

Original Research Article

Dental caries and calculus status in children studying in Government and Private Schools in Malappuram, Kerala, India

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Abstract

Background: Dental caries status in children is influenced by a number of risk factors such as sex, age, socioeconomic status, diet, and oral hygiene practices. The objective of the study was to assess and compare the prevalence of dental caries and calculus in 12-13 year old school children.

Materials and methods: A sample of 761 children aged 12-13 years of both sexes from government and private schools. Clinical examination was carried out using the DMFT index for assessing the caries prevalence and Calculus component of Simplified-Oral Hygiene Index was used for assessing calculus in these children.

Results: The prevalence of dental caries was seen more in children studying in government schools than in private schools which was statistically significant ($p=0.018$). When the gender differences were compared it was seen that girls showed a higher prevalence of dental caries (66.37% in private schools; 87.58% in government schools) than boys (64.47% in private schools; 71.98% in government schools). There was no significant difference seen in the prevalence of calculus between government and private school children.

Conclusion: High prevalence of dental caries was found in these school children which suggested a poor performance of oral hygiene practices in them.

Key words

Caries, Oral health, School children.

Introduction

Dental caries and Periodontal diseases are one of the common oral diseases affecting children. Dental caries affects both sex, all races, all socioeconomic status and all age groups [1]. Periodontal diseases are among the most widespread diseases in mankind [2]. Studies have shown that the severe and destructive forms of periodontal diseases affects only minority and is usually very low, even though poor oral hygiene is a problem of the majority [3, 4].

According to the National Oral Health Survey (2002-2003) conducted throughout India dental caries was seen in 51.9% of 5 year old children, 53.8% in 12 year old children and 63.1% in 15 year old teenagers. The survey recommended a preventive dental health program such as use of fluoride tooth paste, water fluoridation should be initiated to address this problem of dental caries [5].

Dental caries is the most common infectious disease affecting humans [6]. This dental disease preventable and yet continues to be a major public health problem predominantly affecting children [7]. School age is a influential stage, a time when oral health, related behaviors, as well as beliefs and attitudes are being developed [8]. The age 12 -13 years was selected to see the health of the early part of the evolving permanent dentition and also the World health Organization has set some goals for the oral health of the 12 year old and the organization has instructed each country to work towards achieving these goals [9, 10].

By determining the prevalence of dental caries and calculus in 12-13 year school children in Malappuram district provided baseline data that is necessary for planning of preventive and treatment programs in schools, which will assist in improving their oral health as well as general health.

Material and methods

A cross sectional survey was conducted to assess the prevalence of dental caries and calculus in 12-13 year school children in Malappuram district. A total of 761 children who gave consent for the study were selected as the minimum calculated sample size was 450 (at 90 % power, 5% of α -error with a expected variation (d) of 4.3 and Z value of 1.96). The list of both private and government schools were obtained from the concerned authorities schools were selected by a random sampling technique was used to select children from these schools. Out of the selected sample size 426 were from 6 government schools and 335 were from 7 private school including 379 boys and 382 girls. Ethical clearance was obtained from Ethical Committee of Educare Institute of Dental Sciences.

School children between 12-13 years old with a consent form signed by parent of the child and school authority participating for the study were included, and school children who were uncooperative, or undergoing orthodontic treatment, or with systemic diseases, allergic diseases and children undergoing medical treatment were excluded from the study. The present study was carried out from the month of July 2014 and November 2014.

Children who were selected for the study were examined in their respective schools seated on an ordinary chair in a broad day light with the help of dental explorer and mouth mirror. Dental caries prevalence was recorded by taking the Decayed (D) component of DMFT index by Klein, Palmer and Knutson [11]. For the analysis students were categorized according to

- Caries Positive (DMFT/dmft \leq 1)
- Caries Free (DMFT/dmft = 0)

Calculus was recorded using the calculus component of Simplified Oral Hygiene Index given by Greene and Vermillion (1964) [12].

Calculus was reported to be present in each subject when at least one of the index teeth showed a score 1.

The two clinical examiners (AA, FP) were calibrated prior to the study in order to control reliability. In order to assess intra and inter examiner variability a duplicate examinations of approximately 10% of the children were performed. The intra and inter examiner consistency in diagnosis of caries was 0.94 and 0.93 and for the diagnosis of calculus it was found to 0.93 and 0.92 respectively. Descriptive Statistics were used and Mann-Whitney U test was used for comparing the groups. A p value of ≤ 0.05 was considered significant.

Results

This cross sectional study was carried out to compare the difference in prevalence of dental caries between 12-13 year old school children in government and private schools of Malappuram district, Kerala. The prevalence of dental caries according to type of school and gender were as per **Table - 1**. The comparison of DMFT scores between government and private schools were as per **Table - 2**. The mean DMFT of the children from government schools were higher than those from private schools ($p=0.003$). When the 'Decayed' component of the DMFT Index was seen, it was found that children from government schools had higher score than those from private

schools and it was found to be statistically significant. The 'Filled' component of the DMFT was found to be higher in children in private schools compared to children from government schools and it was statistically significant. Prevalence of calculus according to type of school and gender was as per **Table - 3**. In government schools, girls were shown to have a prevalence of dental caries of 87.58% as compared to boys with prevalence of dental caries of 71.98%.

Prevalence of dental caries in private schools among girls was 66.37% when compared to boys at 64.47%. In both government and private schools girls showed a higher significant difference. The total population of children examined in government schools showed a higher rate of dental caries 79.1% than the total children examined in private schools which was 65.49%.

The prevalence of calculus in government schools was found to be more in boys than girls. In private schools the prevalence of calculus in boys were 35.1% than girls 32.0%. When the prevalence of calculus was compared between government schools and private schools, government schools showed a slight more calculus than private schools which was not significant ($p=0.834$) (**Table - 3**).

Table - 1: Prevalence of dental caries in Governmental schools and Private schools.

	Boys				Girls				Total				p value
	Caries Positive		Caries Free		Caries Positive		Caries Free		Caries Positive		Caries Free		
GOVERNMENT SCHOOLS	N	%	N	%	N	%	N	%	N	%	N	%	0.018*
	131	71.98	51	28.02	134	87.58	19	12.42	265	79.1	70	20.9	
PRIVATE SCHOOLS	Boys		Girls		Boys		Girls		Total		Total		
	Caries Positive		Caries Free		Caries Positive		Caries Free		Caries Positive		Caries Free		
	N	%	N	%	N	%	N	%	N	%	N	%	
	127	64.47	70	35.53	152	66.37	77	33.63	279	65.49	147	34.51	

*p value ≤ 0.05 (Mann-Whitney U test)

Table - 2: Distribution of study population according to comparison of dental caries with type of school.

DMFT component	Government schools	Private schools	p-value
Decayed (D)	2.81±1.69	1.16 ± 1.35	0.024*
Missing (M)	1.85±1.26	0.97 ± 1.72	0.816
Filled (F)	1.03±0.76	1.47.± 1.28	0.421*
Total (D+M+F)	5.69±1.45	3.6 ± 1.82	0.003*

Table - 3: Prevalence of calculus in Governmental schools and Private schools.

	Boys				Girls				Total				p value
	With calculus		Without calculus		With calculus		Without calculus		With calculus		Without calculus		
	N	%	N	%	N	%	N	%	N	%	N	%	
	GOVERNMENT SCHOOLS	71	36.04	126	63.96	74	32.31	155	67.69	145	34.04	281	
PRIVATE SCHOOLS	64	35.16	118	64.83	49	32.03	104	67.97	113	33.73	222	66.27	

*p value ≤ 0.05 (Mann-Whitney U test)

Discussion

This cross sectional study was carried out to assess the prevalence of dental caries and calculus in school children in Malappuram district. Children of age 12-13 years were chosen for this study as these are the global monitoring age for dental caries for international comparisons and monitoring of disease trends [13]. In the present study the sample included school children from both private and government schools in order to have children from all social, economic and cultural background in Malappuram district. In the present study the prevalence of dental caries was higher in girls than boys both in government and private schools. This finding may be due to the fact that teeth erupt earlier in females than males which means females teeth would have been

exposed for a longer period than male of the same age [14-18].

Dental caries is a multi-factorial disease influenced by many factors including age, sex, diet, microorganisms, trace elements, saliva, genetic predisposition and tooth morphology [19-22]. In this study the level of dental caries was higher in children attending government schools which are similar with the findings of Almedia, et al. [23]. The higher prevalence of dental caries in government schools may be due to lack of awareness about the importance of oral health and also due to lesser performance of oral hygiene practices by these children compared to those from private schools. Although 12-13 year old female subjects exhibited lower prevalence of calculus as compared to their male counterparts the difference was not statistically

significant. Studies have reported that a large disparities exists between health care utilizations and socioeconomic background of the people in India [24]. Also there exists a difference in socioeconomic background between children who attend schools managed by government and those attend schools which are privately managed. It was observed that children attending the government schools usually came from a lower socioeconomic background than those attending private schools, thus suggesting a large difference in utilization of dental care which could be due to lack of financial support and also due to lack of oral health awareness. Further studies are needed to assess the various barriers for utilization of dental health care services.

According to the proceedings of the 1999 International Workshop for a classification of periodontal Diseases and condition it is reported that children and adolescents can have any of the several forms of periodontitis [25]. During case history recording it was observed that majority of children had not visited the dentist for a oral health check up or a treatment. This could be because of less importance placed on the oral health care by parents for their children. This study revealed that the proportion of children affected by caries was slightly over fifty percent and these findings were similar to those reported in another studies [26, 27].

The study showed that the proportion of girls with dental caries was more affected than boys and similar findings have been reported by other studies [28, 29]. In another study done by Rao it was that girls had marginally better oral hygiene than boys [30]. Findings from this study showed that females affected slightly more by dental caries and it could be explained by their frequent snacking of sweets from the nearby shops during recess and also girls have greater sweet preference than boys which could increase their carcinogenicity [31, 32].

The reported high proportion of school children with calculus may be an indication that oral hygiene practices are not adequately performed.

Our study has shown that male students exhibited a slight increase in prevalence of calculus than female students. This could be explained on the basis of the fact that females may have better oral hygiene practices than males [33]. The reason could be because girls are more conscious about their appearance in general than boys at this age.

The high prevalence of dental caries and calculus in these school children can cause impact on the quality of life in both their childhood as well as in adulthood. This study also demonstrate that use of preventive oral health measures was very uncommon in these children and as a result there could be a chance high prevalence of oral diseases like dental caries, gingivitis, periodontal problems. It was also noted that both in private as well as in government schools there was less oral health education imparted to these children. It is recommended that oral health education and promotion should be implemented to parents by health personnel during routine health check-ups and dental visits and also promoting the earlier use of fluoride toothpaste to prevent dental caries [34].

Conclusion

Our study conveyed the message that dental caries is one of the major health problem in children and adolescents. More than half of the school children examined for dental caries both in private and government schools were mostly girls when compared with boys of the similar age group. A significant portion of schoolchildren examined had calculus and more so in boys than girls. Good oral health through health education and dental awareness programs are essential to improve overall health and well being. It is advisable that both government and private school authorities should mandatorily conduct oral health education programs, preventive dental care to reinforce the importance and maintenance of healthy oral cavity.

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