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Evaluation of application of fix and removable habit breakers among a group of preschool children with thumb sucking habit in Kerman, Iran

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Original Article

Abstract

BACKGROUND AND AIM: Thumb sucking has been reported as one of the etiologic factors for malocclusion. The aim of this study was to determine the prevalence of thumb sucking and use of different kinds of habit breaker (HB) appliances in children attending private kindergartens in Kerman, Iran.

METHODS: The census method was used in the present cross-sectional study, and the study population consisted of all the children attending private kindergartens. A checklist was completed for each subject, and clinical examinations were done. Fisher's exact test was used to evaluate the relationship between thumb sucking and the variables under study. Stata 13 was used for the analysis of data.

RESULTS: Of 503 4 to 6-year-old children, 14 (2.8%) had thumb sucking habits at the time of the study. Among these 14 children, only 6 children used HBs fixed (4 persons) or removable (2 persons).

CONCLUSION: The prevalence of finger sucking, its side effects, as well as using the HBs of this habit in children of Kerman kindergartens were not high. Furthermore, it has same rate like other cities. In this situation, it's necessary for the personnel of kindergartens to notify their parents about the hygiene of the problems.

KEYWORDS: Finger Sucking; Malocclusion; Pacifier

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Considering a high prevalence rate of malocclusion in different communities and the problems resulted from it, it appears absolutely necessary to elucidate the relevant etiologic factors as well as, treatment methods. Thumb sucking has been reported as one of the etiologic factors for malocclusion. It is one of the most common habits of children and is usually broken during normal growth up to age 3

spontaneously. Thumb sucking after 3 years of age might give rise to speech deficiencies, masticatory problems, lisping and open bite in children, exerting a negative effect on their self-confidence.¹

Changes resulting from thumb sucking are diverse and depend on the severity, duration, and the frequency of the habit. Long duration of this period leads to greater tooth movements. The most important malocclusion emanating from thumb sucking

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is anterior open bite. Breaking this habit will not result in the correction of malocclusion due to the incorrect growth pattern resulting from it. The most probable success is achieved when children themselves are interested in breaking this habit. Three different approaches to the treatment have been advocated: (1) Psychoanalytic method, (2) behavioral modification technique, and (3) use of habit breaker (HB) appliances.^{2,3}

The aim of this study was to determine the prevalence of thumb sucking and use of different kinds of HB appliances in children attending private kindergartens in Kerman, Iran in 2014-2015 educational year.

The prevalence of thumb sucking in children in Kerman was evaluated in 2001; however, since the social and cultural behaviors of families have undergone changes during the last 10 year, furthermore in that study was not evaluated the treatment methods, so it is necessary to re-evaluate the problem in Kerman. In that study which done by Poureslami et al.,⁴ among the 3-6-year-old kindergarten children, the results showed that 3.4% of the subjects were in the habit of thumb sucking with equal prevalence in boys and girls. Almost 50% of children had normal dental relationship and 50% had anterior open bit only, the prevalence of posterior cross-bite and posterior open bit along with anterior open bite was 0%.

Methods

The census method was used in the present cross-sectional study and the study population consisted of all the children attending 17 private kindergartens in Kerman, which added up to 503 children 4 to 6-year-old (259 girls and 244 boys), who underwent examinations. The researchers attended the kindergartens and recorded the number of children in each case. The parents signed letter of satisfaction. Then, the kindergarten authorities and the parents were questioned about each subject's thumb sucking habit and using the HBs. A checklist

was completed for each subject. Finally, detrimental effects of thumb sucking on the dentoalveolar system were explained, and instructions were provided to prevent thumb sucking for those who had this habit and did not follow any treatment method.

The checklist consisted of two sections. The first section included the personal data of each subject, and the second section consisted of questions for parents to answer in relation to the thumb sucking habit of their children. These questions covered areas such as age, gender, the child's nutritional status during infancy, use of a pacifier and the duration of the use of a pacifier. The results of clinical examinations, too, were recorded in the checklist. The examination included the status of teeth and the dental arches, which were categorized in three groups, including normal anterior and posterior teeth, anterior open bite, and anterior open bite along with posterior open bite or posterior cross-bite.

To determine the prevalence of thumb sucking, descriptive statistics for qualitative data and calculating 95% confidence intervals (CI) was used. Fisher's exact test was used to estimate the association between gender and kind of nutrition and also gender and occlusion. Stata 13 (Stata Corporation, College Station, TX, USA) was used for the analysis of data. The study did not have important ethical considerations because no therapeutic intervention was carried out and no medications were prescribed; however, the demographic data of the subjects were kept confidential. The protocol of the study was approved by the Ethics Committee under the code IR.KMU.REC.1394.14.

Results

Of 503 4 to 6-year-old children attending private kindergartens in Kerman 14 (2.8%; 95% CI: 1.5-4.6) had thumb sucking habits at the time of the study. Among these 14 children, only 6 children used HBs fixed or removable (4 persons fixed and 2 persons

Table 1. Prevalence of thumb sucking and using of HBs among a group of preschool children in Kerman

Number of children [n (%)]	Children with thumb sucking [n(%)]		Using fixed HB [n(%)]	Using removable HB [n (%)]	No using HB by the suckers [n (%)]
	Female	Male			
503 (100)	9 (1.8)	5 (1.0)	4 (0.8)	2 (0.4)	8 (1.6)

HB: Habit breaker

removable appliances). Five mothers stated his/her child have had finger sucking but was broken the habit by using HB in last year and at the time of the study; these 5 children were free of the habit. Tables 1 and 2 show the gender distribution of thumb sucking and the effect of thumb sucking on teeth relationships and occlusion.

The role of the type of nutrition during their infancy in their thumb sucking habit has been shown in table 3. As well as table 3 presents the status of the use of pacifier during their infancy.

Discussion

At the time of study, 14 children 2.8% exhibited a thumb sucking habit and 1.2% used HBs (0.8% fixed appliance and 0.4% removable appliance). Different prevalence rates have been reported for this habit in the studies, but no study reported the rate of using HBs. The differences on prevalence rates might be attributed to differences in study methodologies and also cultural and social factors that are involved in forming such a habit and each set of statistical data on this habit is specific for that community only. The study that is the closest to this study in relation to its location is a study by Poureslami et al.,⁴ in which of 1000 children studied 34 (3.40%) exhibited thumb sucking and of these children 55.88% (19 subjects) were female and 44.12% (15 subjects) were male, indicating no significant relationship between the thumb sucking habit and

gender. In this study, 2.7% of the subjects (14 children) had the habit, 64.28% (9 subjects) of which were female and 35.72% (5 subjects) were male, revealing no significant relationship between thumb sucking and gender.

In the study by Poureslami et al.,⁴ the statuses of teeth and the dental arches were evaluated in children with a thumb sucking habit. The results showed a significant relationship between the thumb sucking habit and the statuses of teeth and the dental arches. In this context, the minimum relative frequency belonged to children who had anterior open bite in association with posterior open bite or posterior cross-bite (0%). Children with normal relationship of anterior and posterior teeth comprised 50% of the children (17 subjects) and those with anterior open bite only, too, comprised 50% of the children (17 subjects). In this study, too, the statuses of the teeth and dental arches were evaluated in children with a thumb sucking habit. The results showed a significant relationship between the thumb sucking habit and the statuses of teeth and dental arches. In this context, the minimum relative frequency belonged to children with anterior open bite along with posterior open bite or posterior crossbite (21.43%, 3 children), and 35.71% (3 children) of the subjects exhibited a normal relationship between anterior and posterior teeth. Anterior open bite was recorded in 35.71% (5 children) of the subjects.

Table 2. Prevalence of different types of occlusion among the preschool children with thumb sucking habit according to gender (%)

Occlusion	Female [n (%)]	Male [n (%)]	Total [n (%)]	P
Normal	4 (28.58)	2 (14.28)	6 (42.86)	0.96
Anterior open bite	3 (21.42)	2 (14.28)	5 (35.71)	
Anterior and posterior open bite	2 (14.28)	1 (7.15)	3 (21.43)	
Total	9 (64.27)	5 (35.73)	14 (100)	

Table 3. Prevalence of different kinds of the feeding and frequency of using of pacifier (in infancy period of life) among the preschool children with thumb sucking habit according to gender (%)

Kind of nutrition	Female	Male	Total	P
Breast feed	5 (35.72)	3 (21.43)	8 (57.15)	0.99
Formula	0 (0)	0 (0)	0 (0)	
The both	4 (28.57)	2 (14.28)	6 (42.85)	
Total	9 (64.28)	5 (35.72)	14 (100)	
Using of pacifier				0.99
Yes	4 (28.58)	3 (21.43)	7 (50.00)	
No	5 (35.72)	2 (14.29)	7 (50.00)	
Total	9 (64.29)	5 (35.72)	14 (100)	

The results of the present study were consistent with those of Poureslami et al.,⁴ and the differences were attributed to changes in cultural and social variables from 2001 to 2014, which have taken place in the municipal community of Kerman. The differences in the results might be attributed to the number of samples. In addition, in this study, the relationship between the use of a pacifier and thumb sucking habit was evaluated: 50% of the subjects (7 children) used a pacifier and 50% did not, indicating no significant relationship between the use of a pacifier and the thumb sucking habit, consistent with the results of the study by Poureslami et al.⁴

In relation to the status of nutrition during infancy and its relationship with thumb sucking, there was no significant relationship between the two. In this context, of 14 children with the habit, 57.15% (8 children) had been breastfed and 0% had received milk formulations only; 42.85% (6 children) had been breastfed and had received milk formulations. In the study by Poureslami et al.,⁴ of 34 children with the habit, 47.06% of the subjects (16 children) had either been breastfed completely or had been predominantly breastfed; 35.30% (12 children) had been breastfed and had also received milk formulations and 17.64% (6 children) had received milk formulations only or had been predominantly fed on milk formulations, consistent with the results of the present study. Furthermore, there was no significant relationship between birth order of children who had the habit and did not have the habit.

In a study on 1031 children aged 2-5 to

evaluate the presence of anterior open bite and its relationship with oral habits, thumb sucking was reported to be the important etiologic agent for anterior open bite in children, with a prevalence rate of 2.8%,⁵ consistent with the results of this study. In addition, it was demonstrated that the incidence of malocclusion was affected by the thumb sucking habit. It was concluded in this study, too, that the incidence of malocclusion is directly under the influence of thumb sucking habit and it is the principal cause of open bite and cross-bite.

Furthermore, Jahanbin et al. study⁶ on 436 female children aged 7 the highest prevalence rate of thumb sucking habit was observed in children who had been breastfed only; in addition, the highest rate of the use of a pacifier was observed in children who had been breast- or bottle-fed. This finding is contrary to the results of this study. The discrepancies in the results of these two studies can be attributed to differences in the factors involved in the incidence of oral habits. In addition, in that study, the relationship between the rates of pacifier use and sucking of mother's breast was evaluated, and the thumb sucking habit was noted in children who had exclusively been breastfed, while in the present study, there was no relationship between the incidence of thumb sucking habit and being exclusively breastfed.

In another study by Vasconcelos et al.⁷ among 1308 children, the prevalence rate of non-nutritional sucking habits was 40%, which was related to gender, age and type of nutrition, contrary to the results of the present study.

In a study by Romero et al.,⁸ the infants' nutrition and non-nutritional sucking habits of children were evaluated in a group of children aged 3-6. The subjects were classified based on periods fed on mother's milk. The relationship between breast-feeding and non-nutritional sucking habits and the incidence of anterior open bite in the initial dental structure was evaluated. The children who were not breastfed had a higher chance to develop anterior open bite compared to children who were breastfed for more than 12 months, indicating the position effect of breast-feeding on dentoalveolar structure. In our study, the thumb sucking habit had no significant relationship with age and the type of nutrition and the discrepancy between the results might be attributed to differences in the study protocols.

In addition, de Albuquerque et al.⁹ evaluated the relationship between non-nutritional sucking habits and nutritional methods among children aged 12-36 months. The subjects consisted of 292 children of both genders. There was a significant relationship between nutritional methods and non-nutritional sucking habits. The prevalence of the thumb sucking habit decreased with an increase in the duration of breast-feeding. The results of that study were contrary to the results of the present study. In this study, the duration of breast-feeding had no significant relationship with the thumb sucking habit.

In another study by Fukumoto et al.³ on 555 children aged 36-47 months, questionnaires were used to collect data. Termination of breast-feeding before 12 months of age or use of a pacifier before 14 months of age was related with the thumb sucking habit, which is contrary to the results of the present study. Such discrepancy might be attributed to the age range of the subjects: 12-36 months in that study versus 3-6 years in the present study.

In Noori et al. study,¹⁰ 400 boys and girls aged 24-72 months of age were selected and

the thumb sucking habit, bottle-feeding and use of a pacifier were evaluated. Of the subjects, 68 subjects of both genders had oral habits: 52.9% had thumb sucking, 38.2% were bottle-fed, 7.3% had thumb sucking along with bottle-feeding, and 1.4% used pacifiers. There was a direct and significant relationship between thumb sucking on one hand, and tooth crowding and the shape of the hard palate on the other hand. The results of that study are consistent with those of the present study which showed a direct and significant relationship between thumb sucking and tooth crowding, resulting in malocclusion. A study which carried out by Ghasempour and Nasrolahi¹¹ the prevalence of thumb sucking and its effect on dentoalveolar anomalies were evaluated. The subjects consisted of 374 children aged 5-6 years, who attended kindergarteners; 20.1% of the subjects exhibited thumb sucking habit, with no significant differences between boys and girls. The results showed a higher rate of malocclusion in children with a thumb sucking habit, consistent with the results of the present study.

Conclusion

The prevalence of finger sucking, its side effects as well as using the HBs of this habit in children of Kerman kindergartens was not high. Furthermore, it has the same rate like other cities.⁵⁻¹¹ In this situation, it is necessary for the personnel of kindergartens to notify their parents about the hygiene of the problems.

Conflict of Interests

Authors have no conflict of interest.

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