

Original Article

Relationship of Mother-Child Emotional Interactions and Oral Habits in 3-6-Year-Old Children: A Cross-Sectional Study

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Received: 05 Apr 2025; Revised: 23 Apr 2025; Accepted: 03 May 2025

Abstract

Background and Aim: Continuation of oral habits in children can bring about adverse oral and dental health consequences. Considering the significance of psychological and emotional factors in this regard, this study aimed to assess the effect of mother-child emotional interactions on the continuation of oral habits in 3-6-year-old children.

Materials and Methods: This cross-sectional study was conducted on 196 eligible children between 3-6 years. The first questionnaire included questions regarding family demographics, infancy period, and oral habits of the child and family members. The second questionnaire contained 26 questions about mother-child emotional interactions. Parents filled out the questionnaire. The collected data were compared between the two groups with and without oral habits.

Results: Bruxism and nail-biting had a higher prevalence than other habits. The two groups meaningfully differed in the mean score of mother-child emotional interactions, and children with poorer mother-child interactions had a significantly higher frequency of oral habits ($P < 0.05$). Boys had a significantly higher frequency of oral habits than girls ($P < 0.05$). Additionally, the frequency of oral habits was significantly higher in children with a positive family history of oral habits ($P < 0.05$). However, no significant association was found between oral habits and other demographic factors ($P > 0.05$).

Conclusion: Considering the increased prevalence of oral habits such as bruxism and nail-biting and the significant impact of mother-child emotional interactions on the continuation of such habits in children, mother-child interactions should be investigated and improved in children over 3 years with oral habits.

Keywords: Oral Habits, Children, Emotional interactions, Mother

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Please cite this article as:

Moradinezhad, M., Paryab, M., KharraziFard, M. J. & Hormozi, M. Relationship of Mother-Child Emotional Interactions and Oral Habits in 3-6-Year-Old Children: A Cross-Sectional Study. *Int. J. Appl. Behav. Sci.* 2025;12(2):1-8

Introduction

Oral habits are considered a normal part of physiological development during the early infant period. These habits are often spontaneously discontinued by age three or four, following improvements in self-control skills (1). If these habits continue unintentionally beyond this period, they are referred to as parafunctional or non-physiological oral habits. Oral habits include lip sucking, thumb sucking, pacifier sucking, bruxism, nail-biting, and mouth breathing, which can lead to the development of malocclusion depending on their severity, frequency, and duration (1). Also, oral habits may increase the prevalence of temporomandibular disorders (2), burning mouth syndrome (3), dental caries (4), allergy and asthma (5), or infectious diseases (6) in children. Due to the adverse oral health complications of non-physiological oral habits and the associated psychosocial consequences (1), their management is a priority for oral healthcare providers. The continuation of oral habits in children may be influenced by several local, personal, emotional, demographic, genetic, and family structure factors (1). Many children develop oral habits due to parental suppression and spending long hours in kindergarten against their will (7) as a way to release emotional stress and tension (8, 9) or to attract their parents' attention (10). Also, a higher frequency of oral habits has been reported in ill-tempered children (11), introverted children who suppress their anger, and children with high levels of anxiety (12). The structure of the family may influence a child's emotional state. As a result, children may develop oral habits to reduce stress within their families. Parameters such as the number of siblings, presence of one or both parents, age and educational level of the parents, particularly the mother, employment status of the mother, level of income, family socioeconomic status, family culture, and parent-child relationship are among the influential factors in this respect (7, 13). Nematollahi *et al.* (8), in a cross-sectional study in 2003 on elementary schoolers in 6 districts of Mashhad City, showed that oral habits were more commonly observed in children with large and financially and socially weak families. In 2010, Seraj *et al.* (9) conducted a study on children aged 4 to 12 years in Tehran city, and they found

significant relationships between bruxism and mother's occupation, family history, and emotional events in the family. In 2013, Murrieta-Pruneda and colleagues (10) examined 3- to 5-year-old children and reported a significant relationship between the prevalence of oral habits and family type and structure. In 2019, Helvani *et al.* (11) conducted a study on children aged 3 to 6 in Yazd City. They found that children whose mothers were housewives were less prone to bruxism, and children with bruxism had a significantly higher frequency of positive family history for bruxism than others. The objective of the present study was to assess the relationship between mother-child emotional interactions as one of the most important factors in the emotional stability of children at an early age with the development and continuation of oral habits in 3-6-year-old children.

Methods

This descriptive, retrospective, cross-sectional study was approved by the ethics committee of Tehran University of Medical Sciences (IR.TUMS.DENTISTRY.REC.1402.029) and was conducted between 2023-2024. The minimum sample size was calculated to be 196 children assuming $\alpha=0.05$ and $\beta=0.2$ to assess the simultaneous effect of 19 independent variables with $R^2=0.1$ using multiple regression power analysis of PASS 11.

The children were selected from those aged 3 to 6 who presented to the Pediatric Dentistry Department at the School of Dentistry at Tehran University of Medical Sciences. They were also selected from among children attending four kindergartens in Tehran Municipality Districts 1, 2, 6, and 11. The selection process used a combination of convenience and random sampling. Children with systemic diseases, positive history of hospitalization, premature birth or low birth weight, those taking psychiatric medications for hyperactivity or anxiety, children with a history of a family trauma such as divorced or deceased parents, severe personal trauma such as being in an accident or being kidnapped, and oral conditions such as cleft lip and/or palate, or skeletal malocclusion were excluded. Before obtaining informed consent, mothers of the selected children were provided with information and reassured about the confidentiality of their information and that their

children's participation in the study would not affect their treatment. Then, they were asked to complete the study questionnaire. After filling out the questionnaire, the parents received the necessary information about the adverse consequences of the continuation of oral habits and methods to manage them. The relationship between the variables and the mother-child emotional interaction score was analyzed by multiple regression analysis. The mother-child emotional interaction score was compared between the two groups of children with and without oral habits by independent t-test (due to normal distribution of data), and $P < 0.05$ was considered statistically significant.

Materials

The data collection tools of this research were:

Demographic checklist

This checklist was designed and used by the researcher to collect personal demographic

information such as age, gender, birth order of the child, number of siblings, age and educational level of the parents, and family income. It also had some questions about the infancy period of the child (type of delivery, premature birth, breastfeeding/bottle-feeding, and history of sleep disorders), and some questions about the current oral habits of the child (thumb sucking, pacifier use, bruxism, and nail biting). Since habits such as lip biting develop at older ages and during the adolescence period due to stresses caused by school or social contexts (7), they were not included in the present study.

Mother- child emotional interaction questionnaire

This questionnaire included 26 dichotomous yes/no questions about the mother-child emotional interactions. A “yes” answer was scored 1 and a “no” answer was scored 0. The sum of the scores indicated the mother-child emotional interaction score of each child. This questionnaire was designed by Jabbarifar *et al.* (14) with optimal validity, reliability, and internal consistency for the Iranian population (Table 1).

Table 1. Mother-child emotional interaction questionnaire

	Yes	No
1 I cuddle my child when I want to express my emotions.	Yes	No
2 I usually play with my child.	Yes	No
3 I have always been careful about the timing of feeding my child.	Yes	No
4 I try to meet the reasonable needs of my child.	Yes	No
5 Since the early days, I have spent some time talking to my child on a daily basis.	Yes	No
6 I always try to take my child to a park or fun places.	Yes	No
7 My child is dependent on me.	Yes	No
8 I usually try to make my child laugh.	Yes	No
9 I always say the truth to my child.	Yes	No
10 I always protect my child when he is scared of something and comes to me.	Yes	No
11 I tolerate my child's nagging.	Yes	No
12 I reconcile quickly with my child after sulking.	Yes	No
13 I sometimes tell stories to my child	Yes	No
14 I usually get angry when my child gets angry.	Yes	No
15 I pay more attention to my child when he is sick.	Yes	No
16 I often caress my baby.	Yes	No
17 I well listen to my child when he talks to me or reads something.	Yes	No
18 I get really upset if someone is aggressive to my child.	Yes	No
19 I usually buy a present for my child's birthday.	Yes	No
20 I usually consider verbal punishment for my child.	Yes	No
21 I sometimes leave my baby alone at room.	Yes	No
22 I try to usually use verbal encouragement.	Yes	No
23 I always tried to feed my child before bedtime during breastfeeding.	Yes	No
24 My child often sleeps next to me.	Yes	No
25 During infancy, I tried to give my baby a variety of complementary foods and healthy snacks.	Yes	No
26 I usually consider my child's opinion and interests when shopping for him/her.	Yes	No

Results

Descriptive findings

In the present study, 210 children were initially selected according to the inclusion criteria. After applying the exclusion criteria, 196 children (102 girls and 94 boys) remained in the study. Of all children, 87 (44.4%) were the first child, 109 (55.6%) were the middle children, 50 (25.5%) were the only child, and 146 (74.5%) had two or more siblings. The majority of the parents were older than 30 years old and had a high school diploma or a Bachelor's degree. Four children (2%) were born prematurely, and 8 children (4.1%) were bottle-fed. Most children did not have any sleep disorders, and 71.9% had a positive family history of oral habits. The frequency of oral habits was 39 (19.9%) for bruxism, 25 (12.8%) for nail-biting, 21 (10.7%) for pacifier use, and 19 (9.7%) for thumb sucking.

Table 2 shows the measures of central dispersion for the mother-child emotional interaction score.

Analytical results

The t-test was used to compare the emotional interaction score between the two groups of children

with and without oral habits. The results revealed a significant difference between the two groups in this regard ($P = 0.037$), indicating that children with poorer mother-child interactions exhibited a higher frequency of oral habits. Table 3 shows the association between each oral habit and the emotional interaction score.

According to the obtained P values, the association of emotional interaction score with each oral habit was not significant ($P > 0.05$). However, the association between emotional interaction scores and all habits was significant. The regression analysis was used to compare the demographic information between the two groups with and without oral habits. The results showed that gender and a positive history of oral habits in the family were meaningfully associated with the oral habits of the child ($P < 0.05$). Also, the frequency of oral habits in boys was significantly higher than that in girls. Moreover, the frequency of oral habits was significantly higher in children with a positive family history of oral habits. However, the number of children, birth order, age or level of education of the parents, family income, type of delivery, feeding, history of sleep disorders, and oral habit status of children had no significant association with the presence of oral habits ($P > 0.05$, Table 4).

Table 2. Measures of central dispersion for the mother-child emotional interaction score

	Emotional interaction score		
	Minimum	Maximum	Mean (std. deviation)
Children with oral habits			
Thumb sucking	16	24	21.53 (2.065)
Pacifier use	14	26	21.57 (2.731)
Bruxism	17	26	21.62 (2.160)
Nail biting	16	26	21.80 (2.708)
Total	14	26	21.64
Children without oral habits	17	26	22.30

Table 3. Association of mother-child interaction score with each oral habit

Oral habit	P-value
Thumb sucking	0.357
Pacifier use	0.381
Bruxism	0.262
Nail biting	0.676

Table 4. Association of demographic factors with oral habits in children

Demographic factor	P-Value
Gender *	0.022
Number of children	0.655
Birth order	0.388
Father's age	0.939
Mother's age	0.898
Father's educational level	0.219

Mother's educational level	0.224
Family income	0.881
Type of delivery	0.856
Feeding	0.299
History of sleep disorder	0.204
Oral habit status	0.125
Family history *	0.000

*Significant association

Discussion

Despite limitations such as relying on a questionnaire for data collection instead of performing clinical examinations, this study assessed the impact of mother-child emotional interactions on children's oral habits. The prevalence of oral habits varies among different communities (15-23). This variation may be due to differences in how participants are interviewed and assessed, variations in lifestyle and culture, and learning coping skills at home, school, or through the media. This variation has also been noted in studies of the Iranian population (9, 11, 24–26). According to the present results, 49.4% of all children had at least one oral habit, which was in agreement with the results of Murrieta *et al.* (7) who reported that over half of 3-5-year-old children in their study had at least one oral habit. A recent research by Mehdipour *et al.* (24) on Iranian children aged 6-12 reported a lower percentage (38.96%) of children with oral habits. This could be due to the older age of the children in the study or variations in the lifestyles of the study populations. Bruxism was the most commonly reported oral habit in the current study, which was in agreement with the results of Mehdipour *et al.* (7) and Garde *et al.* (16). For young preschool children, it appears that in case of feeling safe at home, the stressful environmental conditions can less commonly affect the child. Thus, a higher incidence of bruxism in younger age groups can be due to increased emotional tensions of children due to the current modern environment and exposure to the media and electronic equipment, and probably social conditions such as the COVID-19 pandemic (27, 28).

Nail-biting was the second most common oral habit in the present study. Nail-biting had the highest prevalence among oral habits in studies by Murrieta *et al.* and Percival *et al.* (7, 18, 29). Nail-biting is usually a substitute for thumb sucking or pacifier use in older children who quit thumb sucking or pacifier use as a

result of social pressure but feel the need for a soothing substitute and start nail-biting since they can do it more privately (7, 18). Thus, the prevalence of nail biting is expected to be lower in the preschool period, and its relatively high prevalence in the current study can be the same reason as the high prevalence of bruxism (emotional tensions).

Thumb sucking had a lower prevalence than other oral habits in the present study, which was in contrast to the findings of studies conducted on 3 to 5-year-old children (17, 20). Poureslami *et al.* (26) also reported a low prevalence of thumb sucking (approximately 3.4%) in preschool children.

The present results showed that oral habits were more common in boys than girls. Similarly, Aloumi *et al.* (20) reported a higher prevalence of mouth breathing in boys than girls under 6 years of age. However, Santos *et al.* (23) showed a higher prevalence of thumb-sucking in girls than boys in the group of children under 6 years of age. The majority of studies revealed that the difference between girls and boys in continuation of oral habits is mainly in the age group over 6 years (15, 16), and this difference is not significant in those under 6 years of age (8, 11, 21, 26). The present study was designed to assess the effect of mother-child emotional interactions on the oral habits of children. Three- to six-year-olds were selected for this study because they had not yet experienced a serious and stressful school environment. Also, the included children had none of the possible confounders, such as systemic diseases, history of allergy (21), respiratory problems (11), low birth weight (30), or severe occlusal problems (8). Also, children from single-parent families (7, 13, 23) and those exposed to severe stresses such as war or kidnapping (23) were not included.

In the present study, mother-child emotional interactions were evaluated by a questionnaire filled out by the parents. A higher score indicated higher mother-child interactions. The results showed that such interactions had a significant effect on the development

of oral habits in children, such that children with a lower score had a higher frequency of oral habits. According to the psychoanalytic theory, following the initiation of mental and psychological development of children at the age of 3, their habits related to oral pleasure are limited. But if continued, they may indicate coping problems with emotional stresses or anxiety reactions, and nail-biting or thumb-sucking by such children can bring about a sense of satisfaction in them (31). Psychological studies have shown that better mother-child emotional interactions result in lower symptoms of anxiety, the development of empathy, the emergence of higher-order thinking, and the development of social and emotional competence in children (32-34).

The present results highlighted the need for a better-quality mother-child emotional interaction. It should be noted that the effect of mother-child emotional interactions on oral habits has not been addressed in any previous study to compare our results.

Environmental factors such as family structure, sudden changes in the family, being a single child, loneliness and solitude, over-protection by the parents (8), or the birth of a younger sibling (7) are all important parameters that can lead to the development of oral habits in children. In the present study, the birth order of the child and the number of siblings had no significant effect on the oral habits of children, which was in agreement with the results of Percival *et al.* (18) and Aloumi *et al.* (20). Nonetheless, it has been confirmed that peace in the family requires equal opportunities for all children, and a high number of children in a family can be associated with deprivation from maternal emotions and can increase the frequency of oral habits such as nail biting or thumb sucking (35). Some other studies demonstrated that the first (36) or last (37) child of the family had a higher frequency of oral habits. Nematollahi *et al.* (8) stated that a higher number of children in a family was equal to increased financial and emotional problems in the family, and increased the incidence of oral habits. Variations in the reported results can be due to cultural differences or the evaluation of different age groups.

The socioeconomic status of the family, occupation, and the level of education of the parents are among other influential factors in the family structure. In the

current study, family income was not an influential factor, which was in agreement with the results of Mehdipour *et al.* (24) and Percival *et al.* (18) and in contrast to the findings of Nematollahi *et al.* (8). Also, oral habits were reported to have a higher frequency sometimes in public schools and sometimes in private schools and modern communities (38).

The parents' employment and their educational level, particularly their mothers', can affect breastfeeding and mother-child emotional interactions and subsequently influence the development of oral habits. The effect of these parameters was not significant in the present study; however, some other studies showed the positive or negative impact of these factors on the development of oral habits in children (9, 11, 23, 36, 37).

Cultural and social factors also affect oral habits in children. Family lifestyle also influences teaching coping mechanisms to children. Some authors believe that family lifestyle is more important than the child's psychological status in this respect. In some communities, a particular oral habit is part of the old culture of the society (39).

Feeding and sleeping of children as well as their occlusal interferences are among the personal factors that can affect the development of oral habits. The feeding of children was assessed in the present study, and the results showed that breastfeeding/ bottle-feeding and duration of breastfeeding had no significant effect on the development of oral habits. Many studies have reported the positive impact of breastfeeding on reducing oral habits in children. These studies have shown that breastfeeding children up to one year of age or older decreases the use of pacifiers, bottle-feeding, and nail-biting (23, 26, 37, 40). However, Percival *et al.* (18) reported different results and indicated that breastfed children had a higher frequency of oral habits than bottle-fed children. Breastfeeding appears to help with the physical and psychological development of children by providing emotional security in the mother's arms. Insufficient breastfeeding and the resultantly incorrect mouth function during the infancy period may result in incomplete development of the stomatognathic system and neuromuscular function in sucking, breathing, and deglutition (1).

Insufficient or poor-quality sleep is among other important personal factors that may lead to the development of oral habits. Children may start thumb-

sucking to cope with fatigue and tiredness. Some studies reported that restless sleep, sleep talking, or light sleep were associated with oral habits (11). However, this parameter did not have a significant effect on the development of oral habits in the current study, which may be because the collected data in this respect were based on the parents' reports.

The questionnaire used in the present study asked about a family history of oral habits to assess the possible genetic component of this trait. The results showed that a positive family history was significantly associated with oral habits in children. Some other studies indicated a higher frequency of oral habits in children whose parents had a history of nail biting or bruxism during their childhood (9,11). Also, the frequency of oral habits has been reported to be very high in some countries such as Brazilian children (15). Furthermore, in addition to the role of genetics, oral habits in some children are an imitation of the oral habits of their siblings (1, 18). Therefore, the main reason behind oral habits and their in-time prevention and management are imperative to prevent their adverse effects.

Not performing any clinical examination was the main limitation of this study. To increase the reliability of the findings, parents received some additional information about oral habits. Also, the present study did not ask the parents about the duration and repetition frequency of oral habits. Considering the effect of these parameters on complications of oral habits, they need to be investigated in future studies.

Conclusion

The present results showed a higher frequency of bruxism and nail-biting than other habits in the study population, which was not expected in 3-6-year-old children and may be related to underlying causes, i.e. emotional tensions, which have an increased prevalence in young children due to exposure to the media and social conditions. In addition, the results showed that mother-child interactions significantly impact the continuation/ cessation of oral habits in children. Thus, in the case of observing oral habits in children older than 3 years, mother-child interactions may need to be investigated and improved in addition to dental interventions.

Acknowledgment

We would like to express our deepest gratitude to the participants for their remarkable patience and cooperation.

Conflict of Interest

The authors declare that they have no conflict of interest.

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