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## Izobrazba o profesionalnim bolestima i zdravstvenim navikama među studentima dentalne medicine u Hrvatskoj

### Education on Occupational Health and Health Related Habits among Dental Students in Croatia

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#### Sažetak

**Uvod:** Profesionalne bolesti su bolesti uzrokovane štetnim utjecajem radnoga mjesta, a bolesti vezane uz rad uzrokovane su mnogim čimbenicima, pri čemu su štetni radni uvjeti jedan od mogućih. Stomatologija je profesija s visokim rizikom od pojave profesionalnih bolesti. Svrha ovog rada je predstaviti rezultate ankete o profesionalnim bolestima i zdravstvenim navikama koja je provedena među studentima Stomatološkog fakulteta Sveučilišta u Zagrebu, te pokazati kako je poboljšala obrazovanje uvođenjem novog kolegija u nastavni plan. **Ispitanici i metode:** Studentima svih godina na Stomatološkom fakultetu Sveučilišta u Zagrebu (ukupno 663) bilo je ponudeno sudjelovanje u anketi o profesionalnim bolestima i zdravstvenim navikama. **Rezultati:** Upitnik je ispunio 351 student – 28 posto studenata i 22,5 posto studentica su pušači. Tijekom prve dvije godine studija čak njih 84,6 posto konzumira alkohol najmanje jedanput na tjedan. Prije početka studija 84,6 posto studenata i 77,6 posto studentica bavilo se sportom. Znatno pad broja studenata i studentica koji se bave sportom uočen je na prvoj godini studija. Svjesnost o zdravstvenim rizicima u stomatološkoj profesiji raste s godinom studija. Većina studenata smatra da profesionalne bolesti mogu biti spriječene. **Zaključak:** Rezultati su pokazali da studenti upisuju dentalnu medicinu s razmjerno niskim znanjem o zdravstvenim opasnostima koje se pojavljuju u stomatološkoj profesiji. Iako razina znanja i svijesti raste s godinom studija, štetne navike kao što su pušenje, konzumiranje alkoholnih pića i nedostatak fizičke aktivnosti prisutne su i u višim godinama studija.

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#### Adresa za dopisivanje

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#### Ključne riječi

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studenti stomatologije; profesionalne  
bolesti; Hrvatska

#### Uvod

Iako se stomatologija smatra profesijom s visokim rizikom od pojave profesionalnih bolesti i bolesti vezanih uz posao, edukacija o tim temama nije uobičajeni dio nastavnog plana u stomatološkim nastavnim ustanovama mnogih zemalja (1). Beach i DeBiase analizirali su 216 priznatih dentalno-higijeničarskih programa u Sjedinjenim Državama kako bi odredili postojanje i opseg obrazovanja o ergonomiji u nastavnom programu škola za dentalne higijeničare. Ustanovili su da je izobrazba o ergonomiji nedostatna, te da ne pruža dovoljno informacija o mehanici ljudskog tijela, te o preventivnim vježbama specifičnima za stomatologe (2).

Zdravstveni rizici stomatološke profesije dobro su poznati, ali je ograničena dostupnost podataka o prevalenciji profesionalnih bolesti i bolesti vezanih uz rad. Ti su podatci obično dostupni samo u zemljama s velikim brojem stanovnika i velikim brojem doktora dentalne medicine. Podatci za manje zemlje obično nedostaju.

#### Introduction

Although dentistry is considered to be a profession with a high risk for development of occupational diseases and diseases related to work, education on occupational health is not a standard part of the curriculum of dental schools in many countries (1). Beach and DeBiase made an analysis of 216 accredited dental hygiene programs in the United States to determine the existence and extent of ergonomic education in dental hygiene curricula and found that there was insufficient ergonomic education without enough information about body mechanics and preventive exercises specific for dental professionals (2).

Health risks of the dental profession are well known, but availability of data about prevalence of some occupational diseases and diseases related to work is limited and usually available only for countries with large populations and many dental practitioners. The data for small countries are often insufficient.

Hrvatska je najnovija članica Europske unije s 4,28 milijuna stanovnika i oko 4000 aktivnih stomatologa. Postoje tri institucije (Stomatološki fakultet Sveučilišta u Zagrebu, Medicinski fakultet Sveučilišta u Rijeci i Medicinski fakultet Sveučilišta u Splitu) za izobrazbu doktora dentalne medicine sa šestogodišnjim nastavnim planom. Svake godine studij završi od 100 do 150 novih doktora dentalne medicine. Preliminarna istraživanja pokazuju da je prevalencija profesionalnih bolesti i bolesti povezanih uz posao visoka među hrvatskim stomatolozima zbog povećanih poslovnih, profesionalnih i administrativnih zahtjeva koji su se pojavili tijekom posljednjeg desetljeća (3).

Istraživanja među studentima dentalne medicine u svijetu pokazala su da imaju nedostatan znanje o profesionalnim zdravstvenim čimbenicima rizika. Zbog navedenoga, mnogi autori zaključili su da je edukacija studenata o profesionalnim zdravstvenim rizicima prvi i najvažniji korak u prevenciji profesionalnih bolesti (4–8). Studenti Stomatološkog fakulteta Sveučilišta u Zagrebu nikad nisu imali kolegij u sklopu kojega bi mogli dobiti adekvatnu količinu informacija o zdravstvenim rizicima vezanima uz njihovu profesiju. S druge strane, studenti prvih dviju godina obvezni su nazočiti kolegiju *Tjelesna i zdravstvena kultura*, te tako moraju sudjelovati u fizičkoj aktivnosti pod profesionalnim nadzorom. Nažalost, ne postoji dovoljno razrađen model koji bi povezo *Tjelesnu i zdravstvenu kulturu* sa zdravstvenim opasnostima stomatološke profesije, pogotovo s onima muskuloskeletnog podrijetla koji su ujedno najčešći. Osim toga, taj kolegij nije obavezan za starije studente koji sudjeluju u pretkliničkim i kliničkim vježbama na kojima se već suočavaju s profesionalnim zdravstvenim rizicima.

Svrha ovoga rada jest predstaviti rezultate ankete o rizicima profesionalnih bolesti i zdravstvenim navikama među studentima Stomatološkog fakulteta Sveučilišta u Zagrebu te pokazati kako je ova anketa poboljšala edukaciju uvođenjem novog kolegija u nastavni program pod nazivom *Profesionalne bolesti u dentalnoj medicini*.

Hrvatske studente dentalne medicine nikad prije nitko nije pitao što znaju i što misle o rizicima i bolestima njihove profesije. Hrvatska je najmlađa članica Europske unije i vjerojatno jedna od rijetkih njezinih zemalja koja za stomatološku profesiju nema relevantne podatke o profesionalnim bolestima i bolestima vezanima uz posao. Ovim se radom pokušava dati temelji daljnjim poboljšanjima u ovom području.

## Ispitanici i metode

U akademskoj godini 2014./2015. studentima svih godina na Stomatološkom fakultetu Sveučilišta u Zagrebu (ukupno 663) ponuđen je upitnik s pitanjima o profesionalnim zdravstvenim rizicima i zdravstvenim navikama. Za ovu svrhu sastavljen je upitnik s pitanjima o zdravstvenim navikama i profesionalnim bolestima. Sudjelovanje u anketi bilo je dobrovoljno i anonimno. Istraživanje je odobrilo Etičko povjerenstvo Stomatološkog fakulteta Sveučilišta u Zagrebu.

Statistička analiza obavljena je računalnim programom MS Excel 2003 (Microsoft Office 2003., Microsoft, and Redmond, WA, SAD) i SPSS Statistics 17,0 for Windows“

Croatia is the newest member of the European Union, has a population of 4.28 million and about 4.000 active dental practitioners. There are three institutions (University of Zagreb School of Dental Medicine, University of Rijeka School of Medicine and University of Split School of Medicine) educating doctors of dental medicine with a six year curriculum. There about 100 – 150 new doctors of dental medicine each year. Preliminary studies showed that the prevalence of occupational diseases and diseases related to work among Croatian dentists is high due to increased professional, business and administrative requirements in last decade (3).

Previous studies conducted among dental students around the world have shown that their knowledge of professional related health risk factors was insufficient. Thus, many authors have concluded that the education of students on occupational health risks is the first and crucial step in the prevention of occupational diseases in the future (4-8). Students of dental medicine at the University of Zagreb have never had a course which would provide adequate information about health hazards related to their profession. On the other hand, students in the first two years of this program have a mandatory course in Physical Education and they are therefore required to engage in physical activity under professional supervision. Unfortunately, there are not enough elaborated models that would connect Physical Education with health risks of the dental profession, especially those of musculoskeletal origin, which are the most frequent. Besides, the Physical Education course is not compulsory for senior students who take part in preclinical and clinical work which brings occupational health risks.

The aim of this paper was to present the results of a survey about occupational health risks and health related habits among dental students at the School of Dental Medicine University of Zagreb and to show how this survey led to an improvement in education by introducing a new course in the dental curriculum entitled “Occupational diseases in dental medicine”.

Croatian dental students have never before been surveyed on their knowledge and attitude regarding occupational health hazards and diseases. Croatia is the youngest member of the European Union and probably one of the few EU member countries without relevant data about occupational diseases and diseases related to work for the dental profession. This paper is an attempt to provide a basis for further improvements in this field.

## Participants and methods

In the academic years 2014/2015, students of all years at the School of Dental Medicine University of Zagreb (total of 663) were offered to participate in a survey about occupational health risks and health related habits. For this purpose, a questionnaire with questions about health related habits and occupational diseases was made. Participation in the survey was voluntary and anonymous. The research was approved by the Ethics Committee of the School of Dental Medicine, University of Zagreb.

Statistical analysis was made using the computer program „MS Excel2003“ (Microsoft Office 2003, Microsoft, and Red-

(SPSS Inc., Chicago, IL, SAD). Napravljena je deskriptivna i neparametrijska statistička analiza, uz primjenu hi-kvadrat testa i Kruskal-Wallisova testa.

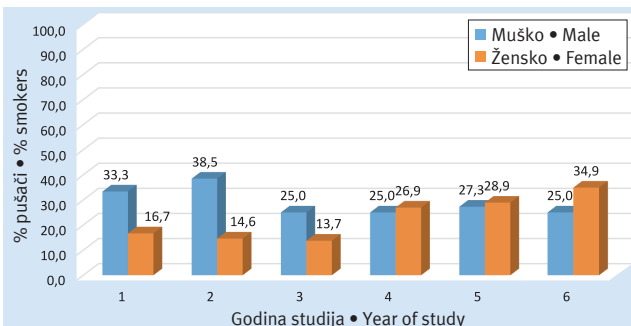
mond, WA) and „SPSS Statistics 17.0 for Windows“ (SPSS Inc., Chicago, IL). Descriptive and nonparametric statistical analysis was made and chi-square test and the Kruskal-Wallis test were applied.

**Rezultati**

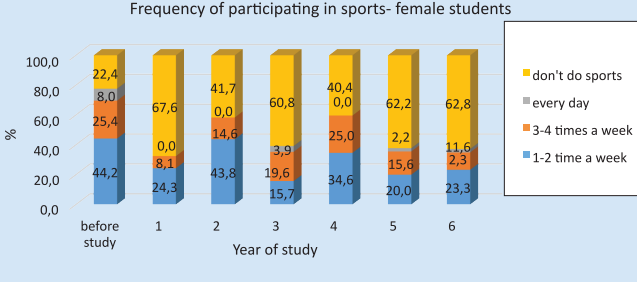
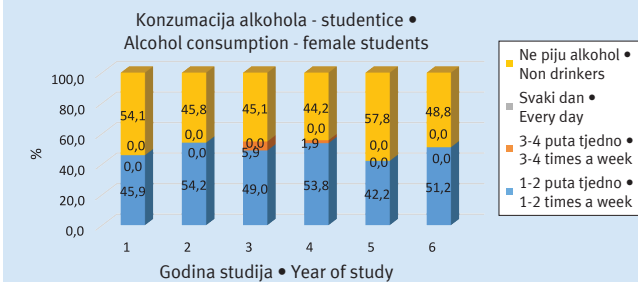
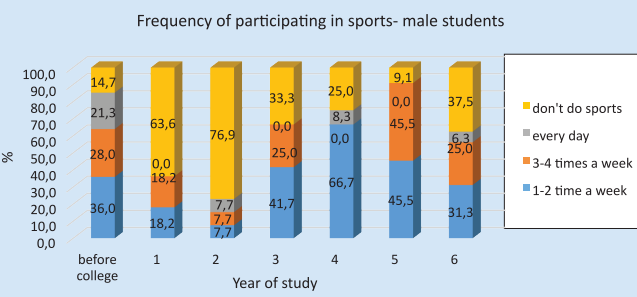
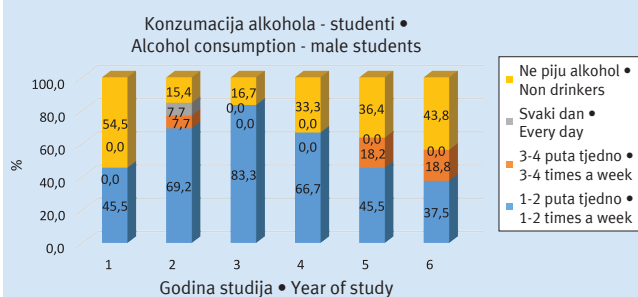
Upitnik je ispunio 351 student, što je 52,9 posto od ukupnoga broja studenata na Stomatološkom fakultetu Sveučilišta u Zagrebu u akademskoj godini 2014./2015.

**Results**

The questionnaire was filled out by 351 students, which was 52.9% of the total number of students at the School of Dental Medicine, University of Zagreb in the academic year



Slika 1. Distribucija pušača među studentima s obzirom na spol  
Figure 1 Distribution of smokers among students regarding gender

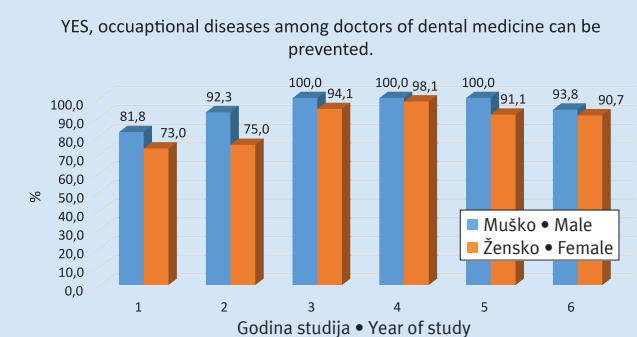
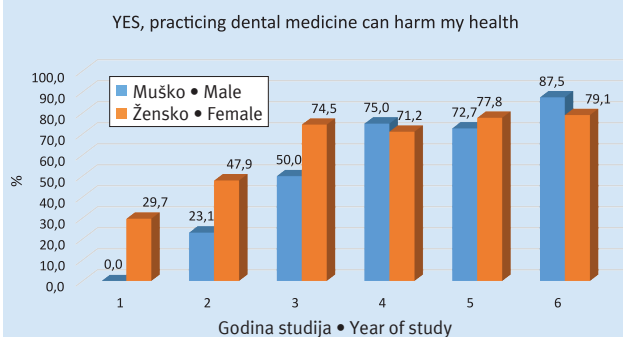


Slika 2. Distribucija studenata i studentica s obzirom na konzumaciju alkohola

Slika 3. Distribucija studenata s obzirom na godinu studija i učestalost bavljenja sportom prije i tijekom studija

Figure 2 Distribution of the students regarding alcohol consumption

Figure 3 Distribution of students participating in sports before and during study



Slika 4. Postotak studenata koji smatra da stomatologija može ugroziti njihovo zdravlje

Slika 5. Stajalište studenata o sprječavanju profesionalnih bolesti stomatologa

Figure 4 Percentage of students who consider dental medicine as a profession harmful for their health

Figure 5 Attitude of students towards prevention of occupational diseases

**Tablica 1.** Distribucija ispitanih studenata prema spolu i godini studija  
**Table 1** Distribution of interviewed students according to their gender and year of study

Godina studija • Year of study	Muški • Male		Ženski • Female		Ukupno • Total N	% od ukupnog broja upisanih studenata • % of number of total enrolled students
	N	%	N	%		
1.	11	22.9	37	77.1	48	38.4
2.	13	21.3	48	78.7	61	49.6
3.	12	19.0	51	81.0	63	61.2
4.	12	18.8	52	81.3	64	58.2
5.	11	19.6	45	80.4	56	58.9
6.	16	27.1	43	72.9	59	55.1
Ukupno • Total	75	21.4	276	78.6	351	Prosječno • Average: 53.6

N - broj ispitanika • Number of subjects

Odziv studenata koji su ispunili anketu bio je od 38,4 posto na 1. godini do 61,2 posto na 3. godini studija, što je u prosjeku za sve godine studija iznosilo 53,6 posto. Distribucija ispitanika s obzirom na spol i godinu studija nalazi se u tablici 1.

Analiza broja pušača među studentima pokazala je da je u ukupnom broju anketiranih 28 posto studenata pušača te 22,5 posto studentica. Nije utvrđena statistički značajna razlika među studentima s obzirom na spol i godinu studija. Na slici 1. prikazana je distribucija pušača s obzirom na spol i godinu studija. Kod studenata je uočen blagi porast broja pušača na prve dvije godine studija, a nakon treće godine njihov broj stagnira. Kod studentica se broj pušača lagano smanjuje tijekom prve tri godine studija, a od 4. godine se udvostručio.

Na slici 2. predočena je distribucija studenata s obzirom na godinu studija i učestalost konzumacije alkoholnih pića. Studenti konzumiraju, statistički značajno, češće alkoholna pića negoli studentice ( $p < 0,05$ ). No ne postoji statistički značajna razlika s obzirom na godinu studija. Među studentima učestalost konzumacije alkoholnih pića na tjednoj razini raste tijekom prve dvije godine studija do čak 84,6 posto na 2. godini studija. Na 3. godini broj studenata koji piju alkohol pada na 83,3 posto i taj se pad nastavlja do 6. godine na kojoj još uvijek 56,3 posto studenata najmanje jedanput na tjedan konzumira alkohol. Učestalost konzumacije alkohola na tjednoj razini među studenticama dosta je ujednačena i varira od 42,2 do 55,7 posto te se s obzirom na godinu studija ne mogu uočiti trendovi smanjenja, odnosno porasta učestalosti konzumacije alkoholnih pića, kao što je to zamjetno kod studenata.

Rezultati analize učestalosti bavljenja sportom pokazali su da se studenti češće bave sportom negoli studentice (slika 3). Kod oba spola uočen je značajan pad broja studenata koji se bave sportom na prvoj godini studija. Prije dolaska na studij 85,3 posto studenata i 77,6 posto studentica bavilo se sportom. Na prvoj godini studija sportom se najmanje jedanput na tjedan bavi samo 36,4 posto studenata i 32,4 posto studentica. Na višim godinama povećava se broj studenata koji se bave sportom do čak 90,9 posto na 5. godini, ali taj trend ne vrijedi za studentice koje studij završavaju s upola manjim brojem (37,2 %) onih koje se redovito bave sportom u usporedbi s brojem prije dolaska na studij (77,6 %). Studenti se najčešće bave biciklizmom, borilačkim sportovima, fitnessom, košarkom, nogometom, plivanjem, rukometom i tenisom.

2014/2015. The percentage of students who filled the questionnaire ranged from 38.4% in the first year to 61.2% in the 3<sup>rd</sup> year, which means that the average for all years of study was 53.6%. Distribution of the surveyed students according to gender and year of study is given in Table 1.

The analysis of the number of smokers among students showed that 28.0% of males out of the total number of interviewed students were smokers as opposed to 22.5% of female smokers. No statistically significant difference was found among students regarding their smoking habits, gender and the year of study. Figure 1 shows the distribution of smokers considering their gender and year of study. A slight increase in the number of smokers is observed among male smokers in the first two years of study while the number of smokers stagnates after the third year. The number of female smokers slightly decreases during the first three years of study while the number of female smokers is doubled and significantly increased after the fourth academic year.

Distribution of students regarding the year of study and frequency of alcohol consumption is shown in Figure 2. Male students statistically consume alcohol significantly more often than female students ( $p < 0,05$ ), however there are no statistically significant differences with respect to the year of study. Consumption of alcohol on a weekly basis among male students tends to increase during the first two years of study to 84.6% in the second year of study. In the third year, the number of male students who consume alcohol is decreased to 83.3% and a decline continues until the sixth year where 56.3% of male students consume alcohol at least once a week. The frequency of alcohol consumption on a weekly basis among female students is quite uniform and varies from 42.2% - 55.7% and with respect to the year of study, it is not possible to observe trends of increased or decreased alcohol consumption compared to the male students.

The results of the analysis of the frequency of students who participate in sports have shown that male students do sports more often than female students (Figure 3). It was noticed that in both genders there was a considerable drop in the number of students who participated in sports in the first academic year. Prior to enrolling in university, 85.3% of male students and 77.6% of female students were engaged in sports. The number of male students who partook in sports activities in the first academic year was 36.4% and the number of female students was 32.4%. In the later years of study,

Studentice se najčešće bave aerobikom, atletikom, badmintonom, fitnessom, košarkom, odbojkom, plesom, plivanjem, rukometom, tenisom i trčanjem.

Studenti se gradom najčešće kreću javnim prijevozom, a najmanje skuterima (motorima). Studenti su skloniji pješaćenju negoli studentice, pa u prosjeku njih 45,9 posto gradom pješaći, dok to isto čini samo 36,5 posto studentica. Za bicikl kao prijevozno sredstvo češće se odlučuju studentice (8,1 %), a taj način prijevoza izbor je samo 5,7 posto studenata. Na višim godinama studija, posebno među studentima, raste broj korisnika automobila. U tablici 2. prikazani su načini kretanja studenata gradom s obzirom na vrstu prijevoznog sredstva.

the number of male students who participated in sports activities increased to up to 90.9% in the fifth year, but this trend did not apply to female students who completed their education with half the figure (37.2%) of those who regularly engaged in sports compared with the figure before they applied to university (77.6%). Male students are usually involved in cycling, martial arts, fitness, basketball, football, swimming, handball and tennis. Female students mostly partake in aerobics, athletics, badminton, fitness, basketball, volleyball, dancing, swimming, handball, tennis and jogging.

Students travel around the city mostly using public transportation while scooters are rarely used. Male students are more likely to walk than female students. On average, 45.9%

Tablica 2. Način kretanja studenata gradom s obzirom na vrstu prijevoznog sredstva  
Table 2 Means of transportation in the city

Godina studija • Academic year	Muškarci • Male									
	Pješaćenje • Walking		Bicikl • Bike		Javni prijevoz • Public Transport		Skuter • Scooter		Automobil • Car	
	N	%	N	%	N	%	N	%	N	%
1	5	45.5	0	0.0	6	54.5	0	0.0	0	0.0
2	5	41.7	0	0.0	6	50.0	1	8.3	1	8.3
3	5	45.5	0	0.0	5	45.5	1	9.1	1	9.1
4	8	80.0	0	0.0	2	20.0	0	0.0	2	20.0
5	2	20.0	2	20.0	6	60.0	0	0.0	1	10.0
6	6	42.9	2	14.3	6	42.9	0	0.0	2	14.3
Godina studija • Academic year	Žene • Female									
	Pješaćenje • Walking		Bicikl • Bike		Javni prijevoz • Public Transport		Skuter • Scooter		Automobil • Car	
	N	%	N	%	N	%	N	%	N	%
1	9	24.3	0	0.0	28	75.7	0	0.0	0	0.0
2	20	41.7	0	0.0	28	58.3	0	0.0	0	0.0
3	11	21.6	1	2.0	39	76.5	0	0.0	0	0.0
4	25	48.1	4	7.7	22	42.3	0	0.0	1	1.9
5	16	38.1	1	2.4	25	59.5	0	0.0	3	7.1
6	19	45.2	1	2.4	22	52.4	0	0.0	1	2.4

N - broj ispitanika • Number of subjects

Na upit smatraju li da bavljenje stomatološkom djelatnošću može štetno utjecati na njihovo zdravlje, među studentima uočen je trend da s godinama studija raste i osviještenost o zdravstvenim opasnostima njihove buduće profesije. Tako je među različitim godinama studija statistički značajna razlika o tom pitanju ( $p < 0,05$ ), neovisno o tome je li riječ o studentima ili studenticama. Tako je na 1. godini studija 29,7 posto studentica svjesno tih opasnosti, ali ni jedan student (0,0 %), a na 6. godini čak 87,5 posto studenata i 79,1 posto studentica smatra da bavljenje stomatologijom može ugroziti njihovo zdravlje (slika 4.). Gledajući sve studente zajedno, njih 60,2 posto ističe da bavljenje stomatologijom može izazvati poremećaje mišićno-koštanoga sustava, 31,8 posto smatra da se mogu pojaviti različite infekcije, 28,7 posto navodi poremećaj vida, kožne poremećaje (24,1 %) i poremećaje sluha (21,0 %) kao moguće posljedice bavljenja stomatologijom. Kao glavne uzročnike profesionalnih bolesti u stomatologiji studenti navode nepravilan položaj tijela pri radu (72,7 %), mikroorganizme (28,7 %), stres (22,4 %), ozljede (20,5 %) i rendgensko zračenje (20,7 %).

of male students walk around the city whereas only 36.5% of female students do the same. Female students use bicycles as a means of transport more often than male students (8.1% female students, 5.7% male students). In senior academic years, there is an increase of car users particularly among male students. Table 2 shows how students get around the city with regard to the means of transportation.

When asked if they considered that dental medicine could harm their health, it was noticed that the higher the academic year, the higher the level of awareness of health issues that come with practicing dental medicine. There was a statistically significant difference considering the level of awareness among different academic years ( $p < 0.05$ ) regardless of the gender. In the first academic year, 29.7% of female students were aware of health issues while none of the male students were aware of them (0.0%). On the other hand, in the sixth academic year, the number of male students who were aware of harmful effects that practicing dental medicine could have, was 87.6% while 79.1% of female students were aware of the same problem (Figure 4). Generally, among

Rezultati ankete o tome što misle o sprječavanju profesionalnih bolesti kod stomatologa prikazani su na slici 5. Većina studenata smatra da se profesionalne bolesti mogu spriječiti, a postotak njih s takvim stajalištem raste s godinama studija. Najmanja potpora takvom stajalištu je na 1. godini studija. Razlika između pojedinih godina statistički je značajna ( $p < 0,05$ ). Kao glavni način sprječavanja profesionalnih bolesti kod stomatologa studenti navode uporabu zaštitnih maski (35,8 %) i rukavica (31,0 %), čestu promjenu položaja tijela pri radu s pacijentima (19,0 %), cijepljenje (17,3 %) te uporabu opreme za zaštitu od zračenja (17,3 %).

## Rasprava

Profesionalne bolesti su bolesti izazvane profesionalnom izloženošću, a bolesti vezane uz rad bolesti su uzrokovane mnogim čimbenicima među kojima su štetni radni uvjeti samo jedan od mogućih uzroka. Stomatologija je profesija s velikim rizikom od razvoja profesionalnih bolesti ili bolesti vezanih uz rad (1,9). Štetni čimbenici koji se pojavljuju u stomatološkom radu mogu biti biološki, biomehanički, kemijski, fizikalni i psihološki (10). Štetni biološki faktori su prioni, virusi, bakterije i gljivice koje mogu uzrokovati razne infekcije koje zahvaćaju kožu, oči, dišni sustav i druge organe ili tkiva (11). Štetni biomehanički elementi su nepravilno držanje tijela tijekom rada, stalno isti pokreti, produženo mehaničko naprezanje, vibracije, itd. Štetni biomehanički čimbenici mogu voditi prema muskuloskeletnim poremećajima, poremećajima perifernog neurološkog sustava, neurološkim i drugim zdravstvenim problemima (12). Čimbenici koji mogu štetno utjecati na zdravlje zbog svojih kemijskih svojstava su lijekovi, dentalni materijali i dezinficijensi (13, 14). Mogu uzrokovati hipersenzitivnost, alergije, kožne bolesti, ozljede i opekline (15). Fizikalni faktori koji mogu štetiti zdravlju u stomatologiji su buka, ionizirajuće i neionizirajuće zračenje, umjetno osvjjetljenje, polimerizacijsko svjetlo i slično (16). Fizikalni čimbenici mogu uzrokovati poremećaj sluha i vida, te druge tegobe uzrokovane pretjeranim zračenjem. Glavni psihološki faktori su stres i kronični umor. Oni mogu uzrokovati ne samo mentalne poremećaje, kao što su depresija i sindrom izgaranja na poslu, nego i somatske manifestacije kao što su kardiovaskularni i probavni poremećaji (17).

Relativno visok broj (52,9 %) studenata koji su bili voljni ispuniti anonimni i dobrovoljni upitnik pokazuje da žele biti informirani o ovoj temi. To je posebno vidljivo na višim godinama na kojima je postotak studenata koji su ispunili upitnik 61,2 posto, što upućuje na to da su studenti s iskustvom u

all students, 60.2% of them considered that practicing dental medicine could cause musculoskeletal disorders, 31.8% thought various infections could occur, 28.7% believed that issues with sight were possible as well as skin diseases (24.1%) and hearing impairments (21.0%) as a result of practicing dental medicine. Students consider improper posture during work, microorganisms (28.7%), stress (22.4%), injury (20.5%), and ionizing radiation (20.7%) to be the main causes of occupational diseases.

The results of the questionnaire considering the attitude of students towards the prevention of occupational diseases are shown in Figure 5. Most of the students considered that occupational diseases could be prevented and their percentage increased with the year of study. On the other hand, first year students do not share this opinion. The difference between individual years is statistically significant ( $p < 0,05$ ). Students stated that the main measures of prevention from occupational diseases for doctors of dental medicine was the use of protective masks (35.8%) and gloves (31.0%), changing the body position while working with patients (19.0%), vaccination (17.3%) and use of radiation protective gear (17.3%).

## Discussion

Occupational diseases are diseases caused by occupational exposures, while diseases related to work are diseases caused by many factors, where the harmful work conditions are one of the possible causes. Dental medicine is a profession with a high risk of developing occupational diseases or work-related diseases (1, 9). Adverse effects that may occur while providing dental services may be: biological, biomechanical, chemical, physical and psychological (10). Harmful biological factors are prions, viruses, bacteria and fungi that can cause various infections affecting the skin, eyes, respiratory system and other body systems or tissues (11). Harmful biomechanical elements are improper posture during work, repetitive movements, prolonged mechanical straining, vibrations, etc. Damaging biomechanical factors can lead to musculoskeletal disorders, disorders of the peripheral neurological system, neurological and other health problems (12). Factors that may adversely affect the health via their chemical properties are medicines, dental material and disinfectants (13, 14). They can cause hypersensitivity, allergies, skin diseases, injuries and burns (15). Physical factors that can damage one's health in dental medicine are noise, ionizing and non-ionizing radiation, artificial lighting, polymerization light and alike (16). Physical factors can cause hearing and sight impairments as well as other disorders caused by excessive radiation. The main psychological factors are stress and chronic fatigue. These factors can cause not only mental disorders such as depression and burnout syndrome but can also have somatic manifestations such as cardiovascular and digestive disorders (17).

A relatively high number (52.9%) of students who were willing to fill out the anonymous and voluntary questionnaire pointed to their readiness to be informed on this subject. This is especially seen in senior years of study where the percentage of students who filled out the questionnaire was 61.2%, indi-

prekliničkim vježbama i kliničkoj stomatološkoj praksi svjesniji problema profesionalnih bolesti i zdravstvenih opasnosti vezanih uz rad.

Ovim istraživanjem utvrđeno je da puši 28 posto studenata i 22,5 posto studentica. Ti rezultati odgovaraju rezultatima Šimata i suradnika iz 2011. godine nakon njihova istraživanja na Stomatološkom fakultetu Sveučilišta u Zagrebu kada su ustanovili da je učestalost pušača 23,8 posto (18). Warren i suradnici proveli su 2011. istraživanje u 44 zemlje o pušenju među studentima stomatologije, te su istaknuli da u više od pola zemalja uključenih u istraživanje puši najmanje 20 posto studenata (19). Ti rezultati odgovaraju i rezultatima ostalih istraživača, poput onih u Tanzaniji gdje je 12,8 posto pušača, ili onima u Poljskoj gdje je 18,3 posto pušača među studentima stomatologije (20, 21). Porast broja pušača među studentima prvih dviju godina studija, te poslije pad toga broja utvrđen u ovom istraživanju, mogao bi se objasniti svladavanjem stresa na najzahtjevnijim godinama studija. S druge strane, kod studentica na početku studija lagano pada broj pušačica do 4. godine kada broj počinje znatno rasti i udvostručavati se. Moglo bi se zaključiti da tijekom studija studenti postaju svjesniji loših učinaka pušenja na zdravlje, za razliku od svojih kolegica.

Činjenica da gotovo polovina studenata i studentica stomatologije Stomatološkog fakulteta Sveučilišta u Zagrebu, neovisno o godini studija, konzumira alkoholna pića najmanje jedanput na tjedan, te da se taj postotak na nekim godinama penje i na više od 80 posto, podatak je čije objašnjenje treba tražiti na individualnoj (npr. mehanizam za prilagodbu stresa kod pojedinca), ali i na društvenoj razini (društveno odobravanje konzumacije alkoholnih pića u raznim prigodama). U istraživanju Amemoria iz 2011., najveći zabilježeni postotak konzumacije alkohola među studentima bio je 23,8 posto, i to na mjesečnoj razini (21). Za mnoge studente odlazak na studij znači i odlazak iz roditeljskog doma, što neke dovodi u iskušenje da počnu pušiti i piti alkohol češće negoli inače. Taj trend posebno je izražen među studentima.

Lijepo je znati da se prije dolaska na studij 85,3 posto studenata i 77,6 posto studentica Stomatološkog fakulteta Sveučilišta u Zagrebu bavilo sportom najmanje jedanput na tjedan. No poražavajući je podatak da se na prvoj godini studija sportom najmanje jedanput na tjedan bavi samo 36,4 posto studenata i 32,4 posto studentica. Naravno, to se smanjenje može jednostavno objasniti dolaskom u novu sredinu i novim životnim okolnostima u kojima se mlada osoba treba snaći, te istodobno udovoljiti zahtjevima nastave koja je na početku studija opsežna i zahtjevna. Nastava tjelesnog odgoja i redovito bavljenje sportom jedan su od osnovnih preduvjeta za sprječavanje zdravstvenih problema kod studenata stomatologije, pogotovo onih muskuloskeletnih (7, 22). Način kretanja studenata gradom, a prevladava uporaba javnog prijevoza, upućuje na nedostatak zdrave navike pješaćenja i uporabe bicikla.

Niska razina osviještenosti studenata, posebno onih na početku studija o profesionalnim bolestima i bolestima vezanima uz rad, upozorava na to da još u srednjoj školi pri odabiru budućeg zanimanja srednjoškolci koji pokazuju zanimanje za upis na ovaj studij treba informirati o zdravstvenim

catating that students with some experience in preclinical and clinical dental practice are more aware of the problem of occupational diseases and work related health hazards.

This research has shown that there were 28.0% of male smokers and 22.5% of female smokers. These results match the ones from the study of Šimat et al. who found that the frequency of smokers among the students of the School of Dental Medicine University of Zagreb was 23.8% (18). Warren et al. conducted a research about smoking among students of dental medicine in 44 world countries in 2011. They have established that in more than half of the countries involved in this study research has shown that at least 20% of students were smokers (19). These results match the ones from other researches such as those in Tanzania where there were 12.8% of smokers or those from Poland where there were 18.3% of smokers among dental medicine students (20, 21). The increase in the number of smokers in the first two years of study and the later decrease of that same number, which was established with this research, could be explained by coping with stress in the most difficult years of study. On the other hand, among the female students, at the beginning of their study there was a slight stagnation in the number of smokers until the fourth year of study when their number significantly increased and doubled. It may be concluded that during the years at the university, male students became more aware of harmful effects smoking has on their health as opposed to female students.

It was shown that almost half of the male and female students alike consumed alcohol at least once a week; regardless of their academic year and that this percentage was as high as 80% in some academic years. This fact should be investigated individually (a means to cope with stress) but also on a social level (socially acceptable situation for alcohol consumption). In Amemoria research from 2011, the highest recorded percentage of alcohol consumption among students was 23.8% on a monthly basis (21). For many students, going to university also means moving away from their parents' homes which for some of them brings the temptations of smoking and drinking alcohol more often than they usually would. This trend was especially expressed among the male students.

It is a positive fact that before commencing their studies, 85.3% percent of male students and 77.6% of female students of the School of Dental Medicine University of Zagreb participated in sports at least once a week. On the other hand, the most unfavorable fact is that in the first years of study, only 36.4% of male students and 32.4% of female students partake in sports at least once a week. Naturally, this decrease can simply be explained by new surroundings and new life circumstances which a young person has to manage while simultaneously meeting the requirements of schooling which are very extensive and demanding at the beginning. Physical education course and regular partaking in sports are basic preconditions for the prevention of health issues in students of dental medicine, especially regarding musculoskeletal problems (7, 22). Increased use of public transportation points to the lack of healthy habits of walking and cycling.

A low level of awareness of students, especially ones at the beginning of university, about occupational diseases and



problemima koje ovo zvanje može izazvati. S druge strane, studentima stomatologije treba omogućiti opis odgovarajućeg kolegija na kojem će se moći teoretski i praktično educirati o profesionalnim bolestima stomatologa, njihovoj etiologiji, patogenezi, liječenju i prevenciji (23, 24). Iako su studenti dobro uočili potencijalne zdravstveno štetne čimbenike u stomatološkoj ordinaciji te naveli osnovne mjere zaštite, to ne mora nužno značiti da će, ako to bude potrebno, znati odgovarajuće prebroditi stres i prevladati zdravstvene rizike stomatološke profesije.

Rezultati ovog istraživanja koji su upozorili na nisku razinu svijesti studenta o profesionalnim i s radom povezanim bolestima, visoka razina nekih loših zdravstvenih navika, kao što su konzumiranje alkohola, nedostatan broj studenta koji su redovito uključeni u sportske aktivnosti i nedostatak ergonomske obrazovanja, potaknuli su na razmatranje mogućnosti uvođenja novog kolegija u nastavni program. Nakon pomne analize zdravstvenih problema koje prijavljuju hrvatski stomatolozi i rezultata studentske ankete te nastavnih programa drugih kolegija na studiju dentalne medicine Stomatološkog fakulteta Sveučilišta u Zagrebu, odlučeno je da se utemelji novi kolegij nazvan *Profesionalne bolesti u stomatologiji*. Planiran je kao multidisciplinarni i temelji se na predavanjima i vježbama za studente 6. semestra. Na studiju dentalne medicine Stomatološkog fakulteta Sveučilišta u Zagrebu 6. semestar je ujedno i posljednji prije početka kliničkoga rada s pacijentima koji traje idućih šest semestara. Ovaj semestar smatra se kao pravo vrijeme da se studenti pouče o zdravstvenim opasnostima, profesionalnim bolestima i bolestima vezanima uz rad, jer već imaju pretkliničko iskustvo i uvid u svakodnevni rad u stomatološkoj ambulanti, što im omogućuje da shvate koliko je važno pravilno držanje pri radu, ergonomija, fizičke aktivnosti, mentalno zdravlje i tehnika obuzdavanja stresa, itd. Predavači ovog kolegija doktori su dentalne medicine i liječnici drugih specijalizacija, kao što su otorinolaringologija, dermatologija, oftalmologija, imunologija, kardiologija, ortopedija, itd. Tijekom 15 predavanja studenti uče o gotovo svim opasnostima za zdravlje vezanima uz stomatološku profesiju i kako spriječiti zdravstvene probleme. Na vježbama se studentima govori o ergonomske načelima u stomatologiji i načinima sprječavanja muskuloskeletnih poremećaja primjenom posebnih vježbi za stomatologe.

## Zaključak

Rezultati istraživanja pokazali su da se studenti stomatologije upisuju na studij s relativno niskom razinom osviještenosti o zdravstvenim opasnostima svoje buduće profesije. Studenti su u većoj mjeri sposobni identificirati štetne, potencijalno za zdravlje opasne čimbenike pri obavljanju stomatološke djelatnosti, te moguće načine zaštite. No iako se razina osviještenosti o profesionalnim bolestima, te bolestima vezanima uz rad podiže s godinama studija, štetne navike poput pušenja, konzumacije alkohola, te nedostatne tjelesne aktivnosti ostaju i na višim godinama studija. Kako bi se zdrav-

work related diseases points to the fact that some level of education should be implemented in high schools to inform the students about the risks that are involved with certain professions. On the other hand, dental medicine students should have the possibility to enroll in a course that would give them theoretical and practical knowledge on occupational diseases among doctors of dental medicine, their etiology, pathogenesis, treatment and prevention (23, 24). Although the students have recognized potential harmful health effects in the dental office and cited basic measures of prevention, it does not mean that they have the necessary knowledge to deal with stressful situations and risks which are part of an everyday routine in a dental office.

Motivated by the results of this survey which indicated a low degree of awareness of students about occupational and work related diseases, high frequency of some bad health-related habits such as smoking and alcohol consumption, insufficient number of students who are regularly involved in sports and a lack of ergonomic education, establishing a new course in the dental curriculum was taken into consideration. After careful analysis of health related issues reported by Croatian dentists, the results of the student survey and program of other dental courses at the School of Dental Medicine University of Zagreb, it was decided to start a new course entitled "Occupational diseases in dental medicine". The course was planned as a multidisciplinary course based on lectures and practical lessons for students of the 6th semester. At the School of Dental Medicine University of Zagreb, the 6<sup>th</sup> semester is the last semester before students start clinical work with patients lasting the next 6 semesters. This semester was considered to be ideal for teaching students about health hazards, occupational and work related diseases because students have some preclinical experience and insights into everyday work in a dental office allowing them to understand the importance of a correct working position, ergonomics, physical activity, mental health and stress managing techniques etc. Teachers of the course are doctors of dental medicine and physicians of different specialties such as otorhinolaryngologists, dermatologists, ophthalmologists, immunologists, cardiologists, orthopedic specialists etc. During 15 lectures students have an opportunity to learn about almost all health risks related to dental profession and how to prevent the health related problems. During the practical lessons students are introduced to dental ergonomics and shown how to avoid musculoskeletal disorders by applying special exercises for dentists.

## Conclusion

The results have shown that students enroll into the School of Dental Medicine University of Zagreb with a relatively low level of awareness of the health hazards of the dental profession. Students are capable of identifying harmful and health endangering factors that can occur while practicing dental medicine as well as possible ways of prevention and protection. Although the level of awareness increases with years of study, harmful habits such as smoking, alcohol consumption and the lack of physical activity still remain present in the later years of study. Preventive measures should

lje novih generacija stomatologa što dulje sačuvalo i kako bi profesionalne bolesti nastupile što kasnije, preventivne mjere potrebno je poduzimati već tijekom studija. Studente treba osvijestiti o tom problemu i poučiti ih kako mogu izbjeći zdravstvene poteškoće kada završe studij i počnu se samostalno baviti stomatologijom.

### Sukob interesa

Nije bilo sukoba interesa.

be applied during the years of study in order to avoid occupational diseases and maintain the health of new generations of doctors of dental medicine. Students should be aware of these problems and learn how to prevent health issues when they finish university and start practicing dental medicine on their own.

### Conflict of interest

None declared

### Abstract

**Introduction:** Occupational diseases are diseases caused by occupational exposures at the workplace, while diseases related to work are diseases caused by many factors, wherein the harmful work conditions are one of the possible causes. Dental medicine is a profession with a high risk of developing occupational diseases. The aim of this paper was to present the results of a survey about occupational health risks and health related habits among dental students at the School of Dental Medicine University of Zagreb and to show how this survey led to an improvement in education by introducing a new course into the dental curriculum. **Participants and methods:** Students of all years at the School of Dental Medicine University of Zagreb (total of 663) were offered to participate in a survey about occupational health risks and health related habits. **Results:** A questionnaire was completed by 351 students. 28.0% of male students and 22.5% of female students were smokers. During the first two years of study, up to 84.6% of students consumed alcoholic beverages at least once a week. Prior to enrollment in the university, 85.3% male and 77.6% female students were engaged in sports. The significant drop in the number of students who participated in sports was noticed in the first study year in both sexes. Student awareness of the health risks related to dental profession increases with the year of study. Most students believe that occupational diseases can be prevented. **Conclusion:** The results have shown that students enter the School of Dental Medicine with a relatively low level of awareness of the health hazards of dental profession. Although the level of awareness increases with years of study, harmful habits such as smoking, alcohol consumption, and the lack of physical activity also remain present in the later years of study.

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### Key words

Education, Dental, Graduate; Students, Dental; Occupational Diseases; Croatia

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