

Oral health behaviour among adolescents in Kerala, India

Jayakumary Muttappillymyalil¹, Binoov Divakaran², Jayadevan Sreedharan¹, Salini K¹, Santhosh Sreedhar²

¹Research Division, Gulf Medical University, Ajman, UAE; ²Department of Community Medicine, Academy of Medical Sciences, Kannur, Kerala, India.

Correspondence to: Jayakumary Muttappillymyalil, Research Division, Gulf Medical University, Ajman, UAE. E-mail: drjayakumary@gmail.com ; jayajayadevan@rediffmail.com

Abstract

Background: Oral health behaviour is essential for planning & evaluation of oral health promotion programmes. This study was conducted to assess the oral health behaviour among adolescents aged between 11 to 19 years in Kannur district, Kerala state in India, including their inter-dental cleaning habits.

Methods: 512 school children aged 11 to 19 years, studying from 6th to 12th standards formed the study subjects.

Results: 52.5% were females and remaining were males. 40.8% were Hindus. Brushing of teeth twice daily was practiced by 75% of students. A significant association was found between the correct brushing technique and male gender as well as students in upper primary school compared to high school and higher secondary school education level. The prevalence of inter-dental cleaning habit was observed to be 58%. 76.3% of males and 58.9% of females used coconut leaf toothpicks for inter-dental cleaning. Multivariate analysis revealed age, religion and positive attitude towards inter-dental cleaning as significant factors associated with the practice of inter-dental cleaning.

Conclusions: There was a statistically significant association between gender, age, class of study and recommended method of tooth brushing. More than half of the study subjects practiced inter-dental cleaning and the materials used were locally and easily available those are not recommended by oral health professionals. Multivariate analysis shows age, religion and attitude were the factors significantly associated with regular practice of inter-dental cleaning. Oral health professionals can plan, propose and implement school oral health promotion activities as part of building up oral health promoting school.

Key words: adolescent, behaviour, health promotion, inter-dental cleaning, oral hygiene

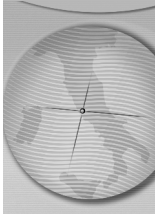
Introduction

Brushing and flossing are practices to maintain good dental health. It is ideal to brush the teeth at least two times daily—once early in the morning and the next before going to bed at night [1,2]. Regular flossing will help prevent tooth decay by removing food particles present between the teeth not reachable by the bristles of the tooth brush. Teeth are vulnerable to plaque, which attracts bacteria. Plaque can also make gingiva red, swollen and sore. Inter-dental cleaning is usually done to remove the food particles lodged between the teeth and also the plaque formed on the tooth. Flossing and regular dental visits are equally important in maintaining oral health [1]. Oral health behaviour data are needed for planning and evaluation of oral health promotion programmes and also to develop specific oral

health messages for behaviour change. The target population for the present study was adolescents [3] between the ages of 11-19 years studying in Kannur district, Kerala state, India. Therefore, this study was conducted to assess the oral health behaviour of adolescents. The aims of this study were to assess the oral health behaviour among adolescents between 10-19 years and to determine the prevalence of inter-dental cleaning as a method of oral hygiene among adolescents.

Methods

This descriptive study was conducted in Kannur district in the Northern part of Kerala. 512 children of 11-19 years of age were interviewed during a school health checkup programme. In India, there are three types of schools viz. Government, Aided and Private. In all schools the



curricula will be more or less same but there are some difference in administrative control and academic fee structure. The present study was conducted in a Government school in Kannur, Kerala, India.

The school was selected based on the proximity to the Medical College and its willingness to participate in the study. All school children from 6th to 12th standard were selected for the study. The school children were selected as the study group because of easy accessibility and availability. Consent from the guardians of the participating children was obtained before starting the study. The study was conducted over a period of one month. The questionnaire included details regarding age, sex, religion, practice of brushing teeth, inter-dental cleaning, flossing and frequency of dental visits. A pre-tested, structured, multiple choice, closed ended questionnaire was used for data collection. Questionnaires were distributed among all the children studying from 6th to 12th standards. A total of 546 questionnaires were distributed among all the children from 6th to 12th standard. Confidentiality was maintained by asking the participants not to write their names in the questionnaire. 512 questionnaires were filled completely.

Statistical Analysis: Chi square test was performed to find the association between oral hygiene measures and socio-demographic variables. Binary and multiple logistic regression was done to find the determinants of oral health

behaviour among adolescents.

Results

Table 1 shows the socio-demographic characteristics of the respondents. A total of 512 students belonging to upper primary, high school and higher secondary, participated in the study. Of the total, 52.5% were females. The age of the participants ranged from 11 to 19 years with a mean age of 14.05 and standard deviation of 1.92 years. The religion wise distribution of the participants showed that 40.8% were Hindus.

Table 2 summarizes the findings concerning tooth brushing habit of adolescents. No significant differences in tooth brushing behaviour were found by gender. There was no child with brushing habit 'never' or 'some times'. Of the total, 84.6% of the respondents claimed to brush their teeth twice daily. No significant difference was observed in tooth brushing behaviour by religion and level of education of adolescents. No significant difference between frequency of tooth brushing and regular dental visits as well as participation in oral health awareness class was observed. Out of 512 participants, 233 (45.5%) claimed regular visit to dental clinic and among them 63.5% practiced inter-dental cleaning. Remaining 279 (54.5%) never had regular visit to dental clinic and among them 53.4% practiced inter-dental cleaning. Among the 512 respondent, 185 (36.1%) participated in awareness class on oral health and among them 67% practiced inter-

Table 1. Socio demographic characteristics of students.

Variable	Group	Frequency	Percentage
Gender	Male	243	47.5
	Female	269	52.5
Age	11	57	11.1
	12	81	15.8
	13	72	14.1
	14	68	13.3
	15	98	19.1
	16	82	16.0
	17	47	9.2
	18	6	1.2
Religion	19	1	0.2
	Hindu	209	40.8
	Christian	130	25.4
	Muslim	173	33.8

Table 2. Tooth Brushing behaviour by different demographic factors.

Variable		Tooth brushing	
		One time	More than one time
Gender	Male	44 (18.1)	199 (81.9)
	Female	35 (13.0)	234 (87.0)
Class	Upper Primary	29 (18.4)	129 (81.6)
	High School	38 (15.4)	208 (84.6)
	Higher Secondary	12 (11.1)	96 (88.9)
Religion	Hindu	29 (13.9)	180 (86.1)
	Christian	20 (15.4)	110 (84.6)
	Muslim	30 (17.3)	143 (82.7)
Regular visit to dental clinic	Yes	34 (14.6)	199 (85.4)
	No	45 (16.1)	234 (83.9)
Participation in awareness class on oral health	Yes	23 (12.4)	162 (87.6)
	No	56 (17.1)	271 (82.9)

Table 3. Method of Brushing by different demographic factors.

Variable		Methods of tooth brushing			P value	Corrected
		Vertical	Horizontal	No systematic methods		
Gender	Male	88 (36.2)	85 (35.0)	70 (28.8)	<0.05	
	Female	76 (28.3)	89 (33.1)	104 (38.7)		
Age	<=14 years	198 (65.9)	95 (54.6)	75 (43.1)	<0.001	
	> 14 years	56 (34.1)	79 (45.4)	99 (56.9)		
Class	Upper Primary	77 (48.7)	51 (32.3)	30 (19.0)	<0.001	
	High School	55 (22.4)	90 (36.6)	101 (41.0)		
	Higher Secondary	32 (29.6)	33 (30.6)	43 (39.8)		
Religion	Hindu	76 (36.4)	62 (29.7)	71 (34.0)	NS ^a	
	Christian	46 (35.4)	42 (32.3)	42 (32.3)		
	Muslim	42 (24.3)	70 (40.5)	61 (35.3)		
NS ^a – Not Significant						

dental cleaning. But among the remaining 327 (63.9%) who never attended awareness class on oral health 52.9% practiced inter-dental cleaning.

Table 3 shows that the recommended method of tooth brushing, with reference to direction of brushing is performed by only 32% of the respondents. Rest of them practiced either horizontal or no systematic method. Results highlight the difference in methods of tooth brushing behaviour by gender. There was a statistically significant association between gender and recommended method of tooth brushing, larger proportion of male adolescents practice vertical method of tooth brushing as compared to females. School children age less the 14 years, 65.9% adhered to the recommended

brushing techniques compared to those above the age of 14 years (34.1%) which was found to be statistically significant ($p < 0.001$). Also, a significant difference among the adolescents belonging to Upper primary, High school and Higher Secondary school was observed. No significant difference in method of tooth brushing behaviour was found by religion.

Figure 1 highlights the materials used by the study group to clean their teeth. In general, tooth paste is used by more than 80% of the respondents. The other means used were burnt husk of paddy (7.4%), which is the by product of rice milling and burnt for the purpose of cleaning teeth, Ayurvedic tooth powder (6.6%), which is a locally available herbal product in Kerala, India

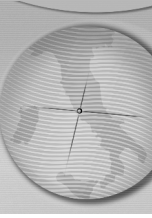
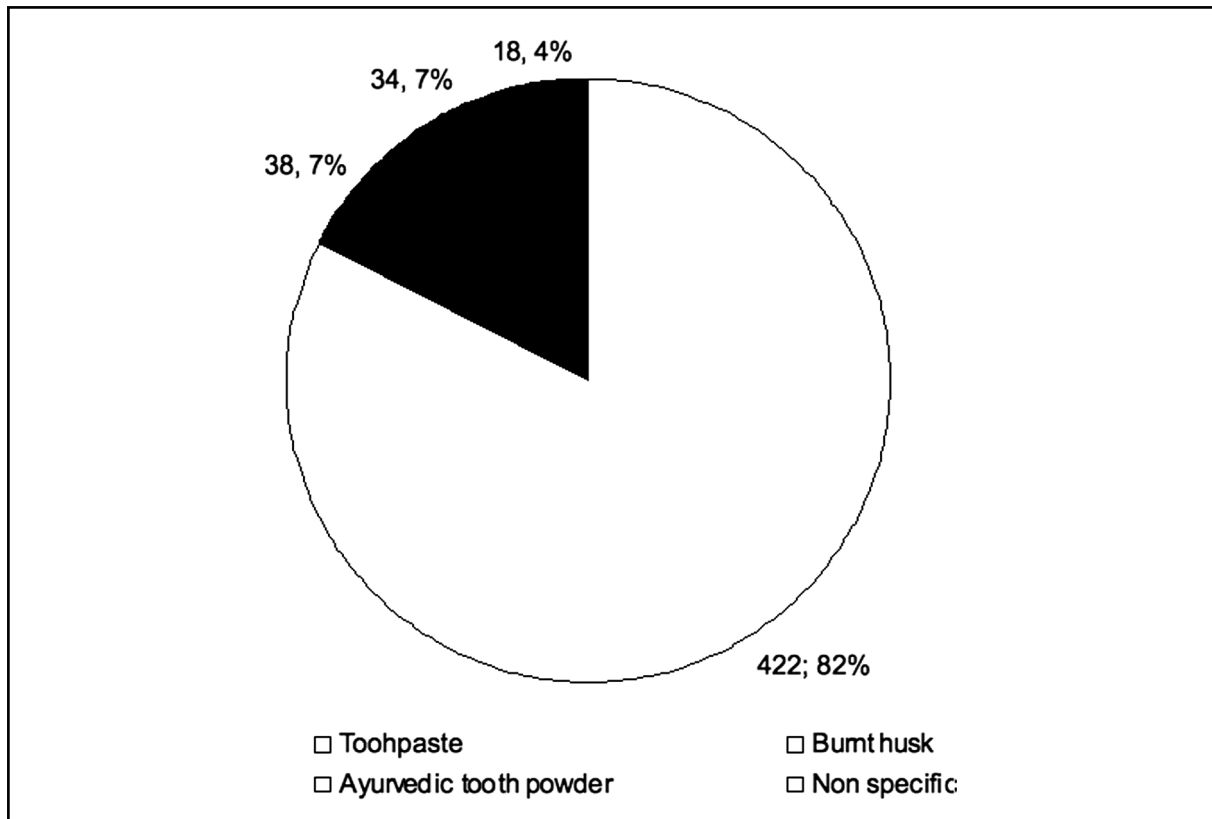


Figure 1. Materials used for tooth brushing.



and 3.5% used non specific materials.

The prevalence of inter-dental cleaning habit among these children was found to be 58% (64% among boys and 52% among girls). With regard to the educational status, students studying in higher classes had lesser tendency for inter-dental cleaning as compared to students studying in lower classes. This association was found to be statistically significant ($p < 0.001$). In Figure 2, the age specific prevalence of inter-dental cleaning behaviour is given. It is evident that the habit decreases as age increases and then a graphical increase is seen after 17 years of age which may be due to lesser number of participants aged 18 and 19 years.

There is a natural tendency to use different objects for inter-dental, the nature of material used is important as the use of sharp objects may injure the oral cavity and this in turn is dangerous for oral health. Table 4 depicts the type of material used by study group for inter-dental cleaning. It shows that 76.3% of males and 58.9% of the females used coconut leaf tooth picks whereas 19.9% and 12.1% of the females used pin and thread as inter-dental cleaning measures.

Multivariate analysis was done to identify the factors associated with inter-dental cleaning practice. The factors included in the analysis are

age, gender, religion, positive attitude towards inter-dental cleaning, visit to dental clinic and participation in awareness class on oral health. Univariate analysis shows all the above factors are significantly associated with inter-dental cleaning practice. All these factors were included in multivariate logistic regression which shows gender, visit to dental clinic and participation in awareness class on oral health were not significant. The significant factors and Odds Ratio is given in Table 5.

Discussion

School health survey is an excellent means to screen large number of children with minimum resources. The present study provides information on socio demographic factors and oral hygiene practices among adolescents. The study was not conducted on a large scale for the entire state and therefore the results are not generalisable to the whole state. The information on oral health behaviour was collected by means of interview and being a school based study, a high response rate was obtained. Among the total children (546), 512 (93.8%) children completely filled and returned the questionnaire. The present study provides an overview of oral health behaviour among adolescents. Of the total, more than 75% of

Figure 2. Age Specific Prevalence of Inter-dental cleaning.

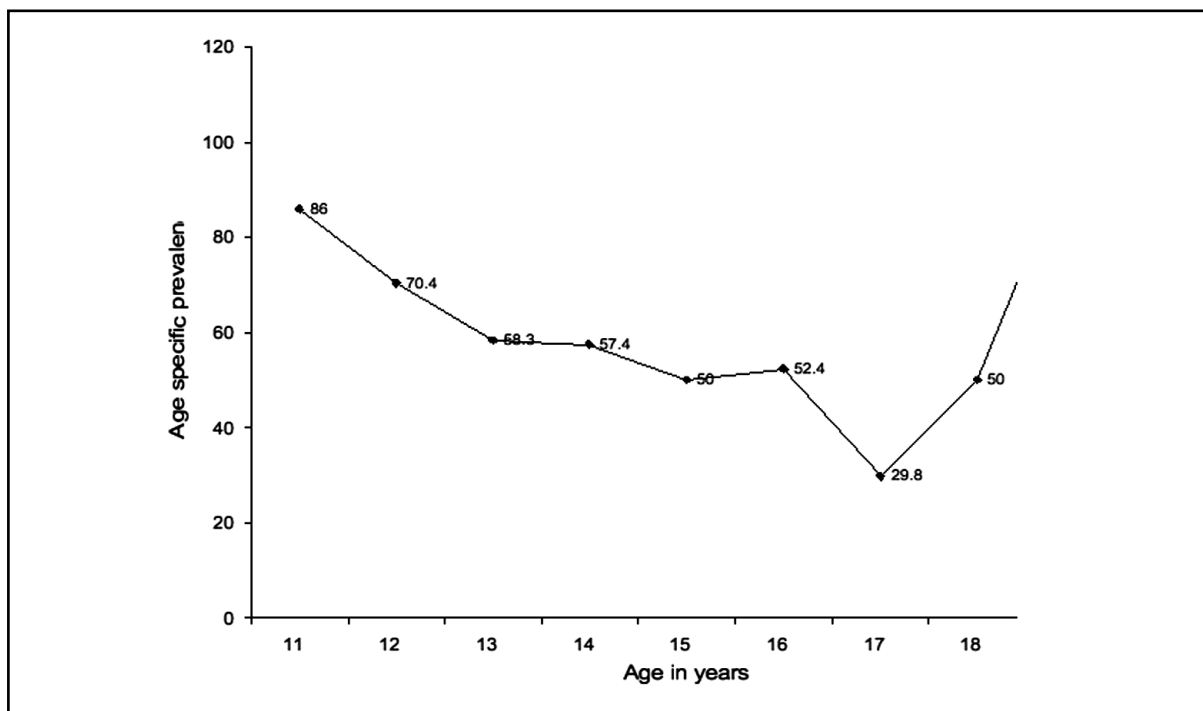


Table 4. Materials Used for inter-dental cleaning by Different Demographic Factors.

Variable		Materials used for inter-dental cleaning among users					Non users
		Coconut leaf tooth pick	Pin	Thread	All	Total	
Gender	Male	119 (76.3)	9 (5.8)	14 (9.0)	14 (9.0)	156	87
	Female	83 (58.9)	28 (19.9)	17 (12.1)	13 (9.2)	141	128
Class	Upper Primary	80 (65.0)	17 (13.8)	12 (9.8)	14 (11.4)	123	35
	High School	94 (72.3)	14 (10.8)	16 (12.3)	6 (4.6)	130	116
	Higher Secondary	28 (63.6)	6 (13.6)	3 (6.8)	7 (15.9)	44	64
Religion	Hindu	51 (54.8)	18 (19.4)	12 (12.9)	12 (12.9)	93	116
	Christian	58 (69.9)	13 (15.7)	4 (4.8)	8 (9.6)	83	47
	Muslim	93 (76.9)	6 (5.0)	15 (12.4)	7 (5.8)	121	52
Regular visit to dental clinic	Yes	103 (69.6)	14 (9.5)	17 (11.5)	14 (9.5)	148	85
	No	99 (66.4)	23 (15.4)	14 (9.4)	13 (8.7)	149	130
Participation in awareness class on oral health	Yes	83 (66.9)	15 (12.1)	16 (12.9)	10 (8.1)	124	61
	No	119 (68.8)	22 (12.7)	15 (8.7)	17 (9.8)	173	154

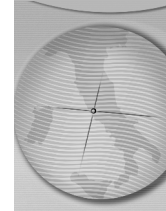


Table 5. Multivariate Analysis showing Factors Associated with inter-dental cleaning practice.

Variable		OR	95% CI	p value
Age	Unit increase	0.80	0.72-0.90	<0.001
Gender	Female	0.75	0.51-1.13	NS ^a
Religion	Christian	2.29	1.41-3.75	<0.001
	Muslim	2.94	1.84-4.69	<0.001
Attitude	No	0.14	0.06-0.29	<0.001
Regular visit to dental clinic	No	0.82	0.55-1.22	NS ^a
Participation in awareness class on oral health	No	0.71	0.46-1.10	NS ^a
NS ^a – Not Significant				

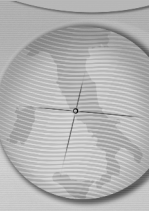
the respondents claimed to brush their teeth twice a day. A national representative study by Zhy et al. among 12-year-old and 18-year-old Chinese about oral health behaviour using self-administered structured questionnaires observed that 44.4% brushed their teeth at least twice a day [4]. Another cross-sectional study among school children conducted in the Hubei Province of China to evaluate the pattern of oral health behaviour reported that only 40% brushed their teeth at least twice a day [5]. A study among 12 year old children by Petersen et al. in Southern Thailand observed that tooth brushing at least once a day was claimed by 88% [6].

In the present study, more than 20% of the respondents used traditional means like, burnt husk of paddy and Ayurvedic powder to clean their teeth. Girls reported that they cleaned their teeth at least two times daily as compared to boys. Study by Peng et al also supports these findings [5]. With regard to the recommend method of tooth brushing and class of study, children who were in the upper primary (48.7%) practiced recommend method [1,4] of tooth brushing compared to high school and higher secondary school. No significant difference was observed in tooth brushing behaviour by religion and level of education of adolescents. Petersen et al in their study conducted among urban and rural school children in Southern Thailand showed that Buddhist children (79%) reported tooth cleaning at least twice a day compared to Muslim children (55%) and in all, 45% reported the use of wooden toothpicks for oral hygiene practices [6].

As far as religion is concerned, among Muslims and Christians, the chance of inter-dental cleaning practice was more than double compared to Hindus and was found to be statistically significant. A possible explanation is that vegetarian diet leaves less feeling about "bothersome between the teeth". In a study conducted by Tuğrul Kirtuloğlu et al in Turkey,

forty per cent of students used only the toothpick as an inter-dental oral hygiene device [7]. Oral hygiene study conducted among adolescents in Finland by Eino Honkala et al. revealed that toothpicks were used sporadically by every second adolescent but daily by 3% only [8]. The present study shows that 68% of the respondents were using coconut leaf tooth pick for inter-dental cleaning. A study by Rossow while studying the inter-dental cleaning habits among family members in Norway reported that mothers seem to play an important role in inter-dental cleaning behavior of children [9].

This study observed 45.5% of the respondents visited dental clinic for consultation. A study by Zhy et al reported that only 31.3% of those aged 12 year old and 22.5% of those aged 18 years consulted a dental doctor during the previous 12 months. The study also reported that about half of the participants had never received any oral health care instruction. This study clearly supports the study conducted in China that systematic community-oriented oral health promotion programmes are needed to target children for better oral hygiene [4]. Peng et al reported that 46% had seen a dentist within the past one year [5]. Petersen et al. who observed the self-care practices and dental visiting habits of 12-year-olds reported that 66% had consulted a dentist within the previous year [6]. Brushing teeth will help to break down plaque and dislodge the food particles present in between the teeth. Children who regularly brush and practice inter-dental cleaning can keep their teeth healthy for a life time [2]. All the studies recommended the need for systematic health education among children to improve their oral health and the primary school provides a unique setting for such programmes. Multivariate analysis revealed that as age increases the inter-dental cleaning behaviour reduces. As age increases by one year, the chance of inter-dental cleaning decreases by 20% which was



found to be statistically significant. School children with a positive attitude towards the inter-dental cleaning, a higher proportion was practicing inter-dental cleaning. Eventhough the children have a positive attitude towards inter-dental cleaning, very few practice flossing (thread), this may be due to the non availability of appropriate materials for inter-dental cleaning in the present study.

Conclusions

There was no child with brushing habit 'never' or 'some times'. Majority of the respondents claimed to brush their teeth twice daily. There was a statistically significant association between gender, age, class of study and recommended method of tooth brushing. Tooth paste is the material most commonly used by the participants for tooth brushing. Students studying in higher

classes had lesser tendency for inter-dental cleaning as compared to students studying in lower classes. More than half of the study subjects practiced inter-dental cleaning and the materials used were locally and easily available those are not recommended by oral health professionals. The type of materials used for inter-dental cleaning was coconut leaf tooth picks, pin and thread. Multivariate analysis shows age, religion and attitude were the factors significantly associated with regular practice of inter-dental cleaning. Oral health promotion programmes in schools is instrumental for good oral health in school children. The schools can incorporate oral health promotion as an integral part of school curricula. Oral health professionals can plan, propose and implement school oral health promotion activities as part of building up oral health promoting school.

References

- 1) Cleaning your teeth and gum. Available from www.ADA.org/public/topic/cleaning.asp. [Accessed June 23, 2009].
- 2) Whitaker EJ. Primary, Secondary and tertiary treatment of dental caries- A 20 year case report. *JADA* 2006; 137: 348-52.
- 3) Adolescent health. Available from http://www.who.int/topics/adolescent_health/en/. [Accessed June 23, 2009].
- 4) Zhu L, Petersen PE, Wang HY et al. Oral health knowledge, attitudes and behaviour of children and adolescents in China. *Int Dent J* 2003; 53(5): 289-98.
- 5) Peng B, Petersen PE, Fan MW et al. Oral health status and oral health behaviour of 12 year old urban school children in the People's Republic of China. *Community Dent Health* 1997; 14(4): 238-44.
- 6.) Petersen PE, Hoerup N, Poomviset N et al. Oral health status and oral health behaviour of urban and rural school children in Southern Thailand. *Int. Dent. J.* 2001; 51: 95-102.
- 7) Kirtiloglu T and Yavuz US. An assessment of oral self care in the student population of a Turkish University. *Public Health* 2006; 120 (10): 953-7.
- 8) Honkala E, Rajala M and Rimpela M. Oral hygiene habits among adolescents in Finland. *Community Dentistry and oral Epidemiology* 2006; 9(2): 61-8.
- 9.) Rossow I. Intra family influences on health behaviour: A study of inter-dental cleaning behaviour. *J Clin Periodontol* 1992; 19 (10): 774-8.