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Materials and methods: A total of 1800 school children constituted the study sample. Each age group consisted of 600 children. Information on oral hygiene methods was collected. Dental caries was recorded using dft/DMFT as per WHO 1997 guidelines.

Results: The prevalence of dental caries was found to be 33.6% in Sulliataluk. The prevalence of dental caries was found among 5 year old 31.0%, 12 year old 32.8% and 15 year old 37.0% respectively. Prevalence of dental caries among tooth brush using 32.6% and finger users 42.8%. This observation was statistically significant ($P<0.05$). The percentage of caries affected children was low among tooth paste user (30.5%) and those who brush their teeth twice daily (10.6%).

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Conclusion: Prevalence of dental caries for the entire study population was 33.6% and the treatment need among the study population revealed that greatest need was for one surface restoration followed by other treatment.

Keywords: dental caries, treatment need.

I. Introduction

Dental caries is a microbial disease of the calcified tissues of the teeth, characterized by demineralization of the inorganic portion and destruction of the organic substance of the tooth.[1]It is a dynamic process where both demineralization and remineralization occur simultaneously. When the rate of demineralization exceeds the rate of remineralization, then there is frank cavity formation.

Dental caries or tooth decay is both a universal and a lifelong disease. This disease is universal in the sense that the prevalence or percent of the population affected increases with age, ultimately affecting almost the entire population. All of us are at risk for caries as long as we have our natural teeth. Thus it is life long and may occur as early as the first year of life as early childhood, caries continue throughout childhood and young adulthood and continue in adults as root surface caries.

Dental caries is a multifactorial disease in which there is an interplay of three principle factors; host (teeth, saliva etc), microflora and substrate (diet). In addition, a fourth factor, time, must be considered. All the factors must be present and must interact with one another for dental caries to develop. The prevalence and incidence of dental caries in a population is influenced by a number of risk factors such as age, sex, ethnic group, dietary patterns and oral hygiene habits.[2]

Dental caries is the most prevalent disease among children in the global scenario. A review of data from the developed countries in the past 25 years revealed a decreasing trend in the levels of dental caries. This has been reported due to the implementation of preventive strategies against dental caries.[3]The scenario in India is no different from other developing countries. Available literature of 1940 to 1960, the prevalence of dental caries in India showed a varied picture i.e. caries being very high in some areas and low in some areas. In spite of conflicting reports, it has been observed that during 1940 the prevalence of dental caries in India was 55.5%, during 1960 it was reported to be 68%. Several studies undertaken in different parts of the country showed that dental caries has been consistently increasing in its prevalence and severity.[4] Due to lack of baseline data, it is virtually impossible to establish the exact situation regarding prevalence of dental caries in India.

Studies reported in Indianchildren reported varied prevalence of dental caries.[3,4] Hence an attempt was done to assess the prevalence of dental caries, treatment needs and oral hygiene practices among school children of Sulliataluk. It will also help to provide baseline data on prevalence of dental caries among 5, 12 and 15 year old school children of Sullia taluk, Karnataka.

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II. Materials and Methods

A cross-sectional study was conducted to evaluate the prevalence of dental caries and treatment needs among 5, 12 and 15 year old school children of Sulliataluk,Dakshina Kannada district, Karnataka.

Public education in Sullia is mostly served by government bodies. From each selected school, 600 children of 5, 12 and 15 year aged children were selected using systematic random sampling.A total of 1800 school children were included in this study. Subjects with mixed dentition and those with acute infections of the oral cavity were excluded from the study.

A specially designed proforma which consisted of two parts was used. The first part had demographic information, which was retrieved from school records and through interviews with the children. Information was also collected on children's oral hygiene practices including regularity of cleaning the teeth, aids and agents used for this purpose and also frequency of brushing. The second part consisted of clinical examination for dental caries and treatment needs as described by WHO (1997) for oral health surveys.[5]Caries was examined under natural day light using mouth mirrors and CPI probes. In children of 5 year age group, dft index was recorded, while for 12 and 15 year age children DMFT was recorded. Intra-examiner reliability was assessed using Kappa coefficient which was 0.90 suggesting an excellent agreement.

III. Statistical Analysis

All the analysis was done using SPSS 14 version (SPSS Inc, Chicago, IL, USA). A p-value of <0.05 was considered statistically significant. Chi-square test was used to compare the proportions between the groups. Student's t test was used to compare the dft/DMFT score between male and females.

IV. Results

A total of 1800 school children constituted the final sample in the study. Each age group consists of 600 children combining both males and females (Table 1). Among 5, 12 and 15 year age group, majority of the children used toothbrush as the method to maintain oral hygiene both in male as well as females. A minor proportion of children also used finger as an aid to maintain oral hygiene. Almost 2/3rd of the children used toothpaste and 1/3rd used tooth powder in 5, 12 and 15 year male and female children. A small proportion of children in 5, 12 and 15 year children used indigenous materials like salt, charcoal and or brick powder as dentifrice (Table 2).

Caries was compared in 5, 12 and 15 year old children with respect to type of oral hygiene aids and dentifrices. In 5 year age group children, there was no significant difference in the caries experience and type of oral hygiene aid ($p=0.272$) or dentifrice used ($p=0.597$). In 12 year age group children, more than 2/3rd of the toothbrush and half of the finger users were caries free ($p=0.006$). Almost 2/3rd of the toothpaste and more than half of the toothpowder users were caries free ($p<0.001$). In 15 year age group children, nearly 2/3rd of the toothbrush and nearly half of the finger users were caries free ($p=0.05$). Almost 2/3rd of the toothpaste and more than half of the toothpowder users were caries free ($p<0.001$) (Table 3).

There was no significant difference in the mean dft score between males and females of 5 year age group ($p=0.452$). In 12 and 15 year age group, there was no significant difference in the mean DMFT score between males and females ($p=0.249$ and $p= 0.742$ respectively) (Table 4)

In 5, 12 and 15 year age group, 2/3rd of the males and females required no specific treatment as assessed by the treatment needs described by WHO in 1997. Preventive care was needed in almost 3-5% of the children while Sealant was required by 4-6.5% children. Major treatment need in all the age groups was one surface filling which was in the range of 17 - 26%.This was followed by the need for 2 or more surface fillings (8 -14%). The need for pulp care was in the range of 7-12%. The least required form of treatment was crown/ veneer/ other care (Table 5).

V. Discussion

The present study showed that majority used tooth brush and tooth paste as the commonly used oral hygiene aids and materials. These findings were similar to the other studies conducted by Retnakumari N (1999)[3], Sarvanan S et al., (2003)[6], Okeigbemen(2004)[7], David et al., (2005)[8].

The prevalence of dental caries in the present study was 32.6% among tooth brush users. This was similar to the findings reported by Misra and Shee (1979)[9] and Sarvananet al., (2003)[6]. This may be attributed to the fact that tooth brush is more effective for removal of plaque from the tooth surface. The low prevalence of dental caries in tooth brush users may be due to the fact that the bristles of a tooth brush could reach and clean those inaccessible areas of oral cavity that might not be accessible to the finger and other materials.

In the present study regarding the use of tooth paste, tooth powder and other materials like salt, charcoal, ash, etc., it was observed that the percentage of caries affected children was high in subjects who used other materials when compared to tooth paste and tooth powder users. The findings was similar to the studies conducted by Kapoor AK et al., (1980)[10], Sarvanan S et al., (2003)[6]. The high prevalence of dental caries who use these indigent oral hygiene aids could

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be attributed to the fact that they were applied with finger which might not permit them to clean the inaccessible areas of the oral cavity. It might also be possible that dentifrices deliver active ingredients like fluoride which lead to effective plaque control and prevention of caries.

In the present study the prevalence of dental caries among the study population was 33.6%. The prevalence of caries increased from 5 years to 15 years age group. This finding was similar to the studies conducted by DuttaA (1965)[11], TewariA et al., (1977)[12], Megas et al., (1989)[13], Rodrigues et al., (1998)[14]. This might be attributed to the fact that as age advances,the teeth were exposed to the cariogenic challenges more often. Increased pattern of sugar consumption, availability of sugar products at schools, urbanization, socio-economic circumstances, availability of dental services, dental service utilization are some factors which could have concomitant role in increased prevalence of dental caries.

The mean dft/DMFT was found to be similar in females and males among 5, 12 and 15 year age group. The finding was contrary to the studies conducted by Dutta (1965)[11],Wright et al., (1989)[15], Megaset al.,(1989)[13], David et al., (2005)[8].

In the present study it was observed that needs for different forms of dental treatment were single surface restoration were in utmost need followed by two or more surface restorations. This study goes which in accordance with the study conducted by Mosha HJ et al., (1994)[16], Rodriquesand Damle SG (1998)[14], Sarvanan S et al., (2003)[6], Kulkarniand Deshp-ande(2002)[17].

Our study provided baseline data for dental caries and treatment needs in Sulliaschool children. Within the limits of this study, we could conclude that the dental caries was high in this area. Healthier children are more likely to attend school, and modest improvements in schooling will allow for the continuation of education. Hence, authorities should consider this data and should plan appropriate action strategy to decrease the overall prevalence and unmet treatment need among this target group along with other prevailing general health problems. Oral health promotional activities like use of topical fluoride, teaching and reinforcing appropriate brushing technique and frequency of brushing, demonstrating plaque using disclosing agents, decreasing the availability of sugar/sweetened food in the school premises and promotion of sugar free (tooth-friendly sweets) should be reinforced and recommended. The cultural habit of cleaning teeth at least once a day is an important cultural infrastructure that can be made use for oral health promotion by showing the right way of brushing and cleaning teeth.High literacy rate in this area could be helpful in implementing health education for children and adults (parents and teachers) which might help in modification of risk behavior. Comprehensive school health programs can cause a dramatic "ripple effect", resulting in changes in attitudes, knowledge and behavior. Schools that provide health services and education not only benefit school-aged children, but also the entire community.School children can act as messengers for other out-of-school children and members of their communities to communicate better practices in hygiene and overall health. Incorporating oral health in general health education can be much more useful. Usage of topical fluoride might not be appropriate as the study area comes under endemic fluoride belts of India. Dental schools in the study area could also be used to decrease the overall unmet needs among children along with promotion of oral health.

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Table 1

Age group	Male N (%)	Female N (%)
5	298 (49.7)	302 (50.3)
12	304 (50.7)	296 (49.3)
15	301 (50.2)	299 (49.8)
Total	**903 (50.2)**	**897 (49.8)**

Table 2

Age group	Oral hygiene aids	Male N(%)	Female N(%)
5	Tooth brush	251 (84.2)	254 (84.1)
	Finger	47 (15.8)	48 (15.9)
12	Tooth brush	270 (88.8)	273 (92.2)
	Finger	34 (11.2)	23 (7.8)
15	Tooth brush	291 (96.7)	287 (96.0)
	Finger	9 (3.0)	12 (4.0)
	Any other	1 (0.3)	-
5	Tooth paste	192 (64.4)	206 (68.2)
	Tooth powder	99 (33.2)	89 (29.5)
12	Tooth paste	206 (67.8)	214 (72.3)

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	Tooth powder	89 (29.3)	79 (26.7)
	Any other	9 (3.0)	3 (1.0)
15	Tooth paste	218 (72.4)	238 (79.6)
	Tooth powder	79 (26.2)	52 (17.4)
	Any other	4 (1.3)	9 (3.0)

Table 3

Age	Method	Caries		p-value	Dentifrice	Caries		p-value
		Experienced	Free			Experienced	Free	
5	Tooth brush	152 (30.1)	353 (69.9)	0.272	Tooth paste	118 (29.6)	280 (70.4)	0.597
	Finger	34 (35.8)	61 (64.2)		Tooth powder	63 (33.5)	125 (66.5)	
	Others	-	-		Others	5 (35.7)	9 (64.3)	
12	Tooth brush	169 (31.1)	374 (68.9)	0.006	Tooth paste	122 (29.0)	298 (71.0)	<0.001
	Finger	28 (49.1)	29 (50.9)		Tooth powder	66 (39.3)	102 (60.7)	
	Others	-	-		Others	9 (75.0)	3 (25.0)	
15	Tooth brush	209 (36.2)	369 (63.8)	0.05	Tooth paste	148 (32.5)	308 (67.5)	<0.001
	Finger	12 (57.1)	9 (42.9)		Tooth powder	64 (48.9)	67 (51.1)	
	Others	1(100)	-		Others	10 (76.9)	3 (23.1)	

Table 4

Age	Sex	N	Mean ± SD dft / DMFT	p-value
5	M	298	0.74 ± 1.66	0.452
	F	302	0.65 ± 1.24	

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12	M	304	0.46 ± 0.84	0.249
	F	296	0.54 ± 0.86	
15	M	301	0.68 ± 1.07	0.742
	F	299	0.71 ± 1.16	

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