

# Oral health knowledge, attitudes and preventive practices of third grade school children

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## Abstract

**Purpose:** The aim of study was to investigate the oral health knowledge, attitudes and preventive practices of third grade school children in Harris County.

**Methods:** In this cross-sectional study, oral health knowledge, attitudes, and preventive practices of the children were investigated by means of a self-administered, bilingual questionnaire. Three calibrated examiners collected data on dental caries, periodontitis, and fluorosis of 1,031 school children.

**Results:** Most children reported "fairly adequate" oral hygiene habits (58%) and oral health knowledge (48%), and "adequate" dietary patterns (59%). Children with inadequate oral health knowledge were twice as likely to have caries than children with adequate knowledge (OR= 2.05, 95% CI=1.29, 3.28). The mean combined DMFT/dft scores of children with inadequate knowledge were significantly higher than the mean for children with adequate knowledge ( $t= 2.6, P= 0.009$ ).

**Conclusions:** Results indicate a need to improve oral health knowledge and preventive practices among the study population. Because of the cross-sectional nature of the study, it is not possible to illustrate a cause-effect relationship between oral health education and prevalence of caries. (*Pediatr Dent* 22:395-400, 2000)

Few studies have evaluated school children's oral health knowledge, attitudes, and preventive practices.<sup>1-9</sup> Some studies have assessed teenagers and older children,<sup>5,7-9</sup> but only a limited number of studies have specifically assessed these parameters among third grade children,<sup>1-3</sup> the target population of the present study. One of the earlier, assessed oral health knowledge of more than 2,500 tenth grade students.<sup>8</sup> The author concluded that the students lacked knowledge about preventive practices, particularly about periodontal diseases. An association was found between gender and oral health knowledge: girls were more knowledgeable about periodontal diseases than boys.

Woolfolk and colleagues<sup>1</sup> assessed dental health knowledge and sources of oral health information among 848 elementary school children aged 9-12 years. Most children were knowledgeable about the benefits of fluoride but did not recognize fluoridated water as the best source of caries preventive agent. Oral health knowledge was not related to age, gender, or mean number of decayed, missing due to caries and filled tooth surfaces (DMFS) scores. Children with higher levels of oral health knowledge identified parents and family as the main source of

oral health information. Hamilton and colleagues<sup>2</sup> surveyed 6,329 11-year-old children in Ontario. Children with the best oral health knowledge reported dentist and school as their primary sources of oral health information. Findings showed that children had poor knowledge of dental caries preventive measures, and that education on preventive methods needs to be reinforced.

Dental health education is believed to be a cost-effective method for promoting oral health,<sup>10</sup> and one of the best places for this type of oral health promotion is the schools, where all children irrespective of their socioeconomic status or ethnicity, can be reached. Furthermore, intervention to prevent dental caries often aims at establishing favorable habits, and these measures are most cost-effective when applied at early ages.<sup>11,12</sup>

The assumption that oral health education may modify children's oral health knowledge, and consequently change children's oral health behavior, however, is controversial. The decline of dental caries in the United States, during the past 30 years, have been primarily associated with factors such as fluoridated water, fluoridated toothpaste, and the use of sealants.<sup>13</sup> Thus, oral health education may not be the main factor associated with the decline in dental caries, but may not be disregarded either. Children must be knowledgeable of not only the causes of oral diseases, but also the current preventive measures to avoid them, such as fluoridation of drinking water. As pointed out by Frazier and Horowitz,<sup>14,15</sup> school education programs will enable children to make decisions about oral health regarding their own children in the future or even their community. Therefore, the evaluation of children's oral health knowledge and preventive practices is of great importance. The purposes of the present study were to assess the oral health knowledge, attitudes, and preventive practices among third grade school children from public schools in Harris County-Texas, as well as to assess the relative effects of socio-behavioral risk factors on children's dental caries experience.

## Methods

This is a cross-sectional study of third grade school children from seven school districts in the jurisdiction of the Harris County Health Department-Texas. Data were collected during the 1998 oral health survey of third grade children conducted by the Harris County Health Department. A multi-stage-stratified cluster sampling technique was used to select

the 1,031 study participants. Only those with positive parental consent were included in the study. Socioeconomic status was determined according to the 1991 Harris County Health Department dental survey guidelines. Participants from schools that provided free lunch to more than 20 percent of the school children were considered to be from low socioeconomic status (SES) families, and those from schools that provided free lunch to less than 20 percent were considered to be from high SES.

The survey instrument was a pretested, self-administered bilingual questionnaire, which consisted of 28 pre-coded questions. Prior to the clinical examination, the students completed the questionnaire, which was pilot tested among a group of children who did not participate in the study. The pilot test focused on the students' ability to understand the vocabulary used in the questionnaire. Minor changes were made to certain terminology in the questionnaire prior to its administration in the actual survey. During the administration of the questionnaire, the students were permitted to seek clarification from the survey coordinator.

The questionnaires comprised six different question categories: 1) oral health knowledge, 2) oral hygiene habits, 3) dietary patterns, 4) perceptions of dental visits, 5) self-perception of oral health, and 6) sources of information about oral health. Each one of these question categories was made up of one or more specific items. Responses to specific items were designated as desirable or undesirable. A desirable response was scored one and an undesirable response was scored zero. Scores for individual category items were summed to obtain an overall category score and these scores were classified into different levels. The following scale shows the possible scores for desirable answers in each level:

- I) Oral hygiene habits
- Inadequate: 0-3
  - Fairly adequate: 4-7
  - Adequate: 8-11

II) Oral health knowledge

- Inadequate: 0-2
- Fairly adequate: 3-4
- Adequate: 5-7

III) Dietary patterns

- Inadequate: 0-1
- Adequate: 2-3

IV) Perceptions of dental visits

- Bad: 0-1
- Good: 2

Prior to the study, the recorders and dental examiners were calibrated by examining 270 third grade children from a school district not included in the study. Repeating the dental examinations on 133 participants assessed inter- and intra-examiner reliability. Decayed, missing due to caries and filled permanent teeth (DMFT) and decayed and filled primary teeth (dft) were used to measure intensity/severity of dental caries, and to estimate caries prevalence in the study population. Combined DMFT/dft was used in the analysis, because both primary and

**Table 1. Levels of Reported Oral Hygiene Habits by Ethnicity, Gender and SES**

	N	Reported hygiene habits		
		Inadequate %	Fairly adequate %	Adequate %
<b>Ethnicity</b>				
Caucasian	446	15	57	28
African-American	136	10	59	31
Hispanic	200	17	59	24
Asian	13	15	59	26
Others	34	29	47	24
<b>Gender</b>				
Male	394	16	59	25
Female	435	14	58	28
<b>SES</b>				
Low	391	16	58	26
High	438	14	58	28
<b>Total</b>	<b>829</b>	<b>15</b>	<b>58</b>	<b>27</b>

**Table 2. Levels of Oral Health Knowledge, as well as Reported Dietary Patterns by Ethnicity, Gender and SES.**

	N	Oral health knowledge			N	Reported dietary patterns	
		Inadequate %	Fairly adequate %	Adequate %		Inadequate	Adequate
<b>Ethnicity</b>							
Caucasian	509	26	50	24	464	42	58
African-American	157	25	44	31	156	44	56
Hispanic	227	32	47	21	224	39	61
Asian	17	24	53	23	16	37	63
Others	33	27	43	30	28	39	61
<b>Gender</b>							
Male	442	28	50	22	410	45	55
Female	501	26	47	27	478	38	62
<b>SES</b>							
Low	447	29	46	25	428	41	59
High	496	26	50	24	460	42	58
<b>Total</b>	<b>943</b>	<b>27</b>	<b>48</b>	<b>25</b>	<b>888</b>	<b>41</b>	<b>59</b>

**Table 3. Perception of Dental Visits and Perceived Oral Health by Ethnicity, Gender and SES**

	N	Perceptions		N	I have good dental health		
		Bad %	Good %		Yes	No	I don't know
<b>Ethnicity</b>							
Caucasian	522	63	37	536	60	4	36
African-American	170	74	26	175	69	5	26
Hispanic	256	72	28	257	53	5	42
Asian	16	56	44	18	61	0	39
Others	33	46	54	34	41	6	53
<b>Gender</b>							
Male	464	69	31	480	62	3	35
Female	523	64	36	540	57	5	38
<b>SES</b>							
Low	473	68	32	490	58	6	36
High	514	65	35	530	60	3	37
<b>Total</b>	<b>987</b>	<b>67</b>	<b>33</b>	<b>1020</b>	<b>59</b>	<b>5</b>	<b>36</b>

permanent teeth were present in almost all of the study participants. The prevalence of dental caries was estimated by the proportion of children with DMFT/dft scores greater than zero.

The distribution of the study population by age, ethnicity, gender and SES was estimated. Prevalence of dental caries by ethnicity, gender, and SES was determined as well. Chi-square test was used to test the differences in proportion of different category levels among different ethnic groups. Odds ratios and 95 percent confidence intervals were computed to investigate any association between the dependent variable (caries prevalence) and the independent variables (oral health knowledge, dietary patterns, perceptions of dental visits, perceived oral health, and source of oral health information). Associations were examined for individual category items as well as overall category levels in the questionnaire by utilizing odds ratios and 95 percent confidence intervals. Both parametric (t-test) and non-parametric (Mann-Whitney) tests were used to investigate the difference in mean DMFT/dft scores between children with inadequate and adequate oral health knowledge levels. Even though some of the assumptions for t-test were not met, the use of t-test could be justified by the relatively large sample size (N= 1,031).

### Results

A total of 1,031 Harris County elementary school children aged 8 to 11 years, with a mean of 8.62±0.56 participated in the study. Females represented a slightly larger proportion of the study population (53 percent), which consisted predominantly

**Table 4. Associations Between Oral Health Knowledge and Caries Prevalence**

Oral health knowledge	N=1031	Odds ratio	95% CI
<u>What does fluoride do?</u>			
Protects teeth from decay	198	1.0	reference
Makes teeth white	214	0.93	(0.61, 1.40)
Makes teeth grow	21	0.67	(0.25, 1.80)
I do not know	564	0.98	(0.69, 1.39)
<b>Missing</b>	<b>34</b>	<b>0.97</b>	<b>(0.65, 1.42)</b>
<u>What is the best way to get fluoride?</u>			
Drink fluoridated water	43	1.0	reference
Brush with fluoridated toothpaste	311	0.55	(0.25, 1.20)
Have a dentist put it on your teeth	114	0.53	(0.22, 1.22)
I do not know	544	0.52	(0.24, 1.09)
<b>Missing</b>	<b>19</b>	<b>0.74</b>	<b>(0.20, 2.86)</b>
<u>What is the best way to clean between teeth?</u>			
Use dental floss	718	1.0	reference
Use toothpick	43	1.17	(0.59, 2.35)
Use toothbrush	162	1.26	(0.86, 1.83)
I do not know	99	0.79	(0.50, 1.23)
<b>Missing</b>	<b>9</b>	<b>0.31</b>	<b>(0.06, 1.42)</b>
<u>What is the best way to prevent gum disease?</u>			
Brush and floss your teeth everyday	484	1.0	reference
Eat healthy foods	216	1.11	(0.79, 1.56)
Take vitamins	34	1.36	(0.62, 3.06)
I do not know	285	1.07	(0.78, 1.46)
<b>Missing</b>	<b>12</b>	<b>0.65</b>	<b>(0.18, 2.32)</b>
<u>Healthy gums do not bleed</u>			
True	555	1.0	reference
False	143	1.12	(0.75, 1.66)
I do not know	315	1.23	(0.91, 1.65)
<b>Missing</b>	<b>18</b>	<b>1.35</b>	<b>(0.46, 4.11)</b>
<u>It is important to keep teeth when you are older</u>			
Yes	721	1.0	reference
No	61	1.78	(0.97, 3.32)
I do not know	224	1.37	(0.99, 1.90)
<b>Missing</b>	<b>25</b>	<b>1.0</b>	<b>(0.43, 2.51)</b>
Adequate	231	1.0	reference
Fairly adequate	453	1.35	(0.97, 1.89)
Inadequate	259	2.05	(1.29, 3.28)
<b>Missing</b>	<b>88</b>	<b>1.45</b>	<b>(0.91, 2.27)</b>

**Table 5. Associations Between Reported Dietary Patterns and Caries Prevalence**

Reported dietary changes	N=1031	Odds ratio	95% CI
<u>What do you usually eat for breakfast?</u>			
Cereals like Cheerios, Shredded Wheat	289	1.0	reference
Donuts, Pop tarts, etc.	102	1.50	(0.91, 2.47)
Eggs and toast	171	1.49	(0.99, 2.24)
Cereals like Frosted Cheerios, frosted flakes	270	1.11	(0.78, 1.57)
Pancakes, waffles	145	1.63	(1.05, 2.54)
<b>Missing</b>	<b>54</b>	<b>1.25</b>	<b>(0.61, 2.57)</b>
<u>What is your afternoon snack?</u>			
Raw vegetables	42	1.0	reference
Candy	118	0.81	(0.36, 1.83)
Popcorn and pretzels	95	0.62	(0.27, 1.42)
Fruit	388	0.73	(0.35, 1.51)
Sandwich	177	0.70	(0.32, 1.52)
Cookies	152	0.69	(0.31, 1.51)
<b>Missing</b>	<b>59</b>	<b>0.65</b>	<b>(0.26, 1.63)</b>
<u>What do you drink most?</u>			
Water	375	1.0	reference
Juice	150	1.13	(0.75, 1.70)
Milk	244	0.99	(0.70, 1.39)
Gatorade	56	2.23	(1.11, 4.53)
Sodas	178	1.17	(0.80, 1.72)
<b>Missing</b>	<b>28</b>	<b>0.90</b>	<b>(0.39, 2.09)</b>
<u>What snacks are safe for teeth?</u>			
Popcorn	87	1.0	reference
Candy	115	1.07	(0.71, 3.75)
Cookies	53	1.62	(0.71, 3.75)
Ice Cream	172	1.12	(0.63, 2.0)
Raisins	566	0.70	(0.42, 1.15)
<b>Missing</b>	<b>38</b>	<b>0.70</b>	<b>(0.28, 1.52)</b>
Adequate	519	1.0	reference
Inadequate	369	1.20	(0.90, 1.60)
<b>Missing</b>	<b>143*</b>	<b>1.04</b>	<b>(0.70, 1.55)</b>

\* Highest proportion of missing responses at 14%.

of Caucasian children (52 percent), followed by Hispanics (26 percent) and African-Americans (17 percent). A majority of children (52 percent) were from high SES.

More than 38 percent of the children in the study population were found to be caries free in both permanent and primary dentitions. African-Americans (66 percent) and Hispanics (67 percent) had a greater prevalence of dental caries than the other ethnic groups. Males (62 percent) had a slightly higher prevalence of caries than females (61 percent). Children of low SES (65 percent) had a greater prevalence of dental caries compared to children of high SES (58 percent). The difference in caries experience between different gender, ethnic and SES groups was not statistically significant.

Most children were classified as having “fairly adequate” oral hygiene habits (58 percent) and oral health knowledge (48 percent), and “adequate” dietary patterns (59 percent). Most respondents had negative perceptions of dental visits (67 percent) and perceived to be in good oral health status (59 percent). A slightly higher proportion of males compared to females was classified as having “inadequate” oral hygiene habits (Table 1). The Hispanic group (32 percent) had a greater proportion of children with “inadequate” oral health knowledge than the other ethnic groups (Table 2). The difference in the proportion of children with the “inadequate” knowledge level among the Hispanic (32 percent) and African-American (25

percent) groups was statistically significant ( $X^2= 4.03$ ,  $df= 1$ ,  $p=0.04$ ). The African-American group had a greater proportion of children (44 percent) with “inadequate” dietary habits than the others. Males (45 percent) reported higher levels of “inadequate” dietary habits than females (Table 2). A greater proportion of African-Americans (74 percent) reported having negative perceptions of dental visits compared to the other ethnic groups (Table 3). A greater proportion of males (69 percent) also reported having negative perceptions of visits to the dental office. A greater proportion of African-Americans (69 percent) reported having good dental health relative to the other groups (Table 3).

The mean combined DMFT/dft scores for the “inadequate” and “adequate” levels of knowledge were  $2.5 \pm 2.8$  and  $1.9 \pm 2.4$  respectively. The mean combined DMFT/dft scores of children with “inadequate” knowledge were significantly higher than that for children with “adequate” levels of knowledge ( $P=0.009$ ). Children with “inadequate” oral health knowledge were twice as likely to have caries than children with “adequate” knowledge (OR=2.05, 95% CI=1.29, 3.28). The results are shown in Table 4.

A proportion of respondents did not answer one or more items in the questionnaire (Tables 4, 5, 6). The question category that presented the highest proportion of missing responses in the analytical part of the study was for the item

on dietary patterns (14%). To evaluate the impact of non-response on the associations examined, odds ratios and 95 percent confidence intervals were computed for association between the non-respondents of independent variables (oral health knowledge, dietary patterns, perceptions of dental visits, perceived oral health, and source of oral health information) and caries prevalence. The statistical evaluation did not demonstrate any significant association, implying that the proportion of missing responses did not affect the relationships between the dependent and certain independent variables (Tables 4, 5, 6). Thus the non-response error in the study was almost non-existent.

Children who reported drinking mostly beverages such as Gatorade, were more likely to have dental caries than those who reported drinking mostly water (OR=2.23, 95% CI=1.11, 4.53). Table 5 shows a lack of difference in the likelihood of having dental caries among the two different dietary pattern levels (inadequate and adequate).

No clear difference was observed in the likelihood of having dental caries between children with positive and negative perceptions of dental visits levels (OR=0.98, 95% CI=0.74, 1.30) or between children with adequate or inadequate self-perception of oral health. Most children received information about oral health from the dental office, followed by home, and school (Table 6). There was no significant difference in the like-

likelihood of having dental caries among children who received information about oral health from the dentist, family at home and school and the other different sources listed in the questionnaire.

## Discussion

The objective of this study was to examine the influence of socio-behavioral risk factors on elementary school children's dental caries experience. Although some studies with similar objectives have been done,<sup>7-9</sup> the present study is unique in the way the statistical analyses were performed. Specifically, responses to individual question category items were analyzed; this degree of detail is not apparent in the literature. Questions were grouped into six different categories to allow a better understanding of the relationship between oral health knowledge and behavioral factors and dental health status.

Given the 14 percent missing responses to the question on dietary patterns, potential for non-response error exists in some of the associations between caries prevalence and the dietary habits. "Non-response error occurs when a significant number of people in the survey sample do not respond to the questionnaire and are different from those who do in a way that is important to the study."<sup>16</sup> The non-response error was almost non-existent in the study as illustrated by the odds ratios for the missing values in the associations investigated. Odds ratios for missing responses in the present study indicate no significant differences between the respondents and non-respondents.

In general, children who provided inadequate responses to certain items were more likely to have dental caries. Many children in this study appear to lack important information about oral health and preventive practices. Most did not appear to know about the benefits of fluoride to dental health. Similar to Woolfolk's study,<sup>1</sup> a low proportion of children recognized fluoridated drinking water as the most efficient source of fluoride. When asked about less cariogenic snacks, a majority of children selected "raisins." Raisins, however, are considered extremely cariogenic.<sup>17</sup> It appears that children are missing important information about the recommended diet for good dental health, even though most of them were classified as having overall adequate dietary habits.

Children who perceived visiting the dental office as a negative experience were more likely to have dental caries than the ones who had a positive perception. Children who go to the dentist only when their teeth hurt or when they have advanced oral problems might have had a negative experience in the dental office. Children who resist going to the dentist out of fear, however, will tend to develop more dental diseases because of lack of oral health information and preventive services. Most children in this study had a negative perception from visits to the dental office. Such perceptions may reflect a tendency of

**Table 6. Associations Between Perceived Oral Health, Source of Oral Health Information and Perceptions of Dental Visits and Caries Prevalence**

Perceived oral health	N=1031	Odds ratio	95% CI
<u>I have good dental health</u>			
Yes	604	1.0	reference
No	44	1.29	(0.90, 1.56)
I do not know	372	1.19	(0.65, 2.59)
Missing	11	0.80	(0.21, 3.06)
Source of oral health information	N=1031	Odds ratio	95% CI
<u>Where did you receive information about taking care of your teeth?</u>			
School	97	1.0	reference
Dentist	530	0.79	(0.49, 1.27)
Friends	17	1.68	(0.46, 6.66)
Television	40	0.96	(0.41, 2.23)
Reading	42	1.03	(0.45, 2.38)
Home	288	0.80	(0.48, 1.33)
Missing	17	0.58	(0.18, 1.84)
Perception of dental health	N=1031	Odds ratio	95% CI
<u>Going to the dentist is scary?</u>			
No	644	1.0	reference
Yes	264	1.45	(1.06, 1.98)
I do not know	111	1.46	(0.93, 2.28)
Missing	12	0.42	(0.16, 1.13)
<u>Having a dentist fix my teeth can...</u>			
Not hurt	347	1.0	reference
Hurt a little	498	1.28	(0.96, 1.71)
Hurt a lot	146	1.57	(1.02, 2.40)
Missing	40	0.91	(0.45, 1.84)
Good	330	1.0	reference
Bad	657	0.98	(0.74, 1.30)
Missing	44	0.60	(0.31, 1.18)

going to the dentist to receive curative treatment, which includes more invasive and traumatic than preventive procedures. Intensified focus on educational and preventive programs may help keep children from having negative perceptions of dental visits.

The present study confirms the findings of other study<sup>2</sup> that the dentist is the main source of oral health information. Parents and family at home were the second most commonly reported source. This finding points to the need for increasing the amount of oral health information received at school. Since children spend a good part of their days at school, it would be more effective to improve the amount of information they receive about oral health knowledge, preventive practices, and dietary habits at school. One way to achieve this would be to incorporate oral health information into science and health curriculum. Family and parents should also be involved in the health educational process because, for these particular children, most of the health information come from family members.

Several factors, in addition to oral health education programs, are known to be involved in the decrease of caries prevalence in the U.S., such as fluoride in the drinking water, fluoridated toothpaste and pit-and-fissure sealants.<sup>13</sup> Oral health education programs, nevertheless, are likely to be an important influence on the oral health of children. According to Frazier and Horowitz,<sup>18</sup> oral health education empowers indi-

viduals with accurate information to take actions towards their health. Thus, it is important to maintain and improve existing oral health education programs to better reach the targeted children. Based on the results of this study, the HCHD can focus on improving the aspects of oral health knowledge and hygiene habits, which appear to be lacking among the study population. Despite the difficulty in changing and monitoring a child's oral health behavior and attitudes towards health as a whole, it is important to increase the awareness of optimal oral health among the study participants.

## Conclusions

1. Oral health knowledge and oral hygiene habits of Harris County third grade children could be improved.
2. Despite being classified as having adequate dietary habits, the study population still needs to improve their knowledge of dietary patterns to promote dental health because they reported good dietary habits but they were equivocal in recognizing foods with low cariogenicity.
3. Because of the cross-sectional nature of the study, it is not possible to illustrate a cause-effect relationship between oral health education and prevalence of dental caries.

## References

1. Woolfolk M, Lang WP, Faja BW: Oral health knowledge and sources of information among elementary school children. *J Publ Hlth Dent* 49:39-43, 1989.
2. Hamilton ME, Coulby WM: Oral health knowledge and habits of senior elementary school children. *J Publ Hlth Dent* 51:212-29, 1991.
3. Sgan-Cohen HD, Weck-Rubinoff, Mann J, Anaise JZ: Dental Knowledge of Israeli schoolchildren. *Dental Hygiene* 162-65, 1995.
4. Henderson WG, Skeeel DK, Soule DJ: A sample survey of dental knowledge, attitudes, behavior and needs among Scott County schoolchildren. *Iowa Dent J* 60:14-16, 1974.
5. Vignarajah S: Oral health knowledge and behaviors and barriers to dental attendance of school children and adolescents in the Caribbean Island of Antigua. *Int Dent J* 47:167-72, 1997.
6. Petersen PE, Danila I, Samoila A: Oral health behavior, knowledge, and attitudes of children, mothers, and school-teachers in Romania in 1993. *Acta Odontologica Scandinavica* 53:363-68, 1995.
7. Peng B, Petersen PE, Fan MW, Tai BJ: Oral health status and oral health behavior of 12-year-old urban schoolchildren in the People's Republic of China. *Community Dental Health* 14:238-44, 1991.
8. Linn EL: Teenagers' attitudes, knowledge, and behaviors related to oral health. *J Am Dent Assoc* 92:946-51, 1976.
9. Freeman R, Maizels J, Wyllie M, Sheiham A: The relationship between health related knowledge, attitudes and dental health behaviors in 14-16-year-old adolescents. *Community Dental health* 10:397-404, 1993.
10. Blinkhorn AS: Dental health education: What lessons have we ignored? *Brit Dent J* 184:58-59, 1998.
11. Borssén E, Stecksén B: Risk factors for dental caries in 2-year-old children. *Swedish Dental Journal* 22:9-14, 1998.
12. Bagramian RA: Combinations of school-based primary and secondary preventive dental programs in the United States and other countries. *J Publ Hlth Dent* 39:275-78, 1979.
13. Brunelle JA, Carlos JP: Changes in the prevalence of dental caries in U.S. schoolchildren, 1961-1980. *J Dent Res* 61:1346-51, 1982.
14. Frazier PJ: School-based instruction for improving oral health: closing the knowledge gap. *Int Dent J* 30:257-68, 1980.
15. Horowitz HS: Established methods of prevention. *Brit Dent J* 149:311, 1980.
16. Salant P, Dillman DA. How to conduct your own survey. 5th Ed. New York John Wiley & Sons, Inc., 1994, pp 13-23.
17. Stephan RM: Effects of different types of human foods on dental health in experimental animals. *J Dent Res* 45:1551-61, 1966.
18. Frazier JP, Horowitz AM: Oral health education and promotion in maternal and child health: A position paper. *J Publ Hlth Dent* 50:390-95, 1990.

## ABSTRACT OF THE SCIENTIFIC LITERATURE



### DIETARY HABITS RELATED TO EARLY CHILDHOOD CARIES

The purpose of this prospective, longitudinal study was to describe dietary habits of infants and toddlers living in Sweden to caries prevalence from infancy to age 2 and at age 3. Children from the community of Jonkoping, Sweden were evaluated. There were 632 children examined at age 1 with 3 having carious lesions. A total of 33% had never been breast-fed or for only 2 months. Of the children still breast-fed at age 1, 49% had developed carious at age 3. At age two, 79% were sucking on a pacifier or finger. Only seven children were given a sugar type liquid during the night but by age three, 5 developed caries. Sweets were consumed at least once a week by 31% of 1-year olds and by 80% of 2-year olds. Immigrants children generally consumed more caries-risk products. Therefore, the need to identify children with caries-risk screening at age 1 and establish suitable dietary habits are essential to achieve good oral health in infants and toddlers.

**Comments:** Here is another study stating the need to identify those children at risk for caries and providing proper dietary counseling. **LHS**

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**Dietary habits related to caries development and immigrant status in infants and toddlers living in Sweden. Wendt, K., and Birkhed, D. Acta Odontol Scand 53(6):339-44, 1995.**  
35 references