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Knowledge, attitudes and behavior of children in relation to oral health

Informisanost, stavovi i ponašanje djece prema oralnom zdravlju

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Abstract

Background/Aim. Health education plays a very important role in maintaining health of individuals. Good oral health, as a part of general health, is largely dependent on the level of knowledge, attitudes and habits that children already have. The aim of this study is to examine the level of knowledge and habits in children regarding oral hygiene, diet and bad habits. **Methods.** The study included 506 school children aged 12 and 15 years in three towns (Foča, Čajniče, Kalinovik, Bosnia and Herzegovina). The survey was conducted in order to assess knowledge, attitudes and habits that children have in relation to their own oral health. **Results.** Most respondents stated that they began to brush their teeth at the age of 4, while a smaller number linked beginning of tooth brushing to the start of school. The parents more often help the boys during tooth brushing. A total of 54.9% of children brush their teeth after every meal, while 40.1% of them brush teeth only once during the day. Twelve year olds brush their teeth more often, especially after a meal. A total of 92.5% of children had never used fluoride tablets nor are the tablets recommended to them by anyone. More than half of the children (61.7%) visited the dentist for the first time before starting school that is on the regular examination that is performed upon enrollment to school. A pain as a reason for dental visits was present in 43.9%, while the preventive check in only 31.4% of the children. **Conclusion.** Children included in this study, particularly 15-year-olds, are quite well informed about teeth brushing frequency and proper selection of tools for hygiene maintenance, but this knowledge is not applied. Girls are more responsible for their own health, and come regularly to the preventive dental checkups.

Key words:
child; adolescent; oral health; attitude to health.

Apstrakt

Uvod/Cilj. Zdravstveno vaspitanje ima izuzetno važnu ulogu u očuvanju zdravlja pojedinca. Dobro oralno zdravlje, kao deo opšteg zdravlja, umnogome zavisi od stepena informisanosti, stavova kao i navika koje djeca već imaju. Cilj rada bio je da se ispita stepen informisanosti i navike djece prema oralnoj higijeni, način ishrane i loše navike. **Metode.** U istraživanje je bilo uključeno 506 školske djece uzrasta od 12 i 15 godina iz tri grada (Foča, Čajniče, Kalinovik). Za ocjenu informisanosti, kao i stavova i navika koje djeca imaju prema sopstvenom oralnom zdravlju, sprovedena je anketa. **Rezultati.** Većina ispitanika je navela da je počela da pere zube sa navršene četiri godine, dok manji broj svoj početak pranja zuba vezuje za polazak u školu. Roditelji češće pomažu dječacima prilikom pranja zuba. Ukupno 54,9% djece pere zube nakon svakog jela, dok 40,1% djece samo jednom u toku dana pere zube. Dvanaestogodišnjaci češće peru zube i to nakon obroka. Ukupno 92,5% djece nije nikada upotrebljavalo fluor tablete, niti im ih je neko preporučivao. Veći broj djece (61,7%) prvi put je posjetilo stomatologa pred polazak u školu, tj. na redovnom sistematskom pregledu koji se obavlja pri upisu u školu. Bol kao razlog posjete stomatologu bila je zastupljena kod 43,9%, dok preventivna kontrola samo kod 31,4% djece. **Zaključak.** Djeca uključena u ovo ispitivanje, a posebno petnaestogodišnjaci, dosta su dobro informisana o redovnosti održavanja oralne higijene i pravilnom izboru pribora, ali to znanje ne primjenjuju. Djevojčice su odgovornije prema sopstvenom zdravlju jer dolaze redovnije na preventivne stomatološke preglede.

Ključne reči:
deca; adolescenti; usta, zdravlje; stav prema zdravlju.

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Introduction

The occurrence of two most common diseases of the oral cavity, dental caries and periodontal disease, as well as reduction in their distribution significantly depend on the knowledge about their origin and measures for their prevention. Health education plays a role in promotion of the right information in order to prevent these diseases. Health education aims to develop responsibility in every individual for their own health, health of the nearest environment as well as for communities where we live and work [1]. In the domain of dental care, health education task is to inform and motivate individuals and society in total to preserve the health of mouth and teeth. The task is also to promote the establishment of regular and proper oral hygiene habits, establishment of proper nutrition, as well as the use of fluoride.

Oral health is largely dependent on habits, attitudes and behaviors that are current hygienic-dietary habits in the family [2]. The parents, as the highest authority, have a crucial importance in forming the personality of the child with the positive attitude to oral health by their health education influence on children [3]. Studies have shown that children, who visit the dentist more often, are more informed about teeth and mouth health. However, implementation of existing knowledge greatly depends on motivation of patient (possible children) to preserve one's own health, but also on the motivation and commitment of parents [4].

Health education program cannot be based only on one-off provision of information, because it usually gives poor results and short-term effects. The program should be based on active learning process and education, both in preschool and school children, their parents and the whole community [5]. The role of dentists is essential in children and parents counseling, as well as in finding an adequate way for the implementation of preventive measures.

Recent researches in the Eastern Europe countries show that the oral health of school children must be improved and school health education programs are needed for health promotion. The engagement of parents and teachers in these programs is essential [6].

Various literature data indicate that the most efficient and economically most cost-effective method of oral preventive program worldwide is the School Dental Care (SDC) [7]. It is particularly significant because schools may include those children who cannot come (due to socioeconomic reasons), do not want to come (because of fear) or who are not sufficiently motivated and interested in coming for regular checkups and dental repairs [8].

Research on oral hygiene habits showed that there are two widely defined forms of behavior – self-defense (oral hygiene, decreased intake of refined carbohydrates, fluoride use), and dental services usage (health education, regular dental checkups and professionally applied preventive measures) [8]. Habits of regular and proper oral hygiene accepted during childhood are extremely important for the preservation of health of teeth and mouth through life. Improvement of oral-hygiene habits led to enhanced dental health in the elderly population [8].

The aim of this study was to evaluate the level of knowledge, current attitudes and habits that children have in relation to oral hygiene maintenance, diet and the presence of the bad habits.

Methods

The study included 506 children: 324 aged 12 years and 182 aged 15 years in three towns (Foča, Čajniče, and Kalinovik, Bosnia and Herzegovina). The sample comprised approximately the same number of boys (263, 51.97%) and girls (243, 48.03%). To assess knowledge, attitudes and habits that children have in relation to their own oral health, survey was conducted using a specially prepared questionnaire (Addendum 1).

The survey consisted of 23 questions in total, divided into three parts. The first part of the questions included questions that examined children's knowledge about proper oral hygiene and the reasons for dental visits. In addition to the data on knowledge part of the questions was related to their hygiene habits.

The second part of the survey contained the history data related to condition of the gums in the sense of the existence of subjective symptoms such as of bleeding, swelling, pain, unpleasant odor. These data indicated the absence or presence of weaker or stronger gingival inflammation.

The third group of questions was related to bad habits, the presence or absence of bad habits as well as the type of food they like to consume.

In order to present and interpret data obtained from this survey in easier and more simple manner during the statistical analysis, within some questions there were answers grouped in response to the accuracy or impact on the incidence of tooth decay (with each such question there will be note with the symbol *).

One of such questions was the question from the first group of questions related to the knowledge of patients, in order to establish the means used for oral hygiene maintenance. In order to facilitate statistical analysis, the answers were deployed in three groups according to their accuracy. The accurate answers were considered the circled responses: toothbrush, toothpaste with fluoride, dental floss. As partially correct were considered the answers when the respondents circled only two responses from the aforementioned three. Incorrect were the responses of all other offered combinations.

Another such question was one in the third group of questions related to examination of the presence of bad habits. In addition to the knowledge of the respondents about the importance of nutrition to caries or periodontal disease occurrence, it was important to know about their favorite food. There were four responses. In order to simplify statistical analysis, grouping of responses was performed. The answer was: cariogenic food, if the respondents rounded up chocolate, coca-cola, fruit; conditionally cariogenic if rounded fruit; non-cariogenic if they rounded up vegetables.

The study began by the prearranged order after obtaining the approval of Medical Faculty in Foča Ethic Commit-

tee, consent of school directors, written consent from parents/guardians. The study was conducted according to the "Principles of good research practice" and the Declaration of Helsinki for Medical Research.

Prior to distribution of the questionnaires, the children were given instructions on how to fill the questionnaire and unfamiliar terms were explained to them. For each question, they had to circle one or more answers.

Data obtained in this study were processed by SPSS program version 11.5 (SPSS Inc., Chicago, IL, USA). The results of the survey were analyzed using the χ^2 test and values of $p < 0.05$ were considered statistically significant.

Results

The research included an approximately equal number of boys (51.97%) and girls (48.03%), 64.03% twelve year olds and 35.97% fifteen year olds, respectively. By means of questionnaire data related to the level of oral hygiene knowledge, reasons for dental visits of children involved in this study, their hygiene and dietary habits, the existence of local risk factors for periodontal disease, as well as to the influence of the parents on children's oral health, were obtained. Analyzing the questionnaire, which consisted of three groups of questions, a statistical significance was observed in the first and the third group.

Almost all the respondents considered the proper and regular oral hygiene as important for dental health, while only 16.4% thought dental hygiene essential to have clean teeth. Most respondents stated to have started teeth brushing at the age of 4, while a smaller number of them associated teeth brushing with enrollment to school. The parents more often help boys with tooth brushing as shown by a statistical significance ($p < 0.01$). More than half of examined children brush their teeth after every meal, while a smaller proportion of children brush teeth only once during the day. Twelve year olds brush teeth more often and after every meal, while fifteen year olds brush only once during the day ($p < 0.05$).

Fifteen year olds were better informed about proper frequency of tooth brushing compared to twelve year olds, while 18.2% of twelve year olds considered brushing twice a day enough ($p < 0.01$) (Figure 1). Girls were more frequent in brushing their teeth and mouth, while boys did so only occasionally ($p < 0.01$) (Figure 2). Fifteen year olds brushed their teeth longer than the twelve year olds ($p < 0.01$).

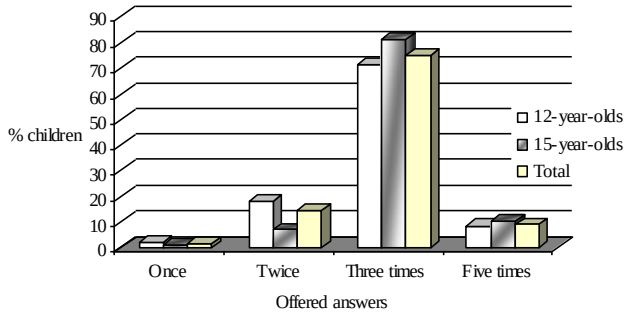

Fig. 1 - Distribution of answers to the question: How many times teeth need to be washed a day?

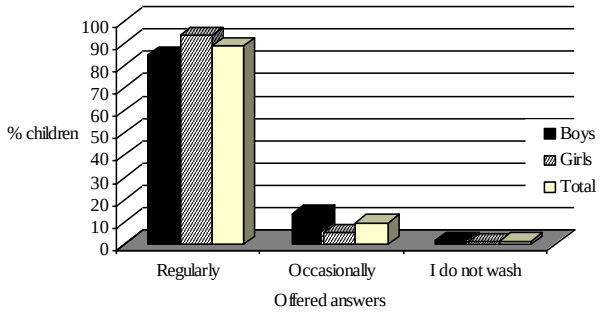

Fig. 2 – Distribution of answers to the question: Do you wash your teeth and mouth regularly?

Half of the examined children gave partially correct answer to question number eight (tooth brush and tooth paste) (Figure 3), while a smaller number of them circled some of the remaining two combinations. A third knew and circled the correct answer. However, fifteen year olds better knew what tools should be used for daily maintenance of proper oral hygiene, compared to the younger population of students ($p < 0.01$). Boys were more likely to avoid brushing teeth than girls ($p < 0.01$).

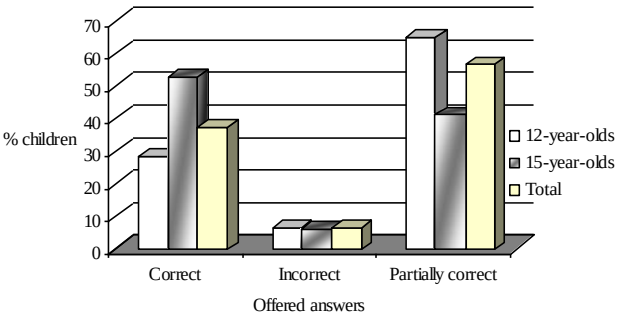

Fig. 3 – Distribution of answers* to the question: What means do you use for oral hygiene maintenance?

*** Answers grouped according to accuracy, due to stastitical analysis.**

The disturbing fact was that 92.5% of children had never used fluoride tablets nor have ever been recommended by anyone, those children did not know what it was fluoride or what was its purpose.

More than half of children (61.7%) visited the dentist for the first time just before starting school, at the regular medical examination performed upon enrollment to school. Slightly more girls visited the dentist for the first time at the age of 3 and 7 years of life, while the boys met with the dentist for the first time at the age of 10 ($p < 0.05$). Toothache as a reason for visiting the dentist was present in the highest percentage of boys of all ages while girls more often went on preventive examinations, with the respect to the schedule at the dentist ($p < 0.01$) (Figure 4).

History data explaining gum health were included in the second set of questions (Addendum 1). The responses also showed if there were any subjective discomforts, swellings, painful gums with the tendency to bleeding or unpleasant odor. This section did not reveal any differences by gender or by age.

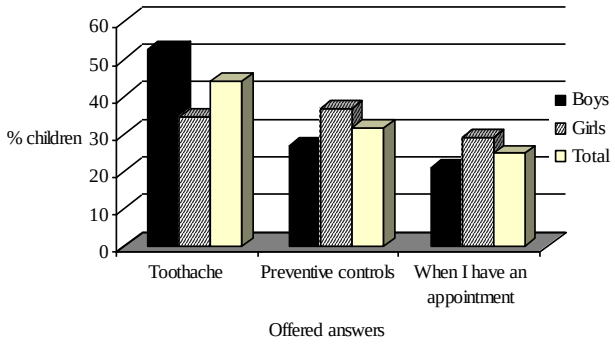

Fig. 4 – Distribution of answers to the question: When do you visit the dentist?

The third group of questions was related to data on the presence of bad habits (Addendum 1). A quarter (22.5%) of the observed children nibbled the objects, 27.5% of them were fifteen year olds. Fifteen year olds had a higher percentage of developed pen nibbling bad habit in relation to the twelve year olds ($p < 0.05$), while boys more often without provocation grip and gnash their teeth.

Unilateral chewing usually indicates the existence of deep carious lesions on the painful side of the jaw. The number of children, who chew on only one side of the jaw, is not insignificant, 16.8% of them seem to do it unconsciously. Every tenth child consumes only softer food (10.1%). Among them, twelve year olds more than fifteen year olds prefer to eat refined, processed food, what indicates a statistically significant difference ($p < 0.05$). Fifteen year olds prefer fresh, unprocessed foods in their diet as opposed to twelve year olds. Boys are more frequent consumers of soft, sticky foods than girls ($p < 0.01$).

More than half of the children observed consumed conditionally cariogenic food (57.7%), while one third (36.0%) enjoyed eating cariogenic food. High statistical significance was observed by age ($p < 0.01$), while boys ate more chocolate and drink Coca-Cola ($p < 0.05$) (Figure 5).

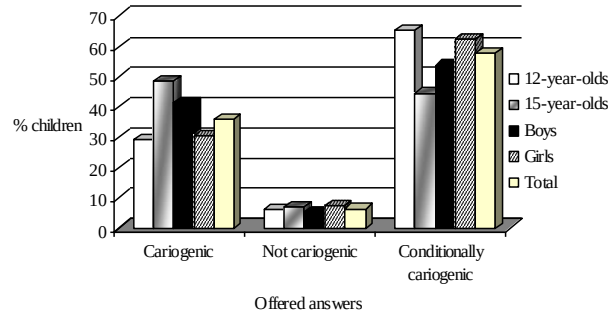

Fig. 5 – Distribution of answers* to the question: What do you prefer to consume?
***Answers grouped according to the influence of food type on tooth decay due to the statistical analysis.**

Discussion

Health education in the field of oral health is very important for acquiring satisfactory oral hygiene habits, but the relationship between knowledge and behavior is not coordinated. It seems that the improvement of the patient's health is more effected by the level of professional engagement, than the patient's knowledge [8].

Independently acquired improper habits of the patients belong to a group of local factors for the occurrence of gingivitis, since they contribute to the accumulation of dental plaque. Long-term retention of dental plaque on caries predilection sites can cause tooth decay over time.

Children often do not have a clear idea of why it is necessary to brush their teeth, and most do not think about the importance of prevention of oral diseases, which increases the risk of caries and gingivitis [9].

Applying the strategy of individual assessment of risk for caries, dentists can tackle the problem in relation to the target groups at risk for tooth decay, pointing to the risk factors, using special methods that include educational and motivational methods with the use of preventive prophylactic methods. All that should be included in everyday practice rather than just earlier approach of carious lesions treatment, which includes only detection of caries lesions and their treatment [10].

Oral health in twelve year olds is enhanced in the last few decades on the territory of our region. It is difficult to explain the reasons for this improvement because all preventive measures taken had been limited to local level. The authors of this study as reasons for oral health state improvement cite strict application of WHO guidelines for the diagnosis of caries lesions, and the use of WHO periodontal probe during examinations [11].

The participant of this study were informed about the factors that may affect oral cavity health, and about the way that it should be preserved. The children from the urban part of Banja Luka stated that they brush their teeth since the age of two, while their rural peers started with teeth brushing between 4 and 6 years of age [12].

Twelve year olds in China believe that the teeth should be brushed preventively in order to have healthy teeth in 76.5%, and for aesthetic reasons in 42%. In the same study, children reported the lack of time as the most common reason why they do not brush their teeth, and it is interesting that 3% of respondents consider teeth brushing useless because the good quality of teeth is hereditary [13]. Respondents from Kushinga (Malaysia) (70.3%) believe that dental plaque accumulated on the teeth cannot cause decay, while brushing teeth on regular basis can prevent gum bleeding (57.4%) [14]. Peers from Spain (79.8%) believe that with good oral hygiene, tooth decay can be avoided [15].

Teeth brushing, as a measure to preserve teeth and gingiva health, should be applied several times during the day (after getting up, after every meal, before bedtime), every day, while brushing the length should be adjusted to age for at least 5 minutes for older children. Similar data are presented by Pellizzer et al. [8] where 82% of girls brushed their teeth more often, in contrast with data from studies [16, 17] that found that girls and boys maintain their oral hygiene in about the same manner. Twelve year olds (28.1%) from this study brush their teeth longer, but most of the children (58.3%) are doing it for about 2 minutes. A total of 92.85% of the exam-

ined children from Sarajevo brush their teeth at least twice a day (Bosnian entity, Federation) and around 56% children from Banja Luka (Bosnian entity, Republic of Srpska), 18.5 % of children from rural part and 9.6% from urban parts of Banja Luka [10, 12, 18]. Their peers, 81.8 % of school children from Pančevo brush their teeth twice a day, 70% of Croats, 45% of Chinese brush their teeth, 50.2% of children from Saravak (Malaysia), 27.5% of girls from Saudi Arabia, about 69% of children from Northern Jordan, about 55.6 % of children from Portugal [8, 13, 14, 19–22] and in most of the cases brushing length is shorter than 2 minutes. The role of parents in proper development of oral-hygiene habits is significant. Children whose parents brushed their teeth twice a day also had similar habit [19].

Oral care tool set for these age groups should consist of tooth brushes, tooth paste with fluoride and dental floss. The level of awareness of the importance of oral hygiene and its maintenance, increases with the age of children and it is more pronounced among children living in urban areas [12, 19, 23].Twelve year olds living in Banja Luka maintain their oral hygiene with toothbrush and toothpaste [18]. A toothbrush as the only oral hygiene tool is used in 90.8% of twelve and fifteen year olds [24]. In the Grewala study, children mostly maintained their oral hygiene with tooth brush and dental floss [25]. Good oral hygiene of the parents and habits to control children while washing teeth are significant predictors of good oral health in children [19].

When it comes to awareness of fluoride, as one of the most powerful means in prophylactic dentistry, most children (93%) did not use fluoride tablets or any other fluoride means. Having in mind that there is no toothpaste that does not contain fluoride today, this is even more interesting information. First of all, we can say that it is due to the lack of children's knowledge gained by dentists, parents, teachers, means of mass communication, or perhaps lack of interest of children (parents). Data from this study are similar to data from the literature [13, 18, 19, 23], while 77% of Croatian adolescents were informed about the positive effect of fluoride on caries development [8]. Of all the fluoride preparations, toothpaste with fluoride is used by 4.3% of Sarajevo twelve year olds [10].

Drinking water in the municipalities where study was conducted has insufficient amount of fluoride (< 0.3 mg F/L). A recent study in the same municipalities indicates a high caries incidence of 5.64 in twelve year olds and 7.12% of fifteen year olds [26]. Latest guidelines on the use of fluoride do not recommend giving fluoride systematically to the whole population. This measure is recommended only to children with a high caries risk, what that is the case with the majority of children in this area.

The use of toothpaste with fluoride is a basic caries preventive measure that is recommended to everyone and should be promoted. In cases brushing is not implemented as recommended or caries risk is increased from any other reason, then additional sources of fluoride can be used [27].

The first dental appointment should be arranged in early childhood, just after the emergence of the first primary teeth (if there are no objective reasons for the earlier examinations), while all the teeth are healthy. However, 62% of respondents met with the dentist for the first time on regular examination before starting the school.

Bad experience from contact between the child and the dentist or medical workers', "fear of the white coats", will adversely affect the future behavior of the child to the dental treatment. Exaggerated and false stories about the "horrific and painful" interventions learned from other children or the parents can also create a false image in the head of little patient, that increases the fear of dental procedures. This kind of fear can be a significant limiting factor in maintaining oral health, which leads to the delay of dental visits and eventually to unsatisfactory oral health. Expression of dental fear increases in this way and creates a vicious circle [28].

Based on the results of this study the main reason for dental visits is a toothache (45%). A study conducted in Portugal shows that twelve year old girls from the city's private schools far more frequently visited the dentist [22]. The same study reported that 58.4% of six year olds and 13.3% of twelve year olds have never been at the dentists'. Literature review reveals that toothache is the most common reason for dental visits [14, 21], while the less frequent reasons are regular dental examinations or regular interventions [18, 24] or every six months visits [17]. In contrast to that, data obtained in studies at the area of Sarajevo, Banja Luka and Pančevo, show that children more often go for control check-ups, as well as for appointments with their dentist [10, 12, 19].

The existence of any long-term changes in soft or hard tissues can cause pain, which by itself prevents the regular, daily brushing, or the use of painful jaw while eating. Although 87% of respondents do not avoid brushing their teeth, the boys are doing it more often than girls. To the questions in the survey related to subjective symptoms such as edematous gums, bleeding from the gums and unpleasant breath, 95% of respondents answered negative. The percentage of 5 is not negligibly small, each 25th respondent feel discomfort in the area of one's mouth.

Slightly more than half of the respondents (50.2%) confirmed to breaththrough the mouth, that increases the risk for reduced secretion of saliva, increased percentage of gingivitis and tooth decay respectively. Over 80% of the respondents do not practice bad habits such as teeth griping and gnashing, unilateral chewing, the use of soft food or foreign objects nibbling. Fifteen year olds are more likely to practice a bad habit of biting foreign objects (27.5%).

Longtime experiences of numerous authors undoubtedly favor the claim that in patients with poor oral hygiene occurrence of caries is more frequent. In children with poor oral hygiene, eating sweets between meals is the most important risk factor in the development of caries. This was confirmed by a study conducted in Priština, where children with caries consumed more carbohydrates between meals, did not washed their teeth regularly and had higher values of plaque index, lower pH values of stimulated saliva compared to their peers with healthy teeth [29].

According to our research every tenth child consumes only softer foods. Among them, twelve year olds prefer to eat refined processed food. Boys are more frequent consumers of soft sticky foods. Studies conducted worldwide have

shown that children are informed about the effects of candy on dental health [8, 12, 19, 23, 24] but sweet meals, mostly chocolate, cakes, fizzy drinks are most frequently consumed, at least once a day [14, 15, 18, 24, 25, 30].

Conclusion

Children included in this study are relatively well-informed about the importance of health, oral health, use of appropriate tools for oral hygiene maintenance, brushing teeth length and its frequency. Surprising is the poor knowledge about fluoride application in caries prevention. Although children in this study acquired knowledge necessary for good oral health, based on the attitudes they have, their daily habits are inconsistent with their knowledge. The results showed that the relationship between knowledge and practice is contradictory. Therefore, knowledge transfer and control over implementation of that knowledge should be enhanced.

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Addendum 1

Layout of the survey questionnaire

Questionary for students (*General data*)

First and last name of the student: .....

School, grade, class: .....

(A) Knowledge of the children		
No.	Question	Answeres
1.	Why is it necessary to wash teeth?	To keep teeth healthy
		To keep teeth clean
		Because parens ask me to do that
		Other
2.	Do you have your own toothbrush?	Yes
		I do not have
		I have, together with my sister/brother
3.	Do you brush your teeth by yourself, and since when?	Yes (start a time when, ...)
		No, parents help me
4.	When do you wash your teeth and how many times a day?	In the morning or evening (once)
		After a meal (three times and more)
		When I leave house
5.	How many times teeth need to be washed a day?	Once
		Twice
		Three times
		Five times
6.	Do you wash your teeth and mouth regularly?	Regularly
		Occasionally
		I do not wash
7.	How long do you wash your teeth?	Around minute
		More than two minutes
		Around five minutes
8.	What means do you use for oral hygiene maintenance? *****	Toothbrush
		Toothpaste with fluoride
		Toothpaste without fluoride
		Dental floss
		Toothpick
9.	Do you avoid tooth brushing?	Yes
		No
		Occasionally
10.	Did you use tablets or other preparation containing fluoride?	Yes
		No
11.	When did you visit the dentist for the first time?	When I was 3 years old
		Before starting the school
		At the age of 10
12.	When do you visit the dentist?	When I have a toothache (as necessary)
		Preventive controls
		When I have an appointment
(B) History data		
13.	Do your gums bleed when you wash your teeth?	Yes
		No
14.	Are you gums swollen or painful?	Yes
		No
15.	Do you feel bad smell (odor) from your mouth?	Yes
		No
16.	Are there some discomfort in the area of the mouth and teeth?	Yes
		No
(C) Bad habits		
17.	Do you usually breathe on your mouth?	Yes
		No
18.	Do you scratch your teeth?	Yes
		No

19.	Do you often clench your teeth?	Yes
		No
20.	Do you nibble objects (pencil, nails, toothpick)?	Yes
		No
21.	Do you often chew food only on one side?	Yes
		No
22.	Do you use softer food in the diet?	Yes
		No
23.	What do you prefer to consume? *	Chocolate
		Fruit
		Vegetables
		Coca-Cola

*** Questions with answers grouped according to the accuracy or the impact of the type of food on caries, due to the statistical analysis of data.**