Original Research Article

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Prevalence of dental caries among 13 and 14 years of school going children in urban Chidambaram: a cross sectional study

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ABSTRACT

Background: Dental caries is a public health problem in developing countries like India. Indian trends show increase in prevalence of dental caries over last five decades with prevalence of 50 to 60%. The present study was conducted to find out the prevalence of dental caries and to find out the associated risk factors for dental caries among 13- and 14-years school children in urban Chidambaram.

Methods: This descriptive cross-sectional study was carried out for the period of 3 months from October to December 2019. 136 students from one government and private school were selected conveniently. Data were collected using a pre-tested, structured questionnaire, which were analyzed using Statistical package for social sciences (SPSS) version 23

Results: The prevalence of dental caries was found to be 58.8%. The prevalence of dental caries was found to higher among the boys (62.1%), lower socioeconomic class students (80.4%) and students studying in the government school (66.7%). There is significant association between frequency of brushing, rinsing of mouth after taking food, brushing technique, frequency changing of brush, duration of brushing and presence of dental caries. (p<0.001).

Conclusions: Lack of awareness, poor oral hygienic practices are seemingly the contributing factors for the development of dental caries. Dental caries is a preventable disease which can be alleviated by creating community awareness through health education activities.

Keywords: Dental caries, School going children, Oral hygiene practices

INTRODUCTION

Oral health is integral to general health and essential for well-being. Oral diseases qualify as major public health problems owing to their higher prevalence and incidence. Dental caries and periodontal diseases have historically been considered the most important global oral health burden.¹ The World Health Organization (WHO) has ranked dental caries, as number three among all chronic non–communicable diseases that require worldwide attention for prevention and treatment.²

Globally, it is estimated that 2.3 billion people suffer from caries of permanent teeth and more than 530 million children suffer from caries of primary teeth.³ In the developing countries like India the prevalence of dental carries is very high particularly among the children and adolescents.⁴ Indian trends show increase in prevalence of dental caries over last five decades with prevalence of 50 to 60%.¹ The prevalence and incidence of dental caries is influenced by various socio-demographic factors like age, sex, ethnic groups, dietary patterns and oral hygiene habits.²

The major impact of dental caries on children are pain, discomfort, inflammation of pulp, sensitivity and bacteraemia which affect their daily routine activities like food intake, speech, attendance at school and self-esteem at greater level. Tooth decay is a frequent cause of absence from school or work. It not only causes pain and discomfort, in addition, places a financial burden on the parent in terms of dental treatment. The prevention of dental caries has long been considered as an important task for the health professionals.

School age is an influential stage during which every individual develops health related behaviours, beliefs and attitudes.² Schools are the best centre for effectively implementing the comprehensive health care programme as children are easily accessible at school.⁷ Complete eruption of permanent dentition except 3rd molar occurred children in the age group of 13 and 14 years.⁴

Thus, the present study was designed to find out the prevalence of dental caries and to find out the associated risk factors for dental caries among 13- and 14-years school children in urban Chidambaram.

METHODS

This descriptive cross-sectional study was conducted among 13 and 14 years of school children in the one government and one private school in urban Chidambaram, Cuddalore. The study was carried out for the period of 3 months from October to December 2019.

There are 33 schools in the urban Chidambaram, out of which one government school and private school were selected conveniently. 136 students in the age group of 13 and 14 years in the class 8th and 9th standard students were selected for the study. Students who were permitted by their parents and present on the day of study were included in the study. Permission for carrying out the study was obtained from the school authorities before the commencement of this study.

Study tool and data collection

Data was collected using a pre-tested semi structured, questionnaire. Information on the socio-demographic profile, dietary habits, oral hygienic practices like brushing the teeth and rinsing after food intake was collected and finally examination of oral cavity was carried out by investigator. Investigator underwent intensive training for a week in a dental teaching institution prior to the start of the study for assessment of dental caries based on WHO guidelines.

The children were interviewed and examined in their respective schools. The participants were made to sit on a chair/bench in natural daylight. The children were asked to rinse mouth thoroughly with water before examination, then the teeth were dried with cotton swab and the dental examination was done.

Oral examination was conducted using an illuminated mouth mirror and CPI probe according to WHO diagnostic criteria. Study findings were reported to respective school authorities and referral to appropriate facility was recommended. A referral was forwarded to the parents of the children who were in need of dental care. At the end of the study, a session on oral health education was conducted.

Statistical analysis

Collected data were entered in Microsoft excel and analyzed by using SPSS software version 23. Chi square test was used as the test of significance and was used to compare the differences in proportions with the significance level (p≤0.05). Step wise logistic regression module has been carried out to find out the association between dental caries and selected risk factors odds ratio.

Ethical approval and informed consent

Ethical approval was obtained from Institutional Ethics Committee of Rajah Muthiah Medical College and Hospital. After explaining about the study and its objectives, written and oral Informed consent was obtained from the parents and the study participants respectively.

RESULTS

The study included 136 school going children in the age group of 13 and 14 years from the one Government and one private school in urban Chidambaram.

Table 1: Socio demographic details of the study subjects (n=136).

Socio-demographic variables		Number (N)	%
A 000	13	78	57.4
Age	14	58	42.6
Sex	Male	87	64
	Female	49	36
Type of School	Government	90	66.2
	Private	46	33.8
Socio- economic	Upper and lower middle	42	30.9
status	Upper lower	48	35.3
(modified Kuppusamy classification)	Lower	46	33.8

In this study, it was found that among the 136 students, 78 (57.4%) students belong to the 13 years and 58 (42.6%) belong to the 14 years of age. 87 (64%) were males and 49 (36%) were females. 90 (66.2%) students belongs to the government school and 46 (33.8%) belongs to the private schools. According to modified Kuppusamy's scales classification, 42 (30.9%) students belongs to the upper and lower middle class, 48 (35.3%) students belongs to the

upper lower, 46 (33.8%) students belongs to the lower class. The socio-demographic details of the study subjects given in Table 1. In the Figure 1 shoes that the prevalence of dental caries was found to be 58.8%.

In this study, government school students 60 (66.7%) had more number of dental caries when compared to the private school students 20 (43.5%) and it was found to be

statistically significant p is 0.011. There is significant association between socio-economic status and dental caries, upper lower 26 (54.2%) and lower class 37 (80.4%) students had more number of dental caries when compared to upper and lower middle class students 17 (40.5%). From the above table 2 shows the details of association of dental caries and socio-demographic characteristics.

Table 2: Association of dental caries with socio-demographic characteristics of the study population (n=136).

Socio-demographic characteristics		Dental caries		Chi gayaya	P
		Present	Absent	Chi-square	value
		N (%)	N (%)		
Gender	Male	54 (62.1)	33 (37.9)	1.050	0.365
	Female	26 (53.1)	23 (46.9)	1.030	
Type of school	Government	60 (66.7)	30 (33.3)	- 6.758	0.011
	Private	20 (43.5)	26 (56.5)	0.738	
Socio-economic status	Upper and lower middle	17 (40.5	25 (59.5)	15 127	0.001
	Upper lower	26 (54.2)	22 (45.8)	15.137	0.001
	Lower	37 (80.4)	9 (19.6)		

Table 3: Association of dental caries with oral hygiene practices among the study population (n=136).

Oral hygiene practices	Dental caries		Chi assusses	P
	Present	Absent	Chi-square	value
	N (%)	N (%)		
Frequency of brushing				
Morning before meal (once a day)	70 (66.7)	35 (33.3)	11.699	0.01
Morning before meal and night after meal (twice a day)	10 (32.3)	21 (67.7)	11.099	
Brushing materials				
Toothpaste	68 (57.1)	51 (42.9)	2.026	.363
Toothpowder	10 (76.9)	3 (23.1)	2.026	
Neem stick and others	2 (50)	2 (50)		
Brushing technique				
Horizontal	60 (61.9)	37 (38.1)		<0.01
Vertical	15 (88.2)	2 (11.8)	18.274	
Both	5 (22.7)	17 (77.3)		
Rinsing after food				
Always	12 (32.4)	25 (67.6)		<.001
Sometimes	56 (65.9)	29 (34.1)	16.568	
Never	12 (85.7)	2 (14.3)		
Changing of brush				
Once in 3 months	17 (38.6)	27 (61.4)		0.004
Once in 6 months	15 (71.4)	6 (28.6)	11.041	
More than 6 months	48 (67.6)	23 (32.4)		
Duration of brushing				
<1 minute	35 (79.5)	9 (20.5)		<.001
1 minute	31 (72.1)	12 (27.9)	30.603	
2 minute	9 (36)	16 (64.0)		
>2 minute	5 (20.8)	19 (79.2)		

Independent variables	b P value			95% CI	95% CI	
		OR	Lower	Upper		
Duration of brushing						
<1 minute	2.666	<.001	14.382	4.086	50.615	
1 minute	2.139	0.001	8.494	2.524	28.586	
2 minutes	0.880	0.191	2.410	0.644	9.015	
>2 minutes	-	-	1			
Frequency of brushing		•			•	
Morning before meal (once a day)	1.222	0.013	3.395	1.294	8.905	
Morning before meal and night after food (twice a day)	-	-	1			

Table 4: Step wise logistic regression analysis of dental caries and oral hygiene practices among study subjects.

b: Regression co-efficient, OR: Odds ratio, CI: Confidence interval.

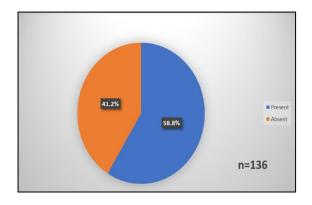


Figure 1: Prevalence of dental caries among study subjects (n=136).

There is significant association between frequency of brushing, brushing technique, rinsing of mouth after taking food, frequency changing of brush, duration of brushing and presence of dental caries (p<0.001). The details about association of dental caries and oral hygiene practices are given in the table 3.

From the given table 4 a stepwise, logistic regression analysis has been carried out, to find out the significant risk factors of dental caries among the children in the age group of 13 and 14 years. Gender, type of school, socio-economic status, frequency of brushing, brushing material, brushing technique, rinsing after food, frequency of changing of brushing, duration of brushing, all these variables are included as independent variables and the presence of dental caries as a dependent variable.

The analysis has been done for all variables. Among these variables, two variables that is duration of brushing and frequency of brushing has been identified as the most significant variable. The result indicates that, for the children who brush for a period <1 minute/day, the chance of dental caries is 14 times higher compared to the children brushing for >2 minute. For children who brush their teeth only once a day had a risk of dental caries 3.3 times higher than compared to children who are brush their teeth twice a day.

DISCUSSION

Dental caries stands third among chronic non-communicable diseases with 60 to 90% prevalence among school going children. Indian trends show increase in prevalence of dental caries over last five decades with prevalence of 50 to 60%.

In the present study, the overall prevalence of dental caries among the school going students aged 13 and 14 years was found to be 58.8% which is in concordance with the study by Khanal et al among 12-15 years aged children in which the prevalence of dental caries was 58.3%. Aparna et al in their study which was conducted among the school children aged between 5-16 years found that the prevalence of dental caries was 63.5%. Datta et al in their study which was conducted among the school children aged 13 and 14 years found that the prevalence of dental caries was 72%. Moses et al. reported that the prevalence of dental caries among the school children aged 12-15 years was 45%.

In the current study, the prevalence of caries teeth was found to higher among males (62%) than females (53%) and this difference was not significant. Similarly, Garkoti et al in their study reported that the overall prevalence of dental caries was higher among boys (60%) than girls (56%). The Karunakaran et al in their study reported that the prevalence of dental caries was 69.57% among boys and 61.5% among girls. Youseffi et al in their study found that the prevalence of caries was higher in boys (45.08%) than girls. Kotha et al found that the prevalence of dental caries was 75% in boys and 63% in girls. The increased prevalence of caries in the boys may be due to the marked preference for the sons, which manifest in preferential feeding compared to daughters and due to snacking habits. For the sons of the so

The prevalence of dental caries was found higher among government school children, that is, 67%, when compared to private school children, that is, 44% and this difference was found to be statistically significant. similarly, Ingle et al reported that the prevalence of dental caries was found higher among government school children, that is, 53%, when compared to private school children, that is, 47% and

this difference was found to be statistically significant.¹³ Malvania et al in their found that prevalence of dental caries was high among government school children (24%) when compared to private school 14%. The higher prevalence of dental caries among children in government schools could be due to lack of parental awareness/prioritization for healthcare, affordability issues, poor socio-economic status.¹⁴

Magnitude of dental caries was found to be higher among the lower class (80.4%) and upper lower class (54.2%) than among the lower and upper middle class (40.5%) and this difference is highly significant. Kotha et al in their study observed that maximum caries prevalence was noted in lower class (70%) followed by middle (20%) and upper class (10%). 15 Datta et al reported that 84.2% of the students belonging to the less income group had dental caries in comparison to 59.65% students in higher income group and this difference is statistically significant. 4 Sudha et al in their study found that the prevalence of caries in the low-socio economic group was higher (96.2%) than high socio economic group (77.1%). ¹⁶ The prevalence of dental caries was high in the low socioeconomic status because of their poor oral hygiene practices, lack of awareness, improper dietary intake.

In this study, it was found that individuals who brushed their teeth twice a day (32.3%) had lower prevalence of dental caries compared to those who brushed their teeth once a day (66.7%) and this difference is statistically significant (p<.001). Children with the habit of brushing their teeth once a day morning before food had 3 times more prone for developing dental caries than those children brushing their teeth twice a day (odds ratio (OR)-3.395, 95% confidence interval (CI) 1.294-8.905).

Tomar et al found that 55 children had dental caries who brushed their teeth once a day when compared to 27 children had dental caries who brushed their teeth morning before food and night after food and this difference is statistically significant. Parasuraman et al in their study found that found that those who brushed their teeth about twice/more than twice a day (20.2%) had lower prevalence of dental caries than those who brushed their teeth once a day (79.8%) and this difference is statistically significant. Kumar et al in their found that individuals who brushed their teeth more than once a day (19.44%) had lower prevalence of dental caries than those who brushed their teeth once a day (70.59%) and this difference is statistically significant. Statistically significant.

In general, oral hygienic practices like cleaning the teeth twice daily and cleaning after food intake will remove the food debris from oral cavity. This prevents the cariogenic bacteria from getting enough nutrients. There by reducing their acid production and preventing the development of dental caries.² The prevalence of dental caries was found to be low among those who washed their mouth always after each meal (32.4%) than those who washed their mouth sometimes (65.9%) and this difference is

significant. Datta et al, Gomathi et al also reported that the prevalence of dental caries was lower among children with habit of rinsing their mouth after every meal and this difference is significant.^{2,4}

In the present study, prevalence of dental caries was lower (22.7%) in children using both horizontal and vertical brushing techno when compared to children using only horizontal (61.9%) and only vertical (88.2%) and this difference is significant. Tomar et al in their study reported that 22% of the participants using correct brushing technique (both horizontal and vertical).¹⁷ Both vertical and horizontal bristle movement produced effective plaque removal.¹⁹

Proper tooth brushing technique along with tooth brush replacement at recommended intervals may help to protect the accumulation of plaque and reduce the prevalence of dental caries. In our study, prevalence of dental caries was low (38.6%) among children who changed their brush once in 3 months when compared to changing of brush for more than 3 months (71.4%). Satish et al, Alpesh et al in their study reported that lower percentage with regard to correct frequency of changing brush. This difference in practice may be a result of poor knowledge in oral hygiene. In the compared to the contract of the

Gallagher et al studied that oral health care professionals generally recommend at least 2 minutes brushing with an appropriate technique, and yet the average brushing time in the general population is closer to 45 seconds. ¹⁹ In our study, with reference to the duration of brushing the teeth, it was found that individuals who brushed their <1 and 1 minute/day had higher prevalence of dental caries than those who brushed their teeth 2 minutes and >2 minutes/day and this difference is statistically significant. Priya et al in their study reported that 45.30% of the subjects brushed their teeth for more than 2 minutes, while 41.90% brushed for at least 2 minutes. ²⁰

Limitations

The information regarding the duration of brushing and frequency of changing the brush were collected from the study subjects. The reliability of the data may be low, because of its subjective nature. Being a convenient sample, the generalisation of the result should be carried out with proper care.

CONCLUSION

The prevalence of dental caries was found to be 58.2%. There is statistically significant association between type of school, socio-economic status, oral hygiene practices like frequency of brushing, brushing technique, duration of brushing, frequency of changing the brush and dental caries. Dental caries is a major public health problem among school children. The disease burden can be alleviated by creating awareness through health education on oral hygiene practices. Active involvement of both

school teacher and parents is mandatory for promoting oral health and preventing oral morbidities among school children. Regular screening programmes should be conducted in schools for early diagnosis and prompt treatment.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

REFERENCES

- Arunkumar M, Gopalakrishnan S, R UD. Prevalence and determinants of dental caries among primary school children in urban area of Kancheepuram district, Tamil Nadu: a cross sectional study. Int J Community Med Pub Health. 2019;6(5):2108-15.
- 2. Parasuraman G, Gowtham Krishna Y, Kaviya M, Jain NA, Rajendran P, Dutta R. A study on the prevalence of dental caries among the school-going children in Tamil Nadu. Int J Community Med Public Heal. 2017;4(10):3582.
- Sugar and dental caries. World Health Organization; 2017.
 - Https://www.who.int/oral_health/publications/sugar s-dental-caries-keyfacts/en/2017. Accessed on
- 4. Pratyay Pratim Datta PD. Prevalence of Dental Caries among School Children in Sundarban, India. Epidemiol Open Access. 2013;03:04.
- Sugars and dental caries. 2017. Https://www.who.int/nutrition/publications/nutrientr equirements/sugars-dental-caries-keyfacts/en/. Accessed on
- Moses J, Rangeeth BN, Gurunathan D. Prevalence of dental caries, socio-economic old school going children of chidambaram status and treatment needs among 5 to 15 year old school going children of chidambaram. J Clin Diagnostic Res. 2011;5(1):146-51.
- 7. Jyotsna S, Khan SA. Prevalence and risk factors of dental caries among school children from a low socio economic locality in Hyderabad, India. International journal of scientific research. 2019;(10):47-8.
- 8. Khanal S, Acharya J. Dental caries status and oral health practice among 12-15 years old children in Jorpati, Kathmandu. Nepal Med Coll J. 2014;16(1):84-7.
- 9. Aparna MSS, Thomas THV. Assessment of dental caries experience among 5-16 years old school going children of Mangalore, Karnataka, India: A cross-sectional study. Ann Essence Dent. 2018;10:2.
- Garkoti PD, Singh RK, Rawat SP. Prevalence of Dental Caries among Primary School Children of

- Haldwani: A Cross Sectional Study. J Evol Med Dent. 2015;4(41):7096-100.
- 11. Karunakaran R, Somasundaram S, Gawthaman M, Vinodh S, Manikandan S, Gokulnathan S. Prevalence of dental caries among school-going children in Namakkal district: A cross-sectional study. J Pharm Bioallied Sci. 2014;6(1):160-1.
- 12. Mohammadi SN, Prashant GMN, Kumar PG, Sushanth VHIM. Dental caries status in 6–14-yearold schoolchildren of rural Channagiri, Davangere: A cross-sectional survey. J Indian Assoc Public Heal Dent. 2015;13:389-92.
- 13. Ingle NA, Dubey HV, Kaur NGR. Prevalence of dental caries among school children of Bharatpur city, India. J Int Soc Prev Communit Dent. 2014;4:52-5.
- 14. Kabasi S, Tangade P, Pal SSA. Dental caries and oral health behavior in 12-year-old schoolchildren in Moradabad city, Uttar Pradesh, India. J Indian Assoc Public Heal Dent. 2014;12:167-72.
- Kotha A, Kumar YV, Rekha CB, Sree YS, Pratibha BBA. Prevalence of Dental Caries and its Relation with Socio- Economic Status in School Children. J Adv Med Dent Scie Res. 2017;5(10):86-9.
- 16. Sudha P, Bhasin S, Anegundi R. Prevalence of dental caries among 5-13-year-old children of Mangalore city. J Indian Soc Pedod Prev Dent. 2005;23(2):74-9.
- 17. Tomar S, Kasar P, Tiwari R. Study of oral hygienic practices and oral health status among school children in Jabalpur, Madhya Pradesh: a cross-sectional study. Int J Community Med Public Heal. 2016;3(2):403-7.
- 18. Anjum Y, Ambrina Q. Tooth brush changing frequency and associated socio-demographic and oral hygiene factors among residents of Karachi. J Dent Oral Hyg. 2016;8(2):4-11.
- 19. Creeth JE, Gallagher A, Sowinski J, Bowman J, Barrett K, Lowe S, et al. The effect of brushing time and dentifrice on dental plaque removal in vivo. J Dent Hyg. 2009;83(3):111-6.
- 20. Amarlal D, Devdas K, Priya M, Venkatachalapathy A. Oral health attitudes, knowledge and practice among school children in Chennai, India. J Educ Ethics Dent. 2013;3(1):26:1-5.

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