Dental Caries Prevalence and Oral Health Status among 15-Year-Old Adolescents in Kosovo

Prevalencija zubnog karijesa i stanje oralnoga zdravlja petnaestogodišnjih adolescenata na Kosovu

Abstract
Caries has a harmful impact on oral and general health and is a major public health problem among children and adolescents. The objective of present study was to investigate into dental caries, oral hygiene, the frequency of brushing habits and dental visits among 15-year-old adolescents. Material and methods: This cross-sectional study was carried out on a random sample of 323 15-year-old adolescents in different schools and municipalities of Kosovo. Oral clinical examination and self-administered questionnaire were used to obtain information about dental caries and oral health practices. Oral hygiene and caries status in permanent dentition was assessed through the DMFT index and Oral Hygiene Index - Simplified (OHI-S). The level of statistical significance was set at p<0.05. Results: The total mean of the DMFT index was 3.21 ± 2.193, while component D of the DMFT index dominated in both genders, with slightly higher values in boys compared to girls (2.15±2.092, and 1.91±1.919). The mean OHI-S index of adolescents aged 15 was found to be 1.945±3.926. Over 50% of schoolchildren brush their teeth only once per day and they have visited the dentist only when it was necessary. Irregular tooth-brushing, dental visits and poor oral hygiene index were significantly related to dental caries. Conclusion: The results of the study showed poor oral health status among 15-year-old adolescents in Kosovo. There is an emergent need for caries-prevention programs focusing on oral health and healthy habits.

Introduction
Dental caries is characterized as a pandemic disease which is still widespread around the world among people, particularly in lower socio-economic classes (1). The multifactorial etiology of dental caries includes tooth, bacteria in dental plaque, such as Streptococcus mutans, and a carbohydrate diet. As a consequence of these three main factors, and many other factors, the demineralization of the enamel will be caused, and after a while the dentin will also be affected (2).

Generally, there are main differences in dental caries between developed and developing countries. In developed countries, a decrease in dental caries was reported as a result of advanced preventive programs applied to promote oral health and access to dental health services (3, 4). However, it
is disturbing that in developing countries there is still a risk of increasing dental caries due to unbalanced diet, uncontrolled sugar consumption, lack of application of fluoridation methods and inadequate oral health care (5).

The group of children aged between 6 and 12 and adolescents are considered to be groups that are most affected by caries, therefore the WHO considers them target age groups to investigate into the level of caries in different countries around the world (6). Children and adolescents are giving preferences to sweetened beverages and soft drinks, which are rich in carbohydrates, between meals. In addition, they have numerous engagements during the day. Consequently, the aforementioned are considered high hazards for dental caries, thus making the problem of caries prevalence even more significant at those ages (7). Oral health goals framed jointly by the World Health Organization (WHO) and the FDI-World Dental Federation for the year 2000 included a 50% reduction of dental caries for 6-year-olds, an average DMFT index of no more than 3.0 for 12-year-olds, and 85% of the population up to the age of 18 should have all of their teeth (8).

Oral health as an important part of overall health enables a person to eat, talk, and to be socialized. Subsequently, this affects the overall well-being of each individual (9). School age is a period of great influence on the development of a child's personality, as well as on the behaviors related to oral health. Hence, it is important to teach children and adolescents good oral health behaviors because they will carry those valuable lessons with them as they get older (10). Particularly, it is important to possess knowledge about dietary habits, brushing habits and dental visits, which will enable individuals to have good oral health (9, 11-13). The results of numerous studies showed that most children brush their teeth once a day (14, 15). A number of dental caries studies have been conducted in Kosovo, and the results have shown that the rate of dental caries is quite high (15-17).

Within this context, this study aimed to evaluate the prevalence of caries and to analyze related risk factors among 15-year-old adolescents from different cities of Kosovo.

**Material and methods**

This study involved an epidemiological cross-sectional data collected in several schools in different cities of Kosovo during 2017/2018. Accordingly, the adolescents from every public school from cities of Kosovo had an equivalent occasion of participating in the study. An electronic invitation was delivered to each school of Kosovo to examine the adolescents, and afterward, the first of them who positively replied to the invitation were selected for further research. The sample and the classroom were randomly selected in each public school. The sample included 323 adolescents of both genders. The study was approved by the Ministry of Education, Science, and Technology of the Republic of Kosovo (approval number: 3752/2016). Firstly, each parent was informed by the school board prior to data collection and then a consent form was obtained for each adolescent examined.

Two working teams were formed to conduct the research; each team consisted of a pediatric dentist and three students
in the final year of dentistry studies. A pediatric dentist with
clinical and epidemiological experience has trained the ex-
aminers to use the methodology according to the criteria of
the World Health Organization (WHO), 1997, for epide-
miological studies (18). In recording caries severity, the De-
cayed, Missing and Filled Tooth (DMFT) index was used for
15-year-old adolescents. Oral hygiene status was assessed by
using evaluation criteria described by Green and Vermillion,
1964, for use of the Simplified Oral Hygiene Index (OHI-
S Index) (19). Dental caries and the OHI-S Index were di-
gnosed under natural light, using the following dental in-
struments: a mirror and a probe. Dental examinations were
performed at school during daytime hours by two calibrat-
ed examiners (Kappa=0.96-intraexaminer and 0.94-interex-
aminer). The clinical findings were recorded by a student as-
sistant.

The questionnaire was administered to all 15-year-old
adolescents attending grade 9 who were willing to take part in
the study, in which demographic records (gender, habita-
tion, simplified oral hygiene and dental status), the fre-
cuency of dental visits and the frequency of brushing habits were
included. A questionnaire was pretested by adolescents’ one
day before the examination to assess whether the question-
naire was understandable to the adolescents. Afterwards, the
teachers supported the researchers and did not interfere in the
administration of the structured questionnaire. Adoles-
cents were asked about the frequency of brushing their teeth
during the day (the main options were: twice or once a day
and rare), whereas regarding dental visits the options were
once in 6 months, once in year, and the third given option
was only when necessary. The exclusion criteria applied in the
current study were as follows: those who rejected to partici-
pate in the study, those undergoing orthodontic treatment,
and healthy compromised adolescents. The inclusion crite-
ria were: 15-year-old adolescents (both genders), who were
present on the day of the examination. At the end of the ex-
amination, the parents of the adolescents who were in need
of dental care were given a recommendation. Subsequently,
a lecture about oral health and using the correct oral hygiene
technique of toothbrushing was held in every classroom.

Statistical Analysis

Data were entered using SPSS package 19 for Windows
(SPSS Inc., Chicago, Illinois, USA) software and descriptive
data were obtained, included frequencies and means. The
variances concerning means were established using the stu-
dent t-test. The Spearman’s rank correlation (Spearman’s rho)
was used to test the association between frequency of brush-
ing habits, dental visits, OHI-S index and DMFT index. A
level of p<0.05 was considered statistically significant.

Results

The characteristics of the adolescents by gender and the
mean of DMFT index are presented in Table 1. The standard
deviation and the mean for DMFT were found (3.21±2.193).
Furthermore, the component D was more dominant among
boys compared to girls (2.15±2.092 and 1.91±1.919), fol-
demiološkim iskustvom osposobil je ispitivače za korištenje
metodologije prema kriterijima Svjetske zdravstvene orga-
nizacije (SZO, 1997.) za epidemiološka istraživanja (18). Za bi-
lježenje progresije karijesa među petnaestogodišnjim adoles-
centima korišten je DMFT indeks (Decayed, Missing, Filled
Tooth). Stanje oralne higijene procijenjeno je prema kriteri-
jima koje su opisali Green i Vermilion (1964.) za pojedno-
stavljeni indeks oralne higijene (OHI-S indeks) (19). Zub-
ni karijes i OHI-S indeks dijagnosticirani su pod prirodnim
svjetlom, s pomoću stomatoloških instrumenata, zraca i son-
de. Stomatološke pregledne u oblik obavljale su dva kalibrirana
ispitivača (Kappa = 0,96 – intraispitivač i 0,94 – interispit-
ivač). Kliničke nalaze bile su poznate. Učestalost slučajeva
u studiji u razredima koji su bili voljni sudjelovati u istraži-
vanju, a bili su uključeni demografski podatci (spol, mjesto
stanovanja, pojednostavljeni status oralne higijene i stanje zu-
ba), učestalost posjeta stomatologu i učestalost četkanja zuba.
Dan prije pregleda adolescenata upitnik je testiran kako bi se
procijenilo li im razumljiv. Nakon toga učitelji su podrža-
li istraživače i nisu posredovali u administraciji strukturirano-
ja upitnika. Adolescenti su odgovarali na pitanja o učestalosti
četkanja zuba tijekom dana (glavne opcije bile su dva puta ili
jedan put da dan i rijetko), te o posjetima stomatologu – mo-
žućnosti su bile jedan put u šest mjeseci i jedanput na godinu,
ili jedanput da dan i rijetko), te o posjetima stomatologu – mo-
žućnosti su bile jedan put u šest mjeseci i jedanput na godinu,
a treća je bila samo kad je potrebno. Kriteriji za isključivanje
primijenjeni su u ovom istraživanju bili su odbijanje sudjelova-
ja u istraživanju, aktivna ortodontska terapija i zdravstveno
kompromitirani adolescenti. Kriteriji za isključivanje bili su
petnaestogodišnjaci (oba spola) nazočni u školi na dan ispi-
tivanja. Na kraju pregleda roditeljima adolescenata kojima je
bila potrebna stomatološka skrb dana je preporuka. Nadalje,
svakoj učionici održano je predavanje o oralnome zdravlju
i pravilnoj tehnici četkanja zuba.

Statistička analiza

Podatci su uneseni s pomoću paketa SPSS 19 za Win-
dowse (SPSS Inc., Chicago, Illinois, SAD) i dobiveni su de-
skriptivni podatci, uključene frekvencije i srednje vrijednosti.
Odstupanja u odnosu prema srednje vrijednostima utvrđe-
ne su Studentovim t-testom. Spearmanova korelacija rangova
(Spearmanov rho) korištena je za testiranje povezanosti izme-
du učestalosti četkanja, posjeta stomatologu, OHI-S indek-
sa i DMFT indeksa. Razina p < 0,05 smatrala se statistički
značajnom.

Rezultati

Karakteristike adolescenata prema spolu i srednje vrijed-
osti DMFT indeksa nalaze se u tablici 1. Standardna devi-
jacija i srednja vrijednost za DMFT iznosila je 3,21±2,193.
Nadalje, komponenta D bila je dominantnija među dječaći-
ma nego djevojčicama (2,15±2,092 i 1,91±1,919), a slije-
lowed by F-component and M-component which tended to be comparable throughout both genders.

On the other hand, the overall OHI-S index was 1.945, slightly higher in girls (1.957) compared to boys (1.932) (Table 1).

The distributions of the frequencies related to brushing habits and dental visits are presented in table 2. According to the results obtained in this study, 65.6 % of adolescents of both genders brush their teeth once a day. The percentage of adolescents who visited the dentist only when necessary exceeded 50% amongst both genders.

de F-komponenta i M-komponenta koje su bile usporedive za oba spola.

S druge strane, ukupni indeks OHI-S iznosio je 1,945 i bio je nešto viši kod djevojčica (1,957) u usporedbi s dječacima (1,932) (tablica 1.).

Distribucija učestalosti vezana za navike četkanja i posjete stomatologu prikazana je u tablici 2. S obzirom na rezultat od 65,6 %, oba spola najčešće četkaju zube jedanput na dan. Postotak adolescenata koji su odlazili kod stomatologa samo prema potrebi premašio je 50 % među oba spola.

**Table 1**  Mean and standard deviation for DMFT components, DMFT free and OHI-S index based on gender  
**Tablica 1.** Srednja vrijednost i standardna devijacija za DMFT komponente, bez DMFT-a i OHI-S indeks na temelju spola

| Gender • Spol         | N   | D  | M  | F  | DMFT | DMFT free • Bez DMFT-a | OHI-S |
|-----------------------|-----|----|----|----|------|-------------------------|-------|
|                        |     | Mean ± SD | Mean ± SD | Mean ± SD | Mean ± SD | Mean ± SD | Mean ± SD |
| Girls • Djevojčice    | 162 | 1.91±1.919 | 0.36±0.665 | 0.86±1.372 | 3.10±2.190 | 0.15±0.356 | 1.957±0.424 |
| Boys • Dječaci        | 161 | 2.15±2.092 | 0.34±0.672 | 0.86±1.344 | 3.33±2.196 | 0.11±0.308 | 1.932±0.359 |
| Overall • Ukupno      | 323 | 2.03±2.008 | 0.35±0.667 | 0.86±1.356 | 3.21±2.193 | 0.13±0.333 | 1.945±0.393 |

**Table 2**  Brushing habits per day and frequency of dental visits  
**Tablica 2.** Dnevne navike četkanja i učestalost posjeta stomatologu

| Gender • Spol         | N   | Frequency • Učestalost četkanja zubi u danu | Dental visits • Posjeti stomatologu |
|-----------------------|-----|------------------------------------------|-------------------------------------|
|                        |     | N % | Frequency • Učestalost | N % |
| Girls • Djevojčice    | 162 |     |                            |     |
| Twice • Dva puta      | 4   | 2.5 | Once in 6 months • Jedanput u 6 mjeseci | 46  | 28.4 |
| Once • Jedanput       | 86  | 53.1| Once in year • Jedanput na godinu    | 20  | 12.3 |
| Rare • rijetko        | 72  | 44.4| Only when necessary • Samo prema potrebi | 96  | 59.3 |
| Boys • Dječaci        | 161 |     |                            |     |
| Twice • Dva puta      | 3   | 1.9 | Once in 6 months • Jedanput u 6 mjeseci | 45  | 28.0 |
| Once • Jedanput       | 126 | 78.3| Once in year • Jedanput na godinu    | 24  | 14.9 |
| Rare • rijetko        | 32  | 19.9| Only when necessary • Samo prema potrebi | 92  | 57.1 |
| Overall • Ukupno      | 323 |     |                            |     |
| Twice • Dva puta      | 7   | 2.2 | Once in 6 months • Jedanput u 6 mjeseci | 91  | 28.2 |
| Once • Jedanput       | 212 | 65.6| Once in year • Jedanput na godinu    | 44  | 13.6 |
| Rare • rijetko        | 104 | 32.2| Only when necessary • Samo prema potrebi | 188 | 58.2 |

**Table 3**  Conditional univariate logistic regression analysis of oral hygiene, dental visits, DMFT index, and OHI-S  
**Tablica 3.** Uvjetna univarijantna logistička regresijska analiza oralne higijene, posjeta stomatologu, DMFT indeksa i OHI-S

| Correlations • Korelacije | Brushing habits per day • Učestalost četkanja zubi u danu | Dental visits • Učestalost posjeta stomatologu | DMFT | OHI-S |
|---------------------------|-----------------------------------------------------------|-------------------------------------------------|------|------|
|                           | Correlation Coefficient                                   | Correlation Coefficient                         |      |      |
|                           | Sig. (2-tailed)                                           | Sig. (2-tailed)                                 |      |      |
|                           | N                                                         | N                                               |      |      |
|                           | .193**                                                   | .100                                           | .044 | .005 |
|                           | .323                                                     | .323                                           | .426 | .928 |
|                           | .323                                                     | .323                                           |      |      |
|                           | .096                                                     | .096                                           |      |      |
|                           | .119**                                                   | .100                                           | .085 | .032 |
|                           | .323                                                     | .323                                           | .323 | .323 |
|                           | .063**                                                   | .100                                           |      |      |
|                           | .323                                                     | .323                                           | .323 | .323 |
|                           | .119**                                                   | .100                                           |      |      |
|                           | .323                                                     | .323                                           | .323 | .323 |
|                           | .000                                                     | .000                                           | .000 | .000 |
|                           | .323                                                     | .323                                           |      |      |
|                           | .063**                                                   | .100                                           |      |      |
|                           | .323                                                     | .323                                           |      |      |
|                           | .000                                                     | .000                                           |      |      |
|                           | .323                                                     | .323                                           |      |      |

**.** Correlation is significant at the 0.01 level (2-tailed) • Korelacija je značajna na razini 0,01  
*. Correlation is significant at the 0.05 level (2-tailed) • Korelacija je značajna na razini 0,05
By using the Spearman's rank correlation, it was obvious that there was a significant association concerning the frequencies of brushing habits, dental visits, OHI-S index and DMFT index (Table 3).

Discussion

Oral health is not only a necessary component of overall health, but it also affects the quality of life. Dental caries is the most common oral problem affecting more than 2 billion people worldwide. According to the WHO report, dental caries is a chronic disease ranked as fourth most expensive medical treatment (20–22).

This study offered a broad overview and evidence on the level of DMFT index, OHI-S index, and behaviors related to dental brushing habits and dental visits among 15-year-old adolescents in Kosovo. This is worthwhile in a population without previous data presented on dental caries among 15-year-old adolescents, as is the case of Kosovo. The present study showed high scores of the DMFT index among the examined adolescents, and the DMF-index was totally dominated by the D component. The results concerning gender showed that boys had higher DMFT index values compared to girls. Those results are corresponding with previous reports (23–25), but the values were higher than those in studies conducted by others (26–32), and considerably lower than reported in other studies (33–37). Such high values can be explained by the deficiency of national preventive programs, the shortage of dentists in schools, as well as the lack of preventive and educational measures in Kosovo.

Oral Hygiene Index (OHI-S) has been accepted as useful index for assessment of dental health education in public school systems, and it is also considered an indication of oral hygiene (19). The level of oral hygiene in our study is considered to be low, and similar values were also found in previous study conducted in our country in different group ages (17). Also, contrary to our results, other studies observed better oral hygiene, which was also correlated with a lower level of dental caries (32, 38, 39). Good oral hygiene practice is the most significant feature determining the general oral health of an individual. The most common aids used for maintaining oral hygiene are toothbrushes and toothpaste. They decrease plaque accumulation within which oral bacteria survive to produce acid that increases the risk of caries. Attaining good oral hygiene practice early in life by the child does improve upright practices later throughout life (38).

The current study showed that most of adolescents in Kosovo brush their teeth only once a day, which caused an increase in the level of caries and plaque index. This may be related to improper toothbrushing time, inefficient brushing technique or both. There is a discrepancy between our results and the results of previous studies where adolescents of the same age brushed their teeth more than once a day (30, 37, 40). Moreover, in disagreement with our study, females, as compared to males, had significantly higher-performing oral hygiene habits such as tooth brushing twice a day and they brushed their teeth after their last meal before bedtime (37). This is not surprising since adolescents are not examined yearly by a dental caries examiner. Korištenjem Spearmanove korelacijske rangova ustanovljena je značajna povezanost u učestalosti četkanja zuba, posjeta stomatologu, OHI-S indeksa i DMFT indeksa (tablica 3.).

Rasprava

Oral zdravlje nije samo nužna komponenta cjelokupnog zdravlja, nego utječe i na kvalitetu života. Zubni karijes najrašireniji je oralni zdravstveni problem koji pogoda više od 2 milijarde ljudi diljem svijeta. Prema izvješću SZO-a, karijes je kronična bolest i nalazi se četvrtom mjestu najskupljih liječenja (20 – 22).

Ovo istraživanje dalo je pregled i dokaze o razini DMFT indeksa, OHI-S indeksa i navikama četkanja zuba i posjeta stomatologu među petnaestogodišnjim adolescentima na Kosovu. To su vrijedni podatci o populaciji bez prethodnih podataka o zubnom karijesu među petnaestogodišnjacima. U ovom istraživanju istaknuta je visoka razina DMFT indeksa među ispitanim adolescentima, pri čemu je prevaldavajuća vrijednost bila komponenta D. Rezultati koji se odnose na spol pokazali su da su dijeca imali više vrijednosti DMFT indeksa u usporedbi s djevojčićima. Ti rezultati korespondiraju s prethodnim izvješćima (23 – 25), ali su bili viši u odnosu prema istraživanjima koja su proveli drugi autori (26 – 32) i znatno niži od onih objavljenih u ostalim istraživanjima (33 – 37). Tako visoke vrijednosti mogu se objasniti nedostatkom nacionalnih preventivnih programa, nedostatkom stomatologa u školama te nedostatkom preventivnih i obrazovnih mjera na Kosovu. Indeks oralne higijene (OHI-S) prihvaćen je kao koristan za procjenu edukacije o zdravlju zuba u javnim školama svih dobnih stavi stava i također se smatra pokazateljem oralne higijene (19). Razina oralne higijene u našem istraživanju smatra se lošom, a približne vrijednosti ustanovljene su i u prethodnom istraživanju provedeno u našoj zemlji u različitim dobrim skupinama (17). Za razliku od naših rezultata, u drugim istraživanjima zabilježena je obilna oralna higijena, što je također bilo u korelaciji s nižom razinom prevalencije zubnog karijesa (32, 38, 39). Dobra praksa u oralnoj higijeni najznačajnije je obilježje koje određuje opće oralno zdravlje pojedinca. Najčešća pomagala za njezinu održavanje su četkice i paste za zube. Njima se smanjuje nakupljanje plaka u kojemu preživljavaju oralni mikroorganizmi kako bi proizveli kiselinu koja povećava rizik od pojave karijesa. Postizanje dobre oralne higijene u ranoj dobi djeteta pomaže i stabilnoj teškoj životu (38). Ovo je istraživanje pokazalo da većina adolescenata zube četka samo jedanput na dan, što utječe i na visoku razinu prevalencije karijesa i indeks plaka. To može biti povezano s neadekvatnim vremenom četkanja, neučinkovitim tehnikom ili jednim i drugim. Rezultati našeg istraživanja različiti su od rezultata dobivenih u drugim istraživanjima u kojima adolescenti iste dobi zube četkaju više od jedanput na dan (30, 37, 40). Stoviše, u suprotnosti s našim istraživanjem, žene su u usporedbi s muškarcima imale znatno bolje navike kad je riječ o oralnoj higijeni, kao što je četkanje zuba dva puta na dan i četkanje zuba poslije posljednjeg obroka prije spavanja (37). To nije neočekivano jer adolescente go
Conclusions

In conclusion, the prevalence of dental caries in Kosovo schoolchildren was high, which is consistent with the results obtained in previous research. However, the prevalence of caries is still much higher than in most European countries. Restorative and preventive public health promotions are exceedingly suggested to improve oral health status among Kosovo adolescents. Caries prevention measures should be taken thoroughly and on a huge scale, primarily in the form of fluoride management (brushing with fluoride gel, tablets), application of dental sealants in order to avoid extensive restorative operations, and dietary modifications as cariogenic diets. Comprehensive education regarding brushing habits and the frequency of dental visits is indispensable in order to identify the population's oral health status, thus learning how to improve it. Understanding risk factors can contribute to development of more effective dental public health policies.

This study has some strengths and limitations. The main strength of the current study includes the assessment of oral status according to WHO procedures and criteria for epidemiological studies so that our results obtained in Kosovo can be compared with those from different countries in the future. Strengths also include necessary steps and pilot test for intra-examiner and inter-examiner agreement, so that obtained results are consistent and reliable. Few limitations of the study must be well-thought-out. In Kosovo, adolescents from higher socioeconomic backgrounds are likely to be enrolled in private schools and we did not make the comparison regarding oral health between public and private adolescents, nor between urban and rural residents. Consequently, the existing relationships with other risk factors heretofore described as cariogenic diet, socio-economic status, family income, parents’ age, educational level and occupation, and anxiety about dental treatment, were not analyzed (30,33,37,38). These circumstances are interesting due to the possible interaction with the variables described in this study. However, the results of this study suggest a possible association of the existing low level of oral health knowledge in the study population with high level of dental caries, which was published in previous research.

Zaklučak

Zaključno, prevalencija i opseg zubnoga karijesa kod kosovske školske djece bio je vrlo sličan u prošlim istraživanjima i još uvijek je mnogo veći nego u većini europskih zemalja. Preporučuju se promocije preventivnih javnozdravstvenih mjera radi poboljšanja statusa oralnoga zdravlja među kosovskim adolescentima. Prevalenciji karijesa potrebno je temeljito i štetički usmjeriti na pokretanje učinkovitih inicijativa za promicanje oralnoga zdravlja u budućnosti. Razumijevanje tih čimbenika rizika prijeklo je potrebno da bi se identificiralo stanje oralnoga zdravlja među stanovništvom i kako bi se ono moglo poboljšati, te potaknuo razvoj učinkovite politike javnoga zdravlja u stomatologiji.

Ovo istraživanje ima i neke prednosti i neka ograničenja. Glavna prednost jest procjena oralnoga statusa prema procedurama SZO-a i kriterijuma za epidemiološka istraživanja, tako da se naši rezultati na Kosovu u budućnosti mogu usporediti s onima iz različitih zemalja. Druga prednost su potrebne mjere i pilot-test za podudaranje unutar ispitača i između njih, tako da su dobiveni rezultati dosljedni i pouzdani. Treba istaknuti i nekoliko ograničenja u istraživanju. Na Kosovu se adolescenti iz viših socioekonomskih sredina vjerojatno upisuju u privatne škole, tako da nismo uspoređivali oralno zdravlje među adolescentima iz javnih i privatnih škola, ni između urbanih i ruralnih sredina. Slijedom toga, nisu analizirani postojeći odnosi s drugim čimbenicima rizika koji su dosad bili opisivani kao kariogeni prehrana, socioekonomski status, prihodi obitelji, dob roditelja, razina obrazovanja i zanimanja te anksioznost prema stomatologu. Ovi aspekti trebali bi biti razmotrjeni i u budućnosti. Međutim, u istraživanju se upozorava na moguću povezanost između niske razine znanja o oralnome zdravlju i ispitanjo populacije i visoke prevalencije karijesa, što je objašnjeno u prethodnim istraživanjima.
storative procedures in the future, and education for healthier oral hygiene. Furthermore, comprehensive tooth brushing with concentrated fluoride gel is recommended for caries prevention in primary and permanent teeth of children in elementary schools.

Data availability
The datasets used and analyses throughout the present study are obtainable from the corresponding author upon reasonable request.

Conflict of interest
The authors of this article declare that they do not have any competing interests concerning the publication of this paper.

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Author’s contribution: L. F., V. B. - performed the statistical analysis, and preparation of the tables; J. K. - contributed to dental examination and questionnaire collection, was involved in drafting and reviewing of the manuscript. The manuscript has been read and approved by all named authors.

Dostupnost podataka
Korišteni podatci i analize iz ovog istraživanja mogu se na zahtjev dobiti od autora.

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Doprinos autora: L. F., V. B. — pisanje rukopisa, interpretacija podataka, pregled literature i bibliografsko pretraživanje; J. K. — stomatološki pregledi i prikupljanj utipnika, pisanje i recenzija rukopisa. Svi su autori pročitali i odobrili konačni rukopis.
Prevalencija zubnog karijesa i stanje oralnog zdravlja

Ferizi i sur.

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