

# Non-nutritive Sucking Habits in Infants Aged 1 to 3 Years: Association with Breastfeeding Duration and Socio-demographic Characteristics of Their Family

Hosseinagha Aghili<sup>1</sup>, Soghra Yassaei<sup>2</sup>, Maryam al-sadat Alavi<sup>3</sup>, Zahra Ebrahimi Nik<sup>4</sup>

<sup>1</sup>Associate professor, Department of Orthodontics, Faculty of Dentistry, Shahid Sadoughi University of Medical Sciences, Iran.

<sup>2</sup>Associate professor, Department of Orthodontics, Faculty of Dentistry, Shahid Sadoughi University of Medical Sciences, Iran.

<sup>3</sup>Faculty of Dentistry, Shahid Sadoughi University of Medical Sciences, Yazd, Iran. <sup>4</sup>Postgraduate student of orthodontics, Department of Orthodontics, Faculty of Dentistry, Shahid Sadoughi University of Medical Sciences, Iran

## Abstract

**Aim:** This study assessed the prevalence of non-nutritive sucking habits and its association with breastfeeding duration and socio-demographic characteristics in 140 children (1 to 3 years of age) attending health and treatment centers in the city of Yazd, Iran.

**Methods:** The sample divided into 2 groups of having NNS (non nutritive sucking) habit and not having NNS habit. The data were collected via validated questionnaires filled by children's mothers and were analyzed by SPSS software using chi-square, Fisher and odds ratio tests.

**Results:** Results showed no statistical differences between study groups in terms of socio-demographic characteristics of their families ( $P>0.05$ ). However the average time period of breastfeeding was remarkably higher in control group compared with test group (17.11 and 11.47 months respectively). The odds ratio for the association between the time period of breastfeeding and the prevalence of NNS habits was 4.88(95% CI 4.76 to 50).

**Conclusion:** Based on this study the lower prevalence of NNS habits belong to the children who were breastfed longer.

*Key Words: Breastfeeding, Non-nutritive sucking habit (NNS), Malocclusion*

## Introduction

Satisfactory maternal breastfeeding has an important effect on child's health and quality of life [1-5]. In pediatric literature breastfeeding has been called the best and safest way of feeding infants [1]. WHO recommends that breastfeeding should be exclusive at least until 6 months of age [6]. It positively affects physiological and psychological development of children. Mother's milk provides all required nutrition which could promote proper immunological protection and therefore prevent chronic diseases and respiratory infections [3-4,7]. Moreover, breastfeeding has been associated with growth and development of the maxillomandibular complex by the act of sucking [7-8]. In fact, sucking develops prenatally and is one of the infant's first coordinated muscular activities. That newborns commonly suck their finger is an instinctive behavior which is likely to be beneficial for the infant [9].

During breastfeeding the perioral muscle activity (repeated advancing and retraction of the tongue and mandible) increases resulting in more neuromuscular stimuli which in turn, helps the correct arrangement of the maxillomandibular structures whilst bottle feeding induces a pattern of low-impact muscular activity that may interfere with the normal development of dental arches [10-11]. In the other hand, non nutritive sucking habits (NNS) would make a negative pressure in the oral cavity that lessens the maxillary dental arch. The relationship between prolonged nonnutritive sucking habits and occlusal abnormalities has been studied extensively [7-8].

There are many authors who believe that breastfeeding, especially if prolonged, could have a preventive effect on

NNS habits and therefore protects against malocclusion [9-12]. Thomaz E reported that breastfeeding period of less than 6 months could lead to malocclusion class two or three which negatively affect the profile esthetic and oral functions [11]. Some studies found that the prevalence of NNS habits was influenced by factors like sex, birth order, feeding method, and socioeconomic status [13-15]. Jahanbin et al. [16] reported that the prevalence of finger sucking among 4367 seven-year-old girls in Mashhad, Iran was 10.6 % which was very similar to other studies: 12%, 10% and 11% in Norway, Sweden and Saudi Arabia respectively [14,17-18]. Jahanbin also showed that the prevalence of finger sucking was not significantly associated to child's birth order and number of siblings and parents' educational level. Another study assessing the prevalence of NNS habits in Kerman, Iran reported that among 1000 kindergarten children 3.4% showed NNS habits [19].

Nevertheless, reports in the literature regarding breastfeeding duration and the prevalence of NNS habits and also the association of each feeding pattern with various types of parafunctional habits are scarce particularly in this study region (central part of Iran).

Because of the unsettled questions concerning this subject, we investigated the association of the breastfeeding duration and socio-demographic characteristics of the infants' families with prevalence of NNS habits.

## Method and Material

This is a case control study conducted in October 2012 to June 2013. The samples were 140 children aged 3 to 6 years

old which were selected from 1200 babies who had pediatric files in health and treatment centers of Yazd, Iran. The data on infant feeding status and demographic information were retrospectively collected from the mothers or caretakers by a questionnaire which consisted of two parts; the first part was related to the demographic information which included age, sex and birth order of the child, parents' education and their job. The second part was a structured, validated questionnaire on history of breast-feeding, bottle feeding and parafunctional habits (NNS) in their children.

The sample divided into test group and control group. To be included into the test group, children had to have non nutritive oral habit like finger sucking or bruxism. Participants with severe maxillofacial abnormalities and those who had severe neuromuscular disorders were excluded from the study. Control group consisted of those children who did not have any oral habit.

Gathered data were entered into a computer and statistical analyses (Chi square, ANOVA ,Odds Ratio, T – Test) were performed using Statistical Package of Social Science (SPSS 15.5) and the probability level was 0.05.

**Results**

The sample consisted of 140 children divided into a control group (70 children without any oral habit) and a test group (70 children with non-nutritive sucking habits). The children's mean age was 55/4 ± 11/4 months. In control group; 51.4% were female and 48.6% were male. In test group; 35.7% were female and 64.3% were male. In both groups, the majority of mothers were housewife and nearly half of the parents were college educated. For over the 50% it was their first child. As summarized in *table 1*, demographic variables in study groups had no statistically differences.

Based on mother's answers, the average time period of breastfeeding was remarkably higher in control group compared with test group (17.11 and 11.47 months respectively). *Table 2* indicates that 22.9% of children with NNS habits (test group) had less than 6 months breastfeeding. 77.1% of them had more than 7 months breastfeeding. However in control group, only 5.7% of children had less than 6 months breastfeeding and 94.3% had more than 7 months breastfeeding. The odds ratio for the association between the time period of breastfeeding and the prevalence of NNS habits was 4.89 (95% CI 4.76 to 50).

The most common habit among test-group children was bruxism (68.66%) followed by external object biting (65.7%), thumb sucking (42.9%) nail biting (34.3%) and pencil sucking (17.1% ).

According to the data shown in *graph 1*, the frequency of all oral habits except the pencil sucking is increased with the decrease of breastfeeding time.

**Discussion**

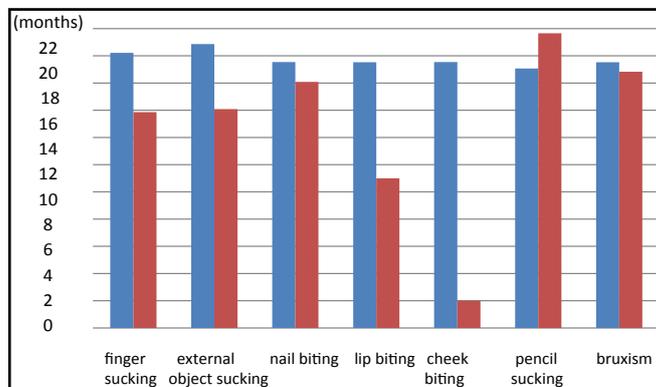
Breastfeeding positively affects physiological and psychological development of children. Mother's milk provides all required nutrition which could promote proper immunological protection and therefore prevent chronic diseases and respiratory infections [4-6]. It is also associated with growth and development of the maxillomandibular

**Table1.** Demographic information; \* 1 USD ≈ 3000 Toman.

Variable	Categories	%		P-value
		Test Group	Control Group	
Child's sex	Female	35.7	51.4	0.061
	Male	64.3	48.6	
Birth rate	First	54.3	65.7	0.125
	Second	25.7	27.1	
	Third	11.4	5.7	
	Fourth	8.6	1.4	
Child's age	Average	56.4	53.4	0.104
Mother's job	Housewife	71.4	65.7	0.174
	Part-time job	17.1	28.6	
	Full-time job	11.4	5.7	
Mother's education	High school or less	51.4	48.6	0.287
	College	48.6	51.4	
Father's education	High school or less	42.9	38.6	0.680
	College	57.1	61.4	
Family income (monthly)	300,000 Toman* or less	11.4	7.1	0.059
	300,000-700,000 Toman	43.0	60.0	
	More than 700,000 Toman	45.7	32.9	

**Table 2.** Time period of breastfeeding.

Time period of breast feeding	%		Chi Square test result		
	Test group	Control group	P-value	Odds ratio	C.I % 95 OR
Less than 6 months	22.9	5.7	0.014	4.889	1.54-15.48
More than 7 months	77.1	94.3			



**Graph 1.** The relationship between oral habits and breastfeeding time. The frequency of all oral habits except the pencil sucking is increased with the decrease of breastfeeding time.

complex by the act of sucking which induces perioral muscle activity [7-8].

On the other hand, nonnutritive sucking habits could cause occlusal abnormalities especially if prolonged [2,13,20]. Some authors showed that the prevalence of NNS habits is influenced by many factors such as sex, birth order, feeding method, and socioeconomic status [21]. The results of the present study could not identify such relationship and the demographic information between study groups didn't show a statistical difference.

Seraj B [22] reported that demographic characteristics including sex, birth order and educational level had no effect on the prevalence of bruxism which is in agreement of our results. These results also support Telles FB [12] and Bishara SE [23] studies that reported the prevalence of NNS habits

didn't statistically different in different genders. However, Vasconcelos FM showed that oral habits are higher among girls than boys [24]. Aarts °C reported that educational level of mothers and their age is associated with time period of breastfeeding and pacifier usage [25].

Information regarding breastfeeding as it relates to NNS habits is somewhat contradictory. Results of this study indicated that the prevalence of NNS habits were lower in children who were breastfed longer which might suggest this assumption that breastfeeding time has a preventive effect on NNS habit development. An explanation is that the less time of breastfeeding induces more time of bottle feeding which in turn increases the chance of other external object sucking. In other words, bottle feeding gives children this opportunity to be addicted in sucking other external objects. However this is not a proven hypothesis and more clinical cohort studies are required to clarify the factors associated to NNS habit development. There are several studies that show the association between breastfeeding time and NNS habit prevalence. Moimaz SA [21], Degan VV [26], Kobayashki HM [7], Viggiano [27], Vasconcelos FM [24], Medeiros AP [28], Telles FB [12], Thomaz EB [11] and Jahanbin [16] all agree our results. However Zadik [29], Aarts [25], Hanna JC [15], Meyers A [30] and Finocchi LL [31] opposed the results of this study. These authors stated that children who were

breastfed for a longer time showed more tendencies toward pacifier usage or other external object sucking.

In the current study the dental examination was not performed because the association between NNS habits and malocclusion prevalence has been well documented. Numerous studies identified a significant association between sucking habits and anterior open bite, class II occlusion, increased overjet, and posterior crossbite [2,8,10-11,24,27,30]. However we recommend further investigation on the association between breastfeeding time and malocclusion prevalence.

## Conclusion

According to this research, the prevalence of NNS habits was significantly lower among children who were breastfed longer. However further investigations with prospective approach is needed to claim that breastfeeding for a reasonable period of time could prevent the types of malocclusion related to the NNS habits.

## Author's Contributions

HA participated in the design of the study and performed the statistical analysis. SY designed the questionnaire and helped drafting the study. MA carried out the interview with the mother's samples and gathered the data. ZE drafted the manuscript.

## References

1. Breastfeeding and the use of human milk. American Academy of Pediatrics. Work Group on Breastfeeding. *Pediatrics*. 1997; **100**: 1035-9.
2. Davis DW, Bell PA. Infant feeding practices and occlusal outcomes: a longitudinal study. *Journal of the Canadian Dental Association*. 1991; **57**: 593-4.
3. Giugliani ER. Breast-feeding: how and why to promote it. *Jornal de Pediatria*. 1994; **70**: 138-51.
4. Newman J. How breast milk protects newborns. *Scientific American*. 1995; **273**: 76-9.
5. Primo CC, Caetano LC. The decision to breastfeed: grandmother's view. *Jornal de Pediatria*. 1999; **75**: 449-55.
6. Organization. WH. Protecting, promoting and supporting breastfeeding. Geneva: WHO 1989.
7. Kobayashi HM, Scavone H, Jr., Ferreira RI, Garib DG. Relationship between breastfeeding duration and prevalence of posterior crossbite in the deciduous dentition. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2010; **137**: 54-8.
8. Jabbar NS, Bueno AB, Silva PE, Scavone-Junior H, Ines Ferreira R. Bottle feeding, increased overjet and Class 2 primary canine relationship: is there any association? *Brazilian Oral Research*. 2011; **25**: 331-7.
9. Pollard K, Fleming P, Young J, Sawczenko A, Blair P. Night-time non-nutritive sucking in infants aged 1 to 5 months: relationship with infant state, breastfeeding, and bed-sharing versus room-sharing. *Early Human Development*. 1999; **56**: 185-204.
10. Milnes AR. Breastfeeding duration may be related to lower prevalence for posterior crossbite in the deciduous dentition. *Journal of Evidence-Based Dental Practice*. 2011; **11**: 67-8.
11. Thomaz EB, Cangussu MC, Assis AM. Maternal breastfeeding, parafunctional oral habits and malocclusion in adolescents: a multivariate analysis. *International Journal of Pediatric Otorhinolaryngology*. 2012; **76**: 500-6.
12. Telles FB, Ferreira RI, Magalhaes Ldo N, Scavone-Junior H. Effect of breast- and bottle-feeding duration on the age of pacifier use persistence. *Brazilian Oral Research*. 2009; **23**: 432-8.
13. Farsi NM, Salama FS. Sucking habits in Saudi children: prevalence, contributing factors and effects on the primary dentition. *Journal of Pediatric Dentistry*. 1997; **19**: 28-33.
14. Larsson E, Ogaard B, Lindsten R. Dummy- and finger-sucking habits in young Swedish and Norwegian children. *Scandinavian Journal of Dental Research*. 1992; **100**: 292-5.
15. Hanna JC. Breast feeding versus bottle feeding in relation to oral habits. *Journal of Dentistry for Children*. 1967; **34**: 243-9.
16. Jahanbin A, Mokhber N, Jabbarimani A. Association between sociodemographic factors and nutritive and non-nutritive sucking habits among Iranian girls. *Eastern Mediterranean Health Journal*. 2010; **16**: 1143-7.
17. Melsen B, Stensgaard K, Pedersen J. Sucking habits and their influence on swallowing pattern and prevalence of malocclusion. *European Journal of Orthodontics*. 1979; **1**: 271-80.
18. Modeer T, Odenrick L, Lindner A. Sucking habits and their relation to posterior cross-bite in 4-year-old children. *Scandinavian Journal of Dental Research*. 1982; **90**: 323-8.
19. Hamidreza Poureslami MRA, Hoda Shamsadin. The prevalence of finger sucking habit among preschool children in Kerman, Iran. *Journal of Oral Health and Oral Epidemiology*. 2013; **2**.
20. Katz CR, Rosenblatt A, Gondim PP. Nonnutritive sucking habits in Brazilian children: effects on deciduous dentition and relationship with facial morphology. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2004; **126**: 53-7.
21. Moimaz SA, Zina LG, Saliba NA, Saliba O. Association between breast-feeding practices and sucking habits: a cross-sectional study of children in their first year of life. *Journal of Indian Society of Pedodontics and Preventive Dentistry*. 2008; **26**: 102-6.
22. Seraj B, Shahrabi M, Ghadimi S, Ahmadi R, Nikfarjam J, Zayeri F, et al. The Prevalence of Bruxism and Correlated Factors

in Children Referred to Dental Schools of Tehran, Based on Parent's Report. *Iranian Journal of Pediatrics*. 2010; **20**: 174-80.

23. Bishara SE, Warren JJ, Broffitt B, Levy SM. Changes in the prevalence of nonnutritive sucking patterns in the first 8 years of life. *American Journal of Orthodontics and Dentofacial Orthopedics*. 2006; **130**: 31-6.

24. Vasconcelos FM, Massoni AC, Heimer MV, Ferreira AM, Katz CR, Rosenblatt A. Non-nutritive sucking habits, anterior open bite and associated factors in Brazilian children aged 30-59 months. *Brazilian Dental Journal*. 2011; **22**: 140-5.

25. Aarts C, Hornell A, Kylberg E, Hofvander Y, Gebre-Medhin M. Breastfeeding patterns in relation to thumb sucking and pacifier use. *Pediatrics*. 1999; **104**: e50.

26. Degan VV, Puppini-Rontani RM. Prevalence of pacifier-sucking habits and successful methods to eliminate them—a preliminary study. *Journal of Dentistry for Children (Chicago, Ill.)*. 2004; **71**: 148-51.

27. Viggiano D, Fasano D, Monaco G, Strohmeier L. Breast feeding, bottle feeding, and non-nutritive sucking; effects on occlusion in deciduous dentition. *Archives of Disease in Childhood*. 2004; **89**: 1121-3.

28. Medeiros AP, Ferreira JT, Felicio CM. Correlation between feeding methods, non-nutritive sucking and orofacial behaviors. *Pro Fono*. 2009; **21**: 315-9.

29. Zadik D, Stern N, Litner M. Thumb- and pacifier-sucking habits. *American Journal of Orthodontics*. 1977; **71**: 197-201.

30. Meyers A, Hertzberg J. Bottle-feeding and malocclusion: is there an association? *American Journal of Orthodontics and Dentofacial Orthopedics*. 1988; **93**: 149-52.

31. Finocchi LL. Breast feeding, bottle feeding and their impact on oral habits. A review of the literature. *Dental hygiene (Chic)*. 1982; **56**: 21-5.