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Original Article

Infant and Child Oral Health Risk Status Correlated to Behavioral Habits of Parents or Caregivers: A Survey in Central Italy

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Abstract

Aim: The aim of this survey was to evaluate the knowledge and awareness of parents and caregivers about potential oral health risk factors for their children in their first months of life (3–30 months).

Materials and Methods: The participation to the survey was proposed to all parents or caregivers of children attending the public consulting service in Latina for mandatory vaccinations during the period of June to August 2014. A self-administered questionnaire was completed to obtain information regarding demographic variables, infant feeding practice, maternal oral health during and after pregnancy, children's oral hygiene habits and risk behaviors (e.g., sharing cutlery, tasting of baby food, nightly using of baby bottles with sugared beverages, or sugared pacifier), and knowledge about caries and its transmission. The analysis of the data was performed using SPSS 14.0 for Windows (SPSS Inc., Chicago, IL, USA). The variance analysis and chi-square test were used to investigate the relationship between the variables.

Results: Overall, the parents of 304 children consented to fill the questionnaire. Data analysis showed that about 50% of respondents considered dental caries an infectious disease, however, 53.6% was not aware of the potential vertical transmissibility of cariogenic bacteria through contaminated saliva. It is a common trend in the early stages of weaning to taste the baby food (53%) and sharing cutlery (38.5%). With regard to children oral health care, parents reported no toothbrushing for 53.1% of the children in their first 3 years of life. The relationship between the two variables concerning caries transmissibility and tools sharing carried out on through Pearson chi-square test identified $P = 0.32$.

Conclusions: From this survey, the need for parental oral health promoting program emerged to control children oral health risk status.

Keywords: *Early childhood caries, infant and child oral health, mothers and caregivers behaviors, prevention*

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Introduction

Although dental caries significantly decreased in the western countries, it is still considered a major public health problem affecting, in the form of Early Childhood caries (ECC), most of the preschool children in many countries world-wide.[1] The American Academy of Pediatric Dentistry defined ECC as "the presence of one or more decayed (noncavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces in any primary tooth in a child in a child 71 months of age or younger."[2] Prevalence of ECC has been reported to range from 1 to 12% in infants from developed countries.[3]

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Considering the potential negative impact on overall oral health and on Oral Health Related Quality of Life of children aged 2–5 years and their parents,[4] ECC represents an indicator of missed prevention programs, either in developed or developing countries. Clinical evidence has succinctly demonstrated the relationship between caries development in early childhood and wrong behaviors. The habit of falling asleep with a bottle of sweetened drinks or with a sweetened pacifier, mothers and/or playmates with untreated dental caries, and sharing of food and utensils (horizontal transmission) expose infants at increased risk for the development of ECC if daily at-home oral health hygiene practices are lacking.[5] The focal reason for this situation is attributable mainly to the parents or caregivers lack of awareness of the potential infection. It follows that interventions designed to assess their knowledge and to consequently change their practices, known to be associated with the ECC, may be useful in the prevention of caries at an early age.

The aim of this survey was to evaluate the knowledge and awareness of parents and caregivers of infants and young children about the incorrect daily behaviors as potential causes that could increase the oral health risk status of children in their first months of life (3–30 months).

Materials and Methods

The study protocol conformed to the ethical guidelines of the 1975 Declaration of Helsinki was approved by the appropriate ethics committee of Sapienza University of Rome. Written informed consent was obtained from all parents or caregivers of infants and young children aged 3–30 months attending the Health Promotion Unit of the public consulting service in Latina for mandatory vaccinations.

A self-administered 16-point survey questionnaire was filled at the initial consultation to assess behavioral habits of parents and caregivers about the oral health care of their children. Confidential information was obtained regarding demographic variables of the child, previous infant feeding practice (breastfeeding or baby bottle using), maternal oral health during and after pregnancy, children's oral hygiene habits (toothbrushing, fluoride usage) and general behavioral variables (sharing cutlery, tasting of baby food, nightly usage of baby bottles or sippy cups with sugared beverages or sugared pacifier), knowledge about caries, and its transmission by a series of closed questions. The questionnaire was prepared together with a statistician that established the sample size sufficient for study validity; questionnaire validation was checked in a previous pilot study used as thesis dissertation.[6]

The data gathered with the questionnaire were recorded with a specially designed computer program and collated in a Microsoft Excel database. Descriptive statistics were computed for each items and the percentage of participants answering yes/no to each of the 16 items was calculated. The analysis of the data was performed using SPSS 14.0 for Windows (SPSS Inc., Chicago, IL, USA). The variance analysis and chi-square test were used to investigate the relationship between the variables.

Results

Overall, 304 parents and no caregiver consented to fill the questionnaire. There were 72 fathers (23.6%) and 232 mothers (76.4%). Among 304 children attending the public health service in Latina, 156 (51.3%) were males and 148 (48.7%) were females. Written informed consent was obtained from all parents during the period June to August 2014.

The results of the questionnaire are described in Table 1. Seventy-five (24.7%) of the respondents referred that tooth decay is not a disease and 67 (22%) referred not to know; 53.6% was not aware about the possibility of caries transmission; 100% of the respondents (304) reported that each family member had their own toothbrush; 38.5% (117) referred to usually share the cutlery with children, and 53% (161) to taste the baby food.

From the questionnaire it emerged that 80.6% of the gynecologists did not suggest the pregnant woman to perform a routine dental visit during the period of pregnancy; despite this, 116 pregnant women (38.16% of the sample) asked for a dental visit for the following reasons: control check-up (46.3%), professional oral hygiene (24.8%), operative treatment (9.9%), emergency and pain (19%).

About children nightly habits, 48% reported routine use of sugar before sleeping and overnight as follow: 2.9% sweetened pacifier, 35% sweetened milk in the baby bottle, 9.5% sweetened juice or chamomile, and 0.7% other drinks. Among the parents who answered positively to the previous question, 26.7% reported doing so to calm the crying baby and 39.3% for making falling the baby asleep. In addition, 75.5% reported that this habit lasted less than 1 year, 23.1% less than 2 years, and 1.4% more than 2 years.

With regard to children oral health care, 74.7% (227) of parents reported not to have administered fluoride (pre or post-eruptive) in the first 3 years of their child's life. For what concerns the beginning of children toothbrushing, Figure 1 shows the distribution of the beginning of this practice, according to the age. More than half of respondents (53.1%) reported no toothbrushing for their

Table 1: Descriptive results of the survey (total percentages)

Questions	Yes		No		Do not know
Dental caries is a disease?	53.3%		24.7%		22.0%
2. Dental decay can be transmittable?	19.1%		53.6%		27.3%
3. All the family members have their own toothbrush?	100%		0%		0%
4. Do you share with your child the same utensils (spoons, forks) during the meal?	38.5%		61.2%		3%
5. Do you Taste the food before giving it to your child?	53.0%		46.1%		1.0%
6. If you are the mother's child, did you perform a dental visit before or during pregnancy?	50.0%		49.1%		0.9%
7. If Yes, why? Control Oral Hygiene Pain Decay	Control	Oral hygiene	Pain		Caries
	46.3%	24.8%	19.0%		9.9%
8. Did your gynecologist advise you about a dental visit among the routine exams of the 1st trimester of pregnancy?	16.8%		80.6%		2.6%
9. Do you believe in a possible development of a vaccine against tooth decay?	15.1%		24.0%		60.9%
10. Was the child breastfed?	78.6%		21.4%		0%
11. How long was the period of breastfeeding?	less than 6 months		between 6 months and 1 year		more than 1 year
	64.9%		28.9%		6.3%
12. What did or do your child use before sleeping and overnight?	a pacifier dipped in honey or sugar	milk in a bottle	juice or chamomile in a bottle	other beverages in a bottle	no one of these answers
	2.9%	35.0%	9.5%	0,7%	52.0%
13. If you answered Yes to any of the above, for which reason?	to fall him asleep		to stopping crying		other
	39.3%		26.7%		34.0%
14. If you answered Yes to any of the above, how long was the period of this habit?	< 1 year		< 2 years		> 2 years
	75.5%		23.1%		1.4%
15. Have you ever administered Fluoride to your child in the first 3 years of life?	Yes			No	
	25.3%			74.7%	
16. When has your child began to brush his teeth?	after the eruption of the first teeth	between 2 and 3 years;	between 2 and 3 years	after 3 years	never brushing
	22.5%	23.8%	0.6%	0%	53.1%

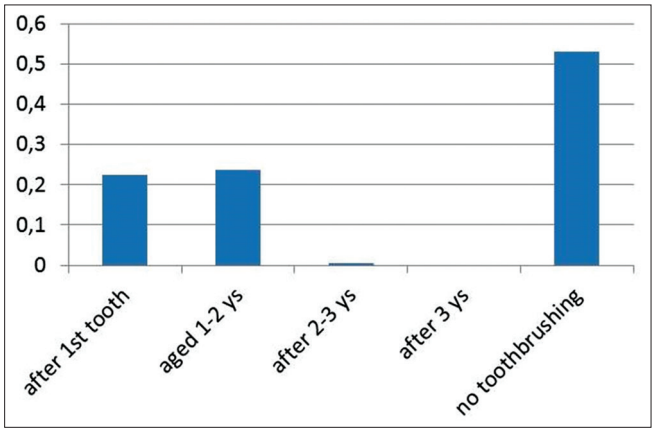

Figure 1: Percentage of timing start using toothbrushing

children in the first 3 years of life, whereas 22.5% started toothbrushing in the first year and the 23.75% started it during the second year. The relationship between the two variables concerning caries transmissibility and tools sharing carried out on through Pearson chi-square test identifies $P = 0.32$ [Table 2].

Discussion

Most noteworthy features of data analysis from this survey showed as more than half of respondents were aware about dental caries as an infectious disease. However, 53.6% did not know that it is a transmissible disease. In fact, from this study, it emerged that the common tendency of parents to have direct contact with their children, often with salivary exchanges can favor bacterial contamination of the oral cavity, especially when parents have current untreated caries. Regarding scientific literature, prevalence of EEC among Italian children is approximately 22% in the fourth of age and 44% in the twelfth;[7] early acquisition of *Streptococci mutans* (MS) is a key event for the beginning of the disease.[8,9] The major reservoir of MS is the mother,

Table 2: Bivariate statistical analysis

Bivariate statistical analysis between responses about caries transmissibility and sharing tools			
Statistic	**Chi-square**	**df**	***P***
Pearson Chi-square	10.52206	4	*P*=0.03249
M-L Chi-square	10.94682	4	*P*=0.02717
Phi	0.1854341		
Contingency coefficient	0.1823259		
Cramer's V	0.1311217		

from whom the child acquires it during a window period of around 2 years of age.[10] Furthermore, ECC has often been labeled as "baby bottle tooth decay", suggesting that the use of a sugar-containing liquid in a bottle at night may be an important etiological factor in the enhancement of the disease. Primary oral colonization by MA coupled with caries-promoting feeding behaviors and poor oral hygiene habits results in accumulation of these organisms to levels exceeding 30% of the total plaque flora, which leads to rapid demineralization of tooth structure.

From this survey it emerged that 48% of parents use to offer their children sugar-containing liquid or sweetened pacifier at night, mainly to calm or facilitate them to sleep. Available experimental evidence shows that cow milk is essentially non-cariogenic because of its mineral content and low level of lactose but saliva production decreases during sleep, and the protracted sucking of sugar-containing milk can result in promoting the cariogenic potential of milk itself.[11,12] Children experiencing caries as infants or toddlers have a much greater probability of subsequent caries in both deciduous and permanent dentitions.[13] Some young children with ECC may be severely underweight because of associated pain and their disinclination to eat.[14]

In addition, from the survey it was found that gynecologists did not suggest pregnant women to make a dental visit in 80.6% of the cases. Dental caries is a preventable disease, and therefore, it should be better if prevention of ECC begins in the prenatal and perinatal periods (including pregnancy and the first months after birth) and addresses the health of both the mother and the infant.[15] Infants whose mothers have high levels of MS due to untreated dental decay are at greater risk of oral colonization. The literature shows, however, that the collaboration between gynecologist, dentist and dental hygienist is of primary importance to implement prevention strategies for oral health of pregnant women.[16-18]

In addition, it emerged that 53.1% of respondents never brushed their children's teeth in the first 3 years of life and 74.7% never administered fluoride (pre or post-eruptive) to their children.

Conclusions

The results obtained from this survey point out that knowledge and awareness on information, health education, and health promotion are lacking throughout respondent parents, and this can potentially increase the oral health risk status of their children.

Although we do not have information about social background of the parents, lack of statistical significance (P = 0.3) indicates that despite a good knowledge of etiology and transmissibility of dental caries often parents take potentially risky behaviors for oral health of their children; this emphasizes the need for better information of parents on these issues and the importance of preventive dental visits from a young age.[19]

Primary prevention health promotion projects should be therefore organized targeting them in order to improve:

1. Feeding and eating habits of the baby. Specifically, it must be highlighted not to sleep with baby bottles containing liquids out than water; avoid prolonged consumption of sugared drinks; not dipping pacifier in honey or sweetened solutions; reducing the use of baby bottles from 14 months onwards, checking child's diet in the amount and frequency of exposure to sugars; restraining the intake of sugar during the main meals, since the salivary flow increases.[2,4,15]
2. Care of parental oral health and nutrition to limit the transmissibility of cariogenic bacteria, specifically performing regular professional and home oral hygiene and regular dental visits. In case of mother untreated caries, limiting salivary exchange habits, such as cleaning the pacifier with water instead of saliva, not blowing and/or tasting child's food during the weaning, and not sharing the same cutlery;[7]
3. oral hygiene of the baby. Following international and national Oral Health guidelines:[2,4,15] from birth to the first tooth eruption baby gums cleansing twice a day using a wet gauze or special soft gloves; after the eruption of the first primary tooth, brushing teeth after meals (or after taking medication containing sucrose), with a smear/pea-size of low fluoride toothpaste (500 ppm) to minimize the risk of accidental ingestion; using individual fluoride supplements for children at medium/high risk for tooth decay).

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Conflicts of interest

There are no conflicts of interest.

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