

Original Research Article

Prevalence of dental caries and other oral health problems among municipal secondary school children in Mumbai metropolitan region

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ABSTRACT

Background: Dental caries and other oral health issues are major public health problems among school going children. This study is conducted to assess the prevalence of dental caries, other oral health problems and some oral hygiene practices among municipal secondary school children in an urban area.

Methods: The present study was conducted among randomly selected 152 students studying in a Municipal Secondary School in an urban area. They were examined for dental caries and other oral health problems. Also, they were asked about the oral hygiene practices. Data was entered in Google form. Obtained data was entered in a MS-Excel spreadsheet and statistical analysis was done using Chi-square test.

Results: Of the 152 subjects examined, 137 (90.13%) were having one or more oral health problems. 74 (48.68%) subjects were having dental caries. Of the 137 subjects having oral health problems, 132 (86.84%) subjects' fathers' education and 135 (88.82%) subjects' mothers' education was $\leq 12^{\text{th}}$ standard ($p < 0.05$). Of the 77 subjects studying in 5^{th} to 7^{th} standard, 45 (29.61%) were suffering from dental caries ($p < 0.05$). Of the 140 subjects whose fathers' education was $\leq 12^{\text{th}}$ standard, 73 (48.03%) were suffering from dental caries ($p < 0.05$). Of the 74 (48.68%) subjects who were suffering from dental caries 24 (15.79%) and of the 78 (51.32%) who were not suffering from dental caries 35 (23.03%) were brushing their teeth for more than 2 minutes.

Conclusions: School health services should be strengthened to detect and treat oral health problems in time as well as to increase general oral health awareness among school children.

Keywords: Dental caries, Oral health, School children

INTRODUCTION

Dental caries is one of the leading health problems in school going children. It is a public health problem in developing countries like India. The problem is dreadful among school children particularly of lower socio-economic status. The WHO has recognized dental caries as a pandemic and reported its prevalence among school children to range from 60-90%.¹ Dental caries, or Tooth decay, is an infectious process involving breakdown of the tooth enamel. Children are susceptible to caries as soon as the first teeth appear, which usually occurs

around age 6 months.² Suganya et al observed that the Erode district of Tamil Nadu has the highest prevalence of dental caries at 89.30%.⁴ Dental health in school going children is a major issue of concern that affects their general health and overall wellbeing. Dental health problems hamper child's involvement in activities such as eating, playing, socializing, speaking and concentrating ability, due to which children are not able to perform to the full potential.⁵ Oral diseases is the second most common illness on the planet. The consequences of poor oral hygiene can begin with discomfort and pain, but can lead to life-threatening illnesses.⁶

90% of the school going children have been affected by dental caries, so it is considered as the most common global oral health burden. Epidemiological studies are essential for monitoring trends in dental caries and for assessing the dental needs among school going children. Tooth decay is a common dental morbidity, which occurs during childhood and continues to be a major public health problem. This dental health issue is associated with oral hygiene practice, sugar consumption and implementation of dental health program.⁷ Miller WD in 1883 laid foundation of diagnosing dental caries and described bacterial involvement in dental caries development. Though centuries have passed, development in the dental field has evolved mankind and is yet to achieve a significant reduction in dental caries and other oral health problems. In 1993 Shafer defined dental caries as an irreversible 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, which often leads to cavitation.⁸

Oral health is one of the key indicators of overall health, well-being and quality of life. It affects students physically and psychologically as well as influences how they grow, look, speak, chew, taste food and socialize in the community. Oral and dental diseases are preventable to a larger extent. However, information and awareness about the preventive aspects of oral and dental health are usually not applied in day-to-day practice. India has an alarming population with Oro-dental problems. Poor oral hygiene and dental caries constitute more than 50% of major public oral-health problem among children and adolescents.⁹ Dental and other oral health problems are one of the leading problems among school children. Oral hygiene is an essential component for prevention of dental diseases. Konwar et al in their study in Ranchi, Jharkhand, observed 53% of the students had an average level of knowledge regarding oral hygiene which is very much important for prevention and control of dental caries and other oral health problems.¹⁰ Taking into consideration, the present study was undertaken to assess the prevalence of dental caries, status of oral health and oral hygiene practices among municipal secondary school going children in Mumbai Metropolitan Region.

METHODS

The present descriptive cross-sectional study was conducted among students studying in a Municipal Secondary School in an urban area in the month of March, 2023. The sample size was estimated considering 89.30% prevalence of dental caries among school children in Tamil Nadu observed by Suganya et al in their study.⁴ 152 students studying in 5th standard to 10th standard aged 09 to 17 years were selected by simple random sampling technique as subjects for the study. Consent was obtained from the parents of the selected subjects. Permission from the school authority was already obtained for the study. The subjects were

examined for dental caries and other oral health problems. They were asked about the oral hygiene practices also. Socio-demographic characteristics of the subjects were recorded. Data was entered in Google form which was already designed. Obtained data was entered in a MS-Excel spreadsheet and statistical analysis was done using Chi-square test for categorical data. Mean, median, range, standard deviation and proportions of the variables were calculated. The Data is represented by tables. Results of the present study were compared with other similar studies conducted in urban and rural India. The subjects with dental caries and other oral health problems were referred to nearest tertiary health care hospital.

RESULTS

Total 152 municipal secondary school students were examined for dental caries and other oral health problems in an urban area, of which 80 (52.63%) were male students and 72 (47.37%) were female students. 76 (50.00%) subjects were in the age group of 09 to 12 years while 76 (50.00%) were belonged to the age group of 13 to 17 years. The mean, median, standard deviation and range of the age of the subjects is 12.33, 12.5, 1.68 and 09 to 17 years respectively. For the boys, the mean, median, standard deviation and range of the age is 12.34, 13, 1.69 and 09 to 17 years and while for the girls it is 12.33, 12, 1.69 and 09 to 17 years respectively. 77 (50.66%) subjects were in 5th to 7th standard while 75 (49.34%) were in 8th to 10th standard. 137 (90.13%) subjects' family income was ≤Rs.20,000 per month while 15 (09.87%) subjects' family income was >Rs.20,000 per month. 140 (92.11%) subjects' fathers' education was ≤12th standard, 09 (05.92%) was >12th standard and 03 (01.97%) subjects' fathers were no more. 148 (97.37%) subjects' mothers' education was ≤12th standard, 04 (02.63%) was >12th standard. 148 (97.37%) subjects' fathers were employed, 01 (0.66%) was unemployed and 03 (01.97%) were no more. 41 (26.97%) subjects' mothers were employed while 111 (73.03%) subjects' mothers were home makers (Table 1).

Of the 152 subjects, 137 (90.13%) were having one or more oral health problems. 29 (19.08%) subjects have given history of dental treatment. 23 (15.03%) subjects were having current dental symptoms. 74 (48.68%) subjects were having dental caries. 12 (07.89%) were having problem of bleeding gums and 12 (07.89%) were having ulcers on buccal mucosa. The distribution of various oral health problems among the subjects is shown in Table 2.

Of the 76 subjects in the age group of 09 to 12 years, 44 (28.95%) were suffering from dental caries ($p < 0.05$). Of the 77 subjects studying in 5th to 7th standard, 45 (29.61%) were suffering from dental caries ($p < 0.05$). Of the 140 subjects whose fathers' education was ≤12th standard, 73 (48.03%) were suffering from dental caries ($p < 0.05$) (Table 3). Of the 137 subjects having oral health problems, 132 (86.84%) subjects' fathers' education and

135 (88.82%) subjects' mothers' education was $\leq 12^{\text{th}}$ standard ($p < 0.05$) (Table 4).

Table 1: Socio-demographic characteristics of the subjects (n=152).

Socio-demographic variables		Total students (152)		Male (80)		Female (72)	
		n	%	n	%	n	%
Age in years	9 to 12	76	50.00	37	46.25	39	54.17
	13 to 17	76	50.00	43	53.75	33	45.83
Standard/class	5 to 7	77	50.66	38	47.50	39	54.17
	8 to 10	75	49.34	42	52.50	33	45.83
Monthly income (Rs)	≤ 20000	137	90.13	70	87.50	67	93.06
	> 20000	15	09.87	10	12.50	05	06.94
Father's education	$\leq 12^{\text{th}}$ Std	140	92.11	75	93.75	65	90.28
	$> 12^{\text{th}}$ Std	09	05.92	04	05.00	05	06.94
	Expired	03	01.97	01	01.25	02	02.78
Mother's education	$\leq 12^{\text{th}}$ Std	148	97.37	79	98.75	69	95.83
	$> 12^{\text{th}}$ Std	04	02.63	01	01.25	03	04.17
Father's employment status	Employed	148	97.37	78	97.50	70	97.22
	Unemployed	01	0.66	01	01.25	00	00.00
	Expired	03	01.97	01	01.25	02	02.78
Mother's employment status	Employed	41	26.97	15	18.78	26	36.11
	Home Maker	111	73.03	65	81.25	46	63.89

Table 2: Distribution of dental caries and other oral health problems among the subjects (n=152).

Oral health problems		Total students (152)		Male students (80)		Female students (72)	
		n	%	n	%	n	%
History of dental treatment	Yes	29	19.08	14	17.50	15	20.83
	No	123	80.92	66	82.72	57	79.17
Current dental symptoms	Yes	23	15.03	12	15.00	11	15.28
	No	129	84.87	68	85.00	61	84.72
Missing teeth	Yes	61	40.13	28	35.00	33	45.83
	No	91	59.87	52	65.00	39	54.17
Broken teeth	Yes	18	11.84	10	12.50	08	11.11
	No	134	88.16	70	87.50	64	88.89
Dental braces	Yes	03	01.97	02	02.50	01	01.39
	No	149	98.03	78	97.50	71	98.61
Dental caries	Yes	74	48.68	38	47.50	36	50.00
	No	78	51.32	42	52.50	36	50.00
Extra teeth	Yes	11	07.24	08	10.00	03	04.17
	No	141	92.76	72	90.00	69	95.83
Staining and mottling of teeth	Yes	08	05.26	07	08.75	01	01.39
	No	144	94.74	73	91.25	71	98.61
Bad breath	Yes	03	01.97	03	03.75	00	00.00
	No	149	98.03	77	96.25	72	100.00
Gingivitis	Yes	03	01.97	02	02.50	01	01.39
	No	149	98.03	78	97.50	71	98.61
Bleeding gums	Yes	12	07.89	07	08.75	05	06.94
	No	140	92.11	73	91.25	67	93.06
Stomatitis	Yes	01	00.66	01	01.25	00	00.00
	No	151	99.34	79	98.75	72	100.00
Ulcers on buccal mucosa	Yes	12	07.89	05	06.25	07	09.72
	No	140	92.11	75	93.75	65	90.28
Status of tongue	Coated	12	07.89	08	10.00	04	05.56
	Ulcer	02	01.32	00	00.00	02	02.78
	Normal	138	90.79	72	90.00	66	91.67

Table 3: Prevalence of dental caries among the subjects (n=152).

Dental caries		Yes (%)	No (%)	Total (%)	P value
		74 (48.68)	78 (51.32)	152 (100.00)	
Age in years	09-12	44 (28.95)	32 (21.05)	76 (50.00)	0.02309
	13-17	30 (19.74)	46 (30.26)	76 (50.00)	
Sex	Male	38 (25)	42 (27.63)	80 (52.63)	0.75816
	Female	36 (23.68)	36 (23.68)	72 (47.37)	
Standard	5 to 7	45 (29.61)	32 (21.05)	77 (50.66)	0.01474
	8 to 10	29 (19.08)	46 (30.26)	75 (49.34)	
Income	≤ 20000	70 (46.05)	67 (44.08)	137 (90.13)	0.07233
	>20000	04 (02.63)	11 (07.24)	15 (09.87)	
Education of father	≤ 12 th Std	73 (48.03)	67 (44.08)	140 (92.11)	0.01701
	> 12 th Std	01 (00.66)	08 (05.26)	09 (05.92)	
Education of mother	≤ 12 th Std	72 (47.37)	76 (50.00)	148 (97.37)	0.95745
	> 12 th Std	02 (01.32)	02 (01.32)	04 (02.63)	
Occupation of father	Employed	73 (48.03)	65 (42.76)	148 (97.37)	
	Unemployed	01 (00.66)	00 (00.00)	01 (00.66)	
Occupation of mother	Employed	20 (13.16)	21 (13.82)	41 (26.97)	0.98849
	Home Maker	54 (35.53)	57 (37.50)	111 (73.03)	

Table 4: Prevalence of oral health problems among the subjects (n=152).

Oral health problems		Yes (%)	No (%)	Total (%)	P value
		137 (90.13)	15 (09.87)	152 (100.00)	
Age in years	09-12	70 (46.05)	06 (03.95)	76 (50.00)	0.41456
	13-17	67 (44.08)	09 (05.92)	76 (50.00)	
Sex	Male	71 (46.71)	09 (05.92)	80 (52.63)	0.54716
	Female	66 (43.42)	06 (03.95)	72 (47.37)	
Standard	5 to 7	71 (46.71)	06 (03.95)	77 (50.66)	0.38449
	8 to 10	66 (43.42)	09 (05.92)	75 (49.34)	
Monthly income (Rs)	≤ 20000	125 (82.24)	12 (07.89)	137 (90.13)	0.16579
	> 20000	12 (07.89)	03 (01.97)	15 (09.87)	
Education of father	≤ 12 Std	132 (86.84)	08 (05.26)	140 (92.11)	0.00001
	> 12 Std	02 (01.32)	07 (04.61)	09 (05.92)	
Education of mother	≤ 12 Std	135 (88.82)	13 (08.55)	148 (97.37)	0.00638
	> 12 Std	02 (01.32)	02 (01.32)	04 (02.63)	
Occupation of father	Employed	133 (89.86)	15 (10.14)	148 (99.32)	
	Unemployed	01 (00.68)	00 (00.00)	01 (00.68)	
Occupation of mother	Employed	37 (24.34)	04 (02.63)	41 (26.97)	0.97749
	Home Maker	100 (65.79)	11 (07.24)	111 (73.03)	

Table 5: Oral hygiene practices among the subjects (n=152).

Oral hygiene practices		Total students (152)		Male students (80)		Female students (72)	
		n	%	n	%	n	%
Frequency of brushing teeth	Once a day	83	54.61	52	65.00	31	43.06
	Twice a day	63	41.45	23	28.75	40	55.56
	Thrice a day	06	03.95	05	06.25	01	01.39
Material used to clean the teeth	Brush and toothpaste	151	99.34	79	98.75	71	98.61
	Brush and tooth powder	01	00.66	01	01.25	01	01.39
Duration of brushing teeth	< 1 min	08	05.26	06	07.50	02	02.78
	1 min	21	13.82	10	12.50	11	15.28
	2 mins	56	36.84	29	36.25	27	37.50
	More than 2 mins	59	38.82	30	37.50	29	40.28
	Not sure	08	05.26	05	06.25	03	04.17

Total 83 (54.61%) subjects were brushing teeth once a day, 151 (99.34%) were using brush and toothpaste to clean the teeth and 59 (38.82%) were brushing teeth for more than two minutes (Table 5). Of the 74 (48.68%) subjects who were suffering from dental caries 39 (25.66%) while of the 78 (51.32%) who were not suffering from dental caries 44 (28.95%) were brushing their teeth once a day. Of the 74 (48.68%) subjects who were suffering from dental caries 73 (48.03%) and all the

78 (51.32%) who were not suffering from dental caries were using brush and toothpaste to clean the teeth. Of the 74 (48.68%) subjects who were suffering from dental caries 24 (15.79%) and of the 78 (51.32%) who were not suffering from dental caries 35 (23.03%) were brushing their teeth for more than 2 minutes. 06 (03.95%) subjects were brushing their teeth thrice a day, of which 05 (03.29%) were suffering from dental caries. This may be because of their dental health problem (Table 6).

Table 6: Correlation between oral hygiene practices and dental caries (n=152).

Characteristics		Dental caries			P value
		Yes	No	Total	
		74 (48.68)	78 (51.32)	152 (100.00)	
Frequency of brushing teeth	Once a day	39 (25.66)	44 (28.95)	83 (54.61)	0.22229
	Twice a day	30 (19.74)	33 (21.71)	63 (41.45)	
	Thrice a day	05 (03.29)	01 (00.66)	06 (03.95)	
Material used to clean the teeth	Brush and toothpaste	73 (48.03)	78 (51.32)	151 (99.34)	
	Brush and tooth powder	01 (00.66)	00 (00.00)	01 (00.66)	
Duration of brushing teeth	< 1 min	02 (01.32)	06 (03.95)	08 (05.26)	0.13225
	1min	11 (07.24)	10 (06.58)	21 (13.82)	
	2 min	34 (22.37)	22 (14.47)	56 (36.84)	
	More than 2 mins	24 (15.79)	35 (23.03)	59 (38.82)	
	Not sure	03 (01.97)	05 (03.29)	08 (05.26)	

DISCUSSION

Datta et al observed, 72% overall prevalence of dental caries in their study in a rural high school in a hard-to-reach area of Sundarbans, West Bengal.¹ The prevalence of dental caries was significantly higher among students belonging to families having less per capita income. The prevalence was significantly lower among students who had brushing habits twice a day as compared to those having brushing habits once daily or not every day.¹ In the present study conducted in urban area, 74 (48.68%) subjects were suffering from dental caries and majority of them were studying in 5th to 7th standard ($p < 0.05$). In the present study, of the 140 subjects whose fathers' education was $\leq 12^{\text{th}}$ standard, 73 (48.03%) were suffering from dental caries ($p < 0.05$). The study conducted by Ghosh et al in adult population in Bihar, revealed that 70.90%, 30.90%, and 36.40% of the study subjects had dental caries, periodontitis and bleeding gums respectively.³ Reddy et al observed 77.41% prevalence of dental health problems among school children in Telangana.⁵ In the present study conducted in municipal secondary school in urban area, of the 152 subjects, 137 (90.13%) were having one or more oral health problems.

Sonavane et al observed, out of 300 students screened 112 (37.33%) students aged ten years were having oral health problems.⁶ Out of 300 students 18% had carious teeth and 67.67% were brushing their teeth once a day. A

significant relationship was found between the frequency of brushing and the oral health problems faced by the students. Out of 235 students who were having oral health problems, 80.43% did not visit the dentist for regular check-ups.⁶ In the present study in urban area, 83 (54.61%) subjects were brushing teeth once a day, 151 (99.34%) were using brush and toothpaste to clean the teeth and 59 (38.82%) were brushing teeth for more than two minutes.

Aranganal et al observed 68.8% prevalence of dental caries among the total surveyed school children in Chennai.⁷ They observed slightly higher prevalence of dental caries among girls than boys. Karunakaran et al in their study in Namakkal district observed 65.88% prevalence of dental caries among school-going children.⁸ They observed higher prevalence of dental caries among boys (69.6%) than in girls (61.5%). In this study the untreated decay teeth accounted for 92.4%. Nidhi Shree et al in their study in Hooghly district, West Bengal observed 86% of the students had self-reported unsatisfactory oral hygiene practice and 55.6% students had poor oral health.⁹ They also observed that males had better oral health and practice scores than females.

This study has some limitations. The study was conducted on working days. So, majority of the parents of the subjects could not remain present at the time of study. Some valuable information of many subjects might have missed due to this.

CONCLUSION

In the present study it is observed that 90.13% subjects were having one or more oral health problems. 48.68% subjects were having dental caries. Oral and dental health plays an important role in the overall well-being of children, their quality of life and performance at school. Creating awareness among the school children and their parents as well as teachers about oral hygiene may help to tackle the dental and other oral health problems in secondary school going children. A comprehensive community focused oral health care intervention that includes oral health education at homes and the strengthening of school health programs is needed to improve the oral health status of the students in urban area.

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