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# Nerealni optimizam i demografski utjecaji na oralnohigijenske navike i percepciju adolescenata u Hrvatskoj

## *Unrealistic Optimism and Demographic Influence on Oral Health-Related Behaviour and Perception in Adolescents in Croatia*

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### Sažetak

Znanje i motivacija smatraju se osnovnim odrednicama zdravstveno-higijenskih navika. U ovom radu željeli smo proučiti utjecaj demografskih karakteristika, percepcije, motivacije i educiranosti adolescenata na oralno zdravlje i njihove oralnohigijenske navike. Ispitivanje je provedeno anonimno, anketnim upitnikom godine 2006. na uzorku od 302 srednjoškolca u dobi od 17 do 19 godina, u tri grada u različitim regijama korištene su neparametrijske statističke metode za analizu podataka. Percepcija adolescenata o oralnom zdravlju na visokoj je razini, za razliku od niske percepcije oralnih bolesti. Iako različiti demografski, socijalni i spolni čimbenici utječu na oralnohigijenske navike, na njih manje utječe znanje adolescenata. Pa čak i oni s većim znanjem o oralnim bolestima i prevenciji, nisu češće primjenjivali osnovne higijenske navike, niti su se češće koristili pomoćnim sredstvima, mijenjali četkicu, posjećivali stomatologa ili izbjegavali šećer. Očito je da adolescenti ne izvlače smisao iz informacija o riziku za vlastito zdravlje, niti mogu jednostavno prepoznati vezu vlastita ponašanja i rizika kojem se izlažu. To je povezano s nerealnim optimizmom i tendencijom da se negativni događaji uočavaju rjeđe, a pozitivni češće na sebi nego na drugima.

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### Ključne riječi

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### Uvod

Na oralno zdravlje utječu načini života, navike i rizična ponašanja - način prehrane, konzumacija alkohola i duhana - oralna higijena i uporaba fluorida, parafunkcije te korištenje usluga stomatologa. No, i samo oralno zdravlje ima niz psihosocijalnih utjecaja na kvalitetu života (1). Najčešće oralne bolesti - karijes i parodontne bolesti - smatraju se bolestima ponašanja, jer ih možemo nadzirati prihvatimo li pravilne oralne navike (2). Ispravne oralnohigijenske navi-

### Introduction

Oral health is affected by one's lifestyle, habits and risk behaviour such as diet, consumption of tobacco and alcohol, oral hygiene, fluoride usage, parafunctional behaviour and regular dental checkups. It has a range of different psychosocial effects on quality of life (1). Since decay and periodontal disease are highly behaviour-related, adoption of oral hygiene methods are of great importance for the control (2). Proper oral hygiene habits consist of continuous

ke sastoje se od stalne provedbe dvaju široko definiranih oblika ponašanja - samozaštite (oralna higijena, manji unos rafiniranih ugljikohidrata, korištenje fluorida) i korištenja stomatoloških usluga (izobrazba o oralnom zdravlju, redoviti kontrolni stomatološki pregledi i profesionalno primijenjene preventivne mjere) (3). Na oralno zdravlje utječe mnogo socijalnih odrednica - socijalni status, izobrazba, zaposlenost i uvjeti rada, fizičko okruženje, osobne higijenske i zdravstvene navike, zdrav razvoj djeteta te zdravstvene službe (4). Oralnohigijenske navike prihvaćene tijekom djetinjstva iznimno su važan čimbenik za održavanje i stanje zuba u daljnjem životu. Njihovo unaprjeđivanje rezultiralo je time da starija populacija ima sve više zuba. Čini se da na bolje oralno zdravlje redovitih stomatoloških pacijenata više utječe razina primijenjene profesionalne zaštite, negoli stupanj pacijentova znanja (6).

Svrha istraživanja bila je procijeniti utjecaj percepcije, oralnozdravstvena educiranost i motiviranost adolescenata na njihove oralnohigijenske navike. Zatim, željeli smo shvatiti povezanost između sociološko-demografskih čimbenika, poput imovinskog stanja obitelji i naobrazbe roditelja.

### Ispitanici i postupci

U istraživanje su bila uključena 302 učenika četvrtih razreda iz slučajno odabranih srednjih škola u Zagrebu (101 ispitanik), Kutini (101 ispitanik) i Rovinju (100 ispitanika) obaju spolova (159 mladića i 143 djevojke) u dobi između 17 i 19 godina (prosječna dob  $17,7 \pm 0,5$ ). Školovali su se za različita zanimanja u gimnazijama te u tehničkim, industrijskim i obrtničkim školama. Za istraživanje morali su popuniti anketni upitnik sa 40 pitanja o socijalno-ekonomskom statusu, procjeni motivacije i znanju o oralnom zdravlju te oralnohigijenskim navikama. Upitnik je bio oblikovan prema modelima različitih autora (7-9), a ispunjavali su ga sami učenici, bez sugestije ispitivača. Kako je većina ispitivanih varijabli imala diskretne vrijednosti, za statističku analizu koristili su se testovi neparametrijske statistike - Kruskal-Wallisov, Mann-Whitneyev, Hi-kvadrat, Fisherov i Spearmanova korelacija, uz software SPSS 10,0. Istraživanje je odobrilo Etičko povjerenstvo Stomatološkog fakulteta Sveučilišta u Zagrebu.

implementation of two widely defined behavioural types: self-protection (oral hygiene, fluoride usage and reduced intake of refined carbohydrates) and seeing a dentist on regular basis (oral health education, regular check-ups and professional prophylaxis) (3). Different social factors like social status, education, employment status and work conditions, physical environment, personal hygiene and health habits, children's healthy development and health services also affect oral health (4). Oral hygiene habits learnt during childhood are of great importance for one's oral health in later life (5). Improvements in oral hygiene have resulted in the elderly population having more and more teeth of their own. It seems that the improved oral health of regular dental patients is more affected by the level of professional care than the patient's knowledge about oral health (6).

The aim of this study was to evaluate the influence of perception, knowledge and motivation regarding oral health of adolescents on their habits in oral hygiene. Furthermore, we wanted to define the association with socio-demographic factors such as family financial status and parents' education.

### Material and Methods

A total of 302 senior secondary school students of both genders (159 boys and 143 girls) aged 17-19 years (mean age  $17,7 \pm 0,5$ ) in three cities from different Croatian regions were randomly chosen to participate in the study (Zagreb, central Croatia - 101 subjects; Kutina, continental Croatia - 101; and Rovinj, littoral Croatia - 100 subjects). The participants in each city attended schools for different educational profiles - gymnasium, technical school and schools for industry and crafts. This survey was conducted on a questionnaire basis, consisted of forty questions about socioeconomic status, knowledge about oral diseases, motivation for oral health and oral hygiene habits. The questionnaire was made upon different models (7-9). Students completed questionnaire on their own, without the interviewer's assistance. The majority of the variables in questionnaire had discrete values, so the parameter-free statistical methods of Kruskal-Wallis, Mann-Whitney, Chi-square, Fisher's Exact Test and Spearman correlation were used in the statistical analysis. To compare mean values t-test was used. Statistics was performed by using a commercial statistical program SPSS Version 10.0 (SPSS Inc. Chicago, IL, USA), and the significance level established for all analyses was 95%.

## Rezultati

Tablica 1. prikazuje oralnohigijenske navike mladih ljudi u Hrvatskoj. Gotovo 70 posto njih četka zube barem dva puta na dan, a 30 posto se, osim četkice, koristi i pomoćnim oralnohigijenskim sredstvima. No, iako 80 posto uopće ne rabi zubnu svilu, kod 92 posto djevojaka i mladića rijetko se ili nikad ne pojavljuje gingivno krvarenje. S dužim korištenjem iste četkice javlja se i češće gingivno krvarenje, pa tako kod 42,9 posto mladih koji četkicu mijenjaju svaka tri mjeseca i 14,3 posto onih koji se njome koriste duže od 6 mjeseci, nikada ne krvari gingiva ( $p=0,017$ ). Korelacija je dokazana i između češće zamjene četkice i češćeg korištenja pomoćnih sredstava te što češćeg četkanja zuba. Ispitanici (82 posto) koji četkicu mijenjaju svaka tri mjeseca, četkaju zube dva puta na dan, a tom istom učestotom četka 33,3 posto mladih ljudi koji četkicu mijenjaju svakih šest mjeseci ( $p<0,001$ ). Pomoćnim sredstvima koristi se 41,2 posto djevojaka i mladića koji četkicu mijenjaju svaka tri mjeseca, te tek 9,5 posto onih koji ju mijenjaju svakih šest mjeseci ( $p<0,001$ ). Osim toga osobe koje se koriste pomoćnim sredstvima češće posjećuju stomatologa radi kontrole (80% mladih koji se koriste pomoćnim sredstvima i 53% onih koji se ne koriste;  $p<0,001$ ), te češće peru zube (Slika 1.). Na Slici 2. prikazan je odnos između kontrolnih stomatoloških pregleda i korištenja zubne svile. Gotovo 66 posto mladeži je u proteklih godinu dana posjetilo stomatologa i to 60 posto radi kontrole - gotovo ih 60 posto na kontrolne stomatološke preglede odlazi jedanput na godinu ili češće. Kako raste broj odlazaka stomatologu tako se znatno smanjuje udio onih koji ga češće posjećuju zbog zubobolje (Slika 3.) te osoba koje bi u slučaju zubobolje radije izvadile zub negoli ga liječile. Prema tome mladi koji stomatologa češće posjećuju zbog zubobolje nego kontrole, češće traže vađenje zuba, rjeđe ih peru i rjeđe se koriste pomoćnim oralnohigijenskim sredstvima. Sve češćim pranjem zuba povećava se i udjel osoba koje misle da ih znaju pravilno prati (Slika 4.) te udjel onih kojima je netko pokazao kako se peru zubi, a oni i češće mijenjaju četkice te se koriste pomoćnim oralnohigijenskim pomagalima (Slika 1.). Oralnozdravstvena educiranost je manjkava, posebice u području parodontologije, jer manje od polovice ispitanika zna da je gingivno krvarenje znak bolesti, te 70 posto kod gingivnog krvarenja pere zube nježnije, 63 posto misli kako je normalna fiziološka pojava da se zubi kod starijih rasklimaju i ispadnu, a 70 posto ne zna što je plak (naslaga). Samo 18 posto zna

## Results

Oral health-related behaviour of Croatian adolescents is shown in Table 1. Almost 70% brush their teeth at least twice a day and 30% use additional oral hygiene products. Even though 80% doesn't use dental floss, 92% of youth reported having gingivitis-related bleeding very rarely or never. The longer the same toothbrush is used, the greater occurrence of gingivitis-related bleeding is - 42.9% of youth who replace their toothbrush every three months and 14.3% who replace it every six months have never experienced gingivitis-related bleeding (Kruskal-Wallis  $H=8.147$ ,  $df=2$ ,  $p=0.017$ ). There is also an association between changing the toothbrush, using additional products and brushing teeth more often. Of those interviewed who brush their teeth twice a day, 82% change their toothbrush every three months and 33.3% every six months (Kruskal-Wallis  $H=30.477$ ,  $df=2$ ,  $p<0,001$ ). Of those who use additional products 41.2% change their toothbrush every three months and 9.5% every six months (Mann-Whitney  $U=6901.0$ ,  $p<0.001$ ). People who use additional products go to the dentist more often for checkups instead only when having toothache (80% of students who are using additional products and 53% who aren't; Fisher  $p<0.001$ ), and also they brush their teeth more often (Figure 1). Figure 2 shows the association between dental checkups and dental floss usage. Almost 66% of students visited the dentist last year, majority for check-up, while 60% usually go for dental checkups at least once a year. The higher the frequency of dental visits, the lower the percentage of persons who visit due to toothache (Figure 3), as well as of those who would rather have their tooth removed than repaired when they have a toothache. In accordance with this, those juveniles who visit the dentist more often because of toothaches than for checkups, request more often tooth removal, brush their teeth less often, and use additional oral hygiene products less often. With an increase in the frequency of tooth brushing, the proportion of people who believe they know how to brush their teeth properly increases (Figure 4), as does the proportion of people who were shown how to brush their teeth, the frequency of toothbrush replacement and the use of additional oral hygiene products (Figure 1). Education is low, especially where periodontology is concerned, because less than half of them know that gingivitis-related bleeding is a sign of an illness (70% brush their teeth more gently while having gingivitis-related bleeding), 63% believe that the fact that the

da i gazirana pića uzrokuju karijes, a 12 posto da se zubi mogu učinkovito očerkati i bez paste. Ipak, 83 posto zna da šećer potiče karijes, 77 posto da ga fluoridi sprječavaju, a 70 posto zna što je kamenac. Odnos između učestalosti četkanja zuba i znanja o oralnom zdravlju prikazan je u Tablici 1. Čak 31 posto mladih ljudi ističe kako im nikada nitko nije pokazao kako prati zube, a najčešći oralnohigijenski edukatori nisu bili stomatolozi (27%) nego roditelji (31%). Oni koji su više znali o oralnoj higijeni, nisu je i češće prakticirali, niti su se koristili pomoćnim sredstvima, ili na vrijeme mijenjali četkice, posjećivali stomatologa ili izbjegavali šećer.

Demografske karakteristike prikazuje Tablica 3. Djevojke češće peru zube (82% žena i tek 57% muškaraca, više ili dva puta na dan;  $p=0,001$ ), češće mijenjaju četkicu i koriste se pomoćnim oralnohigijenskim sredstvima (37% žena i 23% muškaraca;  $p=0,04$ ). No, češće jedu i slastice između obroka, a muškarci češće piju alkohol. Ipak, nema razlike između spolova u odnosu prema znanju o uzrocima karijesa i parodontnih bolesti. Nije dokazana korelacija oralnohigijenske educiranosti, motiviranosti i navika s poslom roditelja i stambenog objekta u kojem se živi. Ipak, porastom stručne spreme roditelja rastao je i postotak njihove djece koja su se koristila pomoćnim oralnohigijenskim sredstvima, posebice zubnom svilom - od 13 posto kod majki s osnovnom školom do 36 posto s fakultetom ( $p=0,03$ ) i od 11 do 45 posto kod očeva ( $p=0,001$ ). Također, djevojke i mladići čiji očevi imaju nižu spremu, češće misle kako je fiziološka pojava da se zubi rasklimaju i ispadnu (94,4%), negoli oni čiji očevi imaju završen fakultet (63%;  $p=0,014$ ). Mladež iz dobrostojećih obitelji nije i bolje obaviještena o oralnom zdravlju, ali više drži do oralnog zdravlja, sigurnija je u svoju oralnohigijensku osviještenost i češće obavlja oralnu higijenu i odlazi stomatologu. To je jasno iz pokazatelja broja automobila i procjene financijskoga stanja vlastite obitelji. Mladi ljudi iz dobrostojećih obitelji češće posjećuju stomatologa, posebice radi kontrole (40% dva puta na godinu u odnosu prema 18% slabostojjećih;  $p=0,022$ ). Također češće peru zube, mijenjaju četkicu i koriste se pomoćnim oralnohigijenskim sredstvima (39% dobrostojećih u odnosu prema 15% slabostojjećih;  $p=0,002$ ). Znanje o uzrocima karijesa i parodontnih bolesti te o njihovoj prevenciji nije znatnije povezano s financijskim stanjem obitelji.

teeth of elderly people become loose and fall out is a normal physiological occurrence, while 70% don't know what plaque is (Table 2). Only 18% is aware that soft drinks can cause cavities and 12% that teeth can be properly brushed even without toothpaste. Nevertheless, 83% know that sugar is to blame for cavities, 77% knows that fluoride prevents cavities and 70% what calculus is. The association between tooth brushing and oral health knowledge is shown in Table 1. 31% of young people were never shown how to brush their teeth, and most often their education on oral hygiene came from their parents (31%) and not their dental professional (27%). Those who were better educated about oral hygiene didn't practice it significantly more often, nor used additional products and changed their toothbrush more often, visited dentist or avoided sugar.

Demographic variables are shown in Table 3. Girls brush their teeth more often (82% of girls and only 57% of boys do it at least twice a day; Mann-Whitney  $U=8399.5$ ,  $p=0.001$ ). Girls also change their toothbrush more often (less than 3 months 43% of girls and 37% of boys; Mann-Whitney  $U=9859.0$ ,  $p=0.029$ ) and use additional oral-hygiene products (37% of females, 23% of males; Fisher  $p=0.004$ ). On the other hand, they eat sweets between meals more often while men consume alcohol more often. However, there was no difference between the sexes when it came to knowledge about what causes cavities and periodontal diseases. There is no association between the education on oral hygiene, motivation and habits and parents' state of employment and the type of housing the student lived in. However, with an increase in parents' level of education, the percentage of children who used additional oral hygiene products jumped from 13% of those whose mothers have an elementary school education to 36% of those whose mothers have a university degree (Kruskal-Wallis  $H=6.977$ ,  $df=2$ ,  $p=0.031$ ) and from 11% to 45% for fathers' education (Kruskal-Wallis  $H=13.098$ ,  $df=2$ ,  $p=0.001$ ), especially for dental floss. Those young people whose fathers had a lower level of education more often believe that the fact that teeth become loose and fall out is a physiological phenomenon (94.4%), than those whose fathers finished university (63%; Kruskal-Wallis  $H=8.522$ ,  $df=2$ ,  $p=0.014$ ). Teenagers from financially well-off families aren't better educated about oral health, but are more aware and take greater care about their oral health, and use dental services more often. This is evident from factors such as the number of cars and assessment of their family's financial situation.

Young people from well-off families are more likely to visit the dentist, especially for checkups (40% twice a year as opposed to those less well-off 18%; Kruskal-Wallis  $H=7.614$ ,  $df=2$ ,  $p=0,022$ ). They also brush their teeth, change their toothbrush and use supplementary products for oral hygiene more often (39% as opposed to those less well-off 15%; Chi-square=12.059,  $df=2$ ,  $p=0.002$ ). Knowledge about what causes cavities and periodontal diseases and their prevention is not significantly connected to their family's financial status.

## Rasprava

Oralnohigijenska izobrazba smatra se osnovnim uvjetom za zdravstvenohigijenske navike, no čini se da je veza između znanja i ponašanja vrlo loša (10, 11). Iako na oralno zdravlje utječu različiti demografski i socijalni čimbenici, čini se da na njegovo poboljšanje više utječe stupanj profesionalne skrbi, negoli pacijentovo znanje (6). Ipak, ljudi koji su prihvatili to znanje, te su motivirani i imaju osjećaj da nadziru svoje zdravlje, vjerojatnije će usvojiti i preventivne mjere osobne higijene (10).

Mladi ljudi kojima je netko pokazao kako se peru zubi, samo su mislili da ih znaju ispravno njegovati (86,5%) za razliku od onih kojima to nitko nije pokazao (70,2%;  $p=0,001$ ), no oni educirani o oralnoj higijeni nisu je češće i obavljali, koristili se pomoćnim sredstvima, mijenjali četkicu, češće posjećivali stomatologa ili izbjegavali šećer. Mladež se u prvom redu koristi vlastitim iskustvom kada procjenjuje vjerojatnost rizika u slučaju zdravlja, no ne može lako prepoznati povezanost između svojega ponašanja i rizika kojem se izlaže (11). Možemo zaključiti da je percepcija oralnog zdravlja kod hrvatskih djevojaka i mladića na visokoj razini, jer ih 98 posto misli da zube treba prati i gotovo 82 posto je uvjeren da ih zna ispravno četkati, a pravilni položaj zuba za izgled lica važnim ocjenjuje 77 posto njih. I motiviranost da se zadrži vlastite zube na visokoj je razini - 87 posto mladih ljudi u slučaju zubobolje radije bi liječilo negoli izvadilo zub. No, percepcija oralnih bolesti na niskoj je razini, jer iako 66 posto mladih posjeti stomatologa barem jedanput na godinu, vrlo čest razlog dolaska je zubobolja - 40 posto, a tek 39,4 posto koristi se istom zubnom četkicom kraće od tri mjeseca i 30 posto pomoćnim sredstvima.

Prema mišljenju Špalja i suradnika, oralnohigijenska educiranost, navike i motivacija mladih ljudi u Hrvatskoj pozitivno korelira s kliničkim statusom njihova oralnog zdravlja, no veza je bila slaba (12).

## Discussion

Oral health knowledge is considered to be an essential prerequisite for health-related behaviour, but only a weak association seems to exist between knowledge and behaviour (10, 11). Although different demographic and social factors affect oral health it seems that the improved oral health is most affected by the level of professional care than the patient's knowledge about oral health (6). Still people who have assimilated this knowledge are motivated and feel a sense of personal control over their oral health, they are more likely to adopt self-care practices (10).

As it can be seen from our investigation, 86,5% of young people who were shown how to brush their teeth were only convinced that they knew the proper way to do it, while only 70,2% of those who weren't shown had the same opinion ( $p=0,001$ ). But results of our study show that those who were better educated about oral hygiene didn't practice it significantly more often, nor used additional products and changed their toothbrush more often, visited dentist or avoided sugar. It seems that young people, in the first place, use their own experience when evaluating health risks, but they can't easily recognise the link between their own behaviour and the risk (11). The oral health perception of Croatian youth is on high level because 98% are of the opinion that teeth should be brushed and almost 82% are convinced that they know the proper way to do it, 77% of young people believe that proper tooth positioning is important for good facial appearance. They are highly motivated to keep their own teeth as well and 87% would rather repair the teeth when having a toothache than have them taken out. But, at the same time, their perception of oral diseases is very low. Even though 66% visit the dentist at least once a year, in 40% of cases the reason is toothache, only 39,4% use the same toothbrush for less than three months and only 30% actually use additional products.

Populacija mladih ljudi u dobi od 18 do 28 godina također je imala visoku percepciju oralnog zdravlja, a nisku oralne bolesti. Oni su nešto rjeđe četkali zube, posjećivali stomatologa i koristili se pomoćnim oralnohigijenskim sredstvima. Slični su podaci o oralnohigijenskim navikama u Poljskoj, Izraelu i Kuvajtu, a bolji u industrijaliziranim europskim državama, poput Švicarske, Italije, Austrije, Njemačke i skandinavskih zemalja (13, 14, 7). No, sudeći prema oralnohigijenskoj educiranosti, hrvatski su adolescenti sličniji onima u razvijenim zemljama, a lošije je znanje zabilježeno u istočnim zemljama poput Kine, Saudijske Arabije, Kenije, Kariba, pa čak i Japana (15-19). Češće održavanje oralne higijene znatno je pozitivno korelirano s brojem posjeta stomatologu, što je identično istraživanju u Kuvajtu (2). Naše ispitivanje potvrdilo je tvrdnje da su oralnohigijenske navike i stajališta povezani sa spolom (20). Čini se da djevojke više zanimaju oralno zdravlje i higijena. Obiteljske karakteristike važne su za adolescentsko shvaćanje vlastita oralnog zdravlja, a status njihovih roditelja na poslu nije. No, nije bilo razlika između spolova i financijskog položaja, kada se radilo o znanju o uzrocima karijesa i parodontnih bolesti. Djevojke ocjenjuju svoje zdravlje boljim ocjenama nego mladići, no nisko im je spoznavanje rizika od budućih problema (21). Razlike u korištenju stomatoloških usluga povezane su s procijenjenom koristi od kontrolnih pregleda, no ne i s rizikom od pojave problema u budućnosti. Mladi u Švicarskoj imali su iscrpno osnovno znanje o zubima i gotovo svi su redovito četkali zube, što se ne bi moglo reći i za korištenje zubne svile (22). Roditelji i stomatolozi imali su glavnu ulogu u prijenosu teoretskog znanja i praktičnih oralnohigijenskih demonstracija, no ne i učitelji. Sličan nalaz bio je i u našem istraživanju.

## Zaključak

Rezultati upućuju na to da su mladi ljudi u Hrvatskoj, pri kraju srednjoškolskog obrazovanja, nedovoljno educirani o prevenciji parodontnih bolesti i karijesa. Iako je njihova percepcija oralnog zdravlja na visokoj razini, suprotno je s percepcijom oralnih bolesti, jer čak i oralnohigijenski educiraniji uglavnom ne provode preventivne mjere. Čini se da djevojke i mladići ne prepoznaju vezu između vlastita ponašanja i rizika koje ono donosi. Zbog toga je shvaćanje rizika od nastanka bolesti kod sebe, a

According to Spalj et al., knowledge, habits and motivation in oral hygiene of Croatian young men positively correlate with clinical status of their oral health (12). 18-28 year-olds also had high level of perception of oral health but low level of perception of oral diseases. They brushed their teeth, visited dentist and used additional products for oral hygiene rarely. Similar data on oral hygiene habits was found in Poland, Israel and Kuwait, but better in Switzerland, Italy, Austria, Germany and in Scandinavia (13, 14, 7). Regarding the knowledge on oral hygiene and oral health, similar data was found in developed countries, but not in China, Saudi Arabia, Kenya, Caribbean islands and even Japan (15 - 19). The frequency of oral hygiene is significantly positively correlated to the frequency of dental visits, which is identical to a study from Kuwait (2). Our study confirmed previous findings that oral hygiene-related attitudes and behaviours in adolescents are gender-related (20). It seems that girls show more interest in oral health and hygiene. Family characteristics were important for adolescents' self-perceived oral health while parental employment status was not. There are no differences between the sexes and financial status regarding the knowledge on what causes cavities and periodontal disease. Female adolescents rated their own dental health more positively than males but the perceived risk of future problems was low (21). Differences in dental services usage were related to the perceived benefits of dental check-ups but not to the risk of future problems. Young adults in Switzerland had a comprehensive basic dental knowledge and almost everyone used a toothbrush regularly, but flossing fell short in the majority of the cases (22). Parents and dentists played a central role in the mediation of theoretical knowledge and practical instruction of oral hygiene procedures, but regular teaching staff, however, fell clearly behind. This finding was similar in our investigation.

## Conclusion

The results show that young people in Croatia at the end of their secondary education are not educated enough when periodontal diseases and cavities are concerned. Although their perception of oral health is at a relatively high level, their perception of oral disease is not, even those who are more aware about oral hygiene often do not practice preventive measures more frequently. It seems that young adolescents do not recognise the relationship between their own actions and the risks. That is the

**Tablica 1.** Povezanost između učestalosti četkanja zubi i oralnihigijenskih navika  
**Table 1** Association between the brushing frequency and oral health related behaviour

Variable • Variables		Dnevna učestalost četkanja • Daily brushing frequency			Σ (n=302)	P *
		<jedanput • < once (n=17)	jedanput • once (n=77)	≥ dvaput • ≥ twice (n=208)		
Trebali četkati zube? • Is brushing necessary*	Ne • No	5 (29,4%)	1 (1,3%)	1 (0,5%)	7 (2,3%)	0,001
	Da • Yes	12 (70,6%)	76 (98,7%)	207 (99,5%)	295 (97,7%)	
Znam pravilno četkati • Know how to brush properly*	Ne • No	8 (47,1%)	15 (19,5%)	33 (15,9%)	56 (18,5%)	0,006
	Da • Yes	9 (52,9%)	62 (80,5%)	175 (84,1%)	246 (81,5%)	
Netko demonstrirao četkanje • Somebody demonstrated brushing*	Ne • No	8 (47,1%)	30 (39,0%)	56 (26,9%)	94 (31,1%)	0,052
	Da • Yes	9 (52,9%)	47 (61,0%)	152 (73,1%)	208 (68,9%)	
Instruktor oralne higijene • OH instructor*†	Nitko • No one	3 (17,6%)	14 (18,2%)	23 (11,1%)	40 (13,2%)	0,23
	Roditelji • Parents	7 (41,2%)	37 (48,1%)	118 (56,7%)	162 (53,6%)	
	Stomatolozi • Dentists	5 (29,4%)	38 (49,4%)	105 (50,5%)	148 (49,0%)	
	Učitelji • Teachers	4 (23,5%)	10 (13,0%)	31 (14,9%)	45 (14,9%)	
Stomatolozi demonstrirali četkanje u školama • Dentists demonstrated brushing in schools*	Nikad • Never	13 (76,5%)	41 (53,2%)	122 (58,7%)	176 (58,3%)	0,07
	Jednom • Once	2 (11,8%)	20 (26,0%)	65 (31,3%)	87 (28,8%)	
	≥ dvaput • ≥ Twice	2 (11,8%)	16 (20,8%)	21 (10,1%)	39 (12,9%)	
Zamjena četkice • Brush replacement	<3 mjeseca • <3 months	3 (17,6%)	18 (23,4%)	98 (47,1%)	119 (39,4%)	0,001
	3-6 mjeseci • 3-6 months	6 (35,3%)	39 (50,6%)	96 (46,2%)	141 (46,7%)	
	>6 mjeseci • >6 months	8 (47,1%)	20 (26,0%)	14 (6,7%)	42 (13,9%)	
Koriste dodatna sredstva • Use additional OH products*	Ne • No	14 (82,4%)	63 (81,8%)	136 (65,4%)	213 (70,5%)	0,014
	Da • Yes	3 (17,6%)	14 (18,2%)	72 (34,6%)	89 (29,5%)	
Učestalost korištenja svile • Flossing frequency*	Nikad • Never	16 (94,1%)	67 (87,0%)	158 (76,0%)	241 (79,8%)	0,286
	Mjesečno • Monthly	1 (5,9%)	6 (7,8%)	27 (13,0%)	34 (11,3%)	
	Tjedno • Weekly	-	3 (3,9%)	12 (5,8%)	15 (5,0%)	
	Dnevno • Daily	-	1 (1,3%)	11 (5,3%)	12 (4,0%)	
Učestalost krvarenja gingive • Gums bleeding frequency*	Često • Often	4 (23,5%)	5 (6,5%)	14 (6,7%)	23 (7,6%)	0,094
	Rijetko • Rarely	10 (58,8%)	45 (58,4%)	115 (55,3%)	170 (56,3%)	
	Nikad • Never	3 (17,6%)	27 (35,1%)	79 (38,0%)	109 (36,1%)	
Posljednji posjet stomatologu • Last dental visit*	< jedna godina • < One year	8 (47,1%)	55 (71,4%)	135 (64,9%)	198 (65,6%)	0,323
	1-2 godine • 1-2 year	3 (17,6%)	14 (18,2%)	40 (19,2%)	57 (18,9%)	
	2-3 godine • 2-3 year	2 (11,8%)	3 (3,9%)	11 (5,3%)	16 (5,3%)	
	>3 godine • >3 year	4 (23,5%)	5 (6,5%)	22 (10,6%)	31 (10,3%)	
Češće posjećuje stomatologa zbog • More often visit dentist for*	Zubobolja • Toothache	9 (52,9%)	38 (49,4%)	72 (34,6%)	119 (39,4%)	0,039
	Kontrola • Check-up	8 (47,1%)	39 (50,6%)	136 (65,4%)	183 (60,6%)	
Redovne godišnje kontrole • Annual dental check-ups*	Rijetko • Rarely	11 (64,7%)	35 (45,5%)	78 (37,5%)	124 (41,1%)	0,048
	Jednom • Once	3 (17,6%)	12 (15,6%)	60 (28,8%)	75 (24,8%)	
	Dvaput • Twice	3 (17,6%)	30 (39,0%)	70 (33,7%)	103 (34,1%)	
Kod zubobolje radije želi • Preferred toothache treatment*	Ekstrakcija • Extraction	4 (23,5%)	10 (13,0%)	25 (12,0%)	39 (12,9%)	0,396
	Popravak • Repair	13 (76,5%)	67 (87,0%)	183 (88,0%)	263 (87,1%)	
Položaj zubi važan za izgled lica • Tooth position important for facial appearance	Manje važan • Less important	10 (58,8%)	24 (31,2%)	36 (17,3%)	70 (23,2%)	0,001
	Više važan • More important	7 (41,2%)	53 (68,8%)	172 (82,7%)	232 (76,8%)	

**Legenda • Legend**

\* Hi kvadrat test • Chi-square test. † Suma ne odgovara broju ispitanika jer instruktori ne isključuju jedan drugoga • The sum does not correspond to the number of subjects as the instructors do not exclude each another.

**Tablica 2.** Povezanost između učestalosti četkanja zubi i znanja o oralnom zdravlju  
**Table 2** Association between the frequency of tooth brushing and the knowledge of oral health

Tvrdnja • Statement		Dnevna učestalost četkanja • Daily brushing frequency			Σ (n=302)	P*
		< jedanput • < once (n=17)	Jedanput • Once (n=77)	≥ dvaput • ≥ twice (n=208)		
Fluoridi sprečavaju karijes • Fluoride prevents cavities	Netočno • False	11 (64.7%)	23 (29.9%)	35 (16.8%)	69 (22.8%)	0.001
	Točno • True	6 (35.3%)	54 (70.1%)	173 (83.2%)	233 (77.2%)	
Plak se može ukloniti četkicom • Plaque can be removed by a toothbrush	Netočno • False	17 (100%)	54 (70.1%)	136 (65.4%)	207 (68.5%)	0.012
	Točno • True	-	23 (29.9%)	72 (34.6%)	95 (31.5%)	
Kamenac se može ukloniti četkicom • Calculus can be removed by a toothbrush	Netočno • False	11 (64.7%)	27 (35.1%)	53 (25.5%)	91 (30.1%)	0.002
	Točno • True	6 (35.3%)	50 (64.9%)	155 (74.5%)	211 (69.9%)	
Krvarenje zubnog mesa je bolest • Gingivitis-related bleeding is an illness	Netočno • False	13 (76.5%)	53 (68.8%)	148 (71.2%)	214 (70.9%)	0.81
	Točno • True	4 (23.5%)	24 (31.2%)	60 (28.8%)	88 (29.1%)	
Šećer uzrokuje karijes • Sugar causes cavities	Netočno • False	9 (52.9%)	13 (16.9%)	30 (14.4%)	52 (17.2%)	0.001
	Točno • True	8 (47.1%)	64 (83.1%)	178 (85.6%)	259 (82.8%)	
Slatki napici uzrokuju karijes • Soft drinks can cause cavity	Netočno • False	12 (70.6%)	59 (76.6%)	177 (85.1%)	248 (82.1%)	0.112
	Točno • True	5 (29.4%)	18 (23.4%)	31 (14.9%)	54 (17.9%)	
Četkanje je uspješno i bez paste • Brushing is effective even without a toothpaste	Netočno • False	15 (88.2%)	69 (89.6%)	183 (88%)	267 (88.4%)	0.93
	Točno • True	2 (11.8%)	8 (10.4%)	25 (12%)	35 (11.6%)	
Kod starijih se zubi rasklimaju i ispadnu • Teeth loss and fall out in elderly	Nije normalno • Not normal	4 (23.5%)	24 (31.2%)	85 (40.9%)	113 (37.4%)	0.154
	Normalno • Normal	13 (76.5%)	53 (68.8%)	123 (59.1%)	189 (62.6%)	
Postupak kod krvarenja zubnog mesa • Bleeding gums procedure	Nikada ne krvari • Never bleed	-	6 (7.8%)	26 (12.5%)	32 (10.6%)	0.532
	Četkam nježnije ili prestanem četkati • Brush gentler or stop brushing	14 (82.4%)	54 (70.1%)	142 (68.3%)	210 (69.5%)	
	Četkam temeljitije • Brush properly	1 (5.9%)	11 (14.3%)	27 (13.0%)	39 (12.9%)	
	Posjetim stomatologa • Visit dentist	2 (11.8%)	6 (7.8%)	13 (6.3%)	21 (7.0%)	

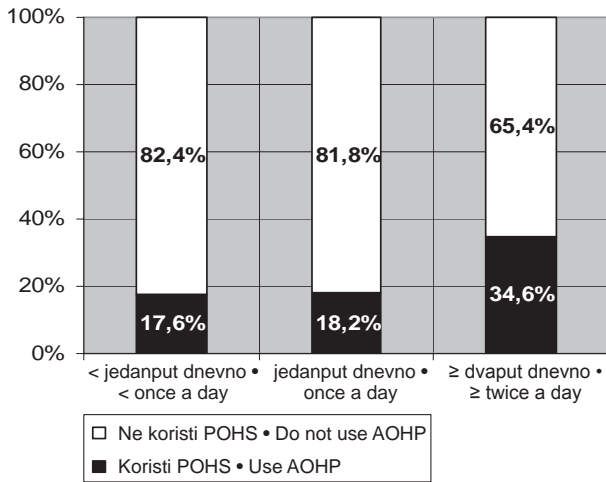
Legenda • Legend

\* Hi kvadrat test • Chi-square test

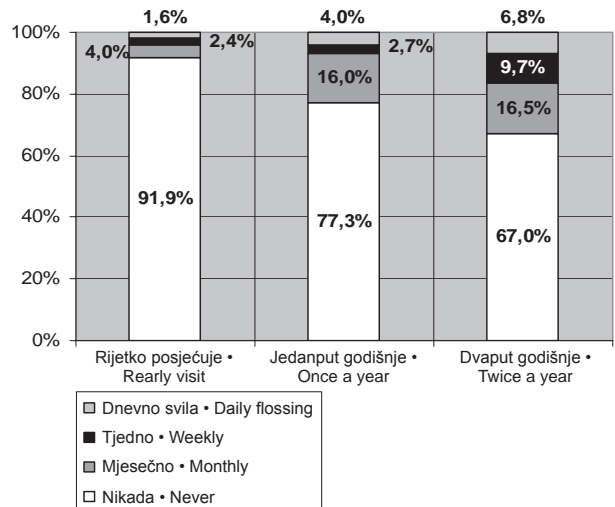
ne kod drugih, motivirajući čimbenik za promjenu ponašanja. Usvajanje znanja temelji se na ponavljanju, te je zato potrebno sustavno kontrolirati školarce i stalno ih tijekom obvezatnoga školovanja upozoravati na oralnohigijenske postupke.

reason why the greatest motivating factor in changing habits is the perception of personal risks associated with the occurrence of diseases. It is necessary to start a continuous preventive public healthcare programme. The acquisition of knowledge is based on repetitive efforts and this is the fundamental reason for systematic monitoring and re-instruction of dental hygiene procedures during mandatory education.

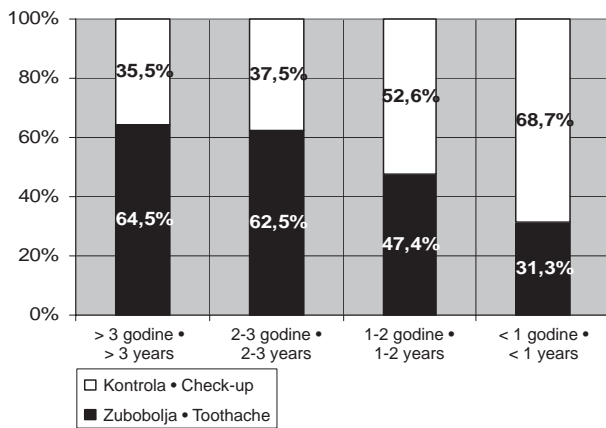




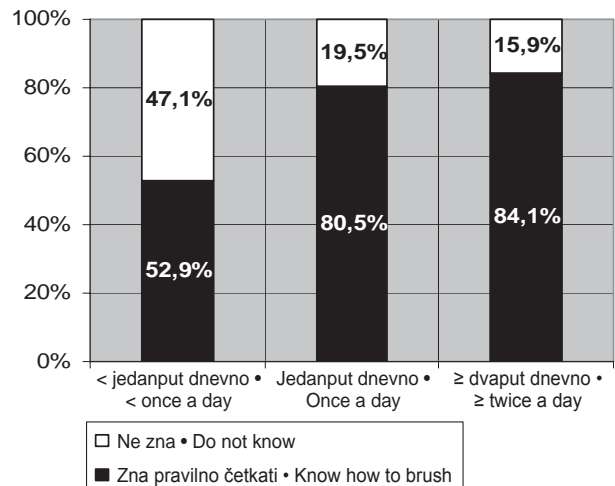
**Slika 1.** Učestalost četkanja zubi i korištenja pomoćnih oralno higijenskih sredstava (POHS).  
 Chi-square=8.513, df=2; p=0,014.  
**Figure 1** The frequency of tooth brushing and the use of additional oral hygiene products.  
 Chi-square=8.513, df=2; p=0,014.



**Slika 2.** Povezanost između kontrolnih stomatoloških pregleda i korištenja zubne svile.  
 Kruskal-Wallis H=22.013, df=2; p<0.001.  
 Spearman correlation Rho=-0.270; p<0.001.  
**Figure 2** Association between visiting dentist for checkups and using dental floss.  
 Kruskal-Wallis H=22.013, df=2; p<0.001.  
 Spearman correlation Rho=-0.270; p<0.001.



**Slika 3.** Povezanost između posljednjeg posjeta stomatologu i razloga posjete.  
 Chi-square=18.704, df=3; p<0.001.  
**Figure 3** The correlation between their last dental visit and the reason for the visit.  
 Chi-square=18.704, df=3; p<0.001.



**Slika 4.** Povezanost između učestalosti četkanja zubi i vlastitog uvjerenja zna li ispravno četkati.  
 Chi-square=10.184, df=2; p=0.006.  
**Figure 4** The correlation between how often someone brushes their teeth and whether they know how to brush their teeth properly.  
 Chi-square=10.184, df=2; p=0.006.

**Tablica 3.** Distribucija demografskih i socioekonomskih varijabli prema učestalosti četkanja zubi  
**Table 3** Distribution of demographic and socioeconomic variables according to brushing-frequency groups

Varijable • Variables		Dnevna učestalost četkanja • Daily brushing frequency			Σ (n=302)	P
		< jedanput • < once (n=17)	Jedanput • once (n=77)	≥ dvaput • ≥ twice (n=208)		
Dob • Mean age <sup>†</sup>		17.7±0.6	17.7±0.5	17.7±0.5	17.7±0.5	0.922
Mjesto • Place*	Kutina	7 (41.2%)	26 (33.8%)	67 (32.2%)	100 (33.1%)	
	Rovinj	7 (41.2%)	28 (36.4%)	66 (31.7%)	101 (33.4%)	
	Zagreb	3 (17.6%)	23 (29.9%)	75 (36.1%)	101 (33.4%)	0.547
Spol • Gender*	Muški • Male	16 (94.1%)	52 (67.5%)	91 (43.8%)	159 (52.6%)	
	Ženski • Female	1 (5.9%)	25 (32.5%)	117 (56.3%)	143 (47.4%)	0.001
Očeva naobrazba • Father's education*	Osnovno • Elementary	3 (17.6%)	2 (2.6%)	13 (6.3%)	18 (6.0%)	
	Srednjoškolsko • Secondary	12 (70.6%)	58 (75.3%)	141 (67.8%)	211 (69.9%)	
	Fakultetsko • University	2 (11.8%)	17 (22.1%)	54 (26.0%)	73 (24.2%)	0.119
Majčina naobrazba • Mother's education*	Osnovno • Elementary	2 (11.8%)	15 (19.5%)	23 (11.1%)	40 (13.2%)	
	Srednjoškolsko • Secondary	11 (64.7%)	49 (63.6%)	138 (66.3%)	198 (65.6%)	
	Fakultetsko • University	4 (23.5%)	13 (16.9%)	47 (22.6%)	64 (21.2%)	0.404
Očevo zaposlenje • Father's employment*	Zaposlen • Employed	13 (76.5%)	69 (89.6%)	181 (87.4%)	263 (87.4%)	
	Nezaposlen • Unemployed	4 (23.5%)	8 (14.4%)	26 (12.6%)	38 (12.6%)	0.276
Majčino zaposlenje • Mother's employment*	Zaposlena • Employed	10 (58.8%)	57 (74.0%)	157 (75.5%)	224 (74.2%)	
	Nezaposlena • Unemployed	7 (41.2%)	20 (26.0%)	51 (24.5%)	78 (25.8%)	0.568
Ukućani • Inmates*#	Majka • Mother	17 (100%)	75 (97.4%)	200 (96.2%)	292 (96.7%)	
	Otac • Father	15 (88.2%)	65 (84.4%)	181 (87.0%)	261 (86.4%)	
	Očuh • Stepfather	2 (11.8%)	1 (1.3%)	6 (2.9%)	9 (2.9%)	
	Pomajka • Stepmother	1 (5.9%)	-	-	1 (0.3%)	
	Braća - sestre • Brothers	14 (82.4%)	57 (74.0%)	158 (75.9%)	229 (75.8%)	
	Djed • Grandpa	3 (17.7%)	11 (14.3%)	18 (8.7%)	32 (10.6%)	
	Baka • Grandma	4 (23.5%)	24 (31.2%)	44 (21.2%)	72 (23.8%)	
	Drugi • Others	2 (11.8%)	-	7 (3.4%)	9 (2.9%)	0.07
Braća i sestre • Brothers and sisters <sup>†</sup>	Broj • Mean No.	1.5±1.1	1.4±1.0	1.2±0.9	1.3±1.0	0.384
Boravište • Residence*	Kuća • House	12 (70.6%)	63 (81.8%)	159 (76.4%)	234 (77.5%)	
	Stan • Flat	5 (29.4%)	14 (18.2%)	49 (23.6%)	68 (22.5%)	0.491
Vlastita soba • Own room*	Da • Yes	12 (70.6%)	51 (66.2%)	137 (65.9%)	200 (66.2%)	
	Ne • No	5 (19.4%)	26 (32.8%)	71 (34.1%)	102 (33.8%)	0.105
Br. auta • No. of cars <sup>†</sup>		1.2±0.7	1.4±0.6	1.4±0.6	1.4±0.6	0.137
Godišnje putovanja na odmor • Vacation yearly <sup>†</sup>		1.1±1.2	1.3±1.1	1.6±1.2	1.5±1.2	0.112
Financijski status • Financial status*	Niski • Low	5 (29.4%)	10 (13.0%)	18 (8.7%)	33 (10.9%)	
	Prosječni • Medium	5 (29.4%)	33 (42.9%)	83 (39.9%)	121 (40.1%)	
	Visoki • High	7 (41.2%)	34 (44.2%)	107 (51.4%)	148 (49.0%)	0.089
Konzumacija alkohola • Alcohol consumption*	< jednom tjedno • <once a week	9 (52.9%)	53 (68.8%)	161 (77.4%)	223 (73.8%)	
	> jednom tjedno • >once a week	8 (47.1%)	24 (31.2%)	47 (22.6%)	79 (26.2%)	0.045
Pušenje • Tobacco use*	<5 cigareta dnevno • <5 cig. a day	10 (58.8%)	52 (67.5%)	151 (72.6%)	213 (70.5%)	
	>5 cigareta dnevno • >5 cig. a day	7 (41.2%)	25 (32.5%)	57 (27.4%)	89 (29.5%)	0.390
Slatkiši • Sweets*	<jednom dnevno • <once a day	6 (35.3%)	36 (46.8%)	93 (44.7%)	135 (44.7%)	
	>jednom dnevno • >once a day	11 (64.7%)	41 (53.2%)	115 (55.3%)	167 (55.3%)	0.691
Slatki napici • Soft drinks*	<jednom dnevno • <once a day	14 (82.4%)	40 (51.9%)	120 (57.7%)	174 (57.6%)	
	>jednom dnevno • >once a day	3 (17.6%)	37 (48.1%)	88 (42.3%)	128 (42.4%)	0.072

**Legenda • Legend**

\* Hi kvadrat • Chi-square test. † t-test. # Suma ne odgovara broju ispitanika jer ukućani ne isključuju jedan drugoga • The sum does not correspond to the number of subjects as the instructors do not exclude each another.

**Abstract**

Knowledge and motivation are considered to be essential determinants of health-related behaviour. The aim of this study was to evaluate the influence of demographic characteristics, perception, knowledge and motivation regarding oral health of adolescents on their habits in oral hygiene. The study was conducted in 2006 in the sample of 302 secondary school students, aged 17 to 19, from three cities in different Croatian regions using a questionnaire. Data were analysed by nonparametric statistics. Adolescents have relatively high perception regarding oral health, but their perception of oral diseases is quite low. Although different demographic, social and gender-related factors affect oral health behaviours, they are less affected by adolescents' knowledge. And in fact those who were better educated about oral diseases and prevention didn't practice basic hygiene significantly more often, nor used additional products, changed their toothbrush, visited dentist or avoided sugar. It is obvious that young people do not draw personal implications from health risk information, or can not easily recognise the link between their own behaviour and the risk they are putting themselves into. It has been related to unrealistic optimism, the tendency to perceive negative events as less likely and positive events as more likely to oneself than to others.

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**Key words**

Oral Hygiene; Oral Health; Croatia

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