Stanje oralnoga zdravlja povezano s društvenim ponašanjem među učenicima u dobi od 6 do 11 godina na Kosovu

Oral Health Status Related to Social Behaviors among 6 - 11 Year Old Schoolchildren in Kosovo

Izvorni znanstveni rad

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Sažetak

Svraha ovog istraživanja bila je procijeniti status oralnoga zdravlja učenika u dobi od 6 do 11 godina na Kosovu. **Materijali i metode:** U istraživanju je sudjelovalo 5679 učenika u dobi od 6 do 11 godina iz različitih kosovskih gradova. Stanje oralnoga zdravlja ocijenjeno je na temelju dijagnostičkih kriterija Sjednice svjetske organizacije o zdravlju (SMZ) koji uključuju bilježenje broja karijesa, izvučenih zuba i ispuna (KEP/KEP indeks) u milječnoj i trajnoj dentici. Uključena djece odgovorila su na različite pitanja o oralnoj higijeni, prehranbenim navikama i posjetima stomatologu. Analiza je uključivala razlike između prosječnih vrijednosti analiziranih su studentovim t-testom (p < 0,05), a čimbenici povezani sa zubnim karijesom Spearmanovim koeficijentom korelacije. **Rezultati:** Prosječni indeks kep/KEP među učenicima u dobi od 6 do 11 godina iznosio je 4,36 ± 3,76 i 1,20 ± 1,488. Zapuštenje zube imalo je 90 učenika – ukupno 1,58 posto. U dobi od 8 godina do 10 posto djece zube je četkalo dva puta na dan. Od uključene djece 40 posto konzumiralo je sladko, a 3,6 posto jedanput na dan, a većina je stomatologa posjetila samo ako je bilo potrebno. Potvrđena je statistički značajna korelacija između konzumiranja slastica, oralne higijene te posjeta stomatologu i prevalencije karijesa. **Zaključak:** Naši rezultati pokazali su veliku prevalenciju karijesa među učenicima u dobi od 6 do 11 godina, što upućuje na to da je potreban sveobuhvatni program primarne oralne zdravstvene zaštite i rani redoviti posjeti stomatologu te preventivne mjere.
DMFT and dmft Among 6-11 Year Olds in Kosovo

Ferizi et al.

Currently, Kosovo has the youngest European country in South-eastern Europe with a total land area of 10,908 km² and about 1,804,944 inhabitants (20). Currently, Kosovo has an underdeveloped economy with relatively poor education and health system. Basically, neither a training program for promotion of oral health, nor any concrete activities in preventive dentistry have been organized by Kosovo Ministry of Health (5). The aim of this study was to assess the oral health status among schoolchildren aged 6 – 11, in Kosovo, based on age, gender, brushing habits, confectionery consumption, dental visits, and application of preventive measures such as fissure sealants.

and sugar intake habits. In contrast, the increase of dental caries has resulted from unhealthy dietary habits, limited use of fluoride and poor access to oral health services. In many of developed countries, most of the oral health services provide symptomatic treatment, with slight priority given to prevention and restoration (5).

Good oral health improves general health and quality of life and contributes to self-image and social interaction (6). Oral health in children and adolescents was accepted as the main concern action, while countries were encouraged to develop preventive approaches to health education in schools through partnerships between families, oral health professionals, communities by improving access to preventive and curative oral health services (7).

The World Health Organization (WHO) goals for 2000 included a 50% reduction in dental caries for 6-year-old children and globally an average of the DMFT index not exceeding more than 3.0 for 12 year olds (8). It has been already mentioned that dental caries is a worldwide spread disease due to increased consumption of refined foods, fizzy drinks and a wide variety of sweets. The additional reasons are a low utilization of fluoride supplements, fissure sealants, lack of widespread and regular use of toothbrushes with fluoride toothpaste, as well as lack of dental health education and promotion (9, 10).

In addition, healthy food lifestyle and good oral hygiene are the most useful measures to prevent caries and periodontal disease. Maintaining a good oral hygiene means regular tooth brushing with fluoride toothpaste at least twice a day. The majority of worldwide schoolchildren brush their teeth as daily routine once a day (11, 14). Furthermore, the socio-economic factors have negative effects on oral hygiene practices among preschool and elementary schoolchildren. Facilitators for maintaining oral hygiene habits in primary schoolchildren were found to be a high level of self-esteem, peers influence and personal appearance (15, 16).

Tooth sealants are applied as a preventive measure covering pits and fissures on occlusal tooth surfaces in order to prevent the development of caries among children. The effectiveness of fissure sealants in preventing caries has been well documented (17, 18). In particular, some studies have shown that the caries-free status of children 6-17 years of age has been associated with subsequent sealant placement (19).

Kosovo is the youngest European country in South-eastern Europe with a total land area of 10,908 km² and about 1,804,944 inhabitants (20).

Trenutačno ima nerazvijenu ekonomiju s pečaćenjem fisura.

Kosovo je najmlađa europska zemlja u jugoistočnoj Europi s ukupnom površinom od 10 908 km² i oko 1 804 944 stanovnika (20). Trenutačno ima nerazvijenu ekonomiju s pečaćenjem fisura. Trenutačno ima nerazvijenu ekonomiju s pečaćenjem fisura.
Materijali i metode

Ovo istraživanje poprečnog presjeka provedeno je između rujna 2016. i siječnja 2017. godine na temelju korištenja podataka prikupljenih epidemiološkim pregledom oralnoga zdravlja među učenicima u dobi od 6 do 11 godina na Kosovu. Odobrenje za istraživanje dobiveno je od Ministarstva obrazovanja, znanosti i tehnologije Republike Kosovo, s referentnim brojem 3752/2016. Primijenjeno je dvostupanj- sko uzorkovanje klastera u nasumično odabranim osnovnim školama. Svakoj je poslan poziv za sudjelovanje u ovom istraživanju, a odabrane su prve dvije iz svakoga grada koje su pozitivno odgovorile. Stoga je svaka škola u svakom gradu imala jednaku mogućnost za sudjelovanje u uzorku. Uzorak je uključivao 5679 djece školske dobi od 6 do 11 godina oba- ju spolova koja su pohađala javne škole u deset različitih gra- dova diljem Kosova.

Radni tim od šest istraživača osposobljen je i kvalificiran za klinička mjerenja, neovisno o iskustvu. Pouzdanost inspek- cijskih kriterija izmjerena je pilot-istraživanjem na slučajno odabranoj skupini od 30 učenika u dobi od 6 do 11 godina. Ponovljivost je mjerenja Cohenovim kappa indeksom, a dobi- veni rezultati kretali su se između 0,88 i 0,80.

Pregledi su obavljeni u učionicama odabranih škola u standardnim uvjetima koje preporučuje Svjetska zdravstvena organizacija. Zubi su pregledani pod umjetnim svjetlom ste- riilnim dentalnim zrcalima i sondama, bez dijagnostičkih do- dataka kao što su prethodno četkanje zuba i sušenje. Stanje denticije procijenjeno je korištenjem kep/KEP indeksa, kao što je opisano u kriterijima i postupcima SZO-a (1997) za epidemiološka istraživanja (21). Uz to, bilježeni su demografi- ski podatci, dob, spol i škola:

- zub s karijesom – d/D, izvađeni zub – e/E, zub s ispunom – p/P i kep/KEP indeks. KEP/kep indeks (za trajnu i mli- ječnu denticiju) metoda je numeričke ekspresije inciden- cije karijesa, a dobiva se zbrajanjem broja karijskih (K) i izvaženih zuba (E) te zuba s ispunom (P).

- kep/kep je nula i primjena preventivnih mjera – peča- nje zuba.

Osim oralnih pregleda i prikupljanja demografskih poda- taka, školskoj djeci postavljena su i pitanja o njihovoj oralnoj higijeni, koliko često četkaju zube tijekom dana (mogućno- sti su bile rijetko, jednako, tri puta na dan i više puta na dan) i koliko često tijekom godine posjećuju stomatologa (jedanput u 6 mjeseci, jedanput na godinu ili samo kada je to potreb- no). Kriteriji za isključivanje iz ovog istraživanja bili su men- talno, fizički i senzorički hendikepirana djeca te medicinski ugoženi pacijenti, npr. oni koji boluju od leukemije, hemogi- filije itd. Navedena djeca bila su poštena zbog opterećenja, nedostatka suradnje i posebnih potreba tijekom pregleda.

Material and Methods

This cross-sectional study was performed using data from the epidemiological survey of oral health among 6-11 year old schoolchildren in Kosovo, performed between September 2016 and January 2017. The approval for the study was obtained from the Ministry of Education, Science, and Technology of the Republic of Kosovo, with Reference Number: 3752/2016. A two-stage cluster sampling was applied. The schoolchildren were chosen in town schools during the first stage which was followed by the second-stage. The schools were selected reasonably and randomly. An invitation was sent to each school for participating in this study and the first two of them who positively responded to the invitation were selected from each town. Therefore, children from every school in any town in Kosovo had equal opportunities of participating in the study. The sample included 5679 schoolchildren aged 6-11 years of both genders who attended pub- lic schools in ten different towns in Kosovo.

The work team of six examiners received training and calibration in making clinical measurements independently from an experienced pedodontist-researcher and epidemi-ological pathfinder study to ward off the impenetrability of participants. The reliability of the inspection criteria was measured by a pre-test performed on a group randomly se- lected 30 schoolchildren, aged 6-11 years. Inter-rater agree- ment was measured by the Cohen kappa index, and the ob- tained results for the best and worst agreement were ranged between 0.88 and 0.80.

The assessment took place in the classrooms of the se- lected schools under standardized conditions recommended by the WHO, whereas dental examinations were carried out under artificial light using sterile dental mirrors and dental probes, without diagnostic adjuncts such as previous dental brushing and drying. Dental caries status was assessed using the dmft/DMFT index in the previously described manner, according to the criteria and procedures by the WHO (1997) for epidemiological studies (21). Data collection was comprom- ised by demographic data. The age, gender and schools of the participants were also, recorded:

- decayed teeth – d/D, missing teeth M/M, filled teeth f/f and dmft/DMFT decayed-missing-filled index. DMFT/ dmft index (for permanent and primary dentition) is a method to numerically express the caries experience and is obtained by calculating the number of decayed (D), missing (M) and filled (F) teeth (T).

- DMFT/dmft free and application of preventive measures - fissure sealants.

Apart from oral examination and demographic data col- lection, the schoolchildren were also asked about their oral hy- giene habits. They were asked how frequently they brushed their teeth during the day (the options were: rare, once or two times per day). Another question was related to eating habits – how often they consumed sweet food and confectionery items such as sweets and chocolate per day (rare, once, two or three and more times per day) and how often they went to see their dentists during the year (once in 6 months, once a year or only when necessary). The exclusion criteria for this study were;
Statistical analysis

Statistical analysis was carried out using MS Excel (Microsoft Office, Windows 2010, USA) and SPSS 19 for Windows (SPSS Inc., Chicago, Illinois, USA) software. The analysis included frequencies and means. The differences between means were tested using the student t-test. Statistical significance was set at p<0.05. The association between frequencies of consumption of confectionary, oral hygiene and dental visits with d/D components were tested using the Spearman's rank correlation (Spearman's rho).

Results

Demographic characteristics of participants are shown in Table 1. The sample included participants (N = 5679) between 6-11 years of age, of both genders. Table 2 shows the structure of dmft index for the observed ages. The dominant component d (decayed teeth) or prevalence of caries were found at the age of 6 (d=27.6%). The highest prevalence for component m or missing teeth and component f or filled teeth were found at the age of 8 (m=24.8%; f = 29.6 %), whereas the highest structure of dmft index was found for the age of 6 (dmft= 26.3%), which is shown in Table 2. The highest prevalence value of caries amongst permanent teeth was found for the age of 11 (DMFT=33.7%). The foremost component D – prevalence of decayed, components M and F (D= 30.4 %; M = 57.7 %; F= 41.6 %) were also found for the same age (Table 3). Total dmft-free and DMFT-free for schoolchildren 6 to 11 years of age were found to be 23.5% and 49.3%, respectively (Table 4).

There was a statistically significant difference between the highest mean of dmft and DMFT index among 6 to 11-year-olds.
Tablica 2. Distribucija kep vrijednosti po dobi
Table 2 Distribution of dmft values based on age groups

| Dobna skupina • Age Group | K • d | E • m | P • f | kep • dmft |
|---------------------------|------|------|------|-----------|
| n | % | n | % | n | % | n | % |
| 6 godina • 6 years | 6162 | 27.6 | 246 | 12.3 | 96 | 22.5 | 6504 | 26.3 |
| 7 godina • 7 years | 5712 | 25.6 | 468 | 23.5 | 66 | 15.5 | 6246 | 25.2 |
| 8 godina • 8 years | 4860 | 21.7 | 495 | 24.8 | 126 | 29.6 | 5481 | 22.1 |
| 9 godina • 9 years | 3390 | 15.2 | 477 | 24.0 | 75 | 17.6 | 3942 | 16.0 |
| 10 godina • 10 years | 1719 | 7.7 | 270 | 13.6 | 42 | 9.9 | 2031 | 8.2 |
| 11 godina • 11 years | 495 | 2.2 | 36 | 1.8 | 21 | 4.9 | 552 | 2.2 |
| Ukupno • Total | 22338 | 100 | 1992 | 100 | 426 | 100 | 24756 | 100 |

n = Broj zuba • Number of teeth

Tablica 3. Distribucija KEP vrijednosti prema dobi
Table 3 Distribution of DMFT values based on age groups

| Dobna skupina • Age Group | K • D | E • M | P • F | KEP • DMFT |
|---------------------------|------|------|------|-----------|
| n | % | n | % | n | % | n | % |
| 6 godina • 6 years | 201 | 3.8 | 3 | 0.8 | 6 | 0.5 | 210 | 3.1 |
| 7 godina • 7 years | 567 | 10.7 | 3 | 0.8 | 21 | 1.8 | 591 | 8.7 |
| 8 godina • 8 years | 987 | 18.6 | 36 | 10.2 | 90 | 7.7 | 1113 | 16.3 |
| 9 godina • 9 years | 909 | 17.1 | 36 | 10.2 | 243 | 21.0 | 1188 | 17.4 |
| 10 godina • 10 years | 1029 | 19.4 | 72 | 20.3 | 318 | 27.4 | 1419 | 20.8 |
| 11 godina • 11 years | 1614 | 30.4 | 204 | 57.7 | 483 | 41.6 | 2301 | 33.7 |
| Ukupno • Total | 5307 | 100 | 354 | 100 | 1161 | 100 | 6822 | 100 |

n = Broj zuba • Number of teeth

Tablica 4. Bez kep/KEP-a u ukupnom uzorku
Table 4 dmft/DMFT - free on overall sample

| Dobna skupina • Age Group | Bez kep u ukupnom uzorku • dmft-free on overall sample | Bez KEP-a u ukupnom uzorku • DMFT-free on overall sample |
|---------------------------|-----------------------------------------------------|-----------------------------------------------------|
| n | % | N | % | N | % |
| 6 godina • 6 years | 111 | 2.0 | 897 | 15.8 |
| 7 godina • 7 years | 57 | 1.0 | 603 | 10.61 |
| 8 godina • 8 years | 51 | 0.9 | 444 | 7.8 |
| 9 godina • 9 years | 81 | 1.4 | 357 | 6.3 |
| 10 godina • 10 years | 285 | 5.0 | 285 | 5.0 |
| 11 godina • 11 years | 750 | 13.2 | 225 | 4.0 |
| Ukupno • Total | 1335 | 23.5 | 2811 | 49.3 |

N = Broj učenika • Number of schoolchildren

Tablica 5. Prosječne vrijednosti i standardna devijacija za kep i KEP kod djece prema dobi i spolu
Table 5 Mean and standard deviation for dmft and DMFT in children based on their age and gender

| Dobna skupina • Age Group | Spol • Gender | kep • dmft | KEP • DMFT |
|---------------------------|---------------|------------|------------|
|                           | X± SD | p          | X± SD | p          |
| 6 godina • 6 years | Dječaci • Boys | 6.56 ± 4.355 | 0.001 | 0.18 ± 0.675 | 0.001 |
|                           | Djevojčice • Girls | 6.31 ± 4.388 | 0.001 | 0.23 ± 0.612 | 0.001 |
| 7 godina • 7 years | Dječaci • Boys | 6.82 ± 3.608 | 0.001 | 0.59 ± 0.952 | 0.001 |
|                           | Djevojčice • Girls | 6.70 ± 3.357 | 0.001 | 0.69 ± 1.051 | 0.001 |
| 8 godina • 8 years | Dječaci • Boys | 5.72 ± 2.653 | 0.001 | 1.11 ± 1.282 | 0.001 |
|                           | Djevojčice • Girls | 5.81 ± 2.704 | 0.001 | 1.24 ± 1.333 | 0.001 |
| 9 godina • 9 years | Dječaci • Boys | 4.44 ± 2.730 | 0.001 | 1.28 ± 1.238 | 0.001 |
|                           | Djevojčice • Girls | 3.85 ± 2.552 | 0.001 | 1.24 ± 1.195 | 0.001 |
| 10 godina • 10 years | Dječaci • Boys | 2.56 ± 2.589 | 0.001 | 1.51 ± 1.444 | 0.001 |
|                           | Djevojčice • Girls | 2.12 ± 2.509 | 0.001 | 1.76 ± 1.480 | 0.001 |
| 11 godina • 11 years | Dječaci • Boys | 0.61 ± 1.282 | 0.001 | 2.20 ± 1.935 | 0.001 |
|                           | Djevojčice • Girls | 0.52 ± 1.091 | 0.001 | 2.43 ± 1.901 | 0.001 |
| Ukupno • Overall | 4.36 ± 3.763 | 0.001 | 1.20 ± 1.488 | 0.001 |

T-Test; X = Prosječna vrijednost • Mean; SD = Standardna devijacija • Standard deviation; p<0.05
nja vrijednost KEP-a zabilježena je kod djevojčica u dobi od 11 godina – 2,45 ± 1,901. Stoga je potvrđeno da prevalenci-
ja zubnog karijesa na mliječnim zubima opada s povećanjem
dobi, a na trajnim zubima povećava se s godinama. Ukupna
vrijednost kep/ KEP indeksa za djecu od 6 do 11 godina pre-
ma dobi i spolu bila je umjereno visoka (kep = 4,36 ± 3,763,
KEP = 1,20 ± 1,488) (tablica 5).

Među uključenom djecom zapečaćene zube imalo je sa-
mo njih 90 ili 1,58% (tablica 6). U tablici 7, prikazan je broj
zapečaćenih zubnih površina, učestalost i ukupan broj pečata.

Kad je riječ o oralno-zdravstvenim navikama, pokazalo
se da u dobi od osam godina do 50 posto učenika zube čet-
ka dva puta na dan (tablica 8.). Do 40 posto uključene dje-
ci do 40 posto izjavilo je da jedu slastice barem jednog puta na dan. Većina dje-
ci rekla je da posjećuje stomatologa samo kada je to potre-
bo (tablica 8.).

Univarijantnom uvjetnom regresijom, koristeći se Spear-
manovom korelacijom, potvrđena je statistički značajna po-

Tablica 6. Pečaćenje u ukupnom uzorku
Table 6 Seals placements in overall
sample

| Pečaćenje zuba • Sealant placement | N | Djeca s pečaćenjem • Children with sealants | % |
|-----------------------------------|---|------------------------------------------|---|
|                                   |   | Overall sample                           | 5679 | 90 | 1.58 |

Tablica 7. Broj zapečaćenih površina zuba, učestalost i ukupni broj pečata
Table 7 Number of sealed tooth surfaces, frequency and total number of seals

| Broj zapečaćenih površina zuba • Number of sealed surfaces | Djeca • Children | Broj pečata • Number of sealants | % |
|-------------------------------------------------------------|-----------------|---------------------------------|---|
| 1                                                           | 24              | 24                              | 26.7 |
| 2                                                           | 36              | 72                              | 40.0 |
| 3                                                           | 12              | 36                              | 13.3 |
| 4                                                           | 18              | 72                              | 20.0 |
| 5                                                           | -               | -                               | -   |
| 6                                                           | -               | -                               | -   |
| 7                                                           | -               | -                               | -   |
| 8                                                           | -               | -                               | -   |
| Ukupno • Total                                             | 90              | 204                             | 100.0 |

Tablica 8. Učestalost četkanja zuba, konzumacija slastica i posjeti stomatologu prema dobi
Table 8 Tooth brushing frequency, sweetened food and confectionery consumption and dental visits based on age

| Dobna skupina • Age Group | 6 godina • 6 years | 7 godina • 7 years | 8 godina • 8 years | 9 godina • 9 years | 10 godina • 10 years | 11 godina • 11 years |
|---------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| N                         | 1011              | 924               | 951               | 942               | 867               | 984               |
| n                         | n                 | n                 | n                 | n                 | n                 | n                 |
| %                         |                   |                   |                   |                   |                   |                   |

Učestalost četkanja zuba (dnevno) • Brushing frequency (per day)

| Rijerko • Rare | 213               | 21.1              | 135               | 14.6              | 78                | 8.2               | 81                | 8.6               | 75                | 8.7               | 42                | 4.2               |
|                | 426               | 42.1              | 372               | 40.3              | 366               | 38.5              | 198               | 21.0              | 204               | 23.5              | 285               | 29.0              |
| Jedanput • Once| 372               | 36.8              | 417               | 45.1              | 507               | 53.3              | 663               | 70.4              | 588               | 67.8              | 642               | 66.8              |

Konzumacija slastica (dnevno) • Sweetened food and confectionery consumption (per day)

| Rijerko • Rare | 324               | 32.0              | 336               | 36.4              | 258               | 27.1              | 357               | 37.9              | 246               | 28.4              | 624               | 63.5              |
|                | 438               | 43.3              | 372               | 40.2              | 459               | 48.3              | 426               | 45.2              | 420               | 48.4              | 201               | 20.4              |
| Jedanput • Once| 324               | 32.0              | 336               | 36.4              | 258               | 27.1              | 357               | 37.9              | 246               | 28.4              | 624               | 63.5              |
| Dva puta • Two | 135               | 13.4              | 135               | 14.6              | 123               | 12.9              | 90                | 9.6               | 114               | 13.2              | 75                | 7.6               |
| Tri puta ili češće • Three or more times | 114 | 11.3 | 81 | 8.8 | 111 | 11.7 | 69 | 7.3 | 87 | 10.0 | 84 | 8.5 |

Posjeti stomatologu • Dental visits

| Jedanput u 6 mjeseci • Once in 6 months | 21 | 2.1 | 24 | 2.6 | 18 | 1.9 | 231 | 24.5 | 195 | 22.5 | 318 | 32.3 |
| Jedanput na godinu • Once a year       | 69 | 6.8 | 81 | 8.8 | 126 | 13.2 | 171 | 18.2 | 198 | 22.8 | 159 | 16.2 |
| Samo prema potrebi • Only when necessary | 921 | 91.1 | 819 | 88.6 | 807 | 84.9 | 540 | 57.3 | 474 | 54.7 | 507 | 51.5 |

The highest mean of the dmft index was found among 7 year-old boys (6.82 ± 3.608), while the highest mean for
DMFT was found among 11 year-old girls (2.45 ± 1,901). Therefore, this study confirmed the fact that there is a decline in
the caries prevalence in the primary dentition with increas-
ing the age. On the contrary, there was an increase in the car-
ies prevalence in the permanent dentition, which increases
with age. The total value of dmft/DMFT index for children
6 to 11 years old based on age and gender was moderately
high (dmft = 4.36 ± 3.763, DMFT=1.20 ± 1.488) (Table 5).

From all children observed, fissure sealants were found
only in 90 schoolchildren, amounting to only 1.58% (Table
6). A number of sealed tooth surfaces, frequency and a total
number of sealants are shown in Table 7.

The oral health practices showed that from the age of
eight, up to 50% of children brush their teeth twice a day
(Table 8). Up to 40% of the observed children declared that
they consumed sweet food and confectionary at least once on
A regular daily basis. Also, the majority of children visited the dentist only when necessary (Table 8).

With initial conditional univariate regression, using the Spearman’s rank correlation, it was confirmed that there was a significant association between frequencies of consumption of confectionary, oral hygiene, dental visits and d/D components (Table 9).

Discussion

This study was designed to evaluate the prevalence of caries, brushing habits, fissure sealants, dental visits and frequency of confectionary consumption during the day. The sample included 6 - 11 year old schoolchildren from Kosovo. According to the World Oral Health Report from 2003, dental caries is still a serious public health problem regardless of great improvements in the oral health of populations worldwide. In most of the developed countries, it affects 60–90% of schoolchildren and the majority of adults. Mainly, problems persist still among poor and disadvantaged groups in both developed and developing countries (22).
U dobi od 6 do 11 godina djeca stvaraju vlastite navi-ke i uče pravila o održavanju oralnoga zdravlja. Tijekom tog razdoblja uglavnom trebaju potporu roditela, poticanje od nastavnika te promicanje oralnoga zdravlja, što trebaju činiti stomatolozi i dentalni higieničari koji će im pružiti znanje i pokazati kako prevarivati oralne bolesti (23, 25).

Općenito, ukupni pokazatelji incidencije karijesa veći su u mješovitoj dentanci. Mliječni zubi dulje su izloženi rizičnim čimbenicima nego vlažni zubi, pa čeka djevojčica s trajnom denticijom. Najveća vrijednost kepa pronađena je među 7-godišnjim djećacima, a DMF je bio veći kod 11-godišnjih djevojčica. Ukupna vrijednost kepa ili DMF-a za uče- nikove u dobi od 6 do 11 godina na temelju dobi i spola, bila je razmjerno visoka.

Srednja vrijednost kepa i DMFT-a za djecu od 6 do 7 godina u našem istraživanju bila je veća kod dječaka nego kod djevojčica u mliječnoj denticijci. Jednača je veća kod djevojčica s trajnom denticijom. Najveća vrijednost kepa pronađena je među 7-godišnjim djećacima, a DMF je bio veći kod 11-godišnjih djevojčica. Ukupna vrijednost kepa ili DMFT-a za uče- nikove u dobi od 6 do 11 godina na temelju dobi i spola, bila je razmjerno visoka.

Srednja vrijednost kepa i DMFT-a za djecu od 6 do 7 godina u našem istraživanju bila je veća nego u Njemačkoj (27). Istaknimo također da je u naši nanalazi smatraju visokima u usporedbi sa skandinavskim zemljama koje su postigle nižu stupanj incidencije karijesa (28 – 30). Naši rezultati kep vrijednosti također su bili najviši u usporedbi s učenicima iz Albanije u dobi do 7 i 15 godina, ali su naše vrijednosti kepa i DMFT-a bile najniže (5). Ipak, naš nalazi za kep bio je najni- ži u usporedbi s drugim zemljama u regiji – Hrvatskom i Bosno i Hercegovinom, te za kep u usporedbi s Turskom i Fil- lipinima (31, 34).

U istraživanju smo utvrdili da je primjena preventivnih mjera – pečaćenje fisura – diljem zemlje bila vrlo niska kod djece u dobi od 6 do 11 godina. Među uključenom djecom samo njih 90 imalo je zapečaćene zube. Niska prevalencija pečaćenja zuba zabilježena je u Njemačkoj i kod grčkih adolescenata u dobi od 12 do 15 godina (26 % za 12-godišnjake i 19 % za 15-godišnjake), no očito su vrijednosti bile više negoli u našem istraživanju (19). Srednje vrijednosti kepa i DMFT-a u dobi od 6 do 15 godina, ali su naše vrijednosti kepa i DMFT-a bile najniže (5). Ipak, naš nalazi za kep bio je najni- ži u usporedbi s drugim zemljama u regiji – Hrvatskom i Bosno i Hercegovinom, te za kep u usporedbi s Turskom i Fil- lipinima (31, 34).

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Children in middle childhood (ages 6-11) create their own habits; they learn basic details and rules on maintain- ing oral health. Throughout this period, children need to be supported by their parents. They learn from their teachers, who are expected to inspire them. Oral health should be pro- moted by dentists or/and hygienists offering children basic knowledge on oral disease prevention (23, 25).

Generally, the total caries experience indicators are higher in the mixed dentition. Primary teeth are exposed to risk factors of caries such as regular consumption of sugar- sweetened beverages, sugar-sweetened confectionery and items such as sweets and chocolate over a longer period of time than permanent teeth. This explains also why primary molar teeth have a higher prevalence than permanent molars. Several studies revealed common correlations in caries experience between primary and permanent teeth (26).

As expected, the results of our study revealed that there was a relatively high prevalence of dental caries in primary dentition than in permanent dentition. Boys had a slightly higher prevalence of caries in primary dentition than girls, whereas girls had higher prevalence of caries in their permanent dentitions. The highest dmft value was found among 7 year-old boys, whereas the DMFT was higher in 11 year-old girls. However, the total value of dmft or/and DMFT for schoolchildren aged 6-11 years, based on age and gender, was found to be relatively high.

The dmft and DMFT means values for children aged 6 to 7 years in our study were higher than those in Germany (27). Furthermore, the values in our findings are considered to be high compared to findings from Scandinavian countries, which have achieved a low degree of caries incidence across the time [28-30]. Also, our results of dmft values were higher compared to those regarding 7-15 years old schoolchildren in Albania, whereas our DMFT values were lower. Therefore, our findings for DMFT values were found lowest compared with other studies in the region such as those obtained in Croatia and Bosnia and, also, for dmft values in Turkey and Filippino (31, 34).

In our study, we have established that application of preventive measures throughout the country - dental sealants among children aged 6 - 11 was very low. Out of all the children observed, we have found sealed teeth only in ninety children. The low prevalence of dental sealants was found also in Greek adolescents aged 12 – 15 years (26% for the 12 and 19% for the 15-year-olds), but obviously, the values were higher than those in our study (19). The mean DMFT scores for Germany declined from 2.44 in 1994-1995 and to 1.24 in 2000. In 2000, on average between 2.13 and 2.83 teeth with fissure sealants per child were found (35). Also, a high prevalence of dental sealants was found in Denmark, where two-thirds of 15-year-old Danish children had at least one or more sealed surfaces. The mean number of sealants was 3.06 (SD=1.60) (36).

The results of our study revealed that tooth brushing is relatively common or routinely practiced in a sample of 6–11-year-old children. Our data confirmed the results of previous studies on oral hygiene in the sense that the majori-
odgovarajuća tehnika četkanja glavni su čimbenici koji nepoljno utječu na prevalenciju karijesa (38, 39).

U našem istraživanju otkrića smo da većina djece konzumira slastice barem jedanput na dan. To bi trebalo smatrati ugrozom kad je riječ o održavanju uravnoteženog unosa hranjivih tvari i sprječavanju karijesa na zubima i njihovu prerana gubitku, čak iako je taj postotak bio najniži u usporedbi s drugim istraživanjima (40, 41). Naši rezultati potvrđuju značajnu korelaciju između učestalosti konzumiranja slastica tijekom dana i prevalencije karijesa. Djeca od 6 do 11 godina odlazila su stomatologu uglavnom samo kada je to bilo potrebno, što je u korelaciji s našim nalazima, visokim kep/KEP indeksom i niskom razinom preventivnih mjera – pečaćenjem zuba. U drugim istraživanjima razlozi za posjete stomatologu među djecom bili su više u sklopu preventivnih mjera (19, 36). Naši rezultati sugeriraju da bi za poboljšanje oralnoga zdravlja djeca trebala trošiti više vremena na četkanje zuba, a u obrazovnom sustavu postoji potreba za uključivanjem programa za promicanje oralnoga zdravlja i prevenciju oralnih bolesti.

Niz je prednosti i ograničenja u ovom istraživanju. Pozitivni aspekt uključuje nužne mjere i pilot-testiranje za usklađivanje istraživača, tako da su dobiveni rezultati pouzdani i dobroćenjenjem program za promicanje oralnoga zdravlja i prevencije karijesa. Njihov status oralnoga zdravlja prema kriterijima i postupcima SZO-a za epidemiološka istraživanja, pa bi naši rezultati u budućnosti mogli služiti za usporedbu s drugim dobivenim rezultatima na Kosovu i u ostalim razvijenim zemljama ili zemljama u razvoju s različitim kulturom. U naše istraživanje uključili smo učenike u dobi od 6 do 11 godina iz različitih kosovskih gradova, što daje svebuhatniju sliku prevalencije karijesa na Kosovu. Potrebno je razmotriti i ograničenja istraživanja. Iako smo pokušali obuhvatiti učenike iz različitih gradova, općenito nismo dobili informacije o mješecnim primanjima obitelji i o obrazovanju roditelja, a nismo uključili ni djecu iz ruralnih područja. Zato ne možemo isključiti važan utjecaj socijalno-ekonomskog čimbenika. Dručija dostupnost preventivnih mjera, pristup oralno-zdravstvenim uslugama i obično manji broj stomatologa po broju stanovnika u ruralnim područjima, može značajno utjecati na rezultate. Posljedično se u našem uzorku ne može potpuno isključiti potencijalna pristranost.

In our study, we have found that the majority of children in Kosovo consume sugar sweetened beverages, sweets and chocolate at least once a day. Inadequate nutrition and fluid intake can result in serious problems; therefore, decreased intake of sugars and well-balanced nutrition can prevent tooth decay and premature tooth loss. The percentage of carious teeth in schoolchildren from Kosovo is lower compared to that of other studies (40, 41). Our results confirmed the fact that there is a significant correlation between frequencies of consumption of sweetened beverages and confectionery items such as sweets and chocolate per day, and prevalence of caries. Some studies reported that a large number of children aged 6-11 visit their dentists "only when necessary". Such a high ratio is in line with our findings, the high dmft/DMFT index and low preventive measures with a small number of dental sealants. Furthermore, other studies reported that such a situation is calling for a national preventive program with sealants which could eliminate caries to a larger extent (19, 36). Consequently, our results suggest that for improving their oral health, children should spend more time on brushing their teeth. Besides, special programs for the promotion of oral health and prevention of oral diseases should be integrated into educational systems.

There is a large number of strengths and limitations of this study. The main strength of our study includes necessary steps and pilot testing for inter-rater agreement. In this way, the obtained results are reliable and consistent. Secondly, we have assessed oral status according to WHO criteria and procedures for epidemiological studies; hence the obtained results from Kosovo can be compared with the results obtained from other developed and developing countries with different cultures. Also, in our study, we have included schoolchildren aged 6-11 years from different towns of Kosovo, which gives an overview of the prevalence of caries in Kosovo. Few limitations of the study must be considered. Even though we have attempted to comprise schoolchildren from different towns, in general, we did not receive information regarding family monthly income and parents’ education level and we did not include children from rural areas. Therefore, we cannot exclude the important significance of broad socioeconomic factors, which could contribute to taking different approaches to specific population, thus improving preventive measurements efficacy, and enabling an easier and better access to preventive oral health services. It is a well-known fact that there are fewer dentists per population living in rural areas and this additional deficieny results in lower access and operation of dental care. Therefore, a potential variety bias in our sample cannot be completely excluded.
Conclusion

Dental caries among children aged 6-11 years in Kosovo remains a significant oral health challenge. Consequently, motivation and education of children are essential in our country for encouraging and inculcating early healthy lifestyle behavior. Parents and school teachers should increase dental awareness among schoolchildren by improving oral hygiene methods and habits together with pedodontists and/or hygienists, demonstrating the proper method, and duration of teeth brushing. In addition, early regular dental visits and preventive measures such as fissure sealants among children would decrease dmft/DMFT indexes. Since oral health is integral to general health, policy makers need to include oral health in public health policies, thus leading to improvement in the differences in health status of urban and rural population.

Competing interests

The authors declare no conflict of interests.

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Abstract

The aim of the present study was to evaluate the current oral health status among schoolchildren in Kosovo aged 6-11 years. Material and methods: A study included 5679 schoolchildren aged 6 -11 years, from different towns of Kosovo. Dental health status was evaluated using the World Health Organization (WHO) caries diagnostic criteria for decayed, missing and filled teeth (dmft/DMFT index), for deciduous and permanent dentition. The observed children have answered a number of questions about their oral hygiene, eating habits, and dental visits. The analysis included frequencies and means. The differences between means were tested using the student t-test (p<0.05). The factors associated with dental caries were tested using the Spearman’s rank. Results: The mean dmft/DMFT of schoolchildren aged 6-11 years was 4.36±0.763 and 1.20±1.488, respectively. Sealant placements were found among 90 schoolchildren, amounting to 1.58%. From 8 years of age, 50% of children brush their teeth twice a day. Confectionery consumption among the observed children has increased. Forty percent of them eat sweets at least once a day, and majority of them visit their dentists only when necessary. A significant correlation between consumption of confectionery, oral hygiene, dental visits and the prevalence of caries was confirmed. Conclusion: The results of the present study show that there is a high prevalence of caries among 6-11 year old schoolchildren, thus pointing to a need for an extensive program of primary oral health care as well as utilizing preventive measures and regular dental visits.

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