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Association of Dental Caries with Utilization of Dental Care among Rural Children

Introduction: Dental caries is one of the most common oral diseases among children in developing countries and the utilization of the oral health care services has always been neglected in these countries. **Objective**: this study aimed to determine the association of dental caries prevalence with utilization oral health care services in Indian rural children. **Methodology**: A sample of 480 children of 12 year and 15 year old were selected from 240 houses in a household survey using a multistage, stratified sampling design. **Results:** It was observed that dental caries prevalence among both the age groups were higher (37% in 12 year and 25% in 15 years old) respectively. The utilization rate of dental care services were also less in these areas. There was positive association between Decayed Missing Filled Tooth (DMFT) values and visits to the dentist (p 0.004). **Conclusion**: There is a need for the reformation in the utilization rate so that prevalence of dental caries can be decreased.

Keywords: Dental caries, dental care utilization, rural population, DMFT, India

INTRODUCTION

Dental diseases are major public health problems in most of the developing countries because of their high prevalence and incidence and they appear to unequally impact the rural and disadvantaged people {1-4}.

Dental caries has been defined in many ways in the literature, but from the past 25 years, understanding of biopathology of dental caries has undergone major refinement. Dental caries is a phenomenon directly linked to continually present, highly complex molecular process active at the interface of susceptible tooth surface areas and the microbial biofilms that cover them. In the multiple sites of teeth where such micro-systems exist at various stages, a key feature is the constant oscillation between hard tissues demineralization and remineralization {5}.

One of the important age groups to observe caries experience and to assess the caries control measure is 12 year and 15 year old children, because it is likely at these age groups, all permanent teeth, except third molars, are erupted and exposed for oral environment for three to nine years. So the assessment of caries prevalence is more meaningful and also these age groups have been targeted as part of the global and regional goals presented by the World Health Organization (WHO) {6}.

The influence of utilization and different health systems on the prevalence of dental caries in children has only occasionally been compared with international studies and the available data are scarce in many developing countries like India. But certain pattern have been noted like children have most untreated dental caries associated with pain and risk of spreading infection{7-9}. These facts reflect the current oral health care services. Although it appears from previous studies that, utilization of oral health care services is better in urban than in rural areas, in contrast where there is increasing demand for oral health care in rural areas. The purpose of the present study was to determine the prevalence of dental caries and its association with utilization pattern of dental services in rural children.

METHODOLOGY

The present study was carried out in rural part of Davangere district located in the southern part of India. A sample of 480 children aged 12 year and 15 year old was selected from household survey. Each age group consisted of 240 children (male 120 and female 120). Children who were not well, who had difficulty in opening mouth were excluded from the study. The sample design was probabilistic, multistage, stratified and was calculated to provide representative information at the district level {10}. The study comprised of two parts, first part was clinical examination of children, followed by second part; individual face to face questionnaire in each randomly selected household's {11}.

Prior to start of the study, volunteer informed consents were obtained from the institutional ethical committee of Bapuji Dental and Hospital, Davangere and also from the parents of selected 12 year and 15 year old children. Calibration of the examiners was done in the department of community dentistry using WHO criteria on sample size of 60 children who possessed collectively the full range of conditions expected to be assessed in the survey. The mean kappa co-efficient values for intra examiner and inter examiner variability test was 0.88 and 0.89 respectively. The questionnaire was pretested to ensure clarity and few modifications were made accordingly.

The clinical examination of all 480 children were carried out by the examiners in their respective household by making each subject to sit on a ordinary chair with headrest under sufficient natural illumination using plane mouth mirror and CPI probe as recommended in WHO Oral Health Assessment methodology 1997. Oral health status was assessed using DMFT index following WHO criteria for epidemiological studies {12}. A tooth was classified as caries when there was either a cavity, undermined enamel or a softened floor or wall on either the pit or fissure or on one of the smooth surfaces. On an average 15-20 subjects were interviewed and examined in any given day during the survey period excluding the weekends. Sufficient number of instruments was made available to avoid the need to interrupt examination while used ones were sterilized. Although a detailed schedule plan was prepared meticulously, few adjustments and changes were called for while working it out practically.

After clinical examination, the following information were obtained from children by questionnaire:

- Socio- demographic variables including age, nationality and parent education.

- Frequency of use oral health care services during the last one year.
- Type of the dental clinic/hospital visited.
- Reasons for the dental visit.
- Level of satisfaction with the last visit.
- Factors determining their decision for choosing their use of dental clinic/hospital.
- Factors determining their decision for non-utilization of oral health care services.

STATISTICS

The collected data were coded and statistical package for social science SPSS was utilized to calculate descriptive statistics and statistical test. Chi-square test was performed wherever needed. Multiple regression analysis was done to determine the association between dental caries and utilization of services.

RESULTS

The percentage of subjects in the rural areas of Davangere taluk with caries experience (permanent teeth) having one or more Decayed, Missing or Filled teeth (DMFT>0) was 37.5 percent (12 years); 25 percent (15 years).The results were highly significant in both the age groups when it was compared with caries experience. The Significant Caries Index (SIC) was used in identifying one third of the population with the highest caries (mean DMFT value) and the mean DMFT for this group.

Figure 1 summarizes the distribution of 480 children of both 12 year (240 children) and 15 years old (240 children), according to socio-demographic profile like age, sex and type of school in rural areas of davangere taluk. As demonstrated, the percent of children studying in government school is very high (12 year 60% and 15 year 70%) compared with the private school (12 year 40% and 15 year 30%).

Table 1 presents the percentage of subjects by age and sex who were with caries experience using a range of DMFT values. The range of values has been grouped in such a way as to provide some indication of the proportion of dentition affected with caries out of the normally present in an average mouth.

Table II shows the frequency of using toothbrush in both the age groups. It was 87.2% in 12 year old and 77.6% in 15year old children, while the use of toothpaste was comparatively less with 50% in 12 year old and 57% in 15 year old children. The use of mouth rinsing habit after food was very less with 33.3% and 43.6% in both the age groups respectively.

Table III shows about 23 and 18.7 percent of the children in both the age groups reported oral health problems in last one year. Males reported more dental problems. Four and eight percent of the children in both age groups who had faced oral problems did consult dentist in last one year; majority of them visited government hospitals for the treatment with 42.2 and 53.7 percent respectively.

Multiple regression analysis in table IV reveals that the independent variables were significantly associated with the DMFT values of the children. Frequency of tooth brushing and visiting to the dentists were positively associated with the DMFT values (p 0.003 and 0.004) respectively. Sex was negatively associated with the DMFT values (0.941).

DISCUSSION

The present study provides information regarding prevalence of dental caries, oral hygiene practices & behavior and dental attendance of children aged 12 and 15 years old in rural children.

Most of the children from low socio economic class family attended public school while from middle socio economic class family children attended private school. The major reason for this difference in the choice of school is finance. The present study sample consisted of children from all socio economic and cultural communities. This provides a true picture of the condition of oral health in the study population. In 12 and 15 year old age groups, the prevalence of dental caries were 37.5% and 25% with a mean DMFT score of 1.9 and 1.2 respectively. These results were similar to the findings of Menon and Indushekhar {13} and Singh A A et al., {14}.The high DMF score in both the age groups could be explained by the fact that caries is a cumulative disease and remains irreversible after cavitations.

The mean caries experience was found to be less among 12 and 15 year age groups. Reasons behind this could be the higher thickness and density of enamel in the permanent teeth when compared to deciduous teeth. As the age advances, dietary habits change from retentive and sucrose rich to less retentive and more fibrous diet {15}.

Tooth brushing once a day was reported by both age groups and the toothbrush was most commonly used method to clean teeth in children of 12 and 15 year age groups. Most of them changed their brush once in 4-6 months. These findings are not commonly observed in rural areas of developing countries. The possible reasons could be their positive oral health attitudes or better dental knowledge. Similar results were obtained from the studies conducted by National Oral Health Survey and Fluoride Mapping, Karnataka {11}.

Around 23.2% in 12-year age group and 18.7% in 15 year age group suffered from oral health problems in last one year. It was also observed that dental decay and gingival and periodontal diseases were the major types of oral health problems reported by these age groups. Out of those suffered from oral health problems, only a small segment of affected age groups consulted trained dentist for treatment. Most of them preferred government facilities for their treatment.

These finding support the assumption that, in developing countries people tend to visit dentist only when emergency care is needed. This observation is in accordance with many prevalence studies done before in united Republic of Tanzania {16}, Srilanka {17} and National Oral Health Survey and Fluoride Mapping, Karnataka {11}.Most of the children answered that the location of dental clinic form their home is less than one hour but still the utilization rate of dental services was not much when it was compared with prevalence of untreated dental caries.

Regarding the availability of dentists, most of them preferred to visit government dentists rather than private dentists. The possible reasons could be in government hospital, the cost of the treatment is free to public and most of the treatment is done under the supervision of specialist dentists. This is in agreement with studies conducted by Butters and Willis {18} and Matee et al., {19}. Multiple regression analysis of prevalence of DMFT values of two age groups of children and dental attendance frequencies revealed that they visited a dentist only when they or their parents had observed a change in at least one tooth; so it is not surprising that the multiple regression analysis revealed

a significant (p<0.001) positive association between the frequency of dental visits and DMFT values. The results from this study are similar with the study done by Schulte et al., {20}. Many studies have shown that there is statistical significance between DMFT values among male and female {21}, however in the present study, no such difference was found (0.941). This could be due to the equal opportunity and equal preferences among both genders.

CONCLUSION

The utilization of dental care services is affected by socio-economic factors such as education, occupation, place of residence and gender. The present system of utilization is mainly concentrated in urban areas and rural areas are neglected. So the utilization of dental services needs to be reformed to prevent the increase of prevalence of dental caries and other oral diseases.

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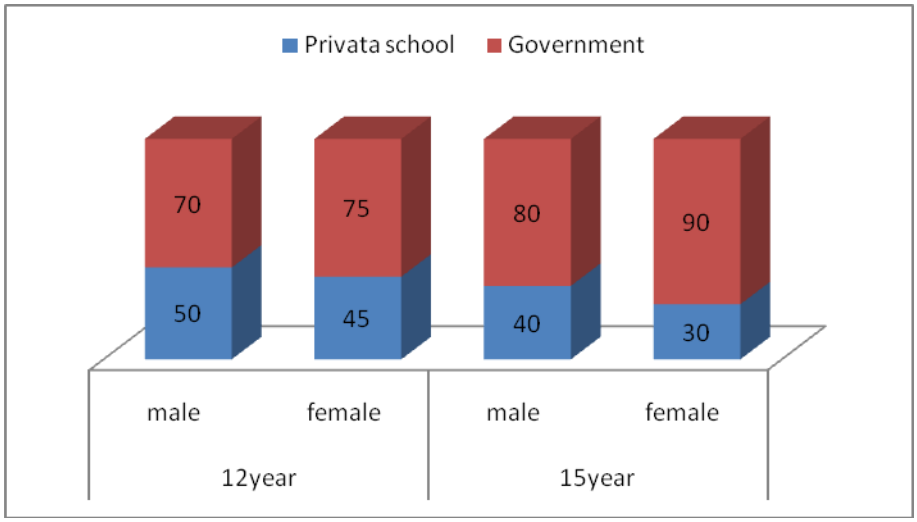

Figure 1: Distribution of children according to age, sex and type of school

Table I: Distribution of children with caries experience and DMFT values by age

	12year			15 year		
	M	F	Total	M	F	Total
Variables	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
with caries experience	52(21.0)	38(16.0)	90(37.5)	27(11.3)	33(13.8)	60(25.0)
DMFT 1-3	37(15.5)	26(11.0)	63(26.5)	24(10.0)	29(12.1)	53(22.1)
DMFT 4-5	14(5.8)	12(5.0)	26(10.8)	3(1.3)	2(0.8)	5(2.1)
DMFT 6-10	1(0.4)	0(0.0)	1(0.4)	1(0.4)	1(0.4)	2(0.8)
DMFT 11-15	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
Mean DMFT	1.3	0.8	1.1	1.1	1	1
SIC	4.1	4.2	4.5	4.2	3.9	4.1

X^2=5.5820, df =2, p=0.001

Table II: Distribution of oral hygiene practice among children

Variables	12year			15 year		
	M	F	Total	M	F	Total
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Toothbrush	115(48.0)	94(39.2)	209(87.2)	100(41.6)	86(36.0)	186(77.6)
Toothpaste	64(26.7)	56(23.3)	120(50.0)	68(28.4)	70(29.1)	138(57.5)
Mouth rinsing	41(17.0)	39(16.2)	80(33.3)	41(17.0)	64(26.6)	105(43.6)

X^2=5.4992, df =2, p=0.04

Table III: Distribution of children according to dental visit

variables	12year			15 year		
	M	F	Total	M	F	Total
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Suffered from oral health problems in last one year	19(14.1)	11(9.1)	30(23.2)	8(3.3)	37(15.4)	45(18.7)
Dental visit in last one year	7(2.9)	3(1.2)	10(4.1)	15(16.2)	5(2.0)	20(8.2)
Dental visit in last two year	12(5.0)	8(3.3)	20(8.3)	8(3.3)	7(2.9)	15(6.2)
Type of dental clinic						
Private clinic	26(10.8)	14(5.8)	40(16.6)	20(8.3)	12(5.0)	32(13.3)
government hospital	50(20.8)	52(21.6)	102(42.4)	66(27.5)	63(26.2)	129(53.7)

X^2=7.2814, df =3, p=0.03

Table IV: Relationship between log DMFT of children with prominent variables

variables	β	OR	SE	P
Sex	-0.041	0.925	0.536	0.941
Frequency of brushing	1.046	5.041	0.511	0.003
Visit at the dentist	1.743	6.321	0.541	0.004

β = coefficient of the regression of each variables

OR= odds ratio

SE = standard error of estimate

P = p value of the multiple regression analysis.