

Evaluation of parents' knowledge and attitudes about early childhood caries

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Abstract

Aim: Tooth decay is the world's most common bacterial infection. Despite the existence of practices for preventing dental caries, early childhood caries (ECC) continue to be a health problem of global concern. The incidence of ECC may vary between societies depending on their cultural habits regarding infant feeding. This study aimed to evaluate parents' attitudes about early childhood caries, to determine their ECC-causing misbehaviors, and to evaluate their knowledge about prevention and preventive treatments.

Methodology: The study was conducted among 150 participants and consisted of a cross-sectional survey tailored to the parents who applied to the clinic. Participation was completely voluntary, and parents who submitted a fully completed questionnaire and volunteered to participate in the study were included, whereas parents who did not wish to participate, did not answer at least one question, or were illiterate were excluded.

Results: 67.3% of the parents participating in the study were female (n=101) and 32.7% were male (n=49). In answering "yes" to the proposition "the bacteria that cause caries can be passed from mother/caregiver to child," 36.7% of participants demonstrated correct knowledge of this matter. 42.7% of the participants believed that "the first sign of dental caries is white spots on the tooth surface." In answering yes to the proposition "if early childhood caries is not treated, it can affect the general health and development of the child," 79.3% demonstrated correct knowledge of this matter.

Conclusion: ECC's risk determinants should be identified as early as possible, and the most appropriate preventive measures should be implemented rapidly with accurate information and on-site interventions.

Keywords: Dental caries, dental health surveys, primary tooth, early childhood caries

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Introduction

Dental caries is among the most common childhood diseases and represent an important public health problem (1). According to the American Academy of Pediatric Dentistry (AAPD), early childhood

caries (ECC) is defined as caries in the primary tooth of a child 71 months of age or younger, "without one or more cavities or cavities on any surface. A carious lesion with a cavity is defined as the presence of missing or filled tooth surfaces due to caries (2).

ECC's etiology is the result of the interaction of bacteria, especially *Streptococcus mutans*, with carbohydrates that can ferment on the tooth surface for a certain period of time. However, recent efforts have focused on social determinants that influence development, and ECC's progression has been shown to be shaped not by only biological factors but also by social determinants of child behavior and attitudes (3, 4).

Adopting positive behaviors that lead to good oral hygiene and less cariogenic diets is one of the key factors in preventing ECC. Habits and behaviors acquired at a young age can continue at a later age, and it is well known that these acquired behaviors are also influenced by parents' beliefs and attitudes. Therefore, parents' knowledge and beliefs have a significant role in shaping their children's future behavior (5, 6).

Bacteria that cause tooth decay are passed from the mother or caregiver to the baby. This transmission occurs with incorrect practices, such as using the same spoon for the baby after controlling the food with a spoon (7). Mothers have been reported to infected their babies between the ages of one-and-a-half and three years due to these erroneous habits (8).

The literature has made various evaluations in determining infants' risk of developing caries based on the attitudes and behaviors of the mother. A significant relationship has been found between the mother's habits and the child's development of ECC in terms of maternal breastfeeding habits, bottle use, frequency of snacking, consumption of sugary drinks, and tooth brushing (9). Additionally, the future formation of caries can be predicted by factors such as age, bottle use, pacifier use during sleep, and breastfeeding habits (10).

The aim of this study was to determine parents' attitudes about early childhood caries, to determine their ECC-causing misbehavior, and to evaluate their knowledge about protective and preventive approaches.

Materials and Methods

Ethics committee approval of this study was received from Necmettin Erbakan University, Faculty of Dentistry Ethics Committee for Non-Pharmaceutical and Medical Device Research (Approval No: 2022/172).

The number of parents required to participate in the survey was determined by G power analysis to be 143, with a sensitivity of 0.4 and a power of 95%; The study was carried out on 150 participants, considering that the participants filled in the form incompletely. The study was based on a cross-sectional survey tailored to the parents who applied to the clinic.

Participation in the study was completely voluntary, and parents who submitted a fully completed questionnaire and volunteered to participate in the study were included, while parents who did not wish to participate in the study, did not answer at least one question, or were illiterate were excluded. Detailed information was given to the

parents of all patients included in the study and an informed consent form was signed.

The survey used in the study consisted of five parts and 46 questions. The first part contained 11 sociodemographic questions; the second part contained 10 questions to evaluate the child's nutritional routine and oral hygiene habits in infancy; the third part contained four questions about the child's current eating habits; the fourth part contained two questions about the mother's oral health behaviors; and in the fifth part contained 19 information questions for parents that had been prepared based on the literature (11-13).

Statistical analysis

The SPSS 26 statistical package program (IBM SPSS Inc., Armonk, NY, USA) was used for statistical evaluation, and frequency and percentage values were used to express descriptive statistics.

Results

According to the results obtained, 67.3% of the participants were female, and 32.7% were male. While 91.3% of the children were cared for by their mothers, close to 6.7%, 0.7% were taken care of by other caregivers, and 1.3% went to kindergarten. While 24.7% of the children were only children, 26.7% had two siblings, 28% had three siblings, and 20.7% had four siblings.

The sociodemographic characteristics of the parents participating in the study are given in Table 1. Regarding how long the infants were breastfed, 14.7% were breastfed for 0-6 months, 16.7% for 6-12 months, 22% for 12-18 months, 24.7% for 18-24 months, and 21.3% for more than 24 months. The participants reported that 56.7% of the infants used bottles. When the duration of use was examined, 14.7% used a bottle for less than 12 months, 16% for 12-18 months, 11.3% for 18-24 months, and 14.7% for more than 24 months. In terms of feeding frequency between naps, 61.3% of participants gave no answer, 30% said 1-2 times, 6.7% said 3-7 times, and 2% said more than 7. While 56% of the participants stated that the night-feeding routine developed on demand, 10.7% said sleeping in the mouth, 6.7% said both, and 26.7% answered that they never fed at night.

Of all participants, 37.3% stated that they did not give water after a bottle, 35.3% stated that they cleaned the infant's teeth and mouth after breastfeeding, 39.3% stated that they use fluorine or a vitamin, and 38.7% stated that they feed their baby with a spoon that is tasted. Data about the infant feeding routine and oral hygiene habits of the parents participating in the study are given in Table 2.

Table 1. Evaluation of parents' educational and socioeconomic statuses

		Frequency (percent)
Gender	Female	101 (67.3%)
	Male	49 (32.7%)
Mother's education level	Primary school graduate	54 (36.0%)
	Secondary School	41 (27.3%)
	High School	24 (16.0%)
	University	27 (18.0%)
	MSc	3 (2.0%)
	PhD	1 (7%)
Maternal employment status	Yes	19 (12.7%)
	No	131 (87.3%)
Father's employment status	Yes	142 (94.7%)
	No	8 (5.3%)
Babysitter status	Mother	137 (91.3%)
	Relative (grandmother)	10 (6.7%)
	Carer	1 (0.7%)
	Going to kindergarten	2 (1.3%)
Monthly income level	2100-4200	25 (16.7%)
	4200-6300	67 (44.7%)
	6300-9000	30 (20.0%)
	9000-15000	19 (12.7%)
	>15000	9 (6.0%)
Term of birth	Yes	137 (91.3%)
	No	13 (8.7%)
Number of siblings	1	37 (24.7%)
	2	40 (26.7%)
	3	42 (28.0%)
	4	31 (20.7%)
How many children	1	58 (38.7%)
	2	42 (28.0%)
	3	34 (22.7%)
	4	14 (9.3%)
	5	2 (1.3%)

Table 2. Evaluation of feeding routines and oral hygiene habits in infancy

		Frequency (percent)
Breastfeeding time of your baby	0-6 months	22 (14.7%)
	6-12 months	25 (16.7%)
	12-18 months	33 (22.0%)
	18-24 months	37 (24.7%)
	24 months	32 (21.3%)
Baby bottle usage status	Yes	85 (56.7%)
	No	65 (43.3%)
Baby bottle duration	<12 months	22 (14.7%)
	12-18 months	24 (16.0%)
	18-24 months	17 (11.3%)
	>24 months	22 (14.7%)
	Never	22 (14.7%)
Nutritional status between sleep	Yes	48 (32.0%)
	No	102 (68.0%)
Feeding frequency between sleep	Never	92 (61.3%)
	1-2 times	45 (30.0%)
	3-7 times	10 (6.7%)
	> 7	3 (2.0%)
Night feeding routine	On demand	84 (56.0%)
	While sleeping	16 (10.7%)
	Both	10 (6.7%)
	Never fed at night	40 (26.7%)
Watering status after baby bottle	No	56 (37.3%)
	Yes	92 (61.3%)
Cleanliness of teeth and mouth after breastfeeding	Yes	53 (35.3%)
	No	97 (64.7%)
Fluor/vitamin use status	Yes	59 (39.3%)
	No	91 (60.7%)
Status of feeding the baby with the spoon with which the food is tasted	Yes	58 (38.7%)
	No	92 (61.3%)

When the answers of the participants were examined, the rate of babies who ate two meals per day was 10.7%, three meals per day was 72.7%, and four meals or more was 16.7%. When asked whether their infants waited for food in their mouths, 15.9% of the

participants answered positively. Regarding junk food, 21.3% of the participants stated that their children consumed junk food once a week or less, 27.3% stated three times a week, 29.3% stated once a day, 15.3% stated less than three times a day, and 6.7% stated that

they consume three or more junk foods a day. In terms of refined sugar, 29.3% of the participants stated that their children consume refined sugar once a week or less, 24% stated three times a week, 32% stated once a

day, 8.7% stated less than three times a day, and 6% stated that they consume 3 or more refined sugars per day. The questions regarding the evaluation of the child's current eating habits are given in Table 3.

Table 3. Evaluation of the child's current eating habits

		Frequency (percent)
Number of main meals per day	2 meals a day	16 (10.7%)
	3 meals a day	109 (72.7%)
	4 meals a day	25 (16.7%)
Waiting for food in the mouth	Yes	23 (15.9%)
	No	122 (84.1%)
Frequency of consumption of junk food	Once a week or less	32 (21.3%)
	3 times a week	41 (27.3%)
	1 time per day	44 (29.3%)
	Less than 3 times a day	23 (15.3%)
	3 or more per day	10 (6.7%)
Frequency of consumption of refined sugar	Once a week or less	44 (29.3%)
	3 times a week	36 (24.0%)
	1 time per day	48 (32.0%)
	Less than 3 times a day	13 (8.7%)
	3 or more per day	9 (6.0%)

The first 11 information questions posed to the parents who participated in the study are given in Table 4. When asked whether "The first primary tooth (on average) starts to erupt in the 6th month," 69.3% of the participants agreed. He gave the correct answer by answering yes to the following proposition: "Blooming/bottle-feeding while lying down can cause early childhood cavities." Of the participants, 47.3% answered yes to the proposition and gave the correct answer. Of the participants, 69.3% agreed that "sucrose (tea sugar) is the most cariogenic (causing tooth decay) sugar." While answering the proposition, "The bacteria that cause cavities can be passed from mother/caregiver to child," 36.7% of the participants said yes.

When asked, "When should the child's first visit to the dentist be?" 17.3% of the participants answered correctly when the first primary tooth erupted. When asked, "How often should parents clean the oral cavity of children from birth?" 35.3% of the participants said twice, in the morning and evening. When asked, "When is it time for the first tooth brushing?" 28.7% of the participants answered "when we see the first primary teeth in the mouth." When asked, "How much paste should be used when children first start brushing their teeth?" 68% of the participants answered as much as a grain of rice. When asked, "What should be the frequency of tooth brushing?" 69.3% of the participants answered two to three times a day. The answers to the last eight information questions are given in Table 5.

Table 4. Information questions for the parents participating in the research

	Yes n, (%)	No n, (%)	I don't know n, (%)
The first primary tooth (on average) begins to erupt in the 6th month	104 (69,3%)	12 (8,0%)	34 (22,7%)
Breastfeeding/bottle-feeding while lying down may cause early childhood caries.	71 (47,3%)	14 (9,3%)	65 (43,3%)
Sucrose (tea sugar) is the most cariogenic (causing tooth decay) sugar	104 (69,3%)	11 (7,3%)	35 (23,3%)
Fruit juices and carbonated drinks can cause cavities.	129 (86,0%)	5 (3,3%)	16 (10,7%)
Bacteria that cause caries can be passed from mother/caregiver to child.	55 (36,7%)	34 (22,7%)	61 (40,7%)
The first sign of dental caries is white spots on the tooth surface.	64 (42,7%)	13 (8,7%)	73 (48,7%)
If left untreated, early childhood caries can affect the child's overall health and development.	119 (79,3%)	10 (6,7%)	21 (14,0%)
Caries in primary teeth can damage the future of the underlying permanent teeth	106 (70,7%)	10 (6,7%)	34 (22,7%)
Do you agree with the negative opinions expressed in the media about fluorine?	46 (30,7%)	31 (20,7%)	73 (48,7%)
Fluoride supplementation is required for all babies older than 3 months living in a fluorine-free zone.	29 (19,3%)	19 (12,7%)	102 (68,0%)
Fissure sealant application is usually applied to primary teeth.	14 (9,6%)	12 (8,2%)	120 (82,1%)

Table 5. Information questions for the parents participating in the research

	Frequency
When should children have their first dentist visit?	in the first month
	7 (4,7%)
	When the first primary tooth erupts
	26 (17,3%)
How often should parents clean their children's oral cavity from birth?	At age 1
	69 (46,0%)
	When you have a toothache
	48 (32,0%)
When is the first tooth brushing time?	Every night before bed
	40 (26,7%)
	Twice a day morning and evening
How much paste should be used when children first start brushing their teeth?	53 (35,3%)
	After each feed
	57 (38,0%)
What should be the frequency of tooth brushing?	When we see the first primary teeth in the mouth
	43 (28,7%)
	after 18 months
How much paste should be used when children first start brushing their teeth?	42 (28,0%)
	After 3 years
	65 (43,3%)
What should be the frequency of tooth brushing?	Grain of rice (in swab)
	102 (68,0%)
	as much as a pea
What should be the frequency of tooth brushing?	34 (22,7%)
	enough to cover the brush
	8 (5,3%)
What should be the frequency of tooth brushing?	1 per week
	2 (1,3%)
	2-3 per week
What should be the frequency of tooth brushing?	6 (4,0%)
	1 per day
	38 (25,3%)

	2-3 per day	104 (69,3%)
	Less than 1 minute	14 (9,3%)
How long should tooth brushing be?	1 minute	54 (36,0%)
	2 minutes	81 (54,0%)
When should children with low caries risk start brushing with fluoridated toothpaste?	When the first primary tooth erupts	27 (18,0%)
	After 18 months	26 (17,3%)
	After age 3	97 (64,7%)
When should children with existing caries start brushing with fluoridated toothpaste?	Immediately after caries detection, regardless of age	55 (36,7%)
	After 18 months	25 (16,7%)
	After age 3	70 (46,7%)

Discussion

In this study, parental knowledge about ECC, their oral hygiene habits, and their relationship with their children's nutrition were examined.

Children should begin receiving oral hygiene care with the eruption of the first primary tooth (14). Only 28.7% of the participants gave the correct answer to the question that asked about the first tooth brushing time. Children with low socioeconomic status are twice as likely to have dental cavities as those with high-income status (15). As can be seen from the monthly income and education levels of the participants in our study, their socioeconomic levels were low. The social status of caregivers, poverty, ethnicity, years of education, oral hygiene habits of children, and other factors affect the severity of ECC (16).

Poor oral hygiene of the mother increases the bacterial load of the child via the vertical transmission of SM and increases the possibility of cavity formation in the child (17). Several studies have reported that if the transmission of *S. mutans* is delayed, the incidence of cavities in infants will be lower in the future, even if an additional preventive program is not applied (18). While only 36.7% of the participants in our study answered correctly to the proposition that bacteria-causing cavities can be passed from mother/caregiver to child, most of them selected "I don't know." For this reason, it is necessary to increase community-based education programs and practices.

Breastfeeding until 1 year of age is not associated with an increased risk of caries and may even provide more protection for infants than formula. In contrast, infants breastfed after 12 months have an increased risk of caries. There is a direct link between breastfeeding for up to 24 months and the severity of caries in primary teeth. This is independent of sugar consumption (19). Participants answered "yes" at a rate of 47.3% to the statement that "breastfeeding/bottle-feeding while lying down may cause early childhood caries," while 3.3% answered "I do not know." A systematic review also found that breastfeeding for more than one year and at night may

be associated with an increased prevalence of dental caries (20).

Infant feeding practices, such as frequent exposure to sugar, frequent snacking, consuming sugary drinks at bedtime, sharing food with a common spoon, the carie condition of the mother, oral hygiene, and dietary habits predispose infants to early SM colonization and high MS numbers (21). Most of the participants stated that the night-feeding routine was on demand, and 61.3% answered yes to the situation of giving water after the bottle.

To mechanically remove dental plaque formed on the tooth surface, regular brushing twice a day with a fluoridated toothpaste suitable for the age of the child is important, and brushing should be started immediately after the teeth erupt (22). It was determined that he did not know that he should start brushing (23). Tosun et al. reported that 76.6% of parents bought toothbrushes for their children when they were over 3 years old (24). Supporting these results, in our study, when we asked participants about the time their children brushed their teeth for the first time, 43.3% of the parents answered, "I don't know," while 28% answered, "less than 18 months old." Then he gave the wrong answer. A tooth brushing time of two minutes was indicated by 54% of the participants.

Daily brushing with fluoride-containing toothpastes is very important for stopping ECC (25). Fluoride is a common and important ingredient in toothpastes that reduces the risk of caries by remineralizing enamel (26). Most patients do not pay attention to the presence or absence of fluoride in toothpastes and do not consciously choose according to the presence of fluorine. In a survey that evaluated patient preferences for toothpastes and their state of consciousness about these preferences, 13% of patients used non-fluoridated toothpaste, and 40% thought that toothpastes without fluoride were less harmful (27).

The participants in the study gave the wrong answer to the question of when children with existing caries should start brushing with fluoridated toothpastes: 46.7% responded "after the age of 3," and 36.7% responded "immediately after the detection of

caries, regardless of age." In addition, 30.7% of the participants agreed with the negative opinions expressed in the media about fluorine, and 48.7% did not have any knowledge about the subject.

Conclusions

There are many social, biological, and behavioral risk factors associated with ECC, which is one of the most common diseases in childhood. The regulation of eating habits should start at an early age, and these habits should be continued. There is a need to establish family-oriented programs for ECC education. The risk determinants of ECC should be identified as early as possible, and the most appropriate preventive measures should be implemented rapidly with accurate information and on-site interventions.

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Ethical Approval: Ethics committee approval was received for this study from Necmettin Erbakan University, Faculty of Dentistry Scientific Research Ethics Committee, in accordance with the World Medical Association Declaration of Helsinki, with the approval number: 2022/172).

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