Oral health status in 12 and 15-year-old schoolchildren

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SUMMARY
Introduction Dental caries is, along with periodontitis, the most frequent oral disease and represents a chronic, progressive, multifactorial process that leads to loss of hard dental tissues. The oral health status analysis and caries risk factors assessment in early childhood and adolescence are necessary for creating strategies in oral health promotion and preventive treatment.

The aim of the present study was to evaluate caries prevalence in 12 and 15-year-old schoolchildren in Cukarica, a municipality of Belgrade.

Material and method The retrospective study included 409 schoolchildren of both genders. The oral health status was registered using the Klein-Palmer DMFT system (D – Decayed, M – Missing, F – Filled teeth). The methods of descriptive statistics were performed and p-values lower than 0.05 were considered statistically significant.

Results The younger group included 214 children (52.3%) and the older group 195 (47.7%). Individual caries rate was higher in 15-year-old children (81.02%) comparing to 12-year-old (57%). The mean value of decayed teeth for all participants was 2.43 and of total DMFT was 8.99%.

Conclusions Oral health promotion programs gave positive results. Moreover, it is important to implement them in the underdeveloped regions of Serbia with an improvement of the oral health literacy of parents and raising awareness of oral diseases.

Keywords: oral health; health promotion; dental caries assessment; risk factors; education

INTRODUCTION
Oral diseases have been identified as one of the global public health issues related to health, psychosocial and economic aspects [1]. Tooth decay is, along with periodontal disease, the most frequent oral disease and represents a chronic, progressive, multifactorial process that leads to loss of dental hard tissues. Its etiology is complex and includes several factors, predominantly the presence of fermentable carbohydrates, host factors, and cariogenic microbial flora [2, 3]. However, there are also 'micro factors' that are related to individual level and family and 'macro factors' that are referred to social, economic, and cultural features of the country [4]. Caries shares common risk factors with some chronic, non-communicable diseases such as obesity, diabetes, cardiovascular and cerebrovascular disorders [3].

Childhood is a period of constant learning and social, cognitive, emotional, and educational development. Consequently, it is essential to embrace positive habits and attitudes towards oral health and oral hygiene in schoolchildren population. Caries prevalence, strategies for its prevention and diagnosis, treatment, and potential complications of caries lesions are subjects of many epidemiological and clinical studies [2].

Literature data indicate that some European countries and the United States of America have achieved significant results in caries prevention due to effective preventive programs and oral health education. Also, it has been shown that dental caries affects unequally countries with different socioeconomic status, with a higher prevalence in areas with a poorer socioeconomic indicator [5].

Caries prevention programs have the most efficient and long-term results. It is very important to analyze oral health status and identify potential risk factors for caries development in early childhood and adolescence. Obtained epidemiological data is indispensable for creating specific strategies in oral health promotion and preventive treatment [2]. Some authors suggest that the highest caries prevalence in permanent dentition is between 15 and 19 years [6]. Oral health status in 12-year-old children is considered a referent caries indicator in the population and is globally used in different research for evaluation of the success of preventive programs and comparison of the results [3].

The aim of the present study was to evaluate caries prevalence in 12 and 15-year-old schoolchildren in Cukarica, a municipality of Belgrade.
MATERIAL AND METHOD

The retrospective study included 409 schoolchildren of both genders, from two elementary schools located in Cukarica, one of the municipalities of Belgrade. They were all patients of Community health center Sremcica where a specialist in preventive and pediatric dentistry performed regular dental examinations. Their dental charts were analyzed and oral status characteristics gathered and registered using the Klein-Palmer DMFT system (D – Decayed, M – Missing, F – Filled teeth) [7].

Data were analyzed using SPSS Statistics 22 software (SPSS Inc., Chicago, IL, USA). The methods of descriptive statistics and testing statistical hypotheses were performed. For testing statistical significance among numeric variables, t-test was used, while for categorical variables chi-square test was done. P-values lower than 0.05 were considered statistically significant.

RESULTS

The present study included 409 schoolchildren located in Cukarica, one of the municipalities of Belgrade. In the 12-year-old group there were 214 children (52.3%) and in the 15-year-old group 195 (47.7%). Gender distribution in the younger group was 113 males and 101 females and in the older group 104 males and 91 females (Figure 1).

In total, 31.54% of children were caries-free (DMFT score 0) and 68.46% had cavitated caries lesions on the permanent teeth. In 12-year-old schoolchildren, the percentage of children with decayed teeth was 57%. Number of males with all healthy teeth was 48, and females 44. On the other hand, number of children with caries lesions was higher, 65 males and 57 females (Figure 2). In 15-year-old schoolchildren, only 19.2% of them had all healthy teeth and 82.3% had cavitated caries lesions on their permanent teeth. Number of children with all healthy permanent teeth was similar in males and females, 19 and 18, respectively. Number of schoolchildren with decayed permanent teeth was 85 males and 73 females (Figure 3).

Individual caries rate, as one of the most important caries prevalence indicators, was higher in 15-year-old children (81.02%) comparing to 12-year-old (57%) and this was statistically significant (p<0.001). Separated analysis in each group showed that in 12-year-old children, individual caries rate was higher in males (57.52%) comparing to females (56.44%), without statistical significance (p=0.839). Similar findings were in the other group; it was also higher in males (81.73%) than in females (80.22). This difference was statistically significant (p=0.026).

The mean value of total DMFT was 8.99%. This value was higher in 15-year-old schoolchildren (11.06%) comparing to 12-year-old children (6.40%). DMFT gender distribution was different between groups, in younger schoolchildren group, this value was slightly higher in males (6.43%) comparing to females (6.35%) and in the older group it was lower in males (10.65%) than females (12.79%). The mean value of decayed teeth for all
participants was 2.43. In 12-year-old children, the mean value of decayed teeth was 1.66 and in the older group it was higher (3.26), and this was found to be statistically significant (t=-6.346, p<0.001). In 12-year-old females the mean value of decayed teeth was 1.65 and males 1.67. In the other schoolchildren group, it was 3.58 for females and 2.98 for males.

The mean value of DMFT in 15-year-old females was significantly higher compared to the 12-year-old females (t=-4.836, p<0.001). The decayed (D) component of the DMFT index was dominant among other variables (52.08%). The percentage of filled teeth was 37.80% and the percentage of extracted teeth due to caries complications was 6.3%. Decayed permanent teeth were more present in the older group (62.60%) compared to the 12-year-old schoolchildren (42.50%), and it was statistically significant (chi-square=16.420, p<0.001). Even though obtained DMFT values were higher in 15-year-old females than 12-year-old females with statistically significant difference (t=-4.836, p<0.001), that difference was not found in the number of missing teeth among these two groups of schoolchildren even though 15-year-old children had more extracted teeth (13.3%) compared to 12-year-old children (9.8%).

The percentage of filled teeth (F) was higher in the older schoolchildren group (48.7%) than younger group (29.4%) and this difference was statistically significant (chi-square=15.995, p<0.001).

**DISCUSSION**

This study, conducted in the scope of the Belgrade municipality of Cukarica, included schoolchildren aged 12 and 15. Oral status of 12-year-olds has been the subject of many studies around the world, since, according to the recommendation of the World Health Organization (WHO), children of this age are considered a standardized group for monitoring oral health, both due to the presence of permanent dentition and the fact that habits of preserving oral health are already formed [7]. In order to understand epidemiological situation of oral health better, it was important that children aged 15 were included in this research as the consequences of bad habits can already be noticed at this age [8]. Of the total number of children examined, 31.54% had all healthy teeth present. This data coincides with the research conducted on the territory of our country, that analyzed the state of oral health in children and youth [3].

If these results are compared with those in developed countries of Europe, such as Germany (ACI only 0.5 and with the tendency to decrease), Spain, where the value of the ACI index for 12-year-olds is 0.82, and for 15-year-olds 1.38, that is, countries in Asia, e.g. China (1.14), and Malaysia (1.36), it is quite clear that the Republic of Serbia is still in the group of countries with a high distribution rate of caries. [9,10] Among the countries with low values, the ACI particularly singles out Nigeria with a score of 0.16 [11]. However, it should be noted that compared to the countries in the environment, Serbia is showing significant progress. The average value of ACI in Montenegro is 3.43, in Bosnia and Herzegovina it is 4.89 in urban areas, and up to 6.74 in rural areas of BiH [12, 13]. Also among the countries with high values of the average caries index is Poland with a value of 4.2 and Iran with 3.35 [14, 15].

The Average Caries Index (ACI) for both age groups was 2.43, which indicates that caries in our area is permanently present and that fact represents a serious social and medical problem affecting the country.

If we compare these results obtained in the scope of one Belgrade municipality (2.43) with those recorded in the southern Serbia (4.22), it can be concluded that there is a difference between the caries index in children living in urban areas and children from rural areas [16]. It should be taken into account that many measures have been taken in the past decade to improve oral health of children in Serbia, especially in the field of prevention [17]. WHO expectations were that by 2020, the value of ACI in twelve-year-olds would be below 1.5 [18]. Our results obtained from the systematic review of the 2019/2020 school year, indicated that we are approaching the achievement of the set goal and that the average values of the caries index, in respondents aged 12, was 1.66.

WHO’s study on the health behavior of young people aged 11, 13 and 15 (Health Behavior in School-aged Children; HBSC) was implemented in 49 countries around the world, including Serbia. According to the data for Serbia from 2018, 70.9% of the respondents stated that they brush their teeth more than once a day (82.6% girls and 59.9% boys), which goes in favor of schoolchildren in Serbia who have higher level of brushing culture compared to their peers from other countries in our region [19].

**CONCLUSION**

The results of this retrospective study showed that the presence of caries in schoolchildren aged 12 and 15 years was found in two-thirds of respondents (68.46%). In the group of 12 years, caries was present in 122 subjects (82.3%) in two-thirds of respondents (68.46%). In the group of 12 years, caries was present in 122 subjects (82.3%) in two-thirds of respondents (68.46%).

The strategy of education, promotion of oral health, as well as the application of preventive and prophylactic measures should be implemented in less developed parts of Serbia. Intensive education of young parents is necessary for raising health awareness to achieve the same level of oral health as in developed countries of the world.

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Procena oralnog zdravlja dece uzrasta 12 i 15 godina

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Uvod
Karijes je, pored parodontopatije, jedno od dva najučestalija oralna oboljenja i predstavlja hronično, progresivno oboljenje tvrdih zubnih tkiva kompleksne etiologije. Analiza stanja oralnog zdravlja i identifikovanje faktora rizika za nastanak karijesa u dečjem uzrastu i adolescenciji su osnove preventivnih programa. Cilj ovog istražивањa je bio da se utvrdi učestalost karijesa kod školske dece uzrasta 12 i 15 godina na teritoriji opštine Čukarica. Materijal i metode Retroспективном studijom obuhvaћено je 409 dece, oba polа. Procena rasprostranjenosti karijesa je registrovana pomoću Klajn–Palmerовог sistema kroz KEP indeks (K = karijes, E = ekstrahovan zub, P = plombiran zub). Za analizu podataka korišćene su metode deskriptivne statistike, a statističke vrednosti su testirane na nivou statističке značajnosti od 0,05. Rezultati Grupa dece od 12 godina obuhvaтила je 214 (52,3%) ispitanika, a grupа dece od 15 godina 195 (47,7%) ispitanika. Vrednosti karijes indeks osoba (Kiso) bile su veće kod dece uzrasta 15 godina (81,02%) u odnosu na uzast od 12 godina (57%). Ukupan karijes indeks zuba (Kiz) za sve ispitanike iznosio je 8,99%, a prosečан broj obolelih stalnih zuba po jedном ispitaniku (Kip) kod svih testiranih iznosio je 2,43. Zaključак Primenjene mere za poboljšањe i unapreђење oralnог zdravlja dece postepено дaju rezultате. Promocija oralnог zdravlja je neophodno sproвести i u slabijе razvijеним delовима Србије уз интензивну едукацију млађих рођака ради подизања здравственог свестi i očuvanja oralnог zdravlja dece.

Ključне реци: oralno zdravlje; karijes indeksi; promocija zdravlja; faktori rizika; едукациja

UVOD
Oboljenja usta i zuba su označena kao jedan od globalних javnorazvratних problema vezаниh за zdravstveni, психосоцијални и економски аспект [1]. Karijes je, pored parodontopatije, најчесто у случаju у случају офналного током читавог живота, a pogotovo u najmlađoj populaciji. Учесталост каријеса и његове потенцијалне компликације су разлог великог броја истраживања која се баве његовом превалентацијом, мерама превенције, односно працко-временом дијагностиком и терапијом [2].

Досадашња истраживања покazuju da su pojедине области Европе, као и Сједињене Америчке Државе, постигле зnačajне rezultate u prevenciji karijesa zahvaljujući pre svega kontinuiranom сропроvођењу preventivnih programa и програма zdravstvenог спаситња. Студијe су такође показале да слабе развијене земље имају значајну њу učestalost karijesa u односu на развијенне [5].

Превентивне мере имају најдугорочнији ефекат и зato je neophodno анализирати stanje oralnог zdravlja и identifikovati faktore rizika za nastanak karijesа u dečjem uzrastu и adolescenciji. Dobijeni epidemiološki podaci могу предсављати полазну основу за израду одговарајућих preventivних programa [2]. Истраžивања ukazuju da je највећа учесталост karijesa на сталним зубима на глобалном нивоу u интервju od 15 до 19. године [6]. Stanje oralног здравља dece uzrasta od 12 godina smatra se referentnim показатељем у одређеној populацији и служи као параметар за разлициита истраживања, међународна поредање, pračenje и evaluaciju preventivних programa [3].

Cilj ovог истраживања je bio da se utvrdi учесталост каријеса kod шкoлскe dece узрasta 12 i 15 година на териториji beogradske opštine Čukarica.

MATERIJAL I METOD
Rетроспективном студијом обухваћено je 409 dece, oba polа, из две основне школе, која живе на териториji beogradske opštine Čukarica. Сви они su redovno kontrolisani од стране деčjег стоматологa у стоматолошкоj ambulanti дома здрављa Сремчић. Analizom података из стоматолошkih kartona pacijenata registрована je rasprostranjenost karijesa. Подаци о присутним karijesnim, ekstrahovanim и plombiranim зубима су registrovani pomoću Klajn–Palmerовог sistema DMF (D = Decayed, E = Missing, F = Filled), koji je kod nas preveđen као KEP (K = karijes, E = ekstrahovan zub, P = plombiran zub) [7].

За анализу података korišćene su metode deskriptivne статистike и методе для тестирование статистических гипотез. За тестирование značajnosti разлики средних vrednosti numericких ошељa коришћен јe t-test, а за utvrđivanje разлике u učestalости kategorijских varijabli hi-kvadrat test. Statističke vrednosti су испитана на нивоу statističke зnačajnosti od 0,05. За статистичку obradu rezultата korišćen јe softverski program SPSS Statistics 22 (SPSS Inc., Chicago, IL, USA).

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REZULTATI

U istraživanju je učestvovalo 409 dece iz beogradske opštine Ćukarica. Grupa dece od 12 godina obuhvatila je 214 ispitanika (52,3%), a grupa dece od 15 godina 195 ispitanika (47,7%). U grupi ispitanika od 12 godina bilo je 113 dece muškog i 101 dete ženskog pola, a u grupi od 15 godina 104 muškog i 91 ženskog pola (Grafikon 1).

Od ukupnog broja ispitanika procent dece sa svim zdravim zubima iznosio je 31,54%, a sa obolelim stalnim zubima 68,46%.

U uzrastu dece od 12 godina 42,5% sa statistički značajno veće kod dece uzrasta 15 godina (62,60%) u odnosu na decu od 12 godina (48,7%) u odnosu na decu od 12 godina (29,4%) i ova razlika je bila statistički značajna (hi-kvadrat = 15,995, p < 0,001).

DISKUSIJA

U ovu studiju, sprovedenu na teritoriji beogradske opštine Ćukarica, uključena su školska dece starosti 12 i 15 godina. Oralni status kod dvanaestogodišnjaka predmet je istraživanja naših studija, što ukazuje na to da je karijes na našim prostorima problem sa kojim se Republika Srbija suočava.

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Istraživanje SZO o zdravstvenom ponašanju mladih uzrasta 11, 13 i 15 godina (engl. Health Behaviour in School-aged Children; HBSC) sprovodi se u 49 zemalja sveta, među kojima je i Srbija. Prema podacima za Srbiju iz 2018. godine, 70,9% ispitanika se izjasnilo da zube pere više od jednom dnevno (82,6% devojčica i 59,9% dečaka), što govori o prilog tome da školari u R. Srbiji poseduju viši stepen kulture pranja zuba u odnosu na svoje vršnjake iz susednih zemalja [19].

ZAKLJUČAK

Rezultati ove retrospektivne studije pokazali su da je učestalost karijesa kod školske dece uzrasta 12 i 15 godina registrovana kod dve trećine ispitanika (68,46%). U grupi od 12 godina karijes je bio prisutan kod 122 ispitanika (57%), a kod dece uzrasta 15 godina kod 158 ispitanika (82,3%). Strategiju edukacije, promocije oralnog zdravlja, kao i primenom preventivnih i profilaktičkih mera treba sprovesti i u slabije razvijenim delovima Srbije. Neophodna je intenzivna edukacija mladih roditelja radi podizanja zdravstvene svesti kako bi se postigao nivo oralnog zdravlja kao i u razvijenim zemljama sveta.