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CARIES PREVALENCE IN CHILDREN FROM THE MOSTAR CITY AREA

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ABSTRACT

A nationwide study from 2004 showed that the children's oral health in Bosnia and Herzegovina is poor with an average dmft index in six-year-olds being 6.2 (4.0), and DMFT 4.8 (3.9) in twelve-year-olds. After the aforementioned nationwide study, only a few regional epidemiological studies have been conducted on the territory of Bosnia and Herzegovina. All studies have shown that the state of oral health in children is poor. Although the WHO has clearly emphasized the importance of regularly conducting epidemiological research regarding children's oral health, there is a lack of recent data on the prevalence of caries in children in other areas of Bosnia and Herzegovina.

The aim of this study was to assess the prevalence of caries in children aged 2-18 years from the Mostar city area.

In this observational, descriptive study, 500 respondents aged 2-18 years participated. For subjects up to 6 years of age, the dmft index was recorded as an indicator of oral health, for subjects with mixed dentition the DMFT index of first permanent molars was used and for subjects aged 12-18 years, the DMFT index was used.

Data were analysed for 495 respondents, aged 2-18 years, of both sexes (253 female respondents and 242 male respondents).

The prevalence of dental caries in respondents aged up to 6 years is 53%. The prevalence of caries of the first permanent molars in subjects aged 6-12 years is 28.3%, while the prevalence of caries in subjects older than 12 years is 44.9%. The average dmft index of five-year-olds is 3.88 (SD 3.83), while the DMFT index of twelve-year-olds is 2.51 (SD 2.17).

The prevalence of caries and previous caries experience of children of all ages from the area of Mostar was lower compared to previous years, both for respondents from the same geographical area and compared to other areas of Bosnia and Herzegovina. New epidemiological studies are needed in order to determine the general oral health trends in Bosnia and Herzegovina.

Keywords: caries prevalence, previous caries experience, dmft, DMFT, children

Introduction

Oral health is an important and inseparable part of general health. Regular monitoring of past caries experience, i.e. the prevalence of caries in the population, enables the planning of health strategies ultimately aiming to improve oral health.

The World Health Organization (WHO) has recommended periodic national epidemiological surveys with clearly defined monitoring groups and oral health parameters [1]. Previous caries experience is an important indicator of oral health.

Children are a vulnerable population group that is part of an important monitoring group to follow up the state of oral health.

Although many epidemiological studies have shown that the prevalence of caries is decreasing, especially in developed countries, caries is still the most common disease in children of all age groups throughout the world [2-6].

A nationwide study from 2004 showed that children's oral health in Bosnia and Herzegovina is generally poor, with an average KEP index in twelve-year-olds being 6.2 (4.0), and 4.8 (3.9) in six-year-olds (3, 4, 5, 6). After this nationwide study, only a few regional epidemiological studies have been conducted on the territory of Bosnia and Herzegovina. In 2007 in the area of the cities of Foča, Čajniče and Kalinovik, an epidemiological children's oral health study including children aged 12 and 15 years was conducted [7]. In 2012, an examination of oral health in children aged 6-10 years was conducted in the same area [8]. In 2016, an epidemiological study was conducted in the Sarajevo Canton on the preschool age [9]. In the same year, the results of caries prevalence research on respondents aged 2-6 years from the Banja Luka city area were published [10]. All studies have shown that the state of oral health in children was poor.

Although the WHO has clearly emphasized the importance of regularly conducting epidemiological research on the state of children's oral health, there is a lack of data on the prevalence of caries in children in other areas of Bosnia and Herzegovina.

The Research Objective

The objective of this research study was to assess the prevalence of caries in children aged 2-18 years from the Mostar city area.

Material and methods

The observational, descriptive study included 500 respondents aged 2-18 years. Five respondents were excluded from the study due to incompletely collected data.

Examinations of respondents were carried out in 5 dental practises that are commonly used as teaching bases of the Faculty of Medicine of the University of Mostar, in the period from May to October 2022. The methodology recommended by WHO (1) was used. The respondents were divided into 3 groups; the first group consisted of respondents up to six years of age, the second group of respondents were aged 6-12 years and the third group of respondents were aged 12-18 years. A corresponding research card was prepared for each group.

For respondents up to 6 years of age, the KEP index was recorded as an indicator of oral health, for subjects with mixed dentition the KEP index of the first permanent molars was used, and for subjects aged 12-18 years, the KEP index was used. The research was approved by the Ethics Committee of the Faculty of Medicine of the University of Mostar.

Data were processed using The Statistical Package for Social Science, version 13.0 (SPSS Inc, Chicago, IL, USA). Data are presented with descriptive statistics.

Results

Data were analysed for 495 respondents, aged 2-18 years, of both sexes (253 female respondents and 242 male respondents).

In the group of respondents, aged up to 6 years, a total of 134 children (27.1%) were examined, in the group of subjects aged 6-12 years, 205 children were examined (41.4%), and in the group of subjects aged 12-18 years, 156 subjects were examined (31.5%).

The prevalence of caries in respondents aged up to 6 years was 53%. The prevalence of caries of the first permanent molars in subjects aged 6-12 years was 28.3%, while the prevalence of caries in subjects older than 12 years was 44.9%. Table 1 shows the prevalence of caries in children and the percentage of children without caries.

Table 1. Distribution of children with caries according to age groups

Age (years)	Caries free N (%)	Caries prevalence N (%)	Total N (%)
2-5	63 (47)	71 (53)	134 (100)
6-12	147 (71.7)	58 (28.3)	205 (100)
12-18	86 (55.1)	70 (44.9)	156 (100)

The average dmft index value, DMFT index of first permanent molars and DMFT index are shown in Tables 2, 3 and 4.

Table 2. Previous caries experience (dmft index) in subjects aged 2-5 years

	Min	Max	Mean	SD
d	0	16	2.14	3.06
m	0	3	0.10	0.44
f	0	5	0.75	1.30
dmft	0	19	2.99	3.48

In children of preschool age, the average value of the dmft index was 2.99 (SD 3.48), where the largest proportion was untreated caries. The mean value of the d component of the dmft index was 2.14 (SD 3.06).

In children aged 6-12 years, the average value of the DMFT index of permanent molars was 1.32 (SD 1.50).

Table 3. Previous caries experience (DMFT index of first permanent molars) in respondents aged 6-12 years

	Min	Max	Mean	SD
D	0	4	0.45	0.88
M	0	2	0.03	0.22
F	0	4	0.81	1.27
DMFT	0	4	1.32	1.50

Table 4. Previous caries experience (DMFT index) in respondents aged 12-18 years

	Min	Max	Mean	SD
D	0	18	0.92	1.76
M	0	4	0.22	0.62
F	0	15	2.26	2.45
DMFT	0	26	3.41	3.45

In children aged 12-18 years, the average value of the DMFT index was 3.41 (SD 3.45), where the largest share of teeth was with fillings. The mean value of the F component of the DMFT index was 2.45 (SD 3.45).

Table 5. shows the distribution of dmft index according to the age of the respondents

dmft	Age of respondents (years)				
	2 N (%)	3 N (%)	4 N (%)	5 N (%)	Total N (%)
0	2 (100)	10 (52.6)	19 (38.8)	13 (20.3)	44 (32.8)
1	0	2 (10.5)	7 (14.3)	6 (9.4)	15 (11.1)
2-3	0	2 (10.5)	9 (18.4)	18 (28.1)	29 (21.64)
4-5	0	2 (10.5)	9 (18.4)	10 (15.8)	21 (15.67)
6<	0	3 (15.8)	5 (10.1)	17 (27.4)	25 (18.66)
Total	2 (100)	19 (100)	49 (100)	64 (100)	134 (100%)

Table 5 shows the distribution of dmft index in different age groups of preschool children. The number of children without caries was lower in

older age groups. The largest number of children with six or more caries was found in five-year-olds.

Discussion

Oral diseases, including caries, are among the most widespread diseases today. Caries in permanent teeth is the most widespread disease in the world, while caries in deciduous teeth is in tenth place among all other diseases [2]. Caries is a global public health problem. The distribution of caries in the world is uneven. In the "Oral Health Country/Area Profile Project" database, the World Health Organization presented data on the state of oral health in all countries of the world [11]. In recent decades, developed countries have successfully brought caries under control, as the most common oral disease, thanks to the intensive implementation of public health preventive programs, as well as health education programs. Thanks to this, the prevalence of caries, among all age groups of the population, is drastically reduced. In many other countries, caries prevalence is still high.

A nationwide study from 2004, which aimed to determine the state of oral health in children aged 6 and 12 from the entire territory of Bosnia and Herzegovina, showed that the prevalence of caries was high in both age groups. The average DMFT index for twelve-year-olds was 4.8, while the average dmft index for six-year-olds was 6.2 [3, 4, 5, 6]. In relation to the epidemiological data on the prevalence of caries from certain parts of Bosnia and Herzegovina from 1985, where the average DMFT index in twelve-year-olds was 6.3, it is noticeable that there has been an improvement in children's oral health ever since [12]. Since there were no data about organized population prevention programs in the mentioned period, it could be assumed that the decrease in caries prevalence was due to generally better health education among the population.

According to Kunzel, there are two regions in Europe - the Western European region, which

includes low-risk countries, and the Eastern European region, which includes high-risk countries [13]. The average DMFT of 12-year-olds being 4.8, still ranks Bosnia and Herzegovina among high-risk countries.

Following the above nationwide study, in Bosnia and Herzegovina, research on the state of oral health in children was carried out regionally, among different age groups. Research conducted in the municipalities of Foča, Čajniče and Kalinovik in 2007, on respondents aged 12 and 15 years, showed that the prevalence of caries is still high, and that only 4% of respondents were free of caries. The largest number of children had a DMFT index value of 4 [7]. A survey of oral health among 15-year-old respondents from the area of Sarajevo showed that their average DMFT index was 7.6, and that only 2% of respondents were caries-free [6].

An epidemiological study from 2012, on respondents aged 6-10 years from the municipalities of Foča, Čajniče, Kalinovik and Rogatica, showed that of the total number of respondents, 96.1% of children had caries. Only 3.94% of respondents were caries-free [8]. During 2012 and 2013, research was conducted in the Banja Luka city area on the frequency of early childhood caries in children up to 2 years of age. According to the results of that research, the prevalence of early childhood caries was 34.9% [14]. The research on the prevalence of caries in children aged 2-5 years conducted in 2012 and 2013 in the Banja Luka city area, showed that 35.35% of respondents were caries-free [10].

In 2014, respondents from the area of Sarajevo Canton, aged 3-5 years, were examined. The results of that research showed that the average dmft index was 6.8, while the percentage of children without caries was 19% in three-year-olds, 8% in four-year-olds, and 1% in five-year-olds [9].

The results of our research conducted in Mostar in 2022, on respondents up to 18 years of age, showed the following results:

The average dmft index in children aged 2-5 years was 3.48. The largest share of the dmft index

refers to untreated caries (the d component of the dmft index was 3.06). The prevalence of caries in this age group was 53%, while the percentage of children without caries was 47%. If we compare the results of this research with those of respondents of the same age group from the area of Sarajevo, it can be observed that the average value of the dmft index in children from Mostar is lower (dmft value of 3.48, compared to dmft of 6.8 for children from the city of Sarajevo). Also, caries prevalence was lower compared to Sarajevo and Banja Luka. In Mostar, 47% of children were caries-free, compared to respondents of the same age group in Banja Luka (35.35% of children without caries) and Sarajevo (17% of children without caries) [9, 10]. Also, if we compare the results of the average dmft index of five-year-olds in Mostar from 2022, with the average dmft index of five-year-olds in Mostar in 2004, a decrease in the dmft index, from 5.1 in 2004 to 3.89 in 2022 [6] has been observed.

In subjects aged 6-12 years, the DMFT index of the first permanent molars was used as an oral health state indicator. The average value of the DMFT index of permanent molars was 1.32 (SD 1.50). The largest share of the DMFT index of the first permanent molars was made up of teeth with fillings (F component 1.27).

Respondents aged 12-18 years from the area of Mostar had an average DMFT index of 3.45, while 55% of respondents were caries-free. Even for this age group, lower DMFT index values and the total prevalence of caries were observed compared to the respondents from the areas of Foča, Čajniče and Kalinovik from 2007 (4% of respondents without caries).

At the same time, the average DMFT index of this group of respondents was lower compared to the group of twelve-year-olds from the nation-wide study conducted in 2004 (DMFT 3.45 in the Mostar area and average DMFT 4.8 for twelve-year-olds from Bosnia and Herzegovina).

If DMFT index values in twelve-year-olds in Mostar from 2022 were analysed and compared with DMFT index values in twelve-year-olds in

Mostar from 2004, it can be observed that the average DMFT index in twelve-year-olds in 2022 was lower - the DMFT index in 2022 was 2.51, while in 2004 year, it amounted to 4.32 4, and in 2003, the average DMFT of twelve -years old in the area of Mostar was 6.1 [15]. The same trend was observed in fifteen-year-olds - the DMFT index values in fifteen-year-olds in Mostar in 2022 were 3.48, while the DMFT in fifteen-year-olds in Sarajevo in 2007 was 7.6 6.

Having analyzed caries prevalence values in subjects of all age groups, and having compared them with the available epidemiological data obtained by the studies conducted in different locations in Bosnia and Herzegovina, it can be concluded that there was a decrease in caries prevalence compared to previous years. Also, the average dmft and DMFT index values of primary and permanent dentition were lower compared to studies conducted in earlier years. Taking into account that previous caries experience was an important indicator of the state of oral health, and based on the data from this study, it can be concluded that the state of child oral health from the Mostar city area was better, compared to the period 18 years ago, when the last data were collected within the study conducted for Bosnia and Herzegovina. Also, the state of child oral health in Mostar was better, compared to the state of child oral health of all age groups from other regions of Bosnia and Herzegovina. Since there was no data on the implementation of any organised public health preventive programmes aimed at improving oral health in the area of Mostar, the improvement of oral health can only be interpreted as an increase in general health awareness and health literacy of the population.

Since the data from this study indicated a decreased caries prevalence and previous caries experience of the examined children population in the city of Mostar, it would be necessary to collect new epidemiological data on the children state of oral health of all age groups from other regions of Bosnia and Herzegovina in order to establish whether the trend of decreasing caries prevalence

and improvement of oral health has a general or regional character.

Conclusions

The prevalence of caries and previous caries experience in children of all ages examined in the Mostar area was lower compared to previous years, both in the case of respondents from the same geographical area and from other areas of Bosnia and Herzegovina. New epidemiological studies are needed in order to determine the general oral health trends in Bosnia and Herzegovina.

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