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# Knowledge and Awareness of Dental Erosion among Croatian Certified Wine Assessors

## Znanje i svijest o dentalnoj eroziji ovlaštenih hrvatskih ocjenjivača vina

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### Abstract

**Objectives:** The aim of this study was to evaluate the knowledge and awareness of dental erosion, its etiology and preventive practices among certified Croatian wine assessors. **Participants and Methods:** An anonymous questionnaire structured in two sections was completed by 90 certified Croatian wine assessors, representing more than 80% of active certified assessors in Croatia. The first section covered demographic and professional data, including age, years of professional experience, frequency of wine tasting and habits related to tasting. The second section evaluated participants' knowledge regarding etiology, prevention and therapy pertaining to dental erosion. Data were analysed using descriptive statistics and standard statistical tests commonly applied in questionnaire-based studies. **Results:** Although the majority of participants visited the dentist regularly, only two-thirds noted that their dentist knew their occupation. Wine assessors' knowledge of dental erosion was not typically associated with dentists' awareness of their occupation. While merely 23% of participants learned about dental erosion from their dentists, 45% acquired this knowledge from other sources. Although 67% of respondents had heard of dental erosion, their factual knowledge was limited. A total of 69% of participants reported no specific oral care practices before or after wine tasting; observable habits were not related to their professional experience. **Conclusion:** Awareness of dental erosion among Croatian wine assessors proved insufficient. An appropriate form of education, especially one provided by dentists, is required to emphasize the risks and outline the potential for prevention and treatment of dental erosion.

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## Introduction

Wine consumption is deeply embedded in Western culture. As a component of the Mediterranean diet, wine has also become an important topic in public health discussions in which its potential health benefits and adverse effects continue to be debated (1). Although wine production is often perceived as an agreeable profession due to tasting as an integral part of quality control, it actually entails several occupational hazards, including significant risks to oral health. Frequent exposure of oral tissues to the chemically aggressive constituents of wine places professional wine assessors at an increased risk of developing dental erosion, dentin hypersensitivity and xerostomia, while associated complications often exacerbate the problem (2, 3). Numerous studies have

## Uvod

Konzumacija vina duboko je ukorijenjena u zapadnoj kulturi. Kao sastavnica mediteranske prehrane vino je postalo važna tema kad je riječ o zdravlju i u raspravama u kojima se kontinuirano govori o njegovim mogućim zdravstvenim dobrobitima, ali i o potencijalno štetnim učincima (1). Proizvoditi vino, zato što je degustacija dio stvaranja i kontrole kakvoće, često se smatra privlačnim zanimanjem. No, uz privlačnost, to uključuje niz profesionalnih rizika, među kojima su i oni povezani s oralnim zdravljem. Učestala izloženost oralnih tkiva kemijski agresivnim sastojcima vina izlaže profesionalne degustatore vina povećanom riziku od pojave dentalne erozije, dentinske preosjetljivosti i kserostomije, pri čemu prateće komplikacije često dodatno pogoršavaju sta-

identified dental erosion as the predominant oral pathology among professional wine assessors, whose work involves not only drinking wine but also the act of swirling and retaining it in the mouth for extended periods, thereby increasing the erosive effects of the wine acids (3–11). Saliva, which normally acts as a natural buffering system in the oral cavity, becomes diluted and washed away during repeated wine tasting; this results in a decrease in oral pH towards the acidic range of wine (12). As reported by Wiktorsson et al., the high frequency of tasting among Swedish wine tasters indicated that between twenty and fifty wines were sampled per day, which supports the premise that dental erosion is a genuine occupational hazard in wine production and professional tasting (4, 7).

Dental erosion is defined as the chronic, pathological loss of dental hard tissues caused by extrinsic or intrinsic acids in the absence of bacterial involvement (13, 14). Although intrinsic factors, such as gastric acid, may lead to severe erosive tooth wear, their effect on dental erosion is far less pronounced than acids introduced into the oral cavity from external sources (15, 16). It stands to reason that, among professional wine tasters, dental erosion is predominantly associated with exposure to extrinsic acids. Wine typically has a pH of approximately 3.0 to 3.8 and contains mainly tartaric, malic, lactic, and citric acids; succinic and acetic acids are also present, albeit in smaller amounts. Hydrogen ions released during the dissociation of these acids together with calcium-binding anions (chelating agents) contribute to the demineralization of dental hard tissues. Demineralization may be followed by or occur simultaneously with remineralization, which may partially repair the demineralized tissues. These processes alternate only while the pH value remains above the critical threshold; once the pH falls below this level, demineralization predominates, resulting in an accelerated loss of dental hard tissues, which clinically manifests as dental erosion. The extent of demineralization depends on several factors: tooth structure, genetic determinants of enamel quality, salivary flow and composition, type of acid involved, duration of exposure (as well as the pattern of acid contact with the tooth surface) and oral hygiene practices (17, 18). The development of dental erosion is therefore multifactorial; some factors promote its onset, whereas others help to prevent or mitigate the demineralization of dental hard tissues. Frequent exposure to wine acids is unavoidable for professional wine assessors and industry personnel. Consequently, they should be aware of this occupational hazard associated with this vulnerability and cognizant of preventive measures that mitigate risks to their oral health. Dentists should therefore be familiar with their patients' professional activities to provide timely advice and preventive guidance before advanced stages of dental erosion require clinical treatment. Numerous studies have identified dental erosion as a consequence of wine consumption (7, 8, 11, 19), while considerably more have focused on acidic non-alcoholic beverages as etiological factors in the development of erosive tooth wear (20–23). However, few studies have assessed the levels of knowledge and awareness of this condition (5, 24, 25). This type of investigation, particularly among individuals at in-

nje (2, 3). Autori mnogobrojnih istraživanja pokazali su da je dentalna erozija najčešća oralna patologija profesionalnih degustatora vina. Njihov posao uključuje ne samo kušanje vina, nego i dulje zadržavanje i ispiranje usne šupljine vinom, čime se pojačava erozivni učinak kiselina (3–11). Slina, koja u usnoj šupljini djeluje kao prirodni puforni sustav, tijekom učestalog kušanja vina razrjeđuje se i ispire, što snižava oralni pH prema kiselim vrijednostima svojstvenima za vino (12). Na primjeru švedskih degustatora, koji na dan ocijene između 20 i 50 uzoraka vina, Wiktorsson i suradnici potvrdili su da je dentalna erozija stvarna profesionalna opasnost u proizvodnji vina i profesionalnom kušanju (4, 7).

Dentalna erozija kronični je patološki gubitak tvrdih zubnih tkiva prouzročen djelovanjem vanjskih ili unutarnjih kiselina, bez sudjelovanja bakterija (13, 14). Iako unutarnji čimbenici, poput želučane kiseline, mogu prouzročiti teško erozivno trošenje zuba, njihov utjecaj na razvoj dentalne erozije znatno je manji od utjecaja kiselina koje u usnu šupljinu dospijevaju iz vanjskih izvora (15, 16). Zato se može pretpostaviti da je kod profesionalnih degustatora vina dentalna erozija uglavnom povezana s izloženošću vanjskim kiselinama. pH vina obično je u rasponu između 3,0 i 3,8, uz najvažnije kiseline vinsku, jabučnu, mliječnu i limunsku, a jantarna i octena kiselina nalaze se u manjim koncentracijama. Vodikovi ioni koji se oslobađaju disocijacijom navedenih kiselina, zajedno s anionima koji vežu kalcij (kelirajućim agensima), pridonose demineralizaciji tvrdih zubnih tkiva. Demineralizaciju može pratiti remineralizacija, ili oba procesa mogu biti istodobna, pri čemu remineralizacija može djelomično obnoviti demineralizirana tkiva. Ti se procesi izmjenjuju samo dok je pH iznad kritične vrijednosti. Kada pH padne ispod te granice, prevladava demineralizacija, što potiče ubrzani gubitak tvrdih zubnih tkiva koji se klinički očituje kao dentalna erozija. Opseg demineralizacije ovisi o mnogobrojnim čimbenicima, uključujući građu zuba, genetski uvjetovana svojstva cakline, protokol i sastav sline, vrstu kiseline, trajanje izloženosti i način kontakta kiseline s površinom zuba, te navike kad je riječ o oralnoj higijeni (17, 18).

Razvoj dentalne erozije stoga je multifaktorijsan proces; pojedini čimbenici potiču njezin nastanak, a drugi pridonose prevenciji ili ublažavanju demineralizacije tvrdih zubnih tkiva. Profesionalni degustatori vina i druge osobe zaposlene u vinskoj industriji, zbog prirode svojega posla, ne mogu izbjeći učestalu izloženost kiselinama u vinu. Ipak, trebali bi biti svjesni profesionalnog rizika kojemu su izloženi te poznavati preventivne mjere kojima se taj rizik može smanjiti i očuvati oralno zdravlje. Zato bi doktori dentalne medicine trebali biti obaviješteni o profesionalnim aktivnostima svojih pacijenata kako bi im mogli pravodobno dati savjete i preporuke za prevenciju, i to prije nego što uznapredovali stadiji dentalne erozije zahtijevaju kliničko liječenje. U mnogobrojnim istraživanjima utvrđena je dentalna erozija kao posljedica konzumacije vina (7, 8, 11, 19), a još veći broj radova bio je usmjeren na kisela bezalkoholna pića kao etiološke čimbenike pojave erozivnoga trošenja zuba (20–23). No u malo se istraživanja procjenjivala razina znanja i svijesti o tom problemu (5, 24, 25). Takva su istraživanja, osobito u populacijama s povećanim rizikom od pojave dentalne erozije, ključ-

creased risk of dental erosion, is crucial for raising awareness as well as for the future development of effective educational programmes and preventive guidelines. Despite the risk of dental erosion in viticulture having been repeatedly recognised as a genuine occupational hazard that requires a multidisciplinary approach (5, 7, 26–29), studies investigating knowledge and awareness of this condition among wine professionals remain scarce (30). While recognised at several international levels through ISO standards (31), various international professional associations (32) and European Union legislation (33), wine assessors have yet to be considered as a specific group of accredited professionals within the wine industry. The need for targeted research and inclusion of dental science in this specific segment of enology is further supported by the fact that wine assessors encounter a significant risk of dental erosion.

The aim of this study was to assess the knowledge of certified Croatian wine assessors with regard to dental erosion, its etiology and prevention and the potential oral health risks associated with the wine sector. These findings should provide a baseline for educational strategies pertaining to dental erosion and its prevention among wine industry employees, with a particular emphasis on professional wine assessors.

## Participants and Methods

The study was conducted at the Laboratory for Sensory Testing of the Croatian Agency for Agriculture and Food. The laboratory is responsible for conducting sensory analyses of wines, fruit wines, aromatized wine-based products and spirits, and is accredited in accordance with the HRN EN ISO/IEC 17025:2017 standard. Due to its distinctive nature and complexity, sensory analysis was performed by certified assessors whose qualifications are defined and accredited through the Croatian Wine Act (34); the procedures for verifying sensory abilities and professional competence are established by the Implementing Regulation (35).

The study included certified assessors listed in the official register, which is periodically updated in accordance with legal provisions and publicly available through the institution's official documentation portal. The study sample comprised 108 certified 'wine assessors', the term being defined as trained professionals authorized to perform the sensory evaluation of wines. Participation in the study was voluntary and anonymous.

A descriptive questionnaire-based cross-sectional study was designed to assess awareness, factual knowledge and preventive behaviours related to dental erosion among certified wine assessors. The study was conducted using an online questionnaire created on Google Forms. The questionnaire consisted of two sections: (1) demographic and professional information (including age, professional experience in the wine sector and wine tasting, oral health habits and wine tasting practices); and (2) awareness and factual knowledge of dental erosion. Awareness was assessed through questions addressing participants' recognition of dental erosion as a potential occupational health issue and their perception of its relevance to wine tasting. Factual knowledge was defined as

na za podizanje svijesti te za razvoj učinkovitih edukacijskih programa i preventivnih smjernica. Iako je rizik od dentalne erozije u vinarstvu više puta istaknut kao stvarna profesionalna opasnost koja zahtijeva multidisciplinarni pristup (5, 7, 26 – 29), istraživanja u kojima se procjenjuju znanje i svijest o tom problemu u ovoj specifičnoj skupini stručnjaka i dalje su rijetka (30). Premda su degustatori vina prepoznati na međunarodnoj razini, u ISO normama s definiranim nazivom *ocjenjivač* (31), u međunarodnim stručnim organizacijama (32) te u zakonodavstvu Europske unije (33), još nisu prepoznati i kao posebna skupina akreditiranih stručnjaka unutar vinskoga sektora. Potrebu za ciljanim istraživanjima i uključivanjem dentalne medicine u taj specifični segment enologije dodatno potvrđuje činjenica da su degustatori vina izloženi povećanom riziku od pojave dentalne erozije.

Svrha ovog istraživanja bila je ispitati znanje ovlaštenih ocjenjivača vina u Hrvatskoj o dentalnoj eroziji, njezinoj etiologiji i prevenciji te mogućim rizicima za oralno zdravlje povezanim s radom u vinskom sektoru. Dobiveni rezultati trebali bi poslužiti kao polazište za odgovarajuće edukacijske strategije o dentalnoj eroziji i njezinoj prevenciji za osobe zaposlene u vinskom sektoru, s posebnim naglaskom na ovlaštene ocjenjivače vina.

## Ispitanici i metode

Istraživanje je provedeno u Laboratoriju za senzorna ispitivanja Hrvatske agencije za poljoprivredu i hranu. Laboratorij je mjerodavan za provedbu senzornih analiza vina, voćnih vina, aromatiziranih proizvoda na bazi vina i jakih alkoholnih pića te je akreditiran u skladu s normom HRN EN ISO/IEC 17025:2017. Zbog specifičnosti i kompleksnosti senzorne analize, provode je ovlašteni ocjenjivači čije su kvalifikacije definirane Zakonom o vinu (34), a postupci provjere senzornih sposobnosti i stručne osposobljenosti propisani su provedbenim pravilnikom (35).

U istraživanje su uključeni ovlašteni ocjenjivači upisani u službeni registar koji se periodično obnavlja u skladu s pravnom podlogom i javno je dostupan na službenom portalu institucije. Početni uzorak obuhvaćao je 108 ovlaštenih ocjenjivača, pri čemu se pod pojmom *ocjenjivač* podrazumijeva osposobljen i certificiran stručnjak, ovlašten za provedbu senzornih ispitivanja u navedenom laboratoriju. Sudjelovanje u istraživanju bilo je dragovoljno i anonimno.

Provedeno je presječno deskriptivno istraživanje na temelju upitnika, sa svrhom procjene svijesti, stvarnoga znanja i preventivnog ponašanja povezanog s dentalnom erozijom ovlaštenih ocjenjivača vina i drugih navedenih proizvoda iz djelokruga laboratorija. Istraživanje je provedeno na temelju mrežnog upitnika izrađenog u aplikaciji Google Forms. Sastojao se od dviju cjelina: (1) demografskih i profesionalnih podataka (dob, profesionalno iskustvo u vinarstvu, iskustvo u profesionalnom ocjenjivanju vina, navike povezane s oralnim zdravljem te praksa degustiranja vina) i (2) pitanja kojima se procjenjivala svijest i stvarno znanje o dentalnoj eroziji.

Svijest o dentalnoj eroziji procijenjena je pitanjima kojima je istraženo prepoznaju li sudionici dentalnu eroziju kao mogući profesionalan zdravstveni problem te smatraju li je

participants' ability to correctly identify evidence-based information regarding the etiology, clinical manifestations, reversibility and prevention of dental erosion. Each questionnaire item was analysed separately according to its objective and response format. Therefore, no composite knowledge score was calculated. The questionnaire was developed within the laboratory, and subsequently underwent expert review by a specialist in preventive and restorative dentistry to confirm the scientific accuracy and clinical relevance of items. Prior to distribution, a pilot test was conducted at the laboratory with three certified assessors to evaluate the clarity of the questions and the response format.

The response rate was 83% of the initial sample; 98% of the returned questionnaires were included in the analysis. Participants' professional experience in the wine sector and their years of experience in professional wine tasting are presented in Figure 1.

### Statistical Analysis

Data were analysed using descriptive statistics and statistical methods commonly applied in survey-based research to test the differences among variables. Frequencies of qualitative variables were presented graphically. As the Kolmogorov–Smirnov test indicated that the data did not follow a normal distribution, comparisons among categorical variables were performed using the non-parametric  $\chi^2$  test for independence. A contingency table was constructed for each response option. Given the presence of multiple comparisons, the  $\chi^2$  test for independence was performed separately for each response option. Effect sizes for the  $\chi^2$  analyses were quantified using Cramer's V, and Cohen's criteria were used for interpretation: V or  $r < 0.3$  small,  $0.3 - 0.5$  medium,  $> 0.5$  large.

To control for alpha inflation resulting from multiple testing, the Bonferroni correction was applied in both sets of analyses. The significance threshold was therefore set at  $\alpha = 0.01$  ( $0.05/5$ ) for the symptom variable and  $\alpha = 0.008$  ( $0.05/6$ ) for the treatment variable. A statistical analysis of the distribution of responses across the targeted groups was performed to evaluate the influence of the dentist–patient relationship as it pertained to the knowledge and behaviour of certified assessors, as well as to examine the influence of tasting intensity and overall professional experience. The null hypothesis ( $H_0$ ) was used to test whether dentists' awareness of the respondents' profession (i.e., certified enologists engaged in intensive tasting) is associated with their knowledge of the symptoms of dental erosion and with oral hygiene practices aimed at preventing its occurrence. Data processing and statistical analyses were performed using Microsoft Excel and Statistica (version 12.0; TIBCO/StatSoft, Tulsa, OK, USA).

### Results

Results showed that, among certified wine assessors, visitation to different dental services was evenly distributed: public dental services (30%), private dentists (35%) and both types of services (35%). Most assessors reported visiting a dentist at least occasionally, regardless of the presence of spe-

važnom u kontekstu kušanja vina. Stvarno znanje definirano je kao sposobnost sudionika da točno prepozna znanstveno utemeljene informacije o etiologiji, kliničkim obilježjima, reverzibilnosti i prevenciji dentalne erozije. Svako pitanje analizirano je zasebno, u skladu s njegovim ciljem i oblikom odgovora.

Upitnik je pripremljen u Laboratoriju za senzorna ispitivanja Hrvatske agencije za poljoprivredu i hranu i pregledao ga je specijalist preventivne i restaurativne dentalne medicine radi potvrde znanstvene utemeljenosti i kliničke relevantnosti sadržaja. Prije početka istraživanja provedeno je pilot-istraživanje s trima ovlaštenim ocjenjivačima radi procjene jasnoće pitanja i ponuđenih odgovora.

Stopa odaziva iznosila je 83 % početnog uzorka, a u analizu rezultata uključeno je 98 % zaprimljenih upitnika. Profesionalno iskustvo sudionika u vinarstvu te iskustvo u profesionalnom kušanju vina prikazani su na slici 1.

### Statistička analiza

Podatci su analizirani primjenom deskriptivne statistike i statističkih metoda koje se uobičajeno primjenjuje u istraživanjima temeljenima na anketnim upitnicima radi ispitivanja razlika između varijabli. Frekvencije kvalitativnih varijabli prikazane su grafički. Budući je Kolmogorov–Smirnovljev test pokazao da podatci ne slijede normalnu raspodjelu, usporedbe kategorijskih varijabli provedene su neparametrijskim  $\chi^2$ -testom neovisnosti. Za svaku kategoriju odgovora izrađena je kontingencijska tablica. S obzirom na višestruke usporedbe,  $\chi^2$ -test neovisnosti proveden je zasebno za svaku kategoriju odgovora. Veličina učinka za  $\chi^2$ -analize procijenjena je Cramérovim koeficijentom V. Za interpretaciju veličine učinka primijenjeni su Cohenovi kriteriji:  $V < 0,3$  označava mali učinak,  $0,3 - 0,5$  srednji učinak, a  $> 0,5$  veliki učinak.

Radi kontrole povećanja vjerojatnosti pogreške tipa I zbog višestrukog testiranja primijenjena je Bonferronijeva korekcija. Prag statističke značajnosti zato je postavljen na  $\alpha = 0,01$  ( $0,05/5$ ) za varijablu simptoma te na  $\alpha = 0,008$  ( $0,05/6$ ) za varijablu preventivnih postupaka. Statistička analiza raspodjele odgovora između promatranih skupina obavljena je zbog procjene utjecaja odnosa doktor dentalne medicine - pacijent na znanje i ponašanje ovlaštenih ocjenjivača vina te ispitivanja utjecaja intenziteta degustiranja i ukupnoga profesionalnog iskustva. Nulta hipoteza ( $H_0$ ) postavljena je da bi se ispitalo postoji li povezanost između obaviještenosti doktora dentalne medicine o zanimanju ispitanika (odnosno, činjenice da su pacijenti enolozi koji se intenzivno bave degustiranjem vina) i njihova poznavanja simptoma dentalne erozije te provedbe mjera u održavanju oralne higijene usmjerenih na njezinu prevenciju. Obrada podataka i statističke analize obavljene su u programima Microsoft Excel i Statistica (verzija 12.0; TIBCO/StatSoft, Tulsa, Oklahoma, SAD).

### Rezultati

Rezultati su pokazali da se ovlaštene ocjenjivače vina podjednako koriste različitim oblicima dentalne zdravstvene skrbi: javnom dentalnom zdravstvenom službom koristi se 30 % ispitanika, privatnim ordinacijama doktora dentalne medicine njih 35 %, a s oba oblika 35 %. Većina ocjenjivača

cific symptoms. In approximately two-thirds of cases, dentists were aware of the participants' profession as well as the fact that their activities involve intensive wine tasting (Figure 2). With regard to tasting intensity, one third of participants reported tasting up to 20 samples per week; thirty percent of participants tasted between 20 and 49 samples per week, while the remaining third tasted 50 or more samples per week; in some cases, up to 200 wines were sampled. Across groups defined by tasting intensity, the range of professional experience varied from only a few years to more than 35 years.

A total of 69% of participants reported no specific dental care practices before and/or after tasting. Oral care habits before or after tasting did not vary with increasing years of professional tasting experience ( $\chi^2 = 1.915$ ,  $df = 2$ ,  $p = 0.384$ ). The observed association was weak (Cramer's  $V = 0.147$ ), indicating a small effect size. Among the participants who practiced some form of dental care, the most frequently mentioned practices included brushing with commercially available toothpaste for sensitive teeth, using commercial mouth rinses for sensitive teeth and brushing their teeth after tasting. Only four participants reported using a specialised toothpaste or protective dental coating. A total of 66% of participants reported frequently rinsing their mouth with

navela je da povremeno posjećuje doktora dentalne medicine, neovisno o specifičnim simptomima. U približno dvije trećine slučajeva doktori dentalne medicine bili su obaviješteni o zanimanju pacijenata te činjenicom da njihov profesionalni rad obuhvaća intenzivno degustiranje vina (slika 2.).

S obzirom na intenzitet degustiranja, jedna trećina sudionika navela je da na tjedan senzorno ocijeni do 20 uzoraka vina, 30 % između 20 i 49, a preostala trećina degustira 50 ili više uzoraka na tjedan, pri čemu su pojedini ispitanici naveli i do 200 uzoraka. U svim skupinama razvrstanim prema intenzitetu degustiranja, profesionalno iskustvo ispitanika bilo je od nekoliko godina do više od 35.

Da ne provodi posebne mjere oralne higijene prije i/ili poslije degustiranja vina, izjavilo je 69 % sudionika. Navike u održavanju oralne higijene prije ili poslije kušanja nisu se razlikovale s obzirom na iskustvo u profesionalnom ocjenjivanju vina ( $\chi^2 = 1.915$ ;  $df = 2$ ;  $p = 0.384$ ). Uočena povezanost bila je slaba (Cramérov  $V = 0.147$ ), što upućuje na malu veličinu učinka. U skupini sudionika koji provode određene mjere u održavanju oralne higijene najčešće je navedeno četkanje zuba komercijalno dostupnim zubnim pastama za osjetljive zube, zatim korištenje komercijalnih vodica za ispiranje usta za osjetljive zube te četkanje zuba poslije ocjenjivanja vina. Samo četiri sudionika navela su da se koriste speci-

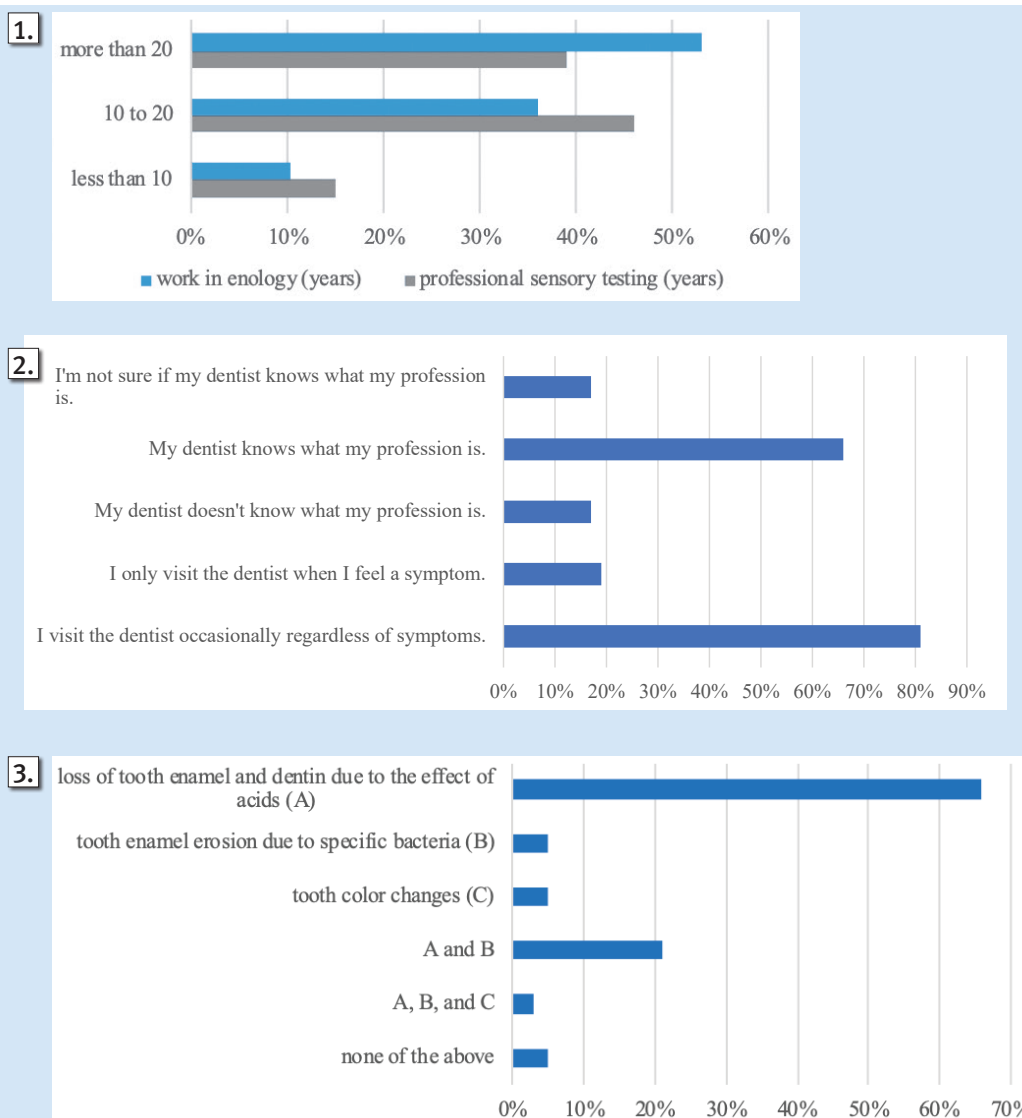
**Table 1** Results of the  $\chi^2$  test and Cramer's  $V$  for the variables 'dentist's awareness of the patient's profession', 'recognized symptoms of dental erosion' and 'treatments for reducing the potential for dental erosion'.

**Tablica 1.** Rezultati  $\chi^2$  testa i Cramerovi  $V$  koeficijenti za varijable obaviještenosti stomatologa o zanimanju ispitanika, prepoznati simptomi dentalne erozije i mjere za smanjenje rizika od dentalne erozije.

|                                                                                              |                                                                                   | Dentist aware of profession • Doktor dentalne medicine obaviješten o zanimanju (n=59) | Dentist possibly unaware • Doktor dentalne medicine vjerojatno nije obaviješten o zanimanju (n=15) | Dentist not aware of profession • Doktor dentalne medicine nije obaviješten o zanimanju (n=15) | $\chi^2$ | df | P      | Cramer's V • Cramérov V |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|----------|----|--------|-------------------------|
| Symptoms of DE • Simptomi dentalne erozije                                                   | Tooth discoloration • Promjene boje zuba                                          | 29 (49.2%)                                                                            | 9 (60.0%)                                                                                          | 5 (33.3%)                                                                                      | 2.18     | 2  | 0.335  | 0.157                   |
|                                                                                              | Sensitivity to cold/heat • Osjetljivost na hladno/toplo                           | 42 (71.2%)                                                                            | 10 (66.7%)                                                                                         | 8 (53.3%)                                                                                      | 1.74     | 2  | 0.419  | 0.140                   |
|                                                                                              | Thinning of tooth edges • Stanjeni rubovi zuba                                    | 27 (45.8%)                                                                            | 5 (33.3%)                                                                                          | 8 (53.3%)                                                                                      | 1.26     | 2  | 0.533  | 0.119                   |
|                                                                                              | Shinier, smoother surfaces • Sjajnije i glatkije površine zuba                    | 4 (6.8%)                                                                              | 0 (0%)                                                                                             | 0 (0%)                                                                                         | 2.13     | 2  | 0.345  | 0.155                   |
|                                                                                              | Fractures of the edges of the tooth • Lomovi na rubovima zuba                     | 14 (23.7%)                                                                            | 6 (40.0%)                                                                                          | 5 (33.3%)                                                                                      | 1.81     | 2  | 0.404  | 0.143                   |
| Treatments reducing the potential of DE • Preventivni postupci povezani s dentalnom erozijom | Teeth brushing immediately after tasting • Pranje zuba neposredno poslije kušanja | 37 (62.7%)                                                                            | 10 (66.7%)                                                                                         | 7 (46.7%)                                                                                      | 1.56     | 2  | 0.457  | 0.132                   |
|                                                                                              | Using a harder toothbrush • Primjena tvrde četkice za zube                        | 3 (5%)                                                                                | 1 (6.7%)                                                                                           | 0                                                                                              | 0.92     | 2  | 0.632  | 0.102                   |
|                                                                                              | More intensive brushing • Intenzivnije četkanje zuba                              | 14 (23.7%)                                                                            | 5 (33.3%)                                                                                          | 2 (13.3%)                                                                                      | 1.67     | 2  | 0.435  | 0.137                   |
|                                                                                              | Avoiding fluoride toothpaste • Izbjegavanje zubne paste s fluoridom               | 2 (3.4%)                                                                              | 1 (6.7%)                                                                                           | 0                                                                                              | 1.02     | 2  | 0.599  | 0.107                   |
|                                                                                              | None of the above • Ništa od navedenoga                                           | 6 (7%)                                                                                | 2 (13.3%)                                                                                          | 0                                                                                              | 1.93     | 2  | 0.381  | 0.147                   |
|                                                                                              | Not sure • Nisam siguran/na                                                       | 14 (23.7%)                                                                            | 3 (20%)                                                                                            | 9 (60%)                                                                                        | 8.35     | 2  | 0.015* | 0.306**                 |
|                                                                                              |                                                                                   |                                                                                       |                                                                                                    |                                                                                                |          |    |        |                         |

\* Trend observed; however, statistical significance was not confirmed after the Bonferroni correction. • Uočen je trend, ali statistička značajnost nije potvrđena poslije primjene Bonferronijeve korekcije.

\*\* Moderate effect • Srednja veličina učinka.



**Figure 1** Participants' professional experience in the wine industry and years of experience in professional wine tasting.

**Slika 1.** Profesionalno iskustvo ispitanika u vinskom sektoru i godine iskustva u profesionalnom senzornom ocjenjivanju vina

**Figure 2** Participants' relation to their dentists and dental services.

**Slika 2.** Odnos ispitanika prema stomatolozima i korištenju stomatoloških usluga

**Figure 3** Distribution of responses to the question 'What is dental erosion?'

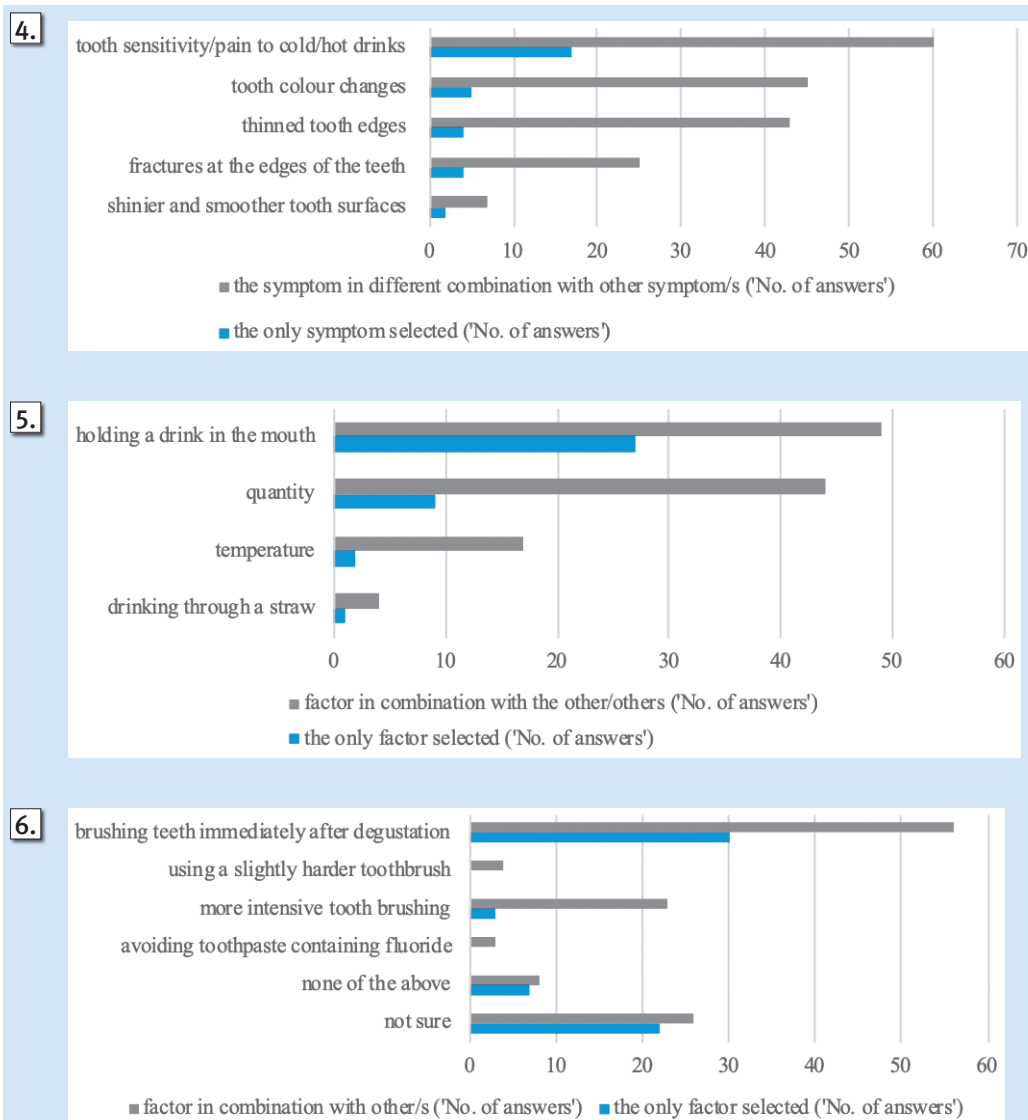
**Slika 3.** Raspodjela odgovora na pitanje: Što je dentalna erozija?

water during tasting, whereas 5% did not rinse at all and 29% did so only occasionally. The  $\chi^2$  test indicated no significant difference in mouth-rinsing behaviour between groups defined by whether their dentist was aware of their professional activities (Table 1).

One third of respondents indicated that they were not familiar with the term 'dental erosion'. This group included professionals of various ages with tasting experience ranging from 5 to 45 years. Participants who were familiar with the concept of dental erosion (67%) identified the following as sources of information: 23% cited their dentist; 24% referred to their workplace or other professional environment; the largest proportion (53%) reported obtaining information through the media or similar sources. To determine if awareness of dental erosion corresponded to factual knowledge, responses to several knowledge-based questions were analysed.

jaliziranim zubnim pastama ili zaštitnim premazom za zube. Da tijekom degustiranja često ispiru usta vodom, izjavilo je 66 % ispitanika, 5 % nikada ih ne ispiru, a 29 % to čini samo povremeno.  $\chi^2$ -test nije pokazao statistički značajnu razliku u navikama ispiranja usta između skupina s obzirom na to je li njihov doktor dentalne medicine obaviješten o njihovim profesionalnim aktivnostima (tablica 1.).

Jedna trećina ispitanika navela je da nije informirana o pojmu dentalna erozija. U toj skupini bili su stručnjaci različite dobi i s iskustvom u profesionalnom ocjenjivanju vina u rasponu od 5 do 45 godina. Sudionici koji su znali za pojam dentalne erozije (67 %), kao izvor informacija naveli su doktora dentalne medicine (23 %), radno mjesto ili drugo profesionalno okruženje (24 %), a najviše ih je (53 %) dobilo informacije iz medija ili sličnih izvora. Kako bi se ustanovilo odgovara li svijest o dentalnoj eroziji objektivnom znanju,



**Figure 4** Distribution of responses to the question 'What are the symptoms of dental erosion?'

**Slika 4.** Raspodjela odgovora na pitanje: Koji su simptomi dentalne erozije?

**Figure 5** Distribution of responses to the question 'Which factors increase the risk of dental erosion?'

**Slika 5.** Raspodjela odgovora na pitanje: Koji čimbenici povećavaju rizik od dentalne erozije?

**Figure 6** Distribution of responses to the question 'Which treatments may reduce the potential for dental erosion?'

**Slika 6.** Raspodjela odgovora na pitanje: Koji postupci mogu smanjiti rizik od dentalne erozije?

The results are presented in Figures 3–6.

A total of 90% of participants indicated that dental erosion ('DE') represents the loss of enamel and dentin due to the action of acids. However, 24% of respondents in this group also indicated that DE represents enamel loss caused by microbiological activity, specifically bacterial; these responses are regarded as inaccurate. The response options related to treatments aimed at reducing erosion potential were designed to assess factual knowledge. As all proposed answers describing specific treatments or behaviours were incorrect, the results indicate an unsatisfactory level of knowledge among most participants (Figure 6). No statistically significant correlation was found between dentists' awareness of their patients' profession and the level of knowledge professional wine assessors had acquired regarding dental erosion, including recognition of symptoms and an understand-

ing, koliko je stvarno znanje blizu objektivnom, analizirani su odgovori na pitanja kojima se procjenjivalo znanje. Rezultati nekih pitanja prikazani su na slikama od 3 do 6.

Ukupno 90 % sudionika navelo je da je dentalna erozija gubitak cakline i dentina prouzročen djelovanjem kiselina. Ali, 24 % ispitanika iz te skupine istodobno je istaknulo da je dentalna erozija gubitak cakline izazvan djelovanjem bakterija, što je pogrešan odgovor. Pitanja koja su se odnosila na postupke kojima se može smanjiti erozivni potencijal bila su osmišljena upravo zbog procjene stvarnoga znanja. Budući da svi ponuđeni odgovori koji su opisivali određene postupke ili ponašanja nisu bili točni, rezultati upućuju na nezadovoljavajuću razinu stvarnoga znanja kod većine sudionika (slika 6.). Nije utvrđena statistički značajna povezanost između obaviještenosti doktora dentalne medicine o zanimanju pacijenata i razine stvarnoga znanja profesionalnih ocjenjivača vina o den-

ing of preventive strategies (Table 1). Cramer's V indicated small effect sizes for all comparisons except for the response "Not sure" regarding preventive strategies, which showed a moderate effect ( $V = 0.306$ ). These findings suggest that the observed differences between groups were of limited practical significance.

## Discussion

To the best of our knowledge, this is the first study examining oral health habits and knowledge regarding dental erosion among Croatian enologists who are certified wine assessors. The high participation rate (83%) contributes to the strength of this investigation. Numerous studies on dental erosion in professional winemaking have primarily focused on risk factors and clinical case reports. In these studies, dental erosion was diagnosed in individuals who were otherwise in excellent general health and had healthy lifestyle habits, with the possible exception of their continuous exposure to wine tasting (6, 8, 14, 36, 37). Several authors have reported that white and sparkling wines, which typically predominate in professional tastings, are generally more erosive than red wines (37–40). However, red wines may represent a comparable risk, despite the potentially protective effects of the polyphenols present in reds (36, 40).

The results in this study indicate that Croatian wine assessors whose work involves frequent sensory evaluation are insufficiently informed about dental erosion. Although these individuals are educated in their area of expertise and generally attentive to oral health, and despite visiting dentists regularly even in the absence of symptoms, limitations in the dentist–patient relationship appear to exist. It was determined that despite the participants having demonstrated a general awareness of oral health, this awareness was not complemented by an adequate knowledge of the risks associated with dental erosion or the appropriate oral hygiene practices. Notwithstanding the fact that a high percentage of the participants were familiar with the term 'dental erosion' (67%), their responses to questions pertaining to definition and symptoms suggest that their factual knowledge of the subject appears to be deficient.

As multiple responses were allowed for several questions, participants may have selected more than one option based on partial knowledge, uncertainty, or guessing, making it difficult to distinguish true knowledge from response strategy. This may have resulted in an overestimation of participants' actual knowledge. For example, although many participants correctly identified dental erosion as the loss of enamel and dentin caused by acid exposure, 22% of those who selected the correct answer also chose the incorrect statement that dental erosion is "a process of enamel loss caused by the action of specific bacteria", indicating uncertainty despite recognizing the correct concept.

A similar limitation applies to the question addressing the symptoms of dental erosion, where all listed symptoms were correct. Participants frequently selected two symptoms, possibly reflecting personal experience or assumptions rath-

talnoj eroziji, uključujući prepoznavanje simptoma i razumijevanje preventivnih mjera (tablica 1.). Cramérov koeficijent V pokazao je male veličine učinka za sve usporedbe, osim za odgovor *nisam siguran/na* u pitanju koje se odnosilo na preventivne mjere, za koje je utvrđena srednja veličina učinka ( $V = 0,306$ ). Ti rezultati upućuju na to da su uočene razlike među skupinama imale ograničeno praktično značenje.

## Rasprava

Prema našim saznanjima, ovo je prvo istraživanje o znanju o dentalnoj eroziji i navikama kad je riječ o oralnome zdravlju i rizicima u populaciji enologa – ovlaštenih ocjenjivača za senzorno ocjenjivanje vina u Hrvatskoj. Visok odaziv sudionika (83 %) dodatno pridonosi vrijednosti ovog istraživanja. Dosad objavljena istraživanja o dentalnoj eroziji u kontekstu profesionalne proizvodnje vina, kako je već navedeno, uglavnom su bila usmjerena na rizične čimbenike i prikaze kliničkih slučajeva. U tim je istraživanjima dentalna erozija dijagnosticirana kod osoba koje su bile dobroga općeg zdravstvenoga stanja i primjerenih životnih navika, uz iznimku kontinuirane izloženosti pijenju i degustiranju vina (6, 8, 14, 36, 37). Prema različitim autorima, bijela i pjenušava vina, koja najčešće prevladavaju u profesionalnim senzornim ocjenjivanjima, općenito su erozivnija od crnih (37 – 40). No i crna vina mogu biti rizična, unatoč mogućem zaštitnom učinku polifenola koje sadržavaju (36, 40).

Prema dobivenim rezultatima, ovlašteni ocjenjivači vina u Hrvatskoj nedovoljno su informirani o dentalnoj eroziji. Iako je riječ o educiranim stručnjacima koji općenito posvećuju pozornost oralnom zdravlju i redovito posjećuju doktora dentalne medicine čak i kada nemaju simptome, rezultati upućuju na određene nedostatke u odnosu između doktora dentalne medicine i pacijenta. Utvrđeno je da opću svijest sudionika o važnosti oralnoga zdravlja ne prati ni odgovarajuće znanje o rizicima dentalne erozije, ni pravilne mjere u oralnoj higijeni. Premda je visok udio ispitanika znao što je pojam *dentalna erozija* (67 %), odgovori na pitanja o njezinoj definiciji i simptomima upućuju na nedostatnu razinu objektivnog znanja.

Budući da se za nekoliko pitanja moglo odabrati više odgovora, sudionici su mogli označiti više ponuđenih opcija na temelju djelomičnog znanja, ali i pretpostavki i pogađanja, što otežava razlikovanje stvarnog znanja od strategije odgovaranja. Zbog toga je možda stvarna razina znanja sudionika i manja od pokazane. Primjerice, iako je velik broj ispitanika ispravno prepoznao dentalnu eroziju kao gubitak cakline i dentina prouzročenu djelovanjem kiselina, 22 % onih koji su odabrali točan odgovor istodobno je označilo i netočnu tvrdnju da je dentalna erozija *proces gubitka cakline prouzročen djelovanjem specifičnih bakterija*, što upućuje na nesigurnost u stvarnom znanju unatoč prepoznavanju definicije.

Slično ograničenje odnosi se i na pitanje o simptomima dentalne erozije u kojemu su svi ponuđeni simptomi bili točni. Sudionici su često označavali dva simptoma, što može odražavati osobno iskustvo ili pretpostavke, a ne objektivno poznavanje kliničkih manifestacija dentalne erozije. Nasuprot tomu, pitanje o reverzibilnosti simptoma dopuštalo je

er than knowledge of the chronological clinical presentation of dental erosion. In contrast, the question addressing the reversibility of symptoms allowed only a single response option, thereby minimizing response ambiguity. The consistency of findings obtained from the single-response question supports the interpretation that questions allowing multiple responses may be more susceptible to response ambiguity.

These findings are not unexpected: even within the dental profession, and despite increasing awareness and understanding of dental erosion, challenges remain in its diagnosis, classification and management in everyday clinical practice (40, 41). A study conducted in Australia reported that after only 5–10 years of professional practice, approximately 50% of wine tasters already experience increased tooth sensitivity. Tasting more than 50 wines per week might therefore be considered a high-risk activity (42).

Although professional experience may be expected to influence knowledge and awareness of the risks associated with intensive wine tasting, as well as personal approaches to oral care, no such correlation was observed in the present study. The distribution of oral care habits before or after tasting did not differ significantly across categories of professional wine tasting experience (<10, 10–20, and >20 years) ( $\chi^2 = 2.550$ ,  $df = 2$ ,  $p = 0.279$ ). The observed association was weak (Cramer's  $V = 0.169$ ), indicating a small effect size. The potential influence of the dentist–patient relationship was also examined. It might be expected that dentists who are aware of their patients' profession would be more actively engaged in providing advice on occupation-related oral health risks. However, the present findings suggest that dentists' awareness of their patients' profession was not associated with better factual knowledge of dental erosion. Instead, participants' knowledge appeared to depend more on intuitive judgement and personal experience than on professional counselling. For example, recognizing symptoms such as tooth discoloration and sensitivity may reflect subjective perception or previous personal experience, whereas identifying smoother, shinier tooth surfaces or structural damage requires more specific clinical knowledge. These findings suggest that communication between dentists and patients exposed to occupational acid challenges is not sufficiently targeted. Simply knowing that a patient is professionally involved in wine tasting does not necessarily mean that specific information about dental erosion and its clinical manifestations is provided. In contrast, dentists' awareness of participants' professional wine tasting activity showed a trend towards an association with preventive oral health behaviour, although statistical significance was not retained after Bonferroni correction. Participants whose dentists were aware of their occupational exposure reported oral care before or after wine tasting more frequently than those whose dentists were unaware ( $\chi^2 = 9.370$ ,  $df = 2$ ,  $p = 0.009$ ). Although causality cannot be inferred from this cross-sectional study, the moderate effect size (Cramer's  $V = 0.324$ ) suggests that effective communication between dentists and professionally exposed patients may contribute to the adoption of preventive oral health behaviors, even if it does not necessarily improve factual knowledge of dental erosion. Despite the observed

samo jedan odgovor, čime je smanjena mogućnost nejednolične interpretacije odgovora. Dosljednost rezultata dobivenih pitanjem s jednim odgovorom podupire pretpostavku da su pitanja s mogućnošću višestrukog odabira podložnija raspravi u interpretaciji odgovora.

Dobiveni rezultati nisu neočekivani. Naime, čak i među doktorima dentalne medicine, unatoč sve većoj svijesti i razumijevanju dentalne erozije, i dalje postoje izazovi glede dijagnostike, klasifikacije i liječenja u svakodnevnoj kliničkoj praksi (40, 41). U konkretnom slučaju, u području senzoričke vina i profesionalnih ocjenjivanja, multidisciplinarno istraživanje u Australiji pokazalo je da se poslije samo 5 do 10 godina profesionalnog rada približno kod 50 % senzornih ocjenjivača vina pojavljuje povećana osjetljivost zuba. Autori, među kojima je i stručnjak iz područja dentalne medicine, zaključuju da se degustiranje više od 50 vina na tjedan može smatrati aktivnošću visokoga rizika (42).

Iako bi se moglo očekivati da profesionalno iskustvo utječe na znanje i svijest o rizicima pri intenzivnom kušanju vina, te na osobni pristup oralnoj higijeni, u ovom istraživanju takva povezanost nije ustanovljena. Raspodjela navika u održavanju oralne higijene prije ili poslije ocjenjivanja nije se značajno razlikovala između skupina prema duljini profesionalnog iskustva u ocjenjivanju vina (< 10, 10 – 20 i > 20 godina) ( $\chi^2 = 2,550$ ;  $df = 2$ ;  $p = 0,279$ ). Uočena povezanost bila je slaba (Cramérov  $V = 0,169$ ), što upućuje na malu veličinu učinka.

Ispitan je i mogući utjecaj odnosa doktor dentalne medicine – pacijent. Moglo bi se očekivati da će doktori dentalne medicine koji su obaviješteni o zanimanju svojih pacijenata aktivnije davati savjete o profesionalnim rizicima za oralno zdravlje. Međutim, rezultati ovog istraživanja pokazuju da obaviještenost doktora dentalne medicine o zanimanju pacijenta nije bila povezana s boljim stvarnim znanjem o dentalnoj eroziji. Čini se da se znanje sudionika više temeljilo na osobnom iskustvu i intuitivnoj prosudbi nego na stručnom savjetovanju. Primjerice, prepoznavanje simptoma, poput promjene boje zuba ili njihove osjetljivosti, može biti posljedica osobnog iskustva, a prepoznavanje glatkih i sjajnih površina zuba ili strukturnih oštećenja zahtijeva specifičnije kliničko znanje. Ti nalazi upućuju na to da komunikacija između doktora dentalne medicine i pacijenata izloženih profesionalnim rizicima nije dovoljno usmjerena. Sama činjenica da je doktor dentalne medicine obaviješten o profesionalnoj aktivnosti pacijenta ne znači nužno da će pacijent dobiti ciljane informacije o dentalnoj eroziji i njezinim kliničkim obilježjima.

Ipak, obaviještenost doktora dentalne medicine o pacijentovu profesionalnom radu – degustiranju vina – pokazala je da postoji trend izraženosti veze s preventivnim ponašanjem u području oralnoga zdravlja, premda statistička značajnost nije potvrđena poslije Bonferronijeve korekcije. Sudionici čiji su doktori dentalne medicine obaviješteni o njihovoj profesionalnoj izloženosti češće provode mjere oralne higijene prije ili poslije ocjenjivanja vina nego oni čiji doktori dentalne medicine ne znaju čime se bave ( $\chi^2 = 9,370$ ;  $df = 2$ ;  $p = 0,009$ ). Iako se iz presječnog istraživanja ne može zaključivati o uzročno-posljedičnim odnosima, srednja veličina

association between dentists' awareness of occupational exposure and preventive oral health behaviour, no differences were found between public and private dental care services. The type of dental care was not associated with either factual knowledge of dental erosion or oral care practices. Although participants demonstrated general awareness of oral health, these findings suggest that communication regarding the occupational risk of dental erosion could be further improved, particularly among certified wine assessors. Similar findings indicating insufficient knowledge and awareness of acid erosion among wine tasters have also been reported in Brazilian and Australian studies (5, 30). The studies showed that, although the majority of participants had heard of dental erosion, their understanding of this issue was relatively poor. Another study reported that seven of the nine Norwegian wine tasters who had recently visited a dentist had not been informed about dental erosion, although in five participants the lesions had already progressed to involve dentine (29).

As a general observation, it should be noted that wine assessors do not regularly rinse their mouth during tasting sessions; overall, assessors are neither adequately informed about nor are consistent in applying more advanced preventive practices. The most frequent responses regarding oral care before or after tasting detail incorrect procedures, with brushing the teeth immediately after tasting being particularly common. Significantly, this common practice is clinically discouraged because it interferes with the natural remineralization process.

Recommendations for the prevention of dental erosion among wine assessors exist and are available (42, 43). Preventive approaches before, during and after tasting include the use of fluoride-containing toothpaste and the application of protective agents containing casein phosphopeptide-amorphous calcium phosphate (CPP-ACP) (44). Nevertheless, the present study indicates that, in the main, participants are unfamiliar with the abovementioned preventive measures. Overall, the results of this study indicate insufficient education and unsatisfactory oral care practices among certified wine assessors.

Because the study population consisted of a relatively homogeneous occupational group, the variability of demographic and professional characteristics was limited, reducing the suitability of multivariable analyses aimed at identifying predictors of knowledge. Although no clinical examination was performed and it was therefore not possible to relate participants' knowledge and preventive behaviors to clinically observed dental erosion, previous studies have demonstrated the presence of dental erosion in this population (6, 26, 29, 45). Future clinical studies may further strengthen these findings by examining the relationship between knowledge, preventive behaviours, and clinically assessed dental erosion.

učinka (Cramérov  $V = 0,324$ ) upućuje na to da učinkovita komunikacija između doktora dentalne medicine i profesionalno izloženih pacijenata može pridonijeti usvajanju preventivnih ponašanja u odnosu na rizik od pojave dentalne erozije, čak i ako ne dovodi nužno do boljega stvarnog znanja o tom problemu.

Nadalje, nisu utvrđene razlike između javne i privatne dentalne zdravstvene zaštite. Unatoč uočenom trendu povezanosti između upoznatosti doktora dentalne medicine s profesionalnom izloženošću i preventivnog ponašanja, vrsta dentalne zdravstvene skrbi nije bila povezana ni s objektivnim znanjem o dentalnoj eroziji, ni s navikama u provođenju oralne higijene. Iako su sudionici pokazali opću svijest o važnosti oralnoga zdravlja, rezultati pokazuju da je potrebna kvalitetnija komunikacija o profesionalnom riziku od dentalne erozije, osobito u populaciji ovlaštenih ocjenjivača vina. Slični rezultati, koji upućuju na nedovoljno znanje i svijest o kiselinskoj eroziji među degustatorima vina, opisani su i u istraživanjima provedenima u Brazilu i Australiji (5, 30). Autori tih istraživanja pokazali su da je, iako je većina sudionika čula za dentalnu eroziju, njihovo razumijevanje toga problema ograničeno. Sličnu ocjenu o stvarnom stanju, znanju i ponašanju degustatora vina prezentirali su autori za Norvešku (29). Istaknuli su da sedam od devet norveških degustatora vina, koji su nedavno posjetili doktora dentalne medicine, nije bilo informirano o dentalnoj eroziji, premda su kod pet ispitanika lezije već zahvatile dentin.

Može se također zaključiti da ocjenjivači vina tijekom degustiranja nedovoljno ispiru usta vodom te da nisu informirani o naprednijim preventivnim mjerama. Najčešći odgovori za konkretne mjere oralne higijene prije ili poslije degustiranja nisu bili prihvatljivi, pri čemu se osobito isticalo četkanje zuba neposredno poslije degustiranja. Upravo četkanje zuba neposredno poslije degustiranja ne preporučuje se jer može poremetiti prirodni proces remineralizacije tvrdih zubnih tkiva.

Preporuke za prevenciju dentalne erozije među ocjenjivačima vina postoje i dostupne su u literaturi (42, 43). Preventivne mjere prije degustiranja, tijekom toga postupka i poslije njega uključuju korištenje zubnih pasta s fluoridom te primjenu zaštitnih premaza koji sadržavaju kazein-fosfopeptid i amorfni kalcijev fosfat (CPP-ACP) (44). Nažalost, rezultati ovog istraživanja pokazuju da većina sudionika nije znala za navedene preventivne mjere.

Budući su ispitanici činili razmjerno homogenu profesionalnu skupinu, varijabilnost demografskih i profesionalnih obilježja bila je ograničena, što je smanjilo prikladnost multivarijatnih analiza usmjerenih na utvrđivanje prediktora znanja. U ovom istraživanju također nije proveden klinički pregled, pa nije bilo moguće povezati razinu znanja i preventivna ponašanja sudionika s klinički ustanovljenom dentalnom erozijom. Ipak, u dosadašnjim istraživanjima potvrđena je dentalna erozija u toj populaciji (6, 26, 29, 45). U budućim kliničkim istraživanjima mogli bi se dodatno potvrditi nalazi ovog istraživanja i to ispitivanjem povezanosti između znanja, preventivnog ponašanja i klinički procijenjene dentalne erozije.

## Conclusion

Wine professionals and certified wine assessors whose work involves intensive wine tasting are exposed to an increased risk of dental erosion. Consequently, they have a greater need to apply appropriate dental care and protective strategies in addition to standard oral hygiene. Although participants in this study were educated professionals in viticulture, their knowledge of this oral pathology and their behaviour regarding preventive practices was inadequate. Although most wine assessors reported regular dental visits as part of their routine oral health care, in a considerable number of cases, their dentists were unfamiliar with their specific professional activities. Dentists' awareness of their patients' occupation was not associated with better factual knowledge of dental erosion, but it was associated with a trend towards more favorable oral care practices before and after wine tasting. These findings suggest that communication regarding occupation-related oral health risks may contribute to preventive behavior, although there remains considerable scope to improve the delivery of targeted information on dental erosion.

The findings of the present study highlight the need for greater attention to occupation-specific oral health counseling in routine dental practice, as well as for the development of educational materials on dental erosion and its prevention. In addition, educational programmes for future certified wine assessors should be supplemented with information on occupational exposure to erosive challenges to increase awareness of this professional risk and promote the adoption of evidence-based preventive practices among certified wine assessors.

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**Author's contribution:** I.A. - preparation of the material and first drafts of the text; I.B. - review of the material, review and editing of the text; I.Č.B. - mentoring. All authors commented on previous texts and thus contributed to the work. All authors read and approved the final text.

## Zaključak

Stručnjaci zaposleni u vinskom sektoru i ovlaštteni ocjenjivači vina, čiji rad uključuje intenzivno degustiranje vina, izloženi su povećanom riziku od pojave dentalne erozije. Zato, uz uobičajene mjere u provođenju oralne higijene, pojačano trebaju primjenjivati odgovarajuće preventivne mjere i postupke zaštite oralnoga zdravlja. Iako su sudionici ovog istraživanja bili educirani stručnjaci iz područja vinarstva, njihovo stvarno znanje o toj oralnoj patologiji te primjena preventivnih mjera ne zadovoljavaju. Premda su ocjenjivači vina naveli da redovito posjećuju doktora dentalne medicine u sklopu skrbi o oralnom zdravlju, u znatnom broju slučajeva doktori dentalne medicine nisu bili obaviješteni o njihovim specifičnim profesionalnim aktivnostima. Obaviještenost doktora dentalne medicine o zanimanju pacijenata nije povezana s boljim stvarnim znanjem o dentalnoj eroziji, ali je vidljiva češća primjena mjera oralne higijene prije i poslije kušanja vina. Ti rezultati upućuju na to da postoji znatan prostor za poboljšanje ciljane edukacije o dentalnoj eroziji te da komunikacija o profesionalnim rizicima za oralno zdravlje može pridonijeti usvajanju preventivnih ponašanja.

Rezultati ovog istraživanja pokazuju da je veću pozornost potrebno usmjeriti na savjetovanje o oralnom zdravlju u kontekstu profesionalnih rizika u svakodnevnoj kliničkoj praksi doktora dentalne medicine, te da su potrebni edukacijski materijali o dentalnoj eroziji i njezinoj prevenciji. Edukacijske programe budućih ovlaštenih ocjenjivača vina također je potrebno nadopuniti sadržajima o profesionalnoj izloženosti erozivnim čimbenicima kako bi se povećala svijest o tom profesionalnom riziku te potaknula primjena znanstveno utemeljenih preventivnih mjera u toj skupini stručnjaka.

**Sukob interesa:** Autori nisu bili u sukobu interesa.

**Doprinos autora:** I. A. – priprema materijala i izrada prve verzije teksta; I. B. – pregled materijala, recenzija i uređivanje teksta; I. Č. B. – mentorstvo. Svi autori komentirali su prve verzije teksta i tako pridonijeli radu te su pročitali i odobrili konačnu verziju.

## Sažetak

**Ciljevi:** Cilj ovog istraživanja je procijeniti znanje i svijest o eroziji zuba, njezinoj etiologiji i preventivnim praksama među certificiranim hrvatskim ocjenjivačima vina. **Ispitanici i metode:** Anonimni upitnik strukturiran u dva dijela ispunilo je 90 certificiranih hrvatskih ocjenjivača vina, što predstavlja više od 80 % aktivnih certificiranih ocjenjivača u Hrvatskoj. Prvi dio obuhvatio je demografske i profesionalne podatke, uključujući dob, godine profesionalnog iskustva, učestalost kušanja vina i navike vezane uz kušanje. Drugi dio procijenio je znanje sudionika o etiologiji, prevenciji i terapiji erozije zuba. Podatci su analizirani korištenjem deskriptivne statistike i standardnih statističkih testova koji se obično primjenjuju u studijama temeljenim na upitnicima. **Rezultati:** Većina sudionika izjavila je da redovito posjećuje stomatološku kliniku; međutim, samo dvije trećine navelo je da su njihovi stomatolozi svjesni njihove profesije. Znanje ocjenjivača vina o eroziji zuba obično nije bilo povezano sa svjesnošću stomatologa o svojoj profesiji. Samo 23 % sudionika navelo je stomatologe kao izvor informacija o eroziji zuba, dok je 45 % te informacije dobilo slučajno. Iako je 67 % ispitanika čulo za eroziju zuba, njihovo činjenično znanje bilo je ograničeno. Ukupno 69 % sudionika nije prijavilo nikakve specifične prakse oralne higijene prije ili nakon degustacije vina; uočljive navike nisu bile povezane s njihovim profesionalnim iskustvom. **Zaključak:** Svijest o eroziji zuba među hrvatskim ocjenjivačima vina bila je nedovoljna. Potreban je odgovarajući oblik edukacije, posebno onaj koji bi mogli pružiti stomatolozi, kako bi se naglasio rizik i istaknuo potencijal za prevenciju i liječenje erozije zuba.

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