

Attitude, Knowledge and Practice of Pediatricians in the Prevention of Early Childhood Caries

SUMMARY

Background/Aim: The aim of the research was to examine the general attitude, knowledge and practice of pediatricians about caries in children of preschool age. **Material and Methods:** The research was conducted from November 2019 to the end of January 2020. The research consisted of a survey of pediatricians. The questionnaire consisted of 4 modules and 37 questions, which related to the attitude, knowledge and practice of pediatricians on the prevention of early childhood caries. **Results:** The majority of pediatricians (84.9%) stated that they assess the nutrition of their patients, while 32.1% of them always do oral health assessment, and half of them in the second month of the child's life; and 39.6% assess oral health only if there is a problem. The majority of pediatricians (86.8%) recommended the first dental examination, most often in the first year of the child's life (79.5%), and then every 6 months (43.5%). The majority of respondents did not require information about the dental health of their patients' mothers, fluoride toothpastes and topical application of fluoride as well (62.3-75.5%). The majority of pediatricians (79.2%) have never provided or sometimes provided educational material on caries prevention and control to the parents of their patients. The most accurate answers and the highest percentage of correct answers that the pediatricians had were about attitudes ($Z=8.98$, 66.63%), while the fewest correct answers and the lowest percentage of correct answers regarding the practices on the prevention of early childhood caries ($Z=11.91$, 58.90%). **Conclusions:** The research showed that pediatricians have the good attitudes and knowledge, but do not implement prevention of early childhood caries in practice. The basic deficiency of attitude, knowledge and perception of the importance of prevention is a consequence of insufficient education of pediatricians.

Key words: Dental Caries, Ecc, Pediatrician

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Introduction

Early childhood caries is defined as the presence of one or more carious dental lesions (with cavitation or without it), lack of teeth as a result of caries or the presence of fillings on milk teeth in the age of the child up to the 71st month^{1,2}. Early childhood caries is an aggressive form of caries that occurs in caries-resistant

places, such as the labial surfaces of the upper maxilla milk incisors, in contrast to caries of older age which occurs in places of plaque retention³.

Oral health, as an important segment of the general health of infants and children, has a significant impact on quality of life⁴. Early childhood caries is a multicausal disease. The key factor, for early childhood development caries, is early colonization by cariogenic

microorganisms⁵. The studies mention the risks for the development of early childhood caries: nutrition, inadequate oral hygiene, irregular dental visits of the child, as well as social and behavioral factors^{6,7}.

The main cariogenic microorganisms in the oral environment are *Streptococcus mutans* and *Lactobacillus*. A newborn can be infected with *Streptococcus mutans* at birth during natural childbirth or immediately in the first months of life by direct contact, through saliva (pacifier, spoon, etc.)- vertical transmission⁸. In the presence of carbohydrates, metabolic processes of cariogenic bacteria are activated creating the acidic products, which lead to the enamel demineralization and caries formation^{2,9}. One of the primary factors for the early childhood caries is nutrition quality and habits, as well as using a bottle. Sweetened beverages, fruit juices and soft drinks with inadequate remineralization activity of saliva, which occurs at night due to reduced flow of saliva, can lead to demineralization of enamel and thus to the development of caries¹⁰. Lack of oral hygiene allows the constant presence of fermentable carbohydrates, it improves the metabolism of cariogenic bacteria and enables the accumulation of plaque on the tooth surface.

The goal of therapy is to slow down the acute course of the disease, prevent complications, as well as premature tooth extraction and possible consequences. As early childhood caries is a disease that can prevent in time, the main goal is the application of measures in its development. The basic therapeutic link is early prevention and diagnosis so the modern dentistry today advocates precisely the prevention of early childhood caries and its occurrence¹¹. Preventive measures include the application of measures before the occurrence of the diseases, namely: use of fluoride preparations, filling of fissures and pits, counseling on nutrition and adequate oral hygiene^{12,13}.

After the birth of a child, the role in the prevention of early childhood caries should be undertaken by pediatricians, due to their the first early and further frequent contacts with parents and newborns. Crucial for the pediatricians is to give mothers the necessary knowledge about the importance of oral hygiene, proper nutrition, and caries development and its vertical transmission. The role of the pediatrician in caries control includes diagnosis, referral to a dentist and application of preventive measures. However, practice shows that pediatricians do not give much attention to the oral health of infants and small children, nor consider essential to refer the parents and the children to the dentist in terms of obtaining instructions for the implementation of preventive measures^{12,14,15}.

Based on all of the above, the aim of this study was to determine the level of knowledge, the perception of importance and the general attitude of pediatricians about early childhood caries.

Materials and Methods

The research was conducted in the territory of Bosnia and Herzegovina, in five cities, which have over 100 000 inhabitants and have health facilities for the provision of health care at all three levels-primary, secondary and tertiary. According to the last updated data, the total number of pediatricians in Bosnia and Herzegovina was 210¹⁶. The total sample was N=53 of pediatrician respondents from Sarajevo, Tuzla, Zenica, Mostar and Banja Luka. The survey was conducted in the period from November 2019 to the end of January 2020. The survey was distributed electronically or in printed form. Completing the survey was anonymous and voluntary.

Questionnaire was constructed for the purposes of this research according to the guide for children's oral health of the United States Academy of Children's Dentistry and questionnaires of similar studies^{12,17}, and modified by researchers according to the specifics of our research. The questionnaire was designed so that the respondents fill in themselves, with a previously signed Informed Consent. The questionnaire consisted of 4 modules and 37 questions.

The first module was about generalities and consisted of 5 questions. The second module contained questions about pediatricians' knowledge of risk factors for caries with a total of 11 statements. The third module contained 10 statements related to pediatricians' attitude about early childhood caries. The fourth module had 11 questions related to the practice and behavior of pediatricians according to the oral health of the child. All modules except the first one were with suggested answers.

For the purposes of statistical data processing, a database was created in the Microsoft office program Excel 2013, and the statistical program IBM SPSS Statistics v was used for their processing. The data were processed using statistical methods of descriptive statistics (n, percentages, central measures tendencies), with a display of the percentage of correct answers and accuracy in answering (Z values). All statistical analyses were performed at the level of significance $p \leq 0.05$.

Results

The research was conducted on a total sample of 53 pediatricians. Average age of respondents is 48.79 (SD±8.67) years old. The youngest respondent was 33, and the oldest 69. The largest number of the respondent was 48 years old. The majority of respondents were women (44 respondents, 83%), and only 17% (25 respondents) were men. The majority of 75.5% of pediatricians worked in state practices. Half respondents indicated that they had education about oral health

during specialization, 13.2% of them that they did not, while the others did not remember those data. Of the total number of examined pediatricians, 79.2% were general pediatricians, while the rest were subspecialists of narrower branches of pediatrics (Table 1).

Table 1. Work area of the respondents

Area of work N %	N	%
Children's endocrinology	2	3.8
Children's Gastroenterohepatology	1	1.9
Children's immunology	1	1.9
Children's cardiology	1	1.9
Children's nephrology	1	1.9
Small pediatrics	2	3.8
Neonatology	1	1.9
Neuropediatrics	1	1.9
General pediatrics	42	79.2
School children	1	1.9
Total	53	100

None of the pediatricians considered the frequency of sugar consumption to be an important risk factor for the occurrence of dental caries, while the other potential risk factors listed by the majority of respondents (from 62.3-100%) were considered important for the development of this disease. All respondents recognized the importance of poor oral hygiene for the occurrence of dental caries, while almost all respondents (over 90%) also considered bottle feeding and non-physiological sucking habits as a risk factor (Table 2).

The majority of pediatricians believed that all the listed risk factors have an impact on the occurrence of gingivitis, and 96.2% of them knew that poor oral hygiene was a key factor for the occurrence of the diseases (Table 2). More than half of the pediatricians considered all of the above factors to be factors risk for the occurrence of malocclusions (52.8-86.8%), where they particularly emphasized the importance of the influence malpositioned teeth (86.8%), followed by non-physiological sucking habits (81.2%), and genetics predispositions (79.2%) (Table 2).

Table 2. Answers to questions about the influence of potential risk factors on the occurrence of dental caries, gingivitis and malocclusion

A risk factor	answer	Dental caries			Gingivitis			Maloklussions (orthodontic anomalies)		
		I do not know	No	Yes	I do not know	No	Yes	I do not know	No	Yes
Gender	n (%)	16 (30.2)	21 (39.6)	16 (30.2)	16 (30.2)	13 (24.5)	24 (45.3)	14 (26.4)	11 (20.8)	28 (52.8)
Family genetic predisposition	n (%)	7 (13.2)	13 (24.5)	33 (62.3)	3 (5.7)	8 (15.1)	42 (79.2)	7 (13.3)	4 (7.5)	42 (79.2)
Frequency of sugar consumption	n (%)	2 (3.8)	51 (96.2)	0 (0)	5 (9.4)	6 (11.4)	42 (79.2)	10 (18.9)	15 (28.3)	28 (52.8)
Bottle feeding	n (%)	2 (3.8)	1 (1.9)	50 (94.3)	9 (17.0)	5 (9.4)	39 (73.6)	11 (20.8)	7 (13.2)	35 (66.0)
Non-physiological sucking habits	n (%)	3 (5.7)	1 (1.9)	49 (92.4)	11 (20.8)	5 (9.4)	37 (69.8)	6 (11.3)	4 (7.5)	43 (81.2)
Oral hygiene/inadequate tooth brushing	n (%)	0 (0)	0 (0)	53 (100)	1 (1.9)	1 (1.9)	51 (96.2)	11 (20.8)	10 (18.9)	32 (60.3)
Malpositioned tooth	n (%)	8 (15.1)	4 (7.5)	41 (77.4)	11 (20.8)	5 (9.4)	37 (69.8)	6 (11.3)	1 (1.9)	46 (86.8)

Table 3. Knowledge of respondents in the field of preventive dentistry

	answer	True	False
A 6-month-old child who lives in areas with low levels of fluoride in drinking water needs fluoride supplements	n (%)	29 (54.7)	24 (45.3)
Bacteria, the causative agents of caries, can be passed from mother to child	n (%)	50 (94.3)	3 (5.7)
Dental irrigants are usually applied to primary teeth	n (%)	37 (69.8)	16 (30.2)
Only children who are bottle-fed have early childhood caries (bottle caries)	n (%)	24 (45.3)	29 (54.7)

The majority of respondents believed that the claims about the importance of fluoridated drinking water, vertical bacterial transmission and dental fillings in the prevention of early childhood caries are accurate (54.7-94.3%). The claim that early childhood caries only affects children who are fed with bottle, half of the pediatricians considered incorrect (54.7%) (Table 3).

The number of respondents who believe that dentists should only provide services was 37.7%, and those who do not agree with it was 39.7%. Half of the pediatricians did not agree with the claim that they should only provide advice on preventive measures at the request of parents and that it takes too much time. Respondents agreed with other claims about the importance and prevention of caries (45.3-96.2%) (Table 4).

Table 4. Pediatricians' viewpoints on the importance and prevention of patients' oral health

	Answer n (%)	Indecisive n (%)	Not agree n (%)	Agree n (%)
Pediatricians have an important role in caries prevention	47 (88.7)	4 (7.5)	2 (3.8)	47 (88.7)
Bad oral children health is an obstacle to the proper growth and development of the child	48 (90.6)	0 (0)	5 (9.4)	48 (90.6)
Teaching pediatricians the skills to carry out caries preventive procedures would be worthwhile	44 (83.0)	7 (13.2)	2 (3.8)	44 (83.0)
Application of fluoride, with minimal risk, is the best and most effective caries preventive procedure	24 (45.3)	21 (39.6)	8 (15.1)	24 (45.3)
The provision of caries preventive services should be left entirely to dentists	20 (37.7)	12 (22.6)	21 (39.7)	20 (37.7)
Caries is an infectious disease that can be prevented, and it is ideal to start preventive measures as early as possible, so it is most important to include pregnant women and children in the first year of life.	48 (90.6)	2 (3.8)	3 (5.7)	48 (90.6)
My knowledge of oral hygiene is quite sufficient	22 (41.5)	14 (26.4)	17 (32.1)	22 (41.5)
It is necessary to warn mothers that the cause of early child caries is the transmission of cariogenic bacteria from mother to child, as the main route of infant infection, and the bad habit of putting a bottle to sleep or feeding sweetened drinks/food at night	48 (90.6)	1 (1.9)	4 (7.5)	48 (90.6)
The oral health of small children is the foundation on which health care for oral health rests, and for this purpose, it is extremely important to make the first visit to the dentist in the period from the eruption of the first tooth, and at the latest by the end of the first year of life, and whenever possible, I advise parents to do so	45 (84.9)	3 (5.7)	5 (9.4)	45 (84.9)
Preventive dental care for children should be a by-pass area when preparing a program of additional education for pediatricians	41 (77.4)	6 (11.3)	6 (11.3)	41 (77.4)

Table 5. Respondents' answers to the question whether they perform an assessment of oral health of their patients

Do you perform oral health assessments on your patients	N	%
Yes	17	32.1
Only when there is a problem	21	39.6
Only at the request	4	7.5
No	11	20.8
Total	53	100

Table 6. The answer to the question of when you recommend the first dental examination to your patients

When do you recommend a first dental appointment to your patients	N	%
Until the first month	4	8.7
Until the second month	3	6.5
Within six months	18	39.1
Until the first year	14	30.4
Until the second year	4	8.7
Until the third year	2	4.3
Until the fourth year	1	2.2
Total	46	100

The majority of pediatricians (84.9%) stated that they assess the nutrition of their patients, while 32.1% of them always do oral health assessment, and half of them in the second month of the child's life; and 39.6% assess oral health only if there is a problem (Table 5). The majority of pediatricians (86.8%) recommended the first dental

examination, most often in the first year of the child's life (79.5%), and then every 6 months (43.5%) (Table 6).

The majority of respondents did not inform themselves about the dental health of their patients' mothers, fluoride toothpastes and topical application of fluoride as well (62.3-75.5%), but they were interested in the type of water that the child drinks and giving recommendations to parents for maintaining oral hygiene in children and other ways of caries prevention, as well as information about the importance of oral hygiene (54.7-96.2%) (Table 7). The majority of pediatricians (79.2%) have never provided or sometimes provided educational material on caries prevention and control to the parents of their patients (Table 8).

By determining the accuracy (Z value) of the given answers to the questions and the percentage of correct answers, the existence of statistically significant differences in the total of the given answers was investigated were related to the knowledge, viewpoint and practice of the group of pediatrician respondents. The most accurate answers that the pediatricians had were about attitude ($Z=8.98$, 66.63%), and pediatricians had the fewest correct answers and the lowest percentage of correct answers to the question practices ($Z=11.91$, 58.90%) on the prevention of early childhood caries (Table 9). No statistically significant differences in Z values of answers to questions, nor in percentages of correct answers to questions related to the knowledge, attitude and practice of the pediatrician respondents were found.

Table 7. Practice of caries prevention

	answer	Yes	No
Do you inform about the dental health of the mother?	n (%)	18 (34.0)	35 (66.0)
Do you ask parents what kind of water a child drinks?	n (%)	33 (62.3)	20 (37.7)
Do you advise parents about the use of fluoride toothpaste?	n (%)	20 (37.3)	33 (62.3)
Do you advise parents on the topical application of fluoride?	n (%)	13 (24.5)	40 (75.5)
Do you recommend parents brush their children's teeth?	n (%)	49 (92.5)	4 (7.5)
Do you advise other ways to prevent caries?	n (%)	29 (54.7)	24 (45.3)
Do you advise parents about the importance of oral hygiene?	n (%)	51 (96.2)	2 (3.8)

Table 8. Response to the question of whether you provide educational promotional materials on caries prevention for the parents of your patients

Do you provide educational promotional materials on caries prevention for the parents of your patients	N	%
Never	21	39.6
Rarely	9	17.0
Sometimes	21	39.6
Often	2	3.8
Always	0	0
Total	50	100

Table 9. Measures of central tendency Z values of answers to questions and percentage of correct answers to questions about knowledge, standpoints and practice of pediatrician respondents

	Pediatricians Z answers	Pediatricians Z answers-knowledge	Pediatricians Z answers-standpoints	Pediatricians Z answers-practice
N	178	73	55	50
X (SD)	10.70 (13.40)	11.16 (14.76)	8.98 (10.02)	11.91 (14.57)
	Pediatricians Percentage of answers	Pediatricians Percentage of answers-knowledge	Pediatricians Percentage of answers-standpoints	Pediatricians Percentage of answers – practice
N	65	27	19	19
X (SD)	62.33 (28.02)	61.71 (28.49)	66.63 (26.23)	58.90 (29.96)

Discussion

Many oral pathological conditions in the child population can be prevented by timely spotting problems and the application of the adequate dental interventions. In order to be recognized on time, it is necessary to educate pediatricians about basic oral diseases of preschool children age¹⁸. The first systematic examination of a newborn is carried out at the age of one month. If we follow calendar of regular vaccinations in Band H, only in the first year of life, a healthy child visits a pediatrician on average 5-6 times¹⁹. The usual period of eruption of the first milk teeth is between the fourth and the sixth month of the child's life. This is the period when the pediatrician is visited regularly. Also, in case of any health problem, even of a dental nature, the parents will take the child to the pediatrician.

Therefore, the pediatrician has an ideal position to give the advice and recommendations of oral health and the first dentist examination. In this way, the awareness of parents about the importance of a child's oral health would be raised and thus would reduce the possibility of developing early childhood caries. In this research, pediatricians showed that they mostly knew the risk factors for the early development of caries, except for

the frequency of sugar consumption. All pediatricians knew the importance of the oral hygiene in the caries prevention. However, no pediatrician believes that more frequent intake of sugar can affect early childhood caries. It is obvious that pediatricians give the priority to good oral hygiene and consider it as crucial in prevention. Therefore, pediatricians consider an adequate oral hygiene can compensate the bad impact of frequent sugar intake on the development of early childhood caries. Also, they may generally ignore the negative impact of sugar in the overall diet, if is a healthy child and eats a variety of foods, and thus early childhood caries as an illness. Such results are not in accordance with the results of random studies in the region and the world, where pediatricians generally recognize the impact of the frequency of sugar consumption on early childhood development caries^{12,20-23}. World Health Organization and American Academy of Pediatrics dentists recommend weaning the one-year-old child from breastfeeding and getting used to drinking from a cup, and with the emergence of the first tooth, switch to solid, pureed, unblended food^{24,25}. Awareness of vertical transmission of *Streptococcus mutans* is quite variable, from study to study. According to research, pediatricians in Montenegro, Italy and Iran are aware of the possibility of transmission of the cariogenic

bacteria from mother to child^{12,21,26}, while in studies from India, USA (California), Nepal and Turkey, most of them are not aware of vertical transmission^{22,27-29}, despite the published content and research of the past two decades. All of the listed risk factors for the development of gingivitis and malocclusion are considered important by the majority of respondents. More than two thirds of respondents believe that bottle feeding can be a risk factor for the occurrence of malocclusion, which is in accordance with research from the region^{12,20}.

Most pediatricians have corrected the views on the importance of oral health, prevention of early childhood diseases caries, as well as their own role. Opinions on whether to leave everything to the dentists' preventive service are divided - an equal number of them agree and disagree with it. The very fact that more than 60% of pediatricians either agree or they are not sure who has the main preventive role in prevention of early childhood caries, indicates that pediatricians are aware of their responsibility for the occurrence of the mentioned disease^{20,30-32}. However, as much as a third of them believe that counseling on the oral hygiene and recommending a dental visit takes too much time. If we take into account the assumed obedience of parents to pediatrics and frequency of visits, we can consider this number to be worrying. Also, pediatricians who do not give the advice about caries prevention, underestimate the importance of oral health and give less importance to the prevention. Counseling on the oral health prevention should be part of a comprehensive preventive program in pediatrics¹², because pediatricians may directly influence on the health literacy of their patients. Most pediatricians assess their patients' nutrition, but not their oral health. They pay attention on nutrition in the overall development of the child, but ignore its importance on oral health. According to the research in other countries, pediatricians mainly assess the nutrition of their patients and its impact on oral health^{12,22,26,33,34}. According to the plan and program of specialization of medical doctors in our country, pediatric specialists have to spend only 15 days in primary and secondary children's dentistry health care^{35,36}. The majority (more than 80%) have the opinion that they are not sufficiently qualified and educated for dental prevention. Therefore, in our country, preventive dentistry is left to each pediatrician's personal responsibility and individual interest. In research from Croatia, 78.85% of pediatricians believe that they need more education on the prevention of oral diseases, and the main source of the information should be the professional training course²⁰. In the research conducted in Montenegro, 82% of respondents believe that they need more knowledge and information about the caries prevention, but still they mostly get information through magazines¹². High percentages of respondents, who state the need for additional education on the prevention of caries in early childhood, precisely indicate their preference for a

preventive approach to oral health in children, as well as the need for a unique information dissemination system^{28,29}.

According to research from Croatia, the majority of dentists (84.62%) examined their patients most often in the 6th month of life, and recommended a visit to the dentist every 6 months²⁰, which is in accordance with this survey, where 67.9% of them do the first oral examination (75%). Also, most pediatricians (62.3%) do not prescribe fluoride supplements, as in the survey in Croatia, where 78.85% do not do so²⁰. On the contrary, according to a study from Montenegro, even 76% of pediatricians prescribe fluoride supplements. According to the results of the research conducted in Italy, the majority of respondents do not prescribe fluoride supplements; as well as in studies from Iran^{12,26,37}. According to the recommendation of the World Health Organization, the maximum of the permitted concentration of fluoride in drinking water is 1.5 mg/L in order to prevent possible manifestation of its unwanted and toxic effects³⁸. Almost all respondents do not know about concentration of fluoride in our drinking water, so they don't prescribe fluoride supplements, because of the insecurities and precautions. Most respondents give recommendations to parents for maintaining oral hygiene of children and other ways of caries prevention, as well as information about the importance of oral hygiene (54.7-96.2%). Similar results were also shown by a study from Montenegro, where 97% of doctors gave the instructions of oral hygiene¹². However, regardless of the awareness of its importance in the prevention of early childhood caries, as well as the insufficient knowledge of it, many (79.2%) pediatricians do not provide educational material to their patients. It is similar to the research from Montenegro and Croatia^{12,20}. The costs of dental treatments as a consequence of caries within the European Union in 2011 were 79 billion euros³⁹. It is estimated that 51 million school hours are lost annually due to dental problems⁴⁰.

Conclusions

The research showed that pediatricians have the good attitudes and knowledge, but do not implement prevention of early childhood caries in practice. The basic deficiency of attitudes, knowledge and perception of the importance of prevention is a consequence of insufficient education of pediatricians. Because of that it is necessary to create a health policy focused on prevention with a clear strategy and action plans in the field of dental health care, which will include education as a priority of all groups of importance for the prevention of early childhood caries, including pediatricians. Oral health is an integral part of general health, and pediatricians are also responsible for its promotion. Therefore, it is important to integrate this segment into their clinical protocols.

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