GINGIVITIS IN PRIMARY SCHOOL CHILDREN OF BANGLADESH

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Abstract

Though early diagnosis and intervention of gingivitis in school children can eliminate progression to frank periodontal diseases, no such measures in Bangladesh are in place to detect gingivitis at an early stage in school children. This survey was conducted in 2007 in the primary schools of rural, suburban and urban areas of Bangladesh to evaluate oral hygiene with special emphasis on gingivitis prevalent among 6-13 years school children. The clinical examination of the gingiva was carried out using a mouth mirror and a periodontal probe. A total of 1,820 primary school students (m/f = 946/873) took part in the investigation. The crude prevalence of gingivitis, AS* and plaque were 17.5%, 9.2% and 56.0% respectively. The prevalence of gingivitis was significantly higher in males than females (20.3 vs. 14.3%, $p < 0.001$), lower than upper social class (21.1 vs. 12.6%, $p < 0.001$) and in rural than urban plus suburban children (22.5 vs. 15.1%, $p < 0.001$). Likewise, the prevalence of AS and plaque were significantly higher in males, lower social class and rural children. Significantly lower prevalence of gingivitis, AS and plaque was found among those who used tooth brush and tooth paste than those who did not (15.4% vs 22.4%, $p < 0.001$). The study concludes that the prevalence of oro-dental diseases is high in Bangladeshi children. The male children of low social class of rural communities are the most vulnerable group.

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Key Words: Gingivitis, primary school children, oral health education.

Introduction

In many developing countries, the prevalence of dental caries and periodontal diseases are increasing, thereby constituting a public health problem.[1] To control such diseases, good oral and dental health should be achieved at both public and personal levels. People in developing countries are burdened excessively by oral disease, particularly periodontal disease. This is aggravated by poverty, poor living conditions, ignorance concerning health education, lack of government funded policies to provide sufficient oral health workers.[2] Few published studies have described the trends in the prevalence of dental caries and periodontal disease in children.[3,4]

In developing countries priority should be based on primary prevention programs. Measures such as teaching programs and instructions for proper brushing techniques are needed from nursery to secondary level of school pupils. Control of the intake of sweets and

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*Acronyms: AS, angular stomatitis; BMI, body mass index; CI, confidence interval; HC, head circumference; ht, height; wt, weight; MUAC, mid-upper arm circumference

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refined sugar is another means of minimizing incidence of the dental diseases and can be achieved by incorporating nutrition education into schools curricula. Further more, mass media messages on the causes, prevention and treatment of dental diseases are essential. A need also exists to consider the training of auxiliary personnel such as dental hygienists and health educators who have a particular role to play in the prevention and control of dental diseases.[5] In Bangladesh, no study on the prevalence of gingivitis was conducted so far. So, this cross sectional study was undertaken to evaluate oral hygiene and gingival condition among children of 6-13 years of age.

Materials and Methods

The survey was conducted among primary school children of Bangladesh from 20 June to 31 July in 2007. The survey was constructed in a simple block design, each group of children being divided according to their residence in urban, suburban, or rural area. Seven locations were purposively selected within 3 hours drive of Dhaka city and 3 were selected in areas outside of Chittagong. Overall, 3 urban, 3 suburban and 4 rural schools were included.

Students were asked about dietary habits like sweets, chocolate including oral hygiene like frequency and use of tooth brush. For socioeconomic condition we took help from the teachers. Some information was also gathered from the parents or relatives. After interview, each student was examined for anthropometry (ht, wt, HC, MUAC), anemia, edema and jaundice. Finally, the students were examined by a trained and experienced team of dentists to determine overall oral health. The indicators included gingivitis or other gum infections, tongue condition and coloration, presence of angular stomatitis (AS), and counts of decayed, missing, and filled teeth. Gingival condition was determined for the fully erupted teeth using the criteria of gingival index of Loe and Silness[6] as follows: (0) sound gingival;(1) slight inflammation, slight change in color and volume with out bleeding on probing; (3) moderate inflammation, red ness, edema, bleeding on probing; and (4) severe inflammation, redness, marked edema and spontaneous bleeding. Thus code 0 and 1 were put under the category of healthy gingiva; and codes 3 and 4 under the category of inflamed gingiva. Appropriate statistical tests were carried out using the SPSS 11.5 program.

Results

A total of 1,820 primary school students (m/f = 946/ 873) of age 6 to 13 years took part in the investigation. The characteristics of the participants were shown in Table 1. Their mean (SD) age was 8.83 (2.0) years. The mean (SD) values for ht, wt, HC, MUAC were 125.6 (11.9) cm, 23.5 (6.7) kg, 50.0 (1.8) cm and 17.4 (1.9) cm, respectively. The mean BMI was 14.6 (2.1). These anthropometric measures did not differ between male and female students. Adjusted for age and sex, the BMI significantly correlated with HC and MUAC and also with height and weight (Table 2).

The crude prevalence (95% CI) of gingivitis was 17.5% (15.7 – 19.3), angular stomatitis (AS) was 9.2% (7.9 – 10.5) and dental plaque was 56.0% (53.7 – 58.3). The associations of gingivitis, AS and plaque with the risk variables are shown in Table 3. The frequency of gingivitis was significantly higher in the rural (22.5%) than in the urban (13.9%) and suburban (16.1%) students ($p < 0.001$). Likewise, the prevalence of AS was significantly higher in rural (24.4%) than among urban (1.2%) and suburban (2.0%) children ($p < 0.001$).

Table-1: *Characteristics of the Children (n=1803)*

Characteristics	Range	Mean (SD)
Age (y)	6 – 13	8.83 (2.0)
Height (cm)	87.5 – 168.0	125.6 (11.9)
Weight (kg)	11.4 – 58.0	23.5 (6.7)
Head circumference (cm)	40.0 – 57.5	50.0 (1.8)
Mid-upper arm circumference (cm)	12.0 – 26.0	17.42 (1.9)
Body mass index	8.76 – 29.8	14.6 (2.1)

SD – standard deviation

Table-2: *Partial correlations between body mass index, head circumference, mid-upper arm circumference, height and weight, controlling for age and sex (n = 1797)*

Variables	HC	MUAC	BMI	Height	Weight
HC	-	0.34 Ns	0.04 p<0.001	0.33 p<0.001	0.38
MUAC	-	-	0.10 p<0.001	0.38 p<0.001	0.58 p<0.001
BMI	-	-	-	–0.35 p<0.001	0.1 p<0.001

HC – head circumference, MUAC – mid-upper arm circumference, BMI – body mass index

Table-3: *The prevalence of gingivitis, angular stomatitis and dental plaque according to risk variables (n=1836)*

Risk variables	Gingivitis			Angular stomatitis			Dental plaque		
	n	%	Chi sq *p	N	%	Chi sq p	n	%	Chi sq p
Sex									
Male	191	20.3	10.5	75	8.0	3.0	543	58.1	3.6
Female	126	14.5	<0.01	90	10.4	0.09	464	53.6	.06
Social class									
Lower	222	21.1	22.7	130	12.4	30.5	646	61.6	32.4
Upper	95	12.6	<0.001	36	4.8	<0.001	362	48.1	<0.001
Geographical site									
Rural	135	22.5	-	146	24.4	-	339	57.7	-
Urban	79	13.9	16.4	7	1.2	250	337	59.3	7.7
Suburban	104	16.1	<0.001	13	2.0	<0.001	335	51.8	<0.01
Tooth cleaning devices									
Tooth brush	194	15.4	12.8	224	15.9	165	66	54.1	9.3
Other than brush	123	22.4	<0.001	92	23.7	<0.001	99	63.0	0.002
Tooth cleaning substances									
Tooth paste	216	15.7	14.7	60	4.3	165	748	54.4	5.9
Other than tooth paste	100	23.8	<0.001	105	25.1	<0.001	254	61.2	0.015

* Chi-square and p values are shown for the association with risk variables.

In contrast, the prevalence of dental plaque was significantly higher among the urban (59.3%) than among the rural 57.7%) and suburban (51.8%) children (p<0.02).

For the social class comparison, the prevalence of gingivitis (21.1 vs. 12.6%), AS (12.4 vs. 4.8%) and plaque (61.6 vs. 48.1%) were significantly higher in the students from lower social class than students from upper social class (for all, p<0.001). Compared with other devices of cleaning teeth, tooth brush was found to have reduced chances of gingivitis (p<0.001), AS (p<0.001), and plaque (p=0.02). Likewise, using tooth paste as a teeth-cleaning substance, compared with other substances like charcoal, salt, ash was found to have beneficial effect against gingivitis, AS and plaque (Table 3).

Discussion

This study was done to evaluate oral hygiene, gingival condition and tooth care habit in different socioeconomic classes of primary school children in rural, urban and suburban communities of Bangladesh. Qaderi and Ta'ani in their study showed significant gender variation in plaque and gingival score where males had a significantly higher gingival score than females.[6] Adenubi in his study among Nigerian children found

the same result.[7] These findings are similar to this study. The underlying cause of this in our country may be, boys are getting more sugar containing food like chocolate, cake, biscuit, chips etc than the girls and secondly, the girls are more obedient to their parents in terms of taking care of their teeth and gum than the boys. However, Maltz *et al*. in their study in Brazil did not find significant differences between boys and girls in any age group in relation to their gingival status.[8]

The prevalence rates of gingivitis, AS and plaque were significantly higher in the poor social class than their rich and middle-class counterparts. These findings are inconsistent with Marisa *et al*. who reported no correlation between gingivitis and the studied socioeconomic variables.[9] On the other hand the findings are very much consistent with the Adenubi's observation among Nigerian children, who found that calculus and gingivitis in the private school children of higher social class had significantly lower prevalence than that found in the government school children.[7] They suggested that better oral hygiene practices in the higher socioeconomic group of private school children might have reduced the incidence of oro-dental disorders. Similar findings were also reported by Ta'ani in her study in Jordanian school children.[5] She found that bleeding and calculus score were prevalent in pupils

of both types of schools though slightly higher in pupils of public schools than that of private schools. This is also consistent with other reports.[10,11]

Though not significant, it was observed that the parents who were micro-credit recipients had a higher percentage of gingivitis than their non-recipient counterparts (18.8% vs16.6%). Tooth brush and tooth paste users had significantly lower oro-dental diseases. There is an obvious relation between the dental plaque and gingivitis as gingivitis predisposes plaque deposition.[12] As such, instruction in proper brushing techniques are needed for the school pupils.

Conclusions

There is scarcity of population based study on oral heath of primary school children in Bangladesh. This study explored the higher prevalence of gingivitis, angular stomatitis and dental plaque among primary school children. It also determined the significant associations of these oro-dental diseases with sex, social class, geographical sites and the use of tooth cleaning devices and tooth cleaning substances. These findings may be of importance for oral health education at primary school level in our country.

Acknowledgment

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