

Sucking habits in Saudi children: prevalence, contributing factors and effects on the primary dentition

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Abstract

A review of the literature on the prevalence of sucking habits shows that it varies from one population to another. The purposes of this study were to: 1) determine the prevalence of sucking habits among preschool Saudi children living in Riyadh City, 2) assess the influence of some cultural factors on that prevalence, and 3) to study the effect these habits might have on the primary dentition. This cross-sectional study was conducted through a survey questionnaire and clinical examination of 583 Saudi children aged 3–5 years using a stratified cluster random sampling technique. The prevalence of sucking habits was 48.36% with the dummy-sucking as the dominant type. Most dummy-suckers had broken their habits in the first few years of life while more digit-suckers were still active at age 5 years. Sucking habits were only related to parents' education and the child feeding methods without significant effect of gender or birth rank or family income. Children with existing digit sucking habits had significantly ($P < 0.05$) more distal molar and class II canine relationships, larger overjet, and open bite than did children without sucking habits. These differences were even more significant ($P < 0.01$) when dummy-suckers were compared with nonsuckers.

The only measurable effect of previous sucking habits was a more open bite. Posterior crossbite was no more common in children with sucking habits than in children without these habits. (Pediatr Dent 19:28–33, 1997)

The concern about sucking habits is evident from the number of articles appearing in scientific journals in the past 50 years. Prevalence of digit or dummy-sucking habits varies significantly from one population to another (Table 1).^{1–10} While sucking habits appear to be increasing in children in industrialized countries, they do not exist in some developing countries. Prevalence seems to be influenced by many factors such as sex, birth rank, feeding method, and socioeconomic status.

Information regarding the relationship of these factors to sucking habits is somewhat contradictory and inconclusive. Most workers did not establish sex difference in the prevalence of sucking habits.^{11–15} In contrast, several reports suggest that girls demonstrated a higher level of sucking habits than boys.^{10, 16–18} Hanna¹⁶ found that the later the sibling rank of the child, the greater the chance of an oral habit. Later studies by

TABLE 1. THE PREVALENCE OF SUCKING HABITS IN DIFFERENT STUDIES

First Author	Year	Sample	Age in Years	Digit-sucker %	Dummy-sucker %
Bliss	1945	300 New Zealander children	2–4	17	NR*
Traisman	1958	2650 U.S. children	Under 4	46	NR*
Bowden	1966	116 Australian children (longitudinal study)	0–8	27	37
Zadik	1977	333 Israeli children	Birth–7	23	70
Melsen	1979	723 Danish children	10–11	8	78
Svedmyer	1979	462 Swedish children	1–10 (mostly 3–5)	16	62
Cerney	1981	600 Australian children	Birth–3	18	62
Modeer	1982	588 Swedish children	4	10	78
Larsson	1985	415 Zimbabwean children	1–2	2	None
		200 skulls in Scandinavia from 1000 to 1500 AD	Juvenile	5	None
Larsson	1992	245 Norwegian children	3	12	37
		175 Swedish children	3	18	70

* Not reported.

Nanda et al.¹⁷ and Johnson and Johnson¹⁹ supported the findings of Hanna. However, Larsson and Jarvheadan²⁰ reported no correlation between the sucking habits and order of birth. Several reports claim that children from a high socioeconomic group demonstrated digit-sucking habits more frequently than children from low socioeconomic class, while dummy-sucking was more prevalent in the lower socioeconomic group.²¹⁻²³

There is convincing evidence that the educational level of parents has a great influence on digit- and dummy-sucking.^{24, 25} Several studies to compare the prevalence of sucking habits in breast-fed versus bottle-fed children predicted a lesser likelihood of these habits among breast-feeders.²⁶⁻²⁸ Many authors believe that the method of feeding has no appreciable influence on the acquisition of the habits.^{2, 4, 16, 29, 30} Recently, Paunio et al.¹⁵ reported that children who have been breast-fed for a long time tend to become finger-suckers. A national survey by Al Mazrou and Farid³¹ showed 90% of the Saudi women breast-fed their children. Kordy et al.³² reported that 57% of Saudi mothers breastfed their children for more than a year. Data are needed to reveal if this special pattern of breastfeeding would have any influence on the prevalence of sucking habits among Saudi children.

Associations of the sucking habit with anterior open bite and increased overjet in the primary dentition have been shown in several studies.^{6, 12, 33, 34, 37} There is no agreement on their effect in the molar region.^{8, 15, 33, 34} However, prevalence of malocclusions associated with sucking habits was positively correlated with duration and intensity of the habits.^{8, 34} The objectives of this survey were to determine the prevalence of sucking habits in preschool Saudi children and to assess the influence of cultural factors on these habits. In addition, this study aimed to investigate the effect that these habits might have on the primary dentition.

Materials and methods

This cross-sectional survey was conducted through a questionnaire and clinical examination. To test the procedure for the main study, a pilot study was conducted on 30 children aged 2-6 years (this sample was not included in the main study). Results of the pilot study were used to determine the sample size of the main study and to incorporate appropriate modifications into the questionnaire, methods for clinical examination, and the criteria for sample selection.

The study population, consisting of 583 Saudi children aged 3-5 years, was recruited from nursery schools in Riyadh City, Saudi Arabia, using a stratified cluster randomized sampling technique. The nursery schools were stratified according to the housing density and housing condition of each area where the nursery schools were located. Twelve schools were selected randomly. The questionnaires were distributed

to parents of all the Saudi children aged 3-5 years attending the schools. The questionnaire included questions about the child's age, sex, birth rank, history and duration of breast feeding, parents' education, economic status of the family, and the child's previous or persisting sucking habits, which were expressed in terms of type of sucking habit (digit or dummy), intensity (1, 2-5, or ≥ 6 hr/day), and duration of the habit (in years). The questionnaire included a cover letter requesting that the forms be completed by the mother or dictated by the noneducated mother to a literate family member.

Occlusal assessments were based only on children who had a complete primary dentition without any erupted permanent teeth and who were free from extensive caries. Thus, 520 children remained for clinical data analysis. Occlusion was assessed with the jaws in centric occlusion. All examinations were performed by one examiner (NF) using a pen light, mouth mirror, and a metal millimeter ruler. In each case, the examiner was blind to the child questionnaire data. The following parameters were recorded by consensus with published definitions:

1. Terminal plane relationship of the primary second molar, recorded as flush, mesial, or distal on each side.
2. Primary canine relationship, recorded as class I, II, or III on each side.
3. Degree of overbite recorded as less than or equal to 50%, greater than 50% overlap of the mandibular incisor crown, edge-to-edge or anterior open bite.
4. Amount of overjet, measured from the lingual surface of the mesial corner of the most protruded maxillary incisor to the facial surface of the corresponding mandibular incisor, recorded in millimeters.
5. Posterior crossbite was recorded when one or more of the maxillary primary canines or molars occluded palatally to the buccal cusp of the opposing mandibular teeth.

In the registration of occlusion characteristics, the intraexaminer reliability was tested by having the same examiner (NF) examine 25 children on two occasions separated by at least 1 week. There was complete agreement ($Kappa = 1.0$) in the repeated recording of posterior crossbite. Kappa values varied between 0.95 and 0.90 for the remainder of the parameters.

The presence of malocclusion was recorded according to the following traits: distal molar relation, class

TABLE 2. PREVALENCE OF SUCKING HABITS IN THE TOTAL SAMPLE (N = 583)

Habits	Boys (N = 268)		Girls (N = 315)		Total (N = 583)	
	N	%	N	%	N	%
Dummy	94	35.07	127	40.31	221	37.90
Digit	24	8.95	27	11.74	61	10.46
Total	118	44.02	164	52.05	282	48.36

TABLE 3. DISTRIBUTION OF PERSISTING SUCKING HABITS BY AGE (N = 583)

Age (years)	N	Digit Sucking		Dummy Sucking	
		# w/Habit	%	# w/Habit	%
3	104	9	8.65	6	5.76
4	220	13	5.90	5	2.27
5	259	16	6.17	2	0.77
Total	583	38	6.51	13	2.22

II canine relation, posterior crossbite, anterior open bite, and overjet of ≥ 4 mm.

Chi-square analysis was used to analyze the effect of the contributing factors on the prevalence of the sucking habits. The Z test was used to compare the proportions of the signs of malocclusion among the different sucking groups. The value of $P < 0.05$ was regarded as significant.

Results

Of the total, 48.36% reported a previous or persisting sucking habit, with dummy-sucking the most common (37.90%). The data in Table 2 show the prevalence of sucking habits by sex. More than half of the dummy users and digit-suckers were girls, but the difference between sexes were not statistically significant ($P = 0.06$). Most of the dummy-suckers (87.32%) used the conventional type, which has a long nipple with round bulbous end and no labial musculature support. Dummy-suckers dominated during the first year of life, while digit-sucking appeared to last longer. Thirteen (2.22%) children were still using dummies at the time of examination, while 6.51% of the sample were still digit suckers. Table 3 shows a summary of the distribution of persisting dummy- and digit-sucking by age. The intensity of the habits was reported to be 2-5 hr/day in more than half of the children with persisting habits (Fig 1).

Contributing factors

The influence of the four variables on prevalence of digit and dummy sucking habits was determined using chi-square analysis and is shown in Table 4. First-born children were compared with other siblings. Dummy-sucking was not found to be associated with a child's birth rank ($P = 0.383$), and neither was digit-sucking ($P = 0.352$). While dummy-sucking was positively related to parents' educational levels, digit-sucking was not affected by the level of parents' education. Family income was classified as high, medium, or low. There were no significant differences among groups in distribution of dummy users ($P = 0.065$) or digit-suckers ($P = 0.374$).

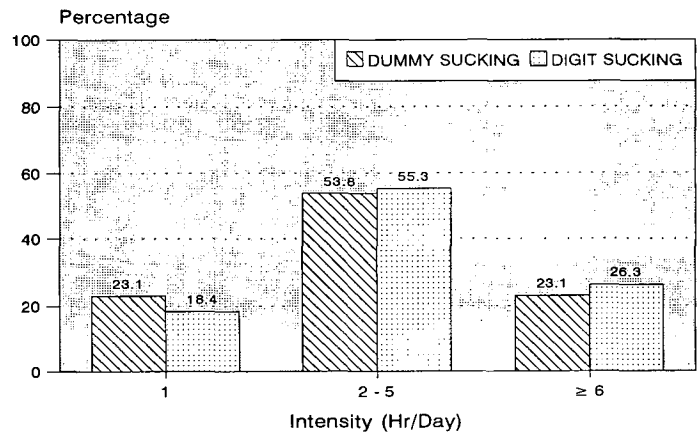


Fig 1. Intensity of existing sucking habits (N = 51)

TABLE 4. PERCENTAGE OF SUCKING HABITS IN RELATION TO VARIOUS CONTRIBUTING FACTORS (N=583)

Contributing Factors		Children with Digit Habit		Children with Dummy Habit	
		Percentage	SS*	Percentage	SS*
Birth rank	First child	12.85	NS	41.42	NS
	Other sibling	9.70		36.79	
Father's education	No formal education	11.42	NS	28.57	†
	School level education	10.68		31.37	
	College level education	10.07		42.24	
Mother's education	No formal education	16.67	NS	22.54	‡
	School level education	8.22		37.82	
	College level education	10.73		40.67	
Family income	High	9.25		43.51	
	Medium	9.78	NS	35.97	NS
	Low	14.43		27.83	
Breastfeeding duration (months)	None	13.53		54.88	
	1-5	15.73	†	59.55	§
	≥ 6	8.03		23.26	

* (SS) Statistical significance of difference between groups using chi-square test.

† 0.01 < P < 0.05

‡ 0.001 < P < 0.01

§ P < 0.001

NS = not significant.

TABLE 5. PERCENTAGE DISTRIBUTION OF DIFFERENT SIGNS OF MALOCCLUSION IN DIFFERENT SUCKING GROUPS (N = 520)

Malocclusion	Children with No Habit		Children with Sucking Habits										
	(N = 279)		Persistent Digit (N = 36)			Persistent Dummy (N = 12)			Previous Digit (N = 20)		Previous Dummy (N = 173)		Combined Previous Digit & Dummy
	N	%	N	%	SS*	N	%	SS*	N	%	N	%	SS*
Distal molar relation	13	4.66	9	25.00	†	6	50.00	‡	0	0.0	14	8.09	NS
Class II canine relation	19	6.81	9	25.00	†	7	58.33	‡	1	5.0	21	12.14	NS
Anterior openbite	10	3.58	13	36.11	‡	6	50.00	‡	3	15.0	14	8.09	†
Overjet ≥ 4 mm	24	8.60	12	33.33	†	6	50.00	‡	3	15.0	19	10.98	NS
Posterior crossbite	14	5.02	2	5.55	NS	0	0.00	NS	0	0.0	5	2.89	NS

* (SS) Statistical significance of difference from (no habit) group using z test.

† 0.01 < P < 0.05.

‡ P < 0.01.

NS = not significant.

Almost 78% of the participating children were breastfed, and 62% of the sample were breast-fed for at least 6 months. Children were grouped according to duration of breastfeeding into three groups: 1) those with no breastfeeding experience (0 duration), 2) those who were breastfed for 5 months or less, 3) those who were breastfed for 6 months or more. There were significant differences in the distribution of digit-suckers ($P = 0.044$) and dummy-suckers ($P < 0.0001$) among the groups. The children who were breastfed for periods longer than 6 months showed the lowest prevalence of digit or dummy sucking.

Association between sucking habits and malocclusion

To evaluate the effect of sucking habits on occlusion, the population was divided into five different groups:

1. Those with no history of sucking habits
2. Those with persistent digit-sucking
3. Those with persistent dummy-sucking
4. Those with previous digit-sucking habit
5. Those with previous dummy-sucking habit.

Table 5 presents the percentage distribution of the different signs of malocclusion among the groups. Statistical analysis using Z test showed that children with persistent digit sucking habits present with significantly ($P < 0.05$) higher proportion of malocclusion parameters, with the exception of posterior crossbite, than those with no habit. These differences were even more significant ($P < 0.01$) when dummy-suckers were compared with nonsuckers. Because of the small number of observations in the group of previous digit-sucking, it was combined with the group of previous dummy-suckers. This combined group was compared to the no habit group. There were no significant differences between the children with previous habits and those with no habits, except for anterior open bite ($P < 0.05$). The distribution of pos-

terior crossbite showed that there were no significant differences between the different habit groups and the no habit group.

Discussion

The sample was selected randomly to be representative of 3- to 5-year-olds in the geographic study area. The age range of the sample eliminated those children with an incompletely developed occlusion or those with mixed dentition. The data collecting instrument was a questionnaire that was well-constructed, short, simple-termed, with few illustrations to minimize respondents' misinterpretation. However, the results from such retrospective data should be interpreted with some caution.

The reported prevalence of sucking habits appears to be high in children in industrialized countries (Table 1). Our study indicates that the prevalence among Saudi children is 48.36% with dummy-sucking as the dominant type (37.90%) and digit-sucking less prevalent (10.46%), which is lower than that reported in Western nations. In contrast, it is higher than in Eskimo and African children. These differences suggest that sucking habits are influenced by child-rearing practices, which differ from one population to another. Introducing the modern Western type of life into the Saudi culture may make the children more prone to sucking habits. This theory warrants further investigation. The prevalence of the habits in the present sample seems to decrease with age. At age 4, 8.2% of the sample were reported to have persistent sucking habits, which is less than one-fifth of that reported by Modeer et al.⁸ for the same age group.

Other researchers found sucking habits to be more prevalent among girls,^{10, 16-18} but results from our study confirmed earlier reports¹¹⁻¹⁵ of no significant differences between sexes in the distribution of digit- or

dummy-suckers. These findings suggest that environmental factors play a more significant role in the habit than does genetic influence.

Our study showed no relationship between birth rank and prevalence of the habit, which is in agreement with the result of Larsson and Jarveheden.²⁰

The distribution of sucking habits by parents' education showed that the higher the level of parents' education, the greater was the probability that the child was a dummy sucker. These observations are in contradiction to Larsson²⁴ who found dummy-sucking to be more prevalent among children of parents with little or no education.²⁴ The uneducated mothers in our sample probably gained their advice on child care from older women in the community who are not readily exposed to dummies. The findings of digit-sucking did not show significant association between the level of parent's education and the prevalence of the habit. In contrast, Wolf and Lozoff²⁵ found a higher percentage of the mothers of thumb-suckers to have had some college education than did the mothers of nonthumb-suckers.

Results showed family income didn't predict digit-sucking, which supports the findings of Paunio et al.,¹⁵ but it is completely different from other studies that reported that digit-sucking children came from higher socioeconomic groups.²¹⁻²³ Although other investigators^{22,23} have reported a significantly greater prevalence of dummy users among children of low socioeconomic status, our sample showed no significant difference.

Information regarding breastfeeding as it relates to sucking habits is somewhat contradictory. Several authors²⁶⁻²⁸ assume that infants who are breastfed for a reasonably long period of time are less likely to become digit-suckers than babies who have no breastfeeding experience. The results of our study strongly agree with this conclusion, as the prevalence of digit- and dummy-sucking habits was the least among children who were breastfed for a period of 6 months or longer. In contrast, the prevalence of digit- and dummy-sucking habits was higher among children who had been breastfed for a short period (less than 6 months) than children with no breastfeeding experience. This could be due to early cessation of breastfeeding causing greater frustration to the child than experiencing no breastfeeding at all. The results of our study contradicts those reports that showed that the method of feeding has no appreciable influence on the acquisition of the sucking habits.^{2, 4, 16, 29, 30} However, the mean duration of breastfeeding in the Traisman and Traisman² sample was only 4.4 months.

A comparative evaluation of the dental conditions of children with and without a continuing or previous digit- or dummy-sucking habit showed a strong correlation between persistent sucking habits and distal molar and canine relationship, open bite, and protrusion. These findings coincide with those of Melsen et al.⁵ and Larsson.^{35, 36} Dummy-sucking was more detrimental to occlusion than digit sucking. Ravn³³ reported a difference between suckers and nonsuckers in the

canine relationship without significant differences in the sagittal molar relationship. Other investigators found no evidence of high postnormal discrepancies among digit-¹² or dummy-suckers.³⁴

The extension of our age range to 5 years may have allowed for self-correction or improvement of some of the occlusal problems in children who discontinued the habit at an early age. We found that children with a previous sucking habit did not show any significant difference in the prevalence of malocclusion compared with the no-habit group, except for anterior open bite, as it was more prevalent among the former group. These differences may indicate that anterior open bite needs more time for improvement or there may be some other factors such as tongue thrusting, allied to the sucking habit.

Several authors reported a significantly greater prevalence of posterior crossbite among dummy- or finger-suckers compared with non-suckers.^{6, 8, 35, 36} Other research reported a higher transverse discrepancy among dummy-users, which was not replicated in the digit-sucking group.^{15, 37} Adair et al.³⁴ found no clinically significant difference in the transverse occlusal relationship between dummy-suckers and nonsuckers. We were unable to demonstrate any significant difference in the prevalence of posterior crossbite among children with persistent or previous sucking habits when compared with the nonsuckers. Modeer et al.⁸ found the posterior crossbite to be positively related to the intensity of the sucking habit, which was 6-15 hr in the majority of their sample. The long daily use of the dummy also has been reported by Svedmyr⁶ and Larsson et al.¹⁰ The majority of our sample practice the habit of digit- or dummy-sucking for less than 5 hr per day. This short intensity, in addition to other factors, could be influencing the prevalence of posterior crossbites in this sample.

Conclusion

The results of our study enable us to make the following conclusions:

1. Sucking habits were found in nearly half of 3- to 5-year-old Saudi children with dummy sucking as the dominant type.
2. We found no significant effect of gender difference, child birth rank, or family income on the prevalence of sucking habits.
3. Parents' educational level is positively related to dummy-sucking habit with no appreciable effect on digit-sucking.
4. Prevalence of digit and dummy-sucking was the lowest among children who have good opportunity for breastfeeding.
5. A significant relationship was found between persistent sucking habits and malocclusion in the form of distal molar and class II canine relationship, increased overjet, and anterior open bite. Posterior crossbite is no more common in

children with sucking habits than in children without these habits.

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