

A STUDY OF DENTAL CARIES AMONG SCHOOL CHILDREN IN RURAL AREA OF JAMMU

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ABSTRACT

A Cross-sectional study was carried out on 322 children in the age group of 6-12 years studying in different Govt. Schools of Miran Sahib Zone of R. S. Pura Block. The children were assessed for dental caries by "Oral Cavity Examination" in outdoor daylight or with a torch. Dental caries was diagnosed according to the presence of "Decayed/Filled Teeth" present according to the WHO Oral health survey 1999. Dental caries was assessed in relation to mode of tooth cleaning, children taking sweets/toffees, oral cleanliness habits, education level of mother and income status of family. Over all prevalence of dental caries was found to be 18.01%. The prevalence was slightly higher 18.63% in girls as compared to 17.39% prevalence seen in boys. Low prevalence (7.65%) of Dental caries was seen in children of literate mothers as compared to illiterate mothers having high prevalence rate of 34.12%. The prevalence was higher (100 %) in children with bad oral cleanliness as compared to prevalence (14.28%) seen in children with good oral hygiene.

KEY WORDS: - Prevalence, Dental Caries, Fluorine, Drinking Water, Brushing Habits, Chi-square test

Introduction

Dental caries has affected the teeth of all nations, irrespective of geographic and bio-cultural differences. However in the past two decades the prevalence of caries has declined by 35-50% in most industrialized countries. Fluoridation of water probably played a major role. In India the incidence has gone up from 40% to around 80% during past four decades. Presumably rising standards of living have led to increase in sugar intake.

Fluorine is essential for normal mineralization of bones and formation of dental enamel. About 96% of the fluoride in the body is found in bones and teeth. The principal sources of fluorine in the body are found in bones and teeth. The principal sources of fluorine available to man are drinking water and some traces in food like sea fish, cheese, tea etc. Fluorine is often called a two edged sword. Prolonged ingestion of fluorides through water in excess of daily requirements is associated with dental and skeletal fluorosis and inadequate intake with Dental caries. The use of fluoride is recognized as the most effective means available for prevention of dental caries.¹

In India 80% of the children and 60% adults suffer from Dental Caries. According to the "National Oral Health Policy of India the goal is to bring down the Decayed/Missed/Fallen Teeth index in school children between 6-12 years of age to less than 2 which is approximately 4 at present. Hygiene is embedded in Indian culture and it is the way of life. Time tested practices of rinsing mouth with plain water after each meal, promoting traditional diets, brushing of teeth etc. should be promoted. Children in particular should be educated on correct brushing, tongue cleaning besides avoiding cariogenic foods. School children can be used as ambassadors of health messages to their homes and neighbourhood and can act as changing agents.

Brushing habits have not been inculcated in rural areas and barely 6% children between the ages (6-11 years) brush their teeth regularly. Most share the toothbrush and cannot afford paste. Chocolate eating and chewing gums and use of soft drinks are invitation to caries and bad teeth. Avoiding chocolate, toffees, pastries, soft drinks should be encouraged and promote consumption of cheese, nuts, corn, fruits, vegetables and fibrous foods.²

Oro-dental health has remained a neglected area and it continues to be a leading cause of morbidity in primary school children. India has a vast geographic area, divided into states which differ with regards to their socio-economic, cultural and behavioural traditions. These factors may affect oral health. The high prevalence of Dental caries may be attributed to local differences in eating habits, oral cleaning habits, fluoride content of water, tooth paste etc.

Undoubtedly, the most important environmental factor associated with caries is past and present exposure to Fluoride, systemic, topical or both which has consistently shown an inverse relationship to caries prevalence.³ Fluorosis is endemic in 17 states in India on account of excess of fluoride in ground water. In India 80% of population is dependent on ground water for drinking purposes. WHO guidelines for value of fluoride has set 0.5mg/litre in drinking water and further favour lower limits 0.5 mg/litre (Nov 2000-International workshop on fluoride). WHO recognizes that dental fluorosis and dental caries co-exist in a population drinking water contaminated with fluoride at concentration above 0.5 mg.

The present study was designed:

1. To find prevalence of dental caries among school children of 6-12 years studying in Govt. Schools of a rural area of Jammu.
2. To determine their associations with socio-economic status of family like literacy of mother and income

of family and dietary factors like intake of coffee, sweets etc.

- To determine Oral hygiene status like mode of teeth cleaning, brushing habits etc. and to find out Fluoride content of water in the study area.

Material and Method

Sampling technique

A list of Government schools procured from Zonal Education (Miran Sahib Zone) was used to identify randomly by lottery method the first school from where the survey was started. After completion of the first school, the next school was picked up as per the descending order of the list available and same pattern followed subsequently. In each school all children of 6-12 years were assessed who were present and the process continued till the desired sample size was achieved.

A total of 322 children were assessed for dental caries. Equal representation was given to boys and girls i.e. 161 boys and 161 girls were examined with 23 boys and 23 girls in each age group.

All children present on the days of examination were assessed and absentees were excluded from the study. The age was recorded from the school records.

Diagnostic criteria

Dental Caries

The children were now examined for dental caries by "Oral Cavity Examination" in outdoor daylight or with a torch. The child was examined while sitting on chair and a naked eye inspection of the oral cavity was done.

Dental caries was diagnosed according to the presence of "Decayed/Filled Teeth" present, according to the WHO oral health survey 1999.

Missing teeth were not considered because of natural exfoliation occurring in young children.

Dental caries in children was diagnosed when the following were present:-

1. Decayed tooth

Caries was regarded as present when a cavity was seen in a pit, fissure or smooth surface of a tooth.

2. Filled Teeth

Teeth which showed evidence of permanent restoration along with one or more areas that are decayed.

The proportion of children with evidence of caries were determined and recorded accordingly in pre-designed Proforma.

Dental caries was also assessed in relation to some risk factors like oral hygiene, Type of tooth paste used (fluoridated/Non fluoridated), mode of tooth cleaning, brushing habits etc. They were asked about the intake frequency of sweets. In case of younger children who were not sure about the type of tooth paste, they were told to confirm from their parents or to bring empty wrappers

of toothpaste for confirmation. Inquiries were also made regarding Income of family, Education of mother etc. and relevant information recorded in Proforma.

Source of Drinking Water

The children were asked about the source of drinking water- Hand pump/Piped water and information recorded in Proforma. All the children were taking water from hand pumps which are located in every house in Miran Sahib Area and are the main source of drinking water. Two litre of water from hand pump from the area was analysed at the "Quality Control Laboratory" situated in the Regional Research Laboratory Centre at Jammu for their fluorine content.

Results

The overall prevalence of dental caries was found to be 18.01% in children.

Table 1 Age/Sex wise distribution of dental caries in each Age in children 6-12 years

Age (In Years)	Boys (n=161)		Girls (n=161)		Totals (n=322)	
	No.	%	No.	%	No.	%
5+	4	(8.69)	5	(10.86)	9	(19.56)
6+	4	(8.69)	3	(6.52)	7	(15.21)
7+	4	(8.69)	3	(6.52)	7	(15.21)
8+	3	(6.52)	6	(13.04)	9	(19.56)
9+	4	(8.69)	4	(8.69)	8	(17.39)
10+	3	(6.52)	4	(8.69)	7	(15.21)
11+	6	(13.04)	5	(10.86)	11	(23.12)
Total	28	(17.39)	30	(18.63)	58	(18.01)

Note: - 46 children examined in each age group-23 boys and 23 girls

Higher prevalence (23.12 %) was found in the age 11 years + followed by age 5 years+ and 8 years+. Both these age groups has same prevalence rate (19.56%)

Table 2 Sex wise prevalence of Dental Caries

Sex	Total Examined	Total affected No.	(%)
Boys	161	28	(17.39)
Girls	161	30	(18.63)
Total	322	58	(18.01)

$\chi^2=0.08$, $df=1$; $P=0.77$ Insignificant

The prevalence of dental caries in girls was slightly higher i.e. 18.63% as compared to boys 17.39% which was statistically insignificant.

The prevalence of dental caries was low in children using both tooth brush and tooth paste which was about 16.36% as compared to a high (27.65%) prevalence of dental caries in children using other modes of tooth cleaning like neem, datun etc. The result was found to be statistically insignificant.

Table 3 Distribution of Dental Caries according to mode of tooth cleaning

Mode of Tooth Cleaning	No (%)	Total Children Affected No (%)
Brushing with tooth paste	275 (85.40)	45 (16.36)
Using Neem, Datun	47 (14.59)	13 (27.65)
Total	322 (100)	58 (18.01)

$X^2 = 3.47$; $df = 1$; $P = 0.06$ Insignificant

Use of Fluoridated/Non fluoridated tooth paste

The 275 children who were brushing their teeth with tooth paste were using fluoridated tooth paste. Regarding frequency of brushing, all the 275 children who were brushing their teeth with tooth paste were brushing only once daily. The fluoride content of drinking water was to be estimated and found to be 0.25 mg /lt at the Regional Research Laboratory Jammu.

Table 4 Distribution of Dental Caries according to oral cleanliness

Oral Cleanliness	No. (%)	Total Children Affected N (%)
Good	308 (95.65)	44 (14.28)
Bad	14 (4.34)	14 (100)
Total	322 (100)	58 (18.01)

$X^2 = 60.94$, $df = 1$, $P < 0.0001$ significant

Prevalence of dental caries in children with bad oral hygiene was 100% as compared to children with good oral cleanliness i.e. 14.28% and this difference was found to be statistically highly significant.

Prevalence of dental caries was high (18.9%) in children consuming sweets daily as compared to children taking

sweets weekly (16.78%), but this difference was also found to be statistically insignificant.

The prevalence of dental caries was found to be highly significant related to the education status of mother. Only 7.65% children were having dental caries who had literate mothers while in those children having illiterate mothers the prevalence was very high i.e. 34.12 % indicating the importance of education of mother in prevention of dental caries.

Table 5 Prevalence of dental caries among children taking sweets/toffees etc.

Age Group (in Years)	Daily Intake	Total Children Affected	Weekly	Total Children Affected
	No.	(%)	No.	(%)
6-9 yrs.	19	(17.92)	13	(16.66)
9-12 yrs.	16	(20.25)	10	(16.94)
6-12 yrs.	35	(18.9)	23	(16.78)

$X^2=0.03$; $df = 1$; $P=0.86$ Insignificant

Table 6 Distribution of Dental Caries according to Education Status of Mother

Education Level of Mother	No (%)	Total Children Affected N (%)
Illiterate	43 (39.13)	126 (34.12)
Literate	15 (60.86)	196 (7.65)
Total	58 (100)	322 (18.01)

$X^2 = 36.40$ $df = 1$, $P = < 0.0001$ Highly Significant

Note: Illiterate neither read nor writes. Literate has either gone to school/college

The prevalence of caries was high 22% in children belonging to low income groups and lowest in children in high income groups 8.10% and this difference was found to be statistically insignificant.

Note: Low income group <Rs 2500 per month, Middle income group: Rs 2500-7500 month, High income group: Rs 7500-10,000 per month

Table 7 Distribution of Dental caries according to Income.

Income group	No.	(%)	Total children affected	
			No.	(%)
Low	50	(15.52)	11	(22)
Middle	235	(72.98)	44	(18.72)
High	37	(11.49)	3	(8.10)
Total	322	(100)	58	(18.01)

$X^2 = 3.08$, $df = 1$, $P=0.21$ Insignificant

Discussion

Epidemiological data available to WHO⁴ shows large differences in the prevalence of dental caries, while level of dental caries have dropped in regions of traditional high prevalence, and are rising in developing countries. The reasons for these changes though not established yet, are probably related on one hand to the greater use of fluorides and on the other hand increased consumption of sugar by persons not protected by fluorides.

The prevalence of dental caries in the study was found to be 18.01% (Table No. 1) and was consistent with prevalence observed by Pandit K *et al*⁵ and could be attributed to simple coarse traditional fibrous food consumed by children, good oral hygiene and use of fluoridated tooth paste by the children.

The prevalence of dental caries in the study is much lower than the prevalence seen in a similar study on 5-12 years children which was 55.33% by Chatufale JD *et al*.⁶ A higher prevalence of dental caries 68.5% was seen by Retnakumari N⁷ in 6-12 years children in Kerala It was also reported by Bajaj M *et al*⁸ prevalence rate of 65% in children of 4-17 years of age in their study.

Sidhu SS⁹ reports that over the past two decades, the prevalence of caries has declined by 35-50 % in most industrialized countries of the world. A slight lower prevalence of 39.19% was also reported in school children 10-15 years by Prakash H *et al*¹⁰ in their study.

Girls had higher prevalence of 18.63% as compared to boys of 17.39% (Table 2) this was found to be statistically insignificant.

The prevalence of dental caries was also seen in relation to certain socio-cultural and socio demographic factor. Type of brushing, frequency of brushing and mode of

tooth cleaning are important factor in maintenance of oral hygiene and poor oral hygiene is widely considered a caries risk factor as reported by Retnakumari N.⁷ Only 16.36% of children who were brushing their teeth within fluoridated tooth paste had caries as compared to 27.65% who were using other modes of tooth cleaning like neem, datun etc. (Table 3). A similar observation by Chatufale JD *et al*⁶ was made in her studies.

Dental caries was present in 100% of children with bad oral cleanliness and only in 14.28% of children with good oral cleanliness in this study. (Table 4) A similar finding being reported by Retnakumari N.⁷

A higher prevalence of dental caries 18.9% was also observed in children taking sweets daily as compared to children taking sweets weekly 16.78%.(Table 5) Lal S *et al*² reports chocolate eating, chewing gums and use of soft drink are invitation to caries and bad teeth, Caries is more directly related to the frequency of consumption of sugary foods then to its total consumption-WHO.¹¹

Dental caries prevalence was found to be higher in children of illiterate mothers- 34.12% as compared to children of literate mothers 7.65% (Table 6). A similar observation was being made by Retnakumari N⁷ in their study. Lack of education in mothers, attributes to lack of awareness for good oral hygiene and healthy dietary habits for their children.

Children belonging to low income group were also found to have a higher prevalence of dental caries 22% as compared to children of high income group 8.10%. (Table 7) Similar observation were also made by Doifode VV *et al*¹² and Retnakumari N.⁷ This could be because children from low income group are unable to afford brush and tooth paste for cleaning their teeth. WHO recommends for public health that every effort must be made to develop affordable tooth paste for use in developing countries. Sidhu SS⁹ reports that the supply of extra fluoride has led to 30-50% reduction in the incidence of dental caries in the west. Tooth paste and tooth powder containing fluoride should be advocated.

WHO guideline for value of fluoride has set 1.5 mg /litre in drinking water and further favours lower limits of 0.5mg/litre. National Oral Health care programme favours promotion of fluoride tooth paste and topical application of fluoride in person above 6 years of age and recommends community water fluoridation.²

The fluoride content of water of the study area was found to be 0.25 mg/litre. This is within the range of fluoride recommended 0.5-0.8 mg/litre in drinking water.¹ Mandal KP *et al*¹³ (2001) reported fluoride content to be negligible in his study. Budipramana ES *et al*¹⁴ (2002) found Fluoride content ranging (0.51-31.5 ppm).

Conclusion

General health and oral health are inseparable. Oral cavity is the mirror which reflects general health. The use of fluoride is recognized as the most effective means

available for the prevention of dental caries. The National Oral Health care programme favours promotion of fluoride toothpaste and Topical application of fluoride in person above 6 years of age. Brushing habits need to be inculcated in rural areas and unhealthy dietary habits need to be strongly discouraged.

School children follow what the teachers do and say and teachers are considered as good role models to transmit values of life and ways of life in the schools as also outside the school. School children can be used as ambassadors of health message to their homes and neighbourhood and can act as change agents.

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