

Prevalence of Oral Habits among 4–13-Year-Old Children in Central Kerala, India

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Abstract

Aim: The present study was conducted to determine the prevalence of harmful oral habits among 4–13-year-old children in relation to their age and gender, in a dental college hospital in Central Kerala, India. **Methods:** A retrospective survey was conducted in 1034 children (478 males and 556 females) aged between 4 and 13 years. The participants were checked for the prevalence of oral habits in relation to their age and gender. Information regarding oral habits was obtained with the help of a questionnaire and clinical evaluation using mouth mirror and water tests. Chi-square test was used in the statistical analysis. **Results:** Overall prevalence of oral habits was 72.7% in the study participants. Nearly 47.1% of the children had only one habit, whereas 19.1% had two habits and 5.5% had three or more habits. Mouth breathing was the most commonly reported oral habit (29.4%), followed by tongue thrusting (23.5%), nail biting (20%), thumb-sucking (17%), pencil biting (8.7%), bruxism (4.9%), and lip/cheek biting (4.5%). Nail biting was reported significantly more in females and bruxism significantly more in males. Prevalence of thumb-sucking was very high in younger children (4–8 years) compared to older children (9–13 years). **Conclusion:** The prevalence of oral habits among 4–13-year-old children is very high in Central Kerala, compared to children in other Indian populations. Since oral habits can be intercepted and prevented, creating awareness regarding the adverse outcomes of oral habits is highlighted.

Keywords: Child, habits, mouth breathing, oral health, prevalence

INTRODUCTION

An important part of general health and well-being is oral health. Traditionally, the presence or absence of oral disease has been the main method of measuring oral health. This has now been substituted by a multidimensional concept which includes the psychosocial aspects of dental health and its influence on quality of life.^[1]

Any repetitive action being done automatically is called a habit.^[2] Stimulation of mouth with tongue, finger, nail, or cigarette is a source of relief in passion and anxiety in both children and adults.^[3] Some repetitive and self-injurious behaviors in the oral cavity include mouth breathing, tongue thrusting, digit sucking, nail/lip/cheek biting, and bruxism. The subsequent effect of an oral habit is dependent on the onset, duration, and nature of the habit.^[4]

Thumb-sucking is forceful and repeated sucking of thumb with associated contraction of lip and buccal musculature. It is considered normal in infants and young children below

the age of 3 years and 6 months.^[5] Dental changes due to prolonged thumb-sucking beyond 5 years of age include increase in overjet, open bite in anteriors, labial inclination of upper incisors, and posterior crossbite.^[6–9]

Delayed transition between infantile and adult swallowing patterns leads to tongue thrusting. Tongue thrusting and mouth breathing may be associated with labial inclination of maxillary incisors, open bite,^[10] and Class II malocclusions.^[11] Bruxism is a forceful nonfunctional contact of tooth surfaces that can be triggered due to emotional stress.^[12] It can lead to attrition of teeth, soreness of masticatory muscles, and dysfunction of temporomandibular joint.

Persistence of oral habits beyond a certain age frequently leads to malocclusion and facial deformities. Harmful oral habits

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can also result in bone malformations.^[13] When prolonged beyond 5 years of age, these habits can be socially stigmatizing and interfere with clarity of speech along with various dental malocclusion.

To the best of our knowledge, the prevalence of oral habits in children has not been previously studied in Kerala population.

METHODS

The survey was conducted in a sample of 1034 children, aged between 4 and 13 years, reporting to a dental college and hospital in Thrissur district, Kerala state. Simple random sampling technique was used for case selection. The Institutional Review Board reviewed the study protocol and granted ethical clearance.

The inclusion criteria were as follows: children (1) should be 4–13-year-old; (2) should have permanent or deciduous central incisors; (3) should not have any syndromes or clefts lip/palate; (4) should not have a current/past orthodontic history; and (5) currently should not have any respiratory infections.

A pilot survey was conducted in which oral habits' prevalence was estimated at 27.5%. Assuming a confidence interval of 95%, a sample size calculation indicated that 1025 participants were required to detect the prevalence of oral habits, with a power of 90% ($\alpha < 0.05$). Kappa coefficient for interexaminer agreement was determined to be 0.81 during the pilot study.

A closed-ended questionnaire was used to get data from the parents of the study participants. After completion of the pilot study, some modifications were made in the questionnaire. Face validity and content validity of the questionnaire were assessed by four experts in the field of dentistry and one methodologist. A written informed consent for the study was obtained from the respective parent/guardian. Deleterious oral habits were screened by trained personnel from the Department of Public health dentistry, using mouth mirrors and probes. Clinical evaluation for mouth breathing was done with water test. The child was asked to take a little amount of water in his/her mouth with lips in contact without swallowing. Children unable to maintain

lips in contact position for 3 min were considered as mouth breathers.^[14] Apart from mouth breathing, the children were screened for tongue thrusting, thumb-sucking, bruxism, pencil/nail biting, and lip/cheek biting. Following the examination, a health educational talk was delivered using study models.

SPSS version 15.0 (Statistical Package for the Social Sciences, SPSS Inc; Chicago, Illinois, USA), was used to derive the prevalence rates of different oral habits. Chi-square test was done to compare the prevalence of oral habits according to age group and gender. The probability level was set at $\alpha = 0.05$. $<5\%$ ($P < 0.05$) differences in probabilities were considered to be statistically significant.

RESULTS

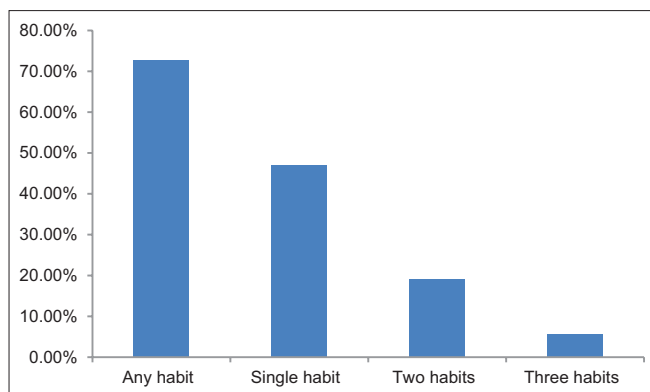
A total of 1034 children, 478(46.2%) males and 556 (53.8%) females; aged 4-13 years, were screened for oral habits. The composition of the sample by age and gender is represented in Table 1.

Among the children assessed, 752 (72.7%) children had at least one oral habit, of which 402 (53.5%) were females and 350 (46.5%) were males. There was no significant gender-wise difference in the oral habits' prevalence. Four hundred and eighty-seven (47.1%) children reported with only one oral habit, 197 (19.1%) had 2 oral habits, and 57 (5.5%) had 3 oral habits [Graph 1]. The two oral habits occurring most concurrently were tongue thrusting and mouth breathing reported in 42 (4.1%) children. The three oral habits occurring most concurrently were tongue thrusting, mouth breathing, and thumb-sucking, reported in 12 (1.2%) children.

Assessment of individual prevalence of oral habits revealed that 304 (29.4%) children had mouth breathing habit, 243 (23.5%) had tongue thrusting habit, 171 (17%) had thumb-sucking, 207 (20%) had habit of nail biting, 90 (8.7%) had pencil biting habit, 51 (4.9%) had bruxism, and lip/cheek biting was found in 47 (4.5%) children [Graph 2]. Gender-wise prevalence assessment of each oral habit indicated significantly higher rates of nail biting in females ($P = 0.0093$) and significantly higher rates of bruxism in males ($P = 0.0325$) [Table 2].

Table 1: Composition sample (n=1034) by age and gender

Age (year)	Total sample			Composition sample by age Males + females (%)	Composition sample by gender	
	Males	Females	Males + females		Males (%)	Females (%)
4	42	33	75	7.2	56	44
5	54	52	106	10.2	50.9	49.1
6	60	68	128	12.4	46.9	53.1
7	54	75	129	12.5	41.9	58.1
8	53	75	128	12.4	41.4	58.6
9	43	62	105	10.2	41	59
10	69	75	144	13.9	47.9	52.1
11	33	38	71	6.9	46.5	53.5
12	43	52	95	9.2	45.3	54.7
13	27	26	53	5.1	50.9	49.1
Total	478	556	1034	100	46.2	53.8



Graph 1: Representation of the number of habits in the study population

Age-wise prevalence assessment of oral habits in the study population divided into two groups of 4–8 years and 9–13 years revealed significantly higher prevalence of thumb-sucking in the younger age group children of 4–8 years ($P = 0.001$) and higher prevalence of tongue thrusting in older children of 9–13 years ($P = 0.0389$) [Table 3].

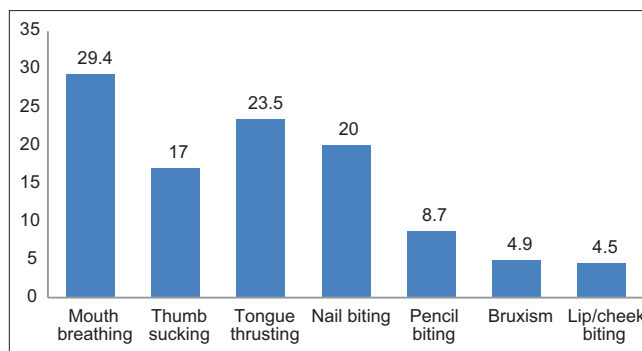
DISCUSSION

The present study represents the first epidemiological survey conducted in Central Kerala population with the aim of assessing the prevalence of oral habits in 4–13-year-old schoolchildren. It is a well-documented fact that oral habits affect occlusal development and thus play a major role in the facial appearance of the child.^[15]

The finding of this study indicates that 72.7% of children had at least one oral habit. This prevalence rate is higher than that reported by Garde *et al.*,^[16] who reported 51% prevalence rate in 6–12-year-old children. Motta *et al.* reported that, among preschoolers, 87.4% had oral habits.^[17] Quashie-Williams,^[18] Shetty and Munshi,^[19] and Kharbanda *et al.*^[20] reported lower prevalence rates of 34.1%, 29.7%, and 25.5%, respectively. The higher prevalence rate of oral habits found in the present study may be due to the fact that it was a hospital-based study. Since the children reported to the hospital for an oral complaint, it can be assumed that the prevalence of oral habits will be higher in such population.

Mouth breathing and tongue thrusting were the most prevalent habits in the present study. This is similar to the results reported by Guaba *et al.*^[21] and Kharbanda *et al.*^[20] In majority of studies, tongue thrusting was reported as the most prevalent habit followed by mouth breathing.^[20,21] In the present study, a high prevalence of mouth breathing was noted (29.4%). Since mouth breathing is one of the etiologic factors in growth alterations in the face, it should be diagnosed early and proper intervention should begin. Abou-Ei-Ezz *et al.*^[22] have reported that mouth breathing is highly associated with malocclusion and this association is statistically highly significant ($P < 0.001$).

Tongue thrusting was reported in 23.5% of children. Shetty and Munshi,^[19] Kharbanda *et al.*,^[20] and Amitha and Arun^[23] have



Graph 2: Representative data of prevalence of the individual deleterious habits in the study population in percentage values

Table 2: Oral habits distribution by gender

Oral habits	Females (n=556), n (%)	Males (n=478), n (%)	P
Any habit	402 (72.3)	350 (73.2)	0.7406
Mouth breathing	155 (27.9)	149 (31.1)	0.2464
Thumb-sucking	91 (16.4)	80 (16.7)	0.8733
Tongue thrusting	130 (23.4)	113 (23.6)	0.9220
Nail biting	128 (23.02)	79 (16.5)	0.0093*
Pencil biting	54 (9.7)	36 (7.5)	0.2149
Bruxism	20 (3.6)	31 (6.5)	0.0325*
Lip/cheek biting	24 (4.3)	23 (4.8)	0.7031

*Indicates statistically significant values

Table 3: Distribution of oral habits in two age groups

Oral habits	Age group 4-8 years (n=566), n (%)	Age group 9-13 years (n=468), n (%)	P
Any habit	419 (74)	333 (71.1)	0.3016
Mouth breathing	169 (29.9)	135 (28.8)	0.7221
Thumb-sucking	135 (23.9)	36 (7.7)	0.0001*
Tongue thrusting	119 (21)	124 (26.5)	0.0389*
Nail biting	108 (19.1)	99 (21.2)	0.4071
Pencil biting	50 (8.8)	40 (8.5)	0.8701
Bruxism	28 (4.9)	23 (4.9)	0.9801
Lip/cheek biting	24 (4.2)	23 (4.9)	0.6044

*Indicates statistically significant values

reported tongue thrusting prevalence to be 3.02%, 18.1%, and 33.65%, respectively. Thumb-sucking was found in 17% of the study group. Amitha and Arun^[23] reported a prevalence of 1.9% and Kharbanda *et al.*^[20] reported 0.7% prevalence. Highly stressful and anxiety-related behavior has been indirectly related to nail biting and thumb-sucking by Agarwal *et al.*^[24]

Nail biting was seen in 20% of children in the present study which is very high compared to the prevalence reported by Garde *et al.*,^[16] Shetty and Munshi,^[19] and Sharma *et al.*,^[25] who reported a prevalence of 5.8%, 12.7%, and 3%, respectively. Baydaş *et al.*^[26] have reported an increased prevalence of *Enterobacteriaceae* in the oral cavities of children having nail-biting habit.

The prevalence of bruxism and pencil biting in the present study is 4.9% and 8.7%, respectively. This is in agreement to the study reported by Shetty and Munshi,^[19] who reported 6.2% prevalence of bruxism and 9.8% prevalence of pencil biting. The prevalence of lip/cheek biting in this study of 5% is also similar to that reported by Shetty and Munshi^[19] of 6%. Bruxism, nail biting, and pencil biting were found to be elevated in 7–17-year-old children suffering from attention-deficit hyperactivity disorder.^[27]

Nail biting was found to be significantly more in females ($P = 0.0088$) in the present study. Bruxism was reported significantly more in male children ($P = 0.0331$), similar to that reported by Shetty and Munshi.^[19] Hormonal changes and diet may be the reason for this gender-wise difference of habits.

A higher prevalence of thumb-sucking was derived in the present study in the younger age group of 4–8-year children ($P = 0.0001$). Tongue thrusting was reported more in older age group of 9–13-year children ($P = 0.0389$) in the present study. If tongue thrusting is not corrected by this age, it can lead to short flaccid upper lip, speech problems, and increased anterior facial height.

A limitation of the present study is that the study sample was obtained from a dental hospital. A higher prevalence rate can be expected in this sample compared to general population. Further studies are recommended by selecting the samples from the general population to know the actual prevalence rate.

CONCLUSION

Prevalence of adverse oral habits was 72.7% in children reporting for dental treatment in Central Kerala, India. Majority of the children had only one habit, of which mouth breathing was the most commonly occurring habit, followed by tongue thrusting and nail biting. Nail biting was seen significantly more in female children and bruxism more in male children. Prevalence of thumb-sucking was more in younger children (4–8 years) and tongue thrusting in older children (9–13 years). As the prevalence of oral habits is very high in this population, compared to other Indian populations, preventive and interceptive strategies to eradicate the oral habits should be planned at the earliest.

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Conflicts of interest

There are no conflicts of interest.

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