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S Kumar
J Panwar
A vyas
J Sharma
B Goutham
P Duraiswamy
S Kulkarni

Tooth cleaning frequency in relation to socio-demographic variables and personal hygiene measures among school children of Udaipur district, India

Authors' affiliations:
Santhosh Kumar, *Jitendra Panwar*, *Anupam vyas*, *Balsubramanya Goutham*, *Prabu Duraiswamy*, *Suhas Kulkarni*, Department of Preventive and Community Dentistry, Darshan Dental College and Hospital, Rajasthan, India
Jyothi Sharma, Department of Oral medicine and Radiology, Darshan Dental College and Hospital, Rajasthan, India

Correspondence to:
Dr *Santhosh Kumar Tadakamadla*
Department of Preventive and Community Dentistry
Darshan Dental College and Hospital
313001 Udaipur
Rajasthan
India
Tel.: +91 9928714533
Fax: +91 2942452273
E-mail: santosh_dentist@yahoo.com

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Kumar S, Panwar J, vyas A, Sharma J, Goutham B, Duraiswamy P, Kulkarni S. Tooth cleaning frequency in relation to socio-demographic variables and personal hygiene measures among school children of Udaipur district, India.

Abstract: *Objective:* The aim of the study was to determine if frequency of tooth cleaning varies with social group, family size, bedtime and other personal hygiene habits among school children. *Methods:* Target population comprised schoolchildren aged 8–16 years of Udaipur district attending public schools. A two stage cluster random sampling procedure was executed to collect the representative sample, consequently final sample size accounted to 852 children. Data were collected by means of structured questionnaires which consisted of questions related to oral hygiene habits including a few general hygiene habits, bed time, family size, family income and dental visiting habits. *Results:* The results show that 30.5% of the total sample cleaned their teeth twice or more daily and there was no significant difference between the genders for tooth cleaning frequency. Logistic regression analysis revealed that older children and those having less than two siblings were more likely to clean their teeth twice a day than the younger ones and children with more than two siblings. Furthermore, frequency of tooth cleaning was significantly lower among children of parents with low level of education and less annual income as compared with those of high education and more annual income. In addition, tooth cleaning habits were more regular in children using tooth paste and regularly visiting to the dentist. *Conclusions:* This study observed that tooth cleaning is not an isolated behaviour, but is a part of multifarious pattern of various social and behavioural factors.

Key words: family size; oral hygiene; personal hygiene

Introduction

Tooth brushing is the most common oral hygiene measure and daily tooth brushing has for many years been the major irrevocable dental health education message given to both children and adults (1). When performed well for an adequate duration of time, tooth brushing is highly effective in maintaining good oral hygiene (2).

It is considered as the most reliable means of controlling plaque, provided cleaning is sufficiently thorough and performed at regular intervals (3).

Furthermore, it is now revealed that the daily use of fluoridated toothpastes, preferably twice a day, was considered to be the most important single factor by most experts for global reduction in dental caries (4).

While evidence seems to accumulate that the proportion of children who brush at least once per day is increasing (5) there still exist high proportions who do not brush regularly.

Tooth brushing is a simple and effective means of plaque control and people who brush their teeth frequently have less plaque than those who brush less frequently or only occasionally (1, 6).

Though the traditional conception has been that tooth should be brushed twice a day (7), it has been proposed that complete removal of plaque every second day is compatible with maintenance of gingival health and preventing dental disease (5, 8).

To promote toothbrushing frequency particularly among irregular brushers, it is necessary to understand the factors which govern tooth brushing and identify social and behavioural factors associated with tooth brushing behaviour.

Certain social and demographic factors have previously been shown to influence toothbrushing behaviour and it is that behaviour which could moderate the relationship between socio economic status and caries prevalence. In addition to social influences, studies have reported that gender appears to be especially important in that females brush their teeth more often than males (9, 10). Furthermore, adolescents who brush their teeth more than once a day at the age of 12 years are more stable in their behaviour through the adolescent years than those who brush their teeth less often (1).

Socioeconomic differences have consistently been associated with the oral health habits including tooth brushing and consumption of sweet snacks (1, 11).

Macgragor and Balding (10), however, reported other factors which significantly influenced tooth brushing behaviour such as frequency of bathing, use of deodorant, washing the hair and washing the hands.

Little is known about the oral health behaviour of children in Asian countries and to our knowledge no information is available on the tooth cleaning behaviour of children and its influential factors.

Hence this study was undertaken to determine how frequency of tooth cleaning varies with social group, family size, bedtime and other personal hygiene habits among school children of Udaipur district.

Study population and methodology

Target population comprised schoolchildren aged 8–16 years of Udaipur district attending public schools. A two stage cluster random sampling procedure was executed to collect the representative sample. At first stage, four subdivisions were randomly selected of a total of seven subdivisions in Udaipur district. Subsequently, at a later stage two schools were selected from each subdivision randomly. Thus a total of eight schools were selected from the district. All the students of the selected schools between the ages 8–16 years were included in the study. Consequently, the final sample size of the study accounted to 852 children, of whom 539 were males and for each gender there was little variation between the parents occupation and education status.

The exclusion criterion comprised children who were unwilling to participate and those who partly filled the questionnaires.

Data were collected by means of structured questionnaires which consisted of questions related to oral hygiene habits including a few general hygiene habits, bed times, family size and dental visiting habits. All the questions were in forced choice format in which subjects selected one response from a provided list of options. Additionally, all the subjects were asked to record their age and gender in the questionnaire.

Parent's education level, family income and occupation were retrieved from the school records. The questions were originally designed in English and then translated in to local language, Hindi. Prior to data collection, the questionnaire was pretested on 100 children attending a school in one subdivision to assess the validity of the questionnaire. Data obtained from the pretest were not included in the study results.

Questionnaires were administered in the class rooms by one of the author (SK) and the questions were read aloud by the examiner giving time for children to fill in the questionnaires and ask doubts.

School staff was placed under an obligation not to enter the class rooms where pupils filled the questionnaire as students tend to answer the questionnaire in favour of socially

acceptable behaviour. Pupils were also informed that their teachers would not look at the scripts and they would be processed away from the school.

The questionnaire was reintroduced to 122 students in four schools, the test-retest time ranged from 8 days to 15 days. The reliability of the questionnaire based on the kappa agreement ranged from 83% to 98% with the highest agreement being for the question on tooth cleaning frequency whereas the lowest was for bed times.

Data were entered into Microsoft excel sheet and was analysed using SPSS (statistical package for social sciences) version 15.0. (SPSS Inc., Chicago, IL, USA).

Chi-squared test was used for comparison of proportions and logistic regression analysis was conducted to assess the influence of various independent variables that were included in the questionnaire.

To facilitate binomial logistic regression analysis tooth cleaning frequency was dichotomized into once or less and twice or more. All the independent variables were included in the analysis and the odds ratio was calculated for each independent variable after controlling for the effect of all other variables. The independent variables included were: age, gender, occupation and education of parents, number of siblings, mode and material used for tooth cleaning, bed times, parents tooth cleaning frequency, type of brush used, dental visiting habits, frequency of sugar consumption, bathing habits, family type and presence of smokers in family.

Results

A total of 852 scripts were analysed, among which 22 were rejected as they were either incomplete or with more than one response selected. Age of the subjects ranged from 8 to 16 years and pupils belonging to the age group 11–13 years constituted a major proportion of the total sample.

The result of this study showed that 30.5% of the total sample brushed twice or more daily and statistical analysis revealed no significant differences between the genders for tooth cleaning frequency, though it was observed that greater percentage (57.6%) of males cleaned more than twice in comparison with females (54.0%) (Table 1).

As shown in Table 2, 64.6% of male children whose parents were in Government service or in professional jobs cleaned their teeth twice or more daily in contrary to 52.9% and 45.3% children whose parents belonged to business and other categories respectively.

There was a significant difference between the male children in terms of father's occupation whereas there was no

Table 1. **Tooth cleaning frequency among school children of Udaipur district according to gender and age group**

Age (years)	Never *n* (%)	Once *n* (%)	≥Twice *n* (%)	Occasionally *n* (%)	Total *n* (%)
8–10	0 (0)	58 (16.8)	104 (30.1)	184 (53.2)	346 (100)
11–13	1 (0.002)	51 (10.6)	149 (31.2)	279 (58.2)	480 (100)
14–16	0 (0)	6 (23.1)	7 (26.9)	13 (50.0)	26 (100)
$\chi^2 = 9.449$, $P = 0.150$.					
Gender					
Male	1 (0.001)	207 (38.5)	310 (57.6)	21 (3.9)	539 (100)
Female	0 (0)	139 (44.4)	169 (54.0)	5 (1.6)	313 (100)

$\chi^2 = 6.204$, $P = 0.102$.

Table 2. **Tooth cleaning frequency distribution of study subjects according to father's occupation**

Gender	Parent occupation	Never *n* (%)	Once *n* (%)	≥Twice *n* (%)	Occasionally *n* (%)	Total *n* (%)
Male	Government service and professionals	1 (0.4)	84 (33.1)	164 (64.6)	5 (2)	254 (100)
	Business	0 (0)	94 (42.5)	117 (52.9)	10 (4.5)	221 (100)
	Others	0 (0)	29 (45.3)	29 (45.3)	6 (9.4)	64 (100)
$\chi^2 = 17.015$, $P = 0.009$.						
Female	Government service and professionals	0 (0)	84 (49.4)	85 (50)	1 (0.6)	170 (100)
	Business	0 (0)	47 (40.5)	67 (57.8)	2 (1.7)	116 (100)
	Others	0 (0)	8 (29.6)	17 (63.0)	2 (7.4)	27 (100)

$\chi^2 = 10.692$, $P = 0.3030$.

Table 3. **Tooth cleaning frequency of the school children distribution in relation to number of siblings**

Number of siblings	Never *n* (%)	Once *n* (%)	≥Twice *n* (%)	Occasionally *n* (%)	Total *n* (%)
0–1	0 (0)	9 (27.3)	24 (72.7)	0 (0)	33 (100)
2–4	1 (0.2)	238 (41.9)	309 (54.4)	20 (3.5)	568 (100)
>4	0 (0)	99 (39.4)	146 (58.2)	6 (2.4)	251 (100)

$\chi^2 = 6.143$, $P = 0.407$.

Table 4. **Tooth cleaning frequency according to bed times among 8–16 years old school children**

Tooth cleaning frequency	21–22 h *n* (%)	22–24 h *n* (%)	24 > h *n* (%)	Others *n* (%)	Total *n* (%)
Never	0 (0)	0 (0)	1 (100)	0 (0)	1 (100)
Once	138 (39.9)	170 (49.1)	23 (6.6)	15 (4.3)	346 (100)
Twice	245 (51.1)	192 (40.1)	34 (7.1)	6 (1.3)	479 (100)
Occasionally	11 (42.3)	12 (46.2)	1 (3.8)	2 (7.7)	26 (100)

$\chi^2 = 34.338$, $P = 0.001$.

influence of father's occupation on tooth cleaning frequency in girls.

It is evident from Table 3 that greater proportion of children who had no sibling or only one sibling tended to clean their teeth twice or more daily (72.7%) than those children who had more than one sibling, though statistical analysis revealed no significant differences.

Chi-squared analysis revealed significant differences for tooth cleaning frequency in relation to bed times as shown in Table 4. Children who cleaned their teeth twice or more daily (51.1%) went to bed earlier than those who cleaned their teeth less often (39.9%). A definite trend was observed with frequency of subjects cleaning their teeth twice or more daily decreasing as the bed times increased.

Logistic regression analysis was employed to determine the effect of various independent variables on the tooth cleaning frequency and the results of logistic regression revealed that age, education of parents, annual income, number of siblings, mode of cleaning teeth, dental visiting habits, bed times, parent's tooth cleaning frequency and bathing habits were the independent variables that were significantly related to tooth cleaning frequency (Table 5). Older children and those having less than two siblings were more likely to clean their teeth twice or more a day than the younger ones and children with more than two siblings. Furthermore, frequency of tooth cleaning was significantly lower among children of parents with low level of education and less annual income as compared with those of high education and more annual income. In addition, tooth cleaning habits were more regular in children using tooth paste and regularly visiting to the dentist.

Frequent tooth cleaning was also associated with parents tooth cleaning frequency.

Discussion

The major strengths of the study were enough sample size and the sample selected was representative of school children of Udaipur district in terms of age, sex, education and geographic location. Moreover, among a total of 852 scripts only 22 scripts were rejected as they were incomplete and to limit socially acceptable responses from students, the school staff were not allowed to enter the class room. However, the data obtained were solely based on subjective responses. Age of the subjects ranged from 8 to16 years and pupils belonging to the age group 11–13 contributed a major proportion in the final sample size while the oldest age group comprised a very less proportion as many of the subjects in this age group were uncooperative and refused to participate.

Moreover, 30.5% of the study population cleaned their teeth twice or more daily which is in agreement with that of 38.5% reported among 11–12 year old school children in a missionary school of Bangalore, India (12). However, it was observed to be 17% in 11–13 year olds of Bhopal city, India (13).

Although it is accepted that higher level of awareness of personal appearance in girls results in more of them brushing their teeth more than once a day, it was observed that greater percentage of males cleaned their teeth twice in comparison with females. This is in contrary to the previous studies (14–16) where the frequency of children who brushed more than twice a day was higher in girls than the boys.

Table 5. **Logistic regression: OR and 95% CI for cleaning tooth more than twice according to various independent variables**

Independent variable	OR	Lower limit	Upper limit
Age			
8–10			
11–13	1.86	1.39	1.86
14–16	2.04	1.16	3.59
Education of father			
Higher			
Secondary	0.82	0.76	0.92
Primary	0.22	0.13	0.47
Education of mother			
Higher			
Secondary	0.73	0.34	1.56
Primary	0.94	0.60	0.92
Annual income of parents			
<20000			
20–50000	1.90	1.65	2.13
50–1 lakh	1.85	1.62	1.99
>1 lakh	1.89	1.22	2.25
Number of siblings			
0–1			
2–4	0.72	0.54	0.82
>4	0.46	0.38	0.53
Mode of cleaning teeth			
Tooth paste			
Tooth powder	0.61	0.14	0.77
Coal	0.67	0.18	0.87
Others	0.18	0.10	0.26
Dental visiting habits			
Twice or more			
Once in last 12 months	0.92	0.41	0.96
Never visited	0.21	0.12	0.46
Bed time			
8–10 pm			
10–12	0.86	0.64	0.99
After 12	0.66	0.54	0.72
Others	0.92	0.31	1.07
Parent's brushing frequency			
Twice			
Occasionally	0.15	0.13	0.39
Once	0.48	0.22	0.81
Never	0.21	0.12	0.42
Bathing habits			
Once daily			
Twice daily	1.51	1.43	1.66
Several times a week	1.68	1.28	1.96
Occasionally	0.82	0.72	0.94

OR, odds ratio; CI, confidence interval.

Older subjects were more likely to clean their teeth more than twice than their younger counterparts in agreement with the study among adolescents from Finland (16).

However, Al-Sadhan (17) reported that age was inversely related and mother's educational level directly related to the tooth cleaning frequency in agreement with this study.

In agreement with Hodge (9), children who belonged to smaller families cleaned their teeth more frequently than those belonged to larger families, this can be explained by two facts; firstly, children who have fewer siblings tend to get more attention and supervision in their daily activities and secondly, larger families are more common among lower socioeconomic groups. Furthermore, even caries was found to be associated with family size among primary schoolchildren in Saudi Arabia (18).

It was also noticed that tooth cleaning behaviour decreased as the bed time progressed towards later hours. Children who are late to bed are likely to get up later and may be less inclined to clean their teeth in the morning.

Tooth cleaning was significantly lower among children of parents with low level of education and less annual income as compared with those of high education and more annual income; the previous studies (19, 20) demonstrated tooth cleaning frequency to be associated with parent's level of education and their dental visiting habits while Quaderi and Taani (15) reported tooth cleaning frequency to be influenced by annual income.

Furthermore, it was observed among 6–16 year old school children of Jordan (20) that dental care habits of children were highly affected by dental visiting habits and level of education of parents in accordance with this study.

In addition, regular tooth cleaning habits were more associated with the tooth cleaning frequency of the parents; this may be explained based on the findings of Hodge (9) who suggested that regularity of toothbrushing was positively related to family pressure and frequency of other hygiene practices.

A study demonstrated that 29% of Indian children cleaned their teeth twice a day in contrast to 60% American children studying in India and this disparity was attributed to the difference in parent's efforts towards oral health behaviour of their children (21).

It was also found that tooth cleaning frequency was dependent on individual's personal habits like bathing habits and socio-demographic factors in accordance with the previous studies (5, 22).

Conclusion

The present study observed that tooth cleaning is not an isolated behaviour but is a part of multifarious pattern of various social and behavioural factors. Tooth cleaning frequency was significantly influenced by age, education of parents, annual income, number of siblings, mode of cleaning teeth, dental visiting habits, bed times, bathing habits and parent's tooth cleaning frequency. Thus, there is a need to explore and understood these factors more thoroughly.

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