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Epidemiološko istraživanje oralnog zdravlja u srednjoj Dalmaciji: pilot studija

Epidemiological Research on Oral Health in Central Dalmatia: A Pilot Study

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Sažetak

Zubni karijes jedna je od najraširenijih bolesti diljem svijeta. Zahvaća sve populacije i sve dobne skupine. Tu je bolest iznimno teško u cijelosti iskorijeniti zbog vrlo složene interakcije socijalnih, kulturalnih, bioloških čimbenika te prehrambenih navika. To sve zajedno utječe na pojavu karijesa. **Svrha rada:** bila je ustanoviti koliko je čest karijes kod stanovnika srednje Dalmacije u tri različite životne sredine - gradskoj (Šibenik), seoskoj (Drniška zagora) i otočnoj (Murter) i to u pet različitih dobnih skupina. **Ispitanici i postupci:** Tijekom istraživanja pregledano je 450 ispitanika iz pet različitih dobnih skupina - šestogodišnjaci, dvanaestogodišnjaci, petnaestogodišnjaci, odrasli (od 35 do 44 godine) i stariji (od 65 do 74 godine). U svakoj je skupini bilo 15 muškaraca i isto toliko žena. Ukupno je u jednom zemljopisnom području pregledano 150 ispitanika, a sveukupno 450. Podaci dobiveni kliničkim pregledom upisivali su se u prilagođeni SZO-obrazac. **Rezultati:** Ukupan KEP-indeks dobiven u istraživanju za trajne je zube iznosio 9,53, sa statistički znatnom razlikom među spolovima. Prosječan KEP-indeks mliječnih zuba u populaciji šestogodišnjaka i dvanaestogodišnjaka iznosio je 2,0, bez statistički znatne razlike među spolovima.

Uvod

Zubni karijes jedna je od najraširenijih bolesti diljem svijeta. Zahvaća sve populacije i sve dobne skupine. Tu je bolest iznimno teško u cijelosti iskorijeniti zbog vrlo složene interakcije socijalnih, kulturalnih, bioloških čimbenika te prehrambenih navika, što sve zajedno utječe na pojavu karijesa (1). Tijekom proteklih 25 godina zabilježen je postupan pad raširenosti te bolesti među stanovništvom industrijaliziranih zemalja, posebice u dječjoj i adolescentskoj populaciji (2, 3). To se objašnjava stalnom

Introduction

Tooth decay is one of the most widespread diseases in the world today. It affects all populations and age groups. It's a disease that is very difficult to eradicate due to a complex interaction of social, cultural and biological factors, as well as nutritional habits, all of which influence the incidence of tooth decay (1). A gradual decline has been noticed over the past 25 years with respect to the frequency of caries findings in industrialized countries, especially within the children's and adolescent demographic segments (2, 3). The factor to

uporabom zubnih pasta s fluorom (4). Zbog toga se poboljšava oralno zdravlje te održava u funkciji veći broji žvačnih jedinica. Pojam oralnoga zdravlja vrlo je složen te obuhvaća niz parametara koji ga definiraju i određuju. Prema definiciji Svjetske zdravstvene organizacije (WHO-a) iz godine 1965., oralno zdravlje je: "Stanje zdravih i za funkciju sposobnih zuba i njihovih potpornih tkiva, uključujući zdravlje svih dijelova usne šupljine koji sudjeluju u žvakanju". Jasno je da samo žvačna funkcija nije jedini cilj u očuvanju oralnog zdravlja, tu su i estetika i fonacija (5). Zubni karijes zahvaća sve populacije i sve dobne skupine (6). Nemoguće ga je shvaćati kao izoliran entitet, to jest kao izoliranu bolest jednog organa – zuba, nego je to bolest koja se odražava na cijeli orofacijalni sustav, pa i na cijeli organizam. Epidemiologija zubnog karijesa vrlo je složena zbog toga što je vrlo čest i uzrokuje ga više čimbenika.

Ovaj rad predstavlja rezultate istraživanja o tome koliko je čest karijes kod stanovnika Šibensko-kninske županije u godini 2003. Prema popisu stanovništva, na dan 31. ožujka 2001., Županija je imala 112.891 stanovnika, a nastanjeni su bili na 2994 km^2 (7).

Svrha rada bila je ispitati koliko je čest karijes kod tamošnjih stanovnika i ustanoviti KEP-indeks za svaku dobnu skupinu i svako zemljopisno područje, zatim ukupan KEP-indeks svih ispitanika, razlike u tom indeksu među spolovima i različitim dobnim skupinama, između različitih zemljopisnih područja te ih međusobno usporediti i pokušati ustanoviti postoje li statistički znatne razlike u rezultatima i zašto.

Ispitanici i postupci

Istraživanje je provedeno u tri različite sredine (zemljopisna područja) Šibensko – kninske županije - u gradu Šibeniku, na otoku Murteru i u Drniškoj zagori. Ukupno je pregledano 450 ispitanika iz pet različitih dobnih skupina i to: šestogodišnjaci, dvanaestogodišnjaci, petnaestogodišnjaci, odrasli (od 35 do 44 godine) i stariji (od 65 do 74 godine). Svaka ispitna skupina sadržavala je 15 ispitanika muškog spola i 15 ispitanika ženskog spola. Ukupno je u jednom zemljopisnom području pregledano 150 ispitanika, a sveukupno 450.

which this trend has been attributed is the ubiquitous use of fluoridated toothpaste (4). This also increases oral health and leads towards improved maintenance of a larger number of intact and functioning masticatory units. The concept of oral health is very complex and, as such, encompasses a host of defining and determining parameters. According to the WHO definition dating from 1965, oral health is: "the condition of healthy and functioning teeth and their supportive tissues, including the health of all parts of the oral cavity which participate in chewing". It is clear that masticatory function isn't the only consideration in preserving oral health, since it is accompanied, in equal importance, by aesthetics and phonation (5). Dental caries affects all populations and age groups (6). It's impossible to view it as an isolated entity or disease involving a single organ – the tooth, it is rather a disease which manifests itself on the entire orofacial system, and finally, upon the organism as a whole. The epidemiology of tooth decay is intricate due to high incidence of caries and a large variety of precipitating factors.

This study demonstrates the results of research into caries incidence in Šibenik-Knin County throughout 2003. According to census taken on March 31st, 2001, the County has 112,891 inhabitants over a surface area of 2,994 km^2 (7).

The purpose of the study was to gain insight into caries incidence in the population of Šibenik-Knin County and to determine the following: the DMFT for each age group; DMFT for each geographical area; the total DMFT for all the subjects examined; the difference in DMFT between sexes; the difference in DMFT between all the different age groups; the difference in DMFT indices between all the different geographical areas; comparison. Comparison was done to establish whether there are statistically significant differences in the obtained, and which factors these differences could be attributed to.

Materials and Methods

Research was conducted in three different living environments (geographical areas) within Šibenik-Knin County: the city of Šibenik, Drniš highlands, and Murter island. The research covered 450 subjects from the following five different age groups: 6-year-olds, 12-year-olds, 15-years-olds, adults (35-44 years old), and elderly patients (65-74 years old). Each focus group consisted of 15 male and 15 female subjects. There were a total of 150 examined subjects per geographical region, and the sum total of subjects was 450. There were 150 subjects examined per geographical region, and the sum total of subjects was 450.

Stomatološki pregled obavila je jedna osoba standardnom stomatološkom metodom - zrcalom i sondom (8). Nalazi su se upisivali u prilagođene obrasce Svjetske zdravstvene organizacije (slika 1.) za utvrđivanje stanja oralnog zdravlja.

Rezultati su statistički obrađeni programskim paketom SPSS-a. Testiranja razlika srednjih vrijednosti obavljena su t-testom i analizom varijance, osim u slučajevima statistički znatno različitih varijanci, odnosno nenormalnih raspodjela podataka. U tim su se slučajevima koristili Mann-Whitneyev (dva neovisna uzorka statistika) i Kruskal-Wallisov (više neovisnih uzoraka statistika) neparametrijski test. Ispitivanje razlika proporcija obavljeno je Pearsonovim hi-kvadrat testom. U svim slučajevima u kojima su distribucije uspoređivanih varijabli bile različite od normalne raspodjele, umjesto asimptotskih testova statističke znatnosti razlika, koristili su se testovi Monte Carlo. Za usporedbu raspodjela varijabli koje nisu normalno ili slično raspodijeljene te varijabli statistički znatno različitih varijanci, u slučaju dvaju neovisnih uzoraka statistika (na primjer spol: muškarci/žene), rabio se Mann-Whitneyev U-test temeljen na razlici suma rangova pojedinih rezultata u objema skupinama.

A standard dental check-up was performed following standard dental methods, using a dental mirror and probe, and was performed by a single person (8). The results were entered into modified WHO dental health forms (figure 1).

The results were statistically processed using the SPSS program package. Average difference testing was done using t-testing and variance analysis, except in cases with statistically significantly different variances, that is, non-normal data distribution. In these cases non-parametric tests were employed: the Mann-Whitney test (two independent statistic samples) and the Kruskal-Wallis test (more independent data samples). Testing for proportion differences was performed with the Pearson chi square test. In all cases involving distribution of compared variables where the variables were different and differed from the normal distribution, Monte Carlo tests were used instead of asymptotic tests for statistical significance. The Mann-Whitney U test was used to compare variables without normal or similar distribution, as well as for variables with statistically significant different variances when there are two independent data samples (ex. sex: male/female). This test was based upon the difference between the sums of the ranks of certain results for

Slika 1. Modificirani obrazac SZO-a korišten za prikupljanje epidemioloških podataka
Figure1 Modified WHO form used for epidemiological data collection

Rezultati

KEP indeks za trajne zube

Istraživanjem je dobiven prosječan broj KEP-trajnih zuba od 9,53. KEP trajnih zuba kod muškaraca iznosio je 8,5 a kod žena 11,06, što je statistički znatna razlika (p=0,019). To se vidi u Tablici 1.

Vrijednosti KEP-indeksa za pojedine dobne skupine predstavljene su u Tablici 2.

Tablica 1. Vrijednosti KEP indeksa za trajne zube prema spolovima (trajni zubi)
Table 1 DMFT values for males and females (permanent teeth)

both groups.

Results

DMFT values for permanent teeth

The average DMFT index this research provided was 9.53 for permanent teeth. As shown in Table 1, the DMFT index for males was 8.50, and 11.06 for females, which creates a statistically significant difference (p=0,019).

Spol • Sex	Muškarci • Male	Žene • Female	P*
KEP • DMFT	8,50	11,06	0,019

* test Monte Carlo • Monte Carlo test

Tablica 2. Vrijednosti KEP indeksa za pojedine dobne skupine (trajni zubi)
Table 2 DMFT values for particular age groups (permanent teeth)

	Dobne skupine • Age groups	6-godišnjaci • Six-year-olds	12-godišnjaci • Twelve-year-olds	15-godišnjaci • Fifteen-year-olds	Odrasli • Adults	Stariji • The elderly	P*
KEP	Djeca	1,27	3,85	5,91			<0,001
	Odrasli i stariji				21,73	23,73	0,007

* test Monte Carlo • Monte Carlo test

Razlika u prosječnom KEP-indeksu trajnih zuba statistički je znatno različita u trima promatranim dječjim dobnim skupinama (p<0,001) te između dviju dobnih skupina odraslih (p=0,007). Vrijednosti KEP-indeksa za pojedina zemljopisna područja iznose: 8,06 za otočno, 9,97 za urbano i 9,27 za ruralno područje te između njih nije utvrđena statistički znatna razlika (p=0,622). Razdioba KEP-indeksa prema zemljopisnim područjima prikazana je u Tablici 3.

The DMFT indices for particular age groups are shown in Table 2.

The difference in the average DMFT values for permanent teeth is significantly different in three of the different children's age groups observed (p<0,001) and between adult age groups (p=0,007). The DMFT values for the various geographical areas were as follows: 8.06 on the island, 9.97 in the city and 9.27 in the rural area. No statistically significant differences were established between them

Tablica 3. Razdioba KEP indeksa prema zemljopisnim područjima (trajni zubi)
Table 3 DMFT distribution for geographical area (permanent teeth)

Zemljopisno područje • Geographical Area	Otočno • Island	Gradsko • City	Ruralno • Rural	P*
KEP • DMFT	8,06	9,97	9,27	0,622

* HI-kvadrat test • HI-square test

KEP indeks za mliječne zube

KEP indeks za mliječne zube (dobne skupine šestogodišnjaka i dvanaestogodišnjaka) iznosi 2,0. Za mliječne zube kod dječaka je 2,27, a kod djevojčica 0,45, što je prikazano u Tablici 4. Razlika između spolova u prosječnom broju KEP zuba nije statistički znatna (p=0,382).

(p=0,622). The DMFT distribution for geographical areas is shown in Table 3.

DMFT values for deciduous teeth

The DMFT index for deciduous teeth (six-year-old and twelve-year-old age groups) was 2.0. For boys the DMFT index was 2.27, whereas for girls

Tablica 4. KEP indeks prema spolu (mliječni zubi)
Table 4 DMFT values for males and females (deciduous teeth)

Spol • Sex	Dječaci • Male	Djevojčice • Female	P*
KEP • DMFT	2,27	0,45	0,382

* HI-kvadrat test • HI-square test

Tablica 5. Vrijednosti KEP indeksa za određene dobne skupine (mliječni zubi)
Table 5 DMFT values for particular age groups (deciduous teeth)

Dobne skupine • Age groups	6-godišnjaci • Six-year-olds	12-godišnjaci • Twelve-year-olds	P*
KEP • DMFT	5,52	0,64	<0,001

* test Monte Carlo • Monte Carlo test

U skupini šestogodišnjaka dobiven je KEP-indeks za mliječne zube od 5,52, a u skupini dvanaestogodišnjaka on iznosi 0,64 te između njih postoji statistički znatna razlika (p<0,001). Pogledaj Tablicu 5.

Vrijednosti KEP-indeksa za mliječne zube s obzirom na zemljopisno područje iznose 1,46 za otočno, 1,88 za urbano i 1,97 za ruralno zemljopisno područje i predstavljene su u Tablici 6. Na temelju istraživanja ne može se tvrditi da je različit prosječan broj KEP mliječnih zuba u otočnim, urbanim i ruralnim populacijama šestogodišnjaka i dvanaestogodišnjaka (p=0,582).

it was 0.45 as shown in Table 4. The difference between the sexes in the average number of DMFT teeth wasn't found to be statistically significant (p=0.382).

The DMFT index for deciduous teeth in the group of six-year-olds was 5.52, and the DMFT index for deciduous teeth in the group of twelve-year-olds was 0.64. There was a statistically significant difference between them (p<0.001) as shown in Table 5.

The DMFT values for deciduous teeth with regard to geographic area of origin were: 1.46 for island origin; 1.88 for urban origin; 1.97 for rural origin as shown in Table 6. This research shows that it isn't possible to establish a difference (p=0.582) in

Tablica 6. Vrijednosti KEP indeksa za različita zemljopisna područja (mliječni zubi)
Table 6 DMFT distribution for geographical area (deciduous teeth)

Zemljopisno područje • Geographical Area	Otočno • Island	Gradsko • City	Ruralno • Rural	P*
KEP • DMFT	1,46	1,88	1,97	0,582

* HI-kvadrat test • HI-square test

Rasprava

Na temelju prijašnjih istraživanja, KEP-indeks pokazao se kao vrlo dobar pokazatelj oralnog zdravlja, ali i socijalno-gospodarskoga razvoja (9). U nekim industrijaliziranim zemljama koje su uspješno smanjile prosječnu vrijednost KEP-indeksa u skladu s odredbama Svjetske zdravstvene organizacije i Međunarodne stomatološke udruge (10), možemo uočiti golemu razliku u pojedinim dijelovima iste zemlje, što je prikriveno uporabom prosječne nacionalne vrijednosti KEP-indeksa za određenu državu (11-14). Također se zna da ne postoji ista karijesna preventivna strategija za sve slojeve društva. Odnos između socijalno-gospodarskoga statusa i prosječne vrijednosti KEP-indeksa upućuje na malu svrhovitost kad je riječ o budućoj pripremi velikih ljestvica nacionalnih istraživanja, kako bi se dobile prosječne vrijednosti KEP-indeksa za cijelu zemlju i na osnovi toga izradio nacionalni plan za poboljšanje oralnog zdravlja. Zato je svakako potrebno vi-

the average DMFT index for deciduous teeth in the island, urban and rural populations of six-year-olds and twelve-year-olds.

Discussion

Based upon prior research, the DMFT index had proved to be a valuable indicator of oral health, and socio-economic development (9). In some industrialized countries, where the average DMFT indices have been reduced according to the aims of the World Health Organization and the International Dental Association (10), there are notable differences among various areas within the same country, which are hidden using national average DMFT indices for specific countries (11-14). Another fact arises, and this is the lack of equal caries prevention strategies for all social levels. The correlation between socio-economic status and average DMFT index values illustrates the lack of purpose in constructing future national-scale research in order to

še manjih istraživanja, kako bi se dobile vrijednosti za pripremu planova za poboljšanje oralnog zdravlja za manja područja određene zemlje (15). Ispitivani uzorak populacije u svakom tom malom istraživanju temeljio bi se na procijenjenoj prevalenciji karijesa i njegovoj homogenosti u ispitanoj populaciji. Spoznaje o različitom socijalno-gospodarskom stupnju društva u zemlji, vrlo su važne za opću predodžbu o zubnom karijesu u populaciji. Dokazano je da tranzicijske zemlje imaju najveće vrijednosti KEP-indeksa, a u takvom je preustroju i Hrvatska. Nezaposlenost, inflacija, niski obiteljski prihodi i privatizacija dentalne profesije, vode prema vlastitu organiziranju korištenja oralno-zdravstvenih usluga, a prve žrtve takvog stanja uglavnom su djeca (16). Prema podacima za Hrvatsku još iz godine 1968., kada je kod dvanaestogodišnjaka zabilježena vrijednost KEP-indeksa 7, ona iz godine u godinu postupno opada, a u porastu je broj djece bez karijesa (do 14,9 %) te pad KEP-indeksa na 3,5. To je dobiveno tijekom istraživanja godine 1999. (17). No, istraživanje poput ovoga provedenoga nakon rata na području Šibensko – kninske županije, pokazuje puno lošije stanje oralnog zdravlja negoli je danas. Srednja vrijednost KEP-indeksa na ispitivanom uzorku pacijenata za trajne zube iznosi 9,53, a za populaciju šestogodišnjaka i dvanaestogodišnjaka 2,0. To podupire ideju o potrebnim pojačanim i ciljanim preventivnim mjerama te sanacijskoj skrbi pojedinca u određenim dijelovima zemlje. Za usporedbu su u Tablici 7. navedene vrijednosti KEP-indeksa u susjednim zemljama i nekim europskim

determine an average DMFT index value for the entire country. This would be fruitless, especially if such a figure would become the founding element of a national plan for oral health improvement. DMFT indices are area specific, and their improvement should be approached in an area-specific manner. Therefore, there is a pronounced need for a number of smaller research projects to obtain values applicable in the oral health improvement of smaller areas within a particular country (15). The population sample researched in each of these small research projects would be based upon caries prevalence and its homogeneity within the population examined. Awareness of various socio-economic levels present within a certain country is also relevant to gaining accurate perception of the presence of tooth decay within a population. It has been proven that countries undergoing socio-economic transition have greater DMFT indices and Croatia is currently such a country. Children are most affected by unemployment, inflation, low family incomes, and changes in organized dental health care (16). The data for Croatia dates back to 1968 when the DMFT index for twelve-year olds was 7, which gradually decreased from year to year with an increase in caries-free children up to 14.9%. In 1999 the DMFT index was 3.5 (17). However, research like this one conducted in Šibenik-Knin County after the war in Croatia, demonstrates a much poorer oral health condition than today. The average DMFT index for permanent teeth was 9.53, whereas for the six-year-olds and twelve-year-olds it was 2.0. This supports the idea that form-

Tablica 7. Prosječne vrijednosti KEP indeksa u susjednim zemljama i europskim tranzicijskim državama
Table 7 Average DMFT index values for Croatia's neighbouring countries and European transition countries

Zemlja • County	KEP indeks • DMFT index	Godina • Year
Albanija • Albania	2,8	1990.
	2,2	1994.
	2,9	1996.
Bosna i Hercegovina • Bosnia and Herzegovina	8,6	1998.
	6,1	2001.
Hrvatska • Croatia	**2,6**	**1991.**
	3,5	**1999.**
Mađarska • Hungary	4,3	1991.
	3,8	1996.
Italija • Italy	2,9	1991.
	2,1	1996.
Poljska • Poland	5,1	1992.
	4,0	1998.
	3,8	2000.
Slovenija • Slovenia	2,6	1993.
	1,8	1998.
Ukrajina • Ukraine	3,7	1984.
	4,4	1992.

tranzicijskim državama (18). U novijem istraživanju u Litvi, na populaciji dvanaestogodišnjaka, dobiveni su rezultati KEP-indeksa od 2,0 u područjima s visokom (1,7 – 2,2 ppm) razinom fluorida u vodi za piće, te od 3,5 u krajevima s niskom razinom fluorida (0,2 ppm) u vodi za piće (19).

Podatak koji se ističe u Tablici 7. jest pad vrijednosti KEP-indeksa kod populacije dvanaestogodišnjaka u susjednoj Sloveniji. Rezultati tamošnjeg istraživanja pokazali su da se udjel djece i adolescenata bez karijesa znatno povećao tijekom 12 godina, koliko je proteklo između dvaju istraživanja, i to kod populacije dvanaestogodišnjaka sa 6 % na 40 %. U istom su razdoblju prosječne vrijednosti KEP-indeksa smanjene s 5,1 na 1,8 kod dvanaestogodišnjaka, s 10,2 na 4,3 kod petnaestogodišnjaka, s 12,9 na 7,0 kod osamnaestogodišnjaka, s 20,5 na 14,7 kod 35-godišnjaka i s 27,0 na 22,5 kod starijih od 65 godina. Što se tiče populacije šestogodišnjaka i dvanaestogodišnjaka, razlika u ukupnom KEP-indeksu statistički je znatna među spolovima (p=0,021). Među dječacima ima više onih s barem jednim KEP mliječnim zubom. Uočena pojava nije do kraja u skladu s istraživanjima u nekim europskim zemljama koja su pokazala da ne postoji veća razlika u incidenciji karijesa s obzirom na spol djece (20). No, novija istraživanja zubnog karijesa u Republici Hrvatskoj na populaciji zdrave djece te djece s poteškoćama u razvoju, pokazala su da je prosječna vrijednost KEP-indeksa kod djece s poteškoćama u razvoju bila 1,41 za mješovitu i 6,39 za trajnu denticiju. U tom su istraživanju vrijednosti KEP-indeksa kod zdrave djece bile 1,23 za mješovitu i 4,76 za trajnu denticiju (21). Dokazano je da je učinkovite programe očuvanja oralnog zdravlja potrebno provesti čak i prije prvog odlaska djeteta stomatologu, kod djece izložene visokom riziku za nastanak karijesa (22).

Zaključci

Ukupan KEP-indeks dobiven u istraživanju za trajne zube iznosi 9,53, sa statistički znatnom razlikom među spolovima (p=0,019). Razlika u ukupnom KEP-indeksu između triju promatranih zemljopisnih područja statistički nije znatna (p=0,622). KEP-indeks mliječnih zuba u populaciji šestogodišnjaka i dvanaestogodišnjaka iznosi 2,0, s tim da nije utvrđena statistički veća razlika među spolovima (p=0,382). Razlika u ukupnom KEP-indeksu še-

ing reinforced and focused preventive measures and individual care is necessary in certain areas within the country. For comparison, the DMFT indices shown in Table 7 are from neighbouring countries and from some European transition countries (18). Recent studies in Lithuanian twelve-year-olds reveal a DMFT index of 2.0 in areas with high fluoride content in drinking water (1.7-2.2 ppm), whereas a value of 3.5 was reported in areas with low fluoride (0.2 ppm) content in drinking water (19).

The data from Table 7 demonstrate a decrease in DMFT index values for twelve-year-olds in Slovenia, adjacent to the Republic of Croatia. Results from their studies have shown that the number of children and adolescents without caries has increased significantly over the past 12 years, which amounts to the time lapsed between the two studies. For the population of twelve-year-olds there was an increase in caries-free status from 6% to 40%. Over the same time period, the average DMFT index values have decreased from 5.1 to 1.8 for twelve-year-olds, from 10.2 to 4.3 for five-year-olds, from 12.9 to 7.0 for eighteen-year-olds, from 20.5 to 14.7 for thirty-five-year-olds, and from 27.0 to 22.5 for those older than sixty-five. Regarding the six-year-old and twelve-year-old population, the difference between the sexes in the total DMFT index is statistically significant (p=0.021). There are more boys with at least one DMFT tooth than there are girls. The incidence noticed isn't completely congruent with studies performed previously in some European countries in which no significant difference was found between the sexes in the children's population (20). However, in the Republic of Croatia recent research into dental caries performed on a population of healthy children and a population of handicapped children has shown that the average DMFT index in handicapped children was 1.41 for the mixed dentition and 6.39 for the permanent dentition. The DMFT indices for healthy children in this study were 1.23 for the mixed dentition and 4.76 for the permanent dentition (21). It has been proven that children with a high risk to caries exposure need effective programs to maintain oral health even before their first contact with a dentist (22).

Conclusions

The total DMFT index obtained through this research was 9.53 for permanent teeth, with a statistically significant difference between the sexes (p=0.019).

The difference in the total DMFT index between

stogodišnjaka i dvanaestogodišnjaka između triju promatranih zemljopisnih područja statistički nije znatna (p=0,582).

the three geographic areas observed failed to display a significant difference (p=0.622). The DMFT index for deciduous teeth was 2.0 in the six-year-old and twelve-year-old populations, without a statistically significant difference between the sexes (p=0.382).

Abstract

Tooth decay is one of the most widespread diseases in the world today. It affects all populations and age groups. It's a disease that is very difficult to eradicate due to a complex interaction of social, cultural and biological factors, as well as nutritional habits, all of which influence the incidence of tooth decay. The purpose of this research was to determine the incidence of caries in Central Dalmatia, and from a variety of living environments: urban (the city of Šibenik), rural (Drniš highlands), and island (Murter Island); this was done for five different age groups. **Material and Methods:** The research covered 450 subjects from the following five different age groups: 6-year-olds, 12-years-olds, 15-year-olds, adults (35-44 years old), and elderly patients (65-74 years old). Each focus group consisted of 15 male and 15 female subjects. Altogether there were 150 examined subjects per geographical region, and the sum total of subjects was 450. The data compiled through clinical examination was entered into modified WHO forms. **Results:** The total DMFT index attained with this research was 9.53 for permanent teeth, with statistically significant difference between sexes. The average DMFT for deciduous teeth among six-year-olds and twelve-year-olds was 2.0, without a statistically significant difference between genders.

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