashtra, 53.6% prevalence in children of 1-15 years age was reported (Krishnamachari, 1974) and 54.3% in school children (6-17 years) in Simla (Agarwal and Agarwal, 1983). In school children aged 5 years to 18 years and 6-17 years, the goitre prevalence was 60.5 and 50.0%, respectively, in Bharuch district (Gujarat) and 32.0% in 6-17 years old in Baroda (Agarwal et al., 1983).

Follis et al. (1962) observed 24.4% prevalence in 7-18 years old children of Thailand. As high as 93.0% prevalence was reported in children (6-14 years) in Mexico (Maisterrena et al., 1964). An overall prevalence of 32% was reported in children (7-14 years) of Krk, an Island of Yugoslavia (Kusic et al., 1990).

The Maximum prevalence (64.3%) in the study area was in the age group of 16-18 years, followed by 57.9, 48.3, 45.5 and 16.1% in the age groups of 13-15, 10-12, 7-9 and 4-6 years, respectively. In the same area in the 1988-89 children in the age group of 6-10 years and 10-16 years had 40.0 and 65.6 goitre prevalence, respectively (Personal Communication, 1989). Higher incidence was observed in the pubertal and post-pubertal period due to increased demand for iodine by increased metabolic processes of growing children. In Narmada Valley, Gujarat, 21.2, 50.1 and 36.7% goitre was observed in the age group of 0-5, 6-11 and 12 years and above, respectively (Edibam et al., 1972). In Maharashtra, the maximum prevalence (73.8%) was reported in the 11-15 years of age group followed by 70.3 and 28.7% in the age group of 6-10 and 1-5 years, respectively (Krishnamachari, 1974). In the Bharuch and Baroda, the prevalence was more *i.e.* 51.0 and 43.7% in the 6-12 years old children than in 13-17 years old having 20.8 and 23.8%, respectively (Agarwal et al., 1983).

In the present study with the advance-

ment of age the goitre prevalence increased as has also been seen in most of the goitre endemic areas. Malamos et al. (1966) reported that the prevalence was strongly related to age and sex with maximum prevalence during growth period. The boys and girls had an overall prevalence of 54.9 and 46.6%, respectively, indicating that the boys were affected more than girls. Similar results were observed by Agarwal and Agarwal (1983) in school children (6-12 years) of Neoria, Puranpur and Sherpur areas of Uttar Pradesh and 6-17 years of children in Simla (Himachal Pradesh).

According to WHO (1979), goitre may affect all ages and both sexes. The boys surveyed had a varied prevalence from 7.4% (4-6 years) to 68.3% (13-15 years) and the girls from 24.1% (4.6 years) to 62.8% (16-18 years), affecting all age groups and both sexes.

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