

Bruno Špiljak^{1*}, Maja Firić², Miroslav Sikora³, Vlaho Brailo^{1,4}

Self-assessment of Readiness and Equipment of Dental Clinics for Managing Medical Emergencies in the Republic of Croatia

Samoprocjena spremnosti i opremljenosti dentalnih ordinacija za zbrinjavanje hitnih medicinskih stanja u Republici Hrvatskoj

¹ Department of Oral Medicine, University of Zagreb, School of Dental Medicine, Zagreb, Croatia
Zavod za oralnu medicinu Stomatološkog fakulteta Sveučilišta u Zagrebu, Hrvatska

² Dental Polyclinic Zagreb, Zagreb, Croatia
Stomatološka poliklinika Zagreb, Hrvatska

³ Medical Centre Osijek, Osijek, Croatia
Dom zdravlja Osijek, Hrvatska

⁴ Clinic for Dentistry, University Clinical Hospital Centre Zagreb, Zagreb, Croatia
Klinika za stomatologiju Kliničkoga bolničkoga centra Zagreb, Hrvatska

Abstract

Objective: Medical emergencies (MEs) pose immediate threats to patients' lives and health and can occur in dental clinics. This study aimed to evaluate how well dentists in Croatia feel prepared to manage MEs and how well their clinics are equipped with necessary drugs and equipment. **Materials and Methods:** The study involved 319 active dentists who completed an online questionnaire covering demographic data, education on MEs, self-assessment of their ability to manage MEs, clinic equipment for MEs, knowledge and ability to use drugs for MEs, and opinions on further education needs. The normality of the distribution was tested using the Shapiro-Wilk test. Percentages were used for nominal variables, and mean \pm standard deviation was applied for continuous variables. A t-test and χ^2 test were used to analyze group differences. **Results:** Most of the respondents (77%) were general dentists. Adrenaline was the most available drug (98.7%), while other drugs were less common. The respondents in secondary and tertiary healthcare clinics showed greater readiness and better education for managing MEs and attended ME training significantly more often than those working in primary healthcare clinics ($p=0.009$). Additionally, the respondents with specialization and experience in secondary and tertiary clinics had more drugs and equipment and attended ME training more frequently ($p < 0.0001$ and $p=0.001$). **Conclusions:** Training on managing MEs should be held more frequently, on an annual basis, and should be mandatory for all dentists, regardless of their workplace.

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Address for correspondence

Bruno Špiljak, PhD student
University of Zagreb School of
Dental Medicine, Department of Oral
Medicine
Gundulićeva 5, 10000 Zagreb, Croatia
Phone: 00 385 91 189 7720
bspiljak@sfdg.unizg.hr

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Bruno Špiljak: <https://orcid.org/0000-0003-2545-4474>

Vlaho Brailo: <https://orcid.org/0000-0002-8449-871X>

Introduction

Medical emergencies (MEs) require immediate attention as they pose significant threats to life and health (1-3). In dental clinics, early recognition and management of MEs are critical to prevent severe harm or death, since improper handling can lead to legal consequences and affect the dentist's well-being (4). With advancements in healthcare and an aging population, dentists increasingly treat patients with chronic illnesses and medications, which raises the likelihood of MEs during treatment (5). The complexity of patients' medical histories, extended procedures, and medication use further elevate these risks (6-8). Common triggers include allergic reactions, local anesthetics, and materials such as latex (9). Additionally, dental anxiety and fear can induce hemodynamic changes, adding stress to the cardiovascular system, especially during procedures involving local

Uvod

Hitna medicinska stanja (HMS) zahtijevaju trenutačnu reakciju jer su velika prijetnja životu i zdravlju (1 – 3). U ordinacijama dentalne medicine rano prepoznavanje i zbrinjavanje HMS-ova ključni su za sprječavanje teških ozljeda ili smrti, jer nepravilno postupanje može imati pravne posljedice i utjecati na dobrobit stomatologa (4). Uz napredak u zdravstvenoj skrbi i starenje populacije, stomatolozi sve češće liječe pacijente s kroničnim bolestima i jakim lijekovima, što povećava vjerojatnost HMS-a tijekom terapije (5). Složenost medicinskih anamneza pacijenata, dulji postupak i primjena lijekova dodatno povećavaju te rizike (6 – 8). Česti uzročnici uključuju alergijske reakcije, lokalne anestetike i materijale poput lateksa (9). Stomatološka anksioznost i strah također mogu izazvati hemodinamičke promjene zato što dodatno opterećuju kardiovaskularni sustav, posebno tijekom postu-

anesthesia and surgery (10, 11). Though rare, MEs in dental practices are becoming more frequent, occurring approximately every 3.6–5 years (6), and are 5.8 times more likely to happen in dental settings than in medical offices (12). Their unpredictability often leaves dentists feeling unprepared, and infrequent encounters can lead to skill degradation over time (13). Most dentists face at least one emergency annually, often related to dental procedures (10, 14). Despite the priority of patient safety, dental procedures inherently carry some risk, and MEs can occur during or after anesthesia, procedures, or even in the waiting room (8, 15). Tooth extractions and pulp extirpations are commonly associated with MEs, while abscess incisions, apicoectomies, and fillings pose less frequent risks (15). Preventative strategies, including updating medical histories and thorough examinations, can significantly reduce ME risks (10, 16–18). The presence of an emergency kit and up-to-date knowledge further enhance response efficacy (19, 20). Azad et al. (20) found that up to 90% of MEs could be prevented through detailed patient histories and examinations. However, even patients without significant medical histories may experience MEs during treatment (21). Given the unpredictability of emergencies, it is essential that dentists are trained and equipped to manage them effectively (22–25). Research indicates low competence and confidence in emergency management among numerous dentists (6, 26). For instance, Čuković Bagić et al. (27) found that most general dentists lack the knowledge and confidence to manage medical emergencies in pediatric patients. This study aimed to assess dentists' self-perceived education and preparedness to handle MEs in their clinics and the adequacy of Croatian dental clinics in managing such emergencies.

Materials and Methods

The study involved active dentists practicing in the Republic of Croatia. An online questionnaire was created using Google Forms® (Google Inc., Mountain View, CA, USA) and distributed via email to all active dentists through the Croatian Dental Chamber database. Ethics Committee Approval was received for this study from the Ethics Committee of the School of Dental Medicine, University of Zagreb. Participants were informed about the aims of the study and purpose, and participation was explicitly stated as anonymous and voluntary. Before starting the questionnaire, participants confirmed their understanding of the the purpose and nature of the study. The questionnaire consisted of six parts. The first part collected general demographic data (gender, years of practice, specialization, size of the workplace, and place of employment). The second part addressed the education on MEs, asking if participants had attended ME training, the type of training, and the frequency of attendance throughout their careers. The third part evaluated participants' self-assessed ability to manage MEs using a five-point Likert scale (1 = extremely unprepared to 5 = extremely prepared). The fourth part assessed current clinic equipment,

paka koji uključuju lokalnu anesteziju i kirurške zahvate (10, 11). Iako rijetki, HMS-ovi u dentalnim praksama postaju sve češći – pojavljuju se otprilike od 3,6 do 5 godina (6) i 5,8 puta vjerojatniji su u dentalnim ustanovama nego u medicinskim (12). Njihova nepredvidivost često zatekne stomatologe nesprennima, a rijetke intervencije mogu rezultirati degradacijom vještina tijekom vremena (13). Većina stomatologa suočava se barem s jednim hitnim stanjem na godinu, često povezanim s dentalnim postupcima (10, 14). Unatoč tomu što je prioritet sigurnost pacijenta, dentalni postupci inherentno nose određeni rizik, a HMS se može dogoditi tijekom anestezije i postupaka ili poslije njih, pa čak i u čekaonici (8, 15). Ekstrakcije zuba i pulpektomije često su povezane s HMS-ovima, a incizije apscesa, apikotomije i ispuni manje su česti rizici (15). Preventivne strategije, uključujući ažuriranje medicinskih anamneza i temeljite preglede, mogu značajno smanjiti rizike od HMS-a (10, 16 – 18). Kompleti za hitne intervencije i ažurirano znanje dodatno povećavaju učinkovitost odgovora (19, 20). Azad i suradnici (20) otkrili su da se do 90 % HMS-ova može spriječiti detaljnim anamnezama i pregledima pacijenata. No i pacijenti bez značajnih anamneza mogu tijekom liječenja doživjeti HMS (21). S obzirom na nepredvidivost hitnih stanja, bitno je da stomatolozi budu educirani i opremljeni za njihovo učinkovito zbrinjavanje (22 – 25). Autori istraživanja upozoravaju na nisku kompetenciju i samopouzdanje među mnogim stomatolozima kad je riječ o zbrinjavanju hitnih stanja (6, 26). Primjerice, Čuković Bagić i suradnici (27) ustanovili su da većina općih stomatologa nema dovoljno znanja i samopouzdanja za zbrinjavanje hitnih medicinskih stanja kod pedijatrijskih pacijenata. Ova studija imala je za cilj procijeniti samoprocjenu edukacije i spremnost stomatologa za zbrinjavanje HMS-ova u njihovim ordinacijama te procijeniti opremljenost hrvatskih dentalnih ordinacija za takva stanja.

Materijali i metode

Istraživanje je obuhvatilo aktivne stomatologe koji rade u Republici Hrvatskoj. Online upitnik kreiran je putem Google Forms® (Google Inc., Mountain View, CA, SAD) i distribuiran e-poštom svim aktivnim stomatolozima preko baze podataka Hrvatske komore dentalne medicine. Istraživanje je odobrilo Etičko povjerenstvo Stomatološkog fakulteta Sveučilišta u Zagrebu. Sudionici su bili informirani o cilju i svrsi istraživanja, a sudjelovanje je izričito navedeno kao anonimno i dobrovoljno. Prije početka ispunjavanja upitnika svi su morali potvrditi da razumiju svrhu i prirodu istraživanja. Upitnik se sastojao od šest dijelova. U prvom dijelu traženi su opći demografski podatci (spol, godine prakse, specijalizacija, veličina radnog mjesta i mjesto zaposlenja). Drugi dio odnosio se na obrazovanje o HMS-ovima, uključujući pitanje je li sudionik pohađao tečajeve za hitna stanja, vrstu edukacije i učestalost pohađanja tijekom karijere. U trećem dijelu procjenjivana je samoprocjena sudionika o sposobnosti upravljanja HMS-ovima koristeći se Likertovom ljestvicom od pet točaka (1 = potpuno nesprenan, do 5 = potpuno spreman). U četvrtom dijelu procjenjivala se trenutačna opremljenost ordinacija, posebno lijekovima i opremom za HMS-ove – na

specifically drugs and supplies for managing MEs, through Yes/No questions. The fifth part measured participants' knowledge and ability to use drugs for managing MEs, also using a five-point Likert scale. The sixth part gathered opinions on the need for further education on MEs, the frequency of such training, and its necessity for dental assistants. The questionnaire, based on similar surveys from the literature, was tested on a pilot sample of 20 dentists. A test-retest examination determined an internal consistency coefficient (Cronbach's alpha) of 0.75, indicating good reliability and repeatability. Data were organized in tabular format using Microsoft Excel® (Microsoft Inc., Redmond, WA, USA) and statistically processed with SPSS® software (IBM Inc., Armonk, NY, USA). The normality of the distribution was tested using the Shapiro-Wilk test. Percentages were used for nominal variables, and the mean \pm standard deviation was calculated for continuous variables. Since the data were normally distributed, a t-test examined differences between groups for continuous variables, while the χ^2 test was used for nominal variables. P-values less than 0.05 ($p < 0.05$) were considered statistically significant. Given the goal to include as many respondents as possible, and the questionnaire being sent to all active dentists in Croatia, a power analysis was not conducted.

Results

The study included 319 active dentists in the Republic of Croatia. Three-quarters of the respondents (239, 75%) were female, while 25% (80) were male. Most of the respondents (247, 77%) were general dentists working in primary care clinics. Nearly half of the respondents (131, 41.2%) were from cities with over 500,000 inhabitants. The details on general demographic data are presented in Table 1.

Table 2 shows details of ME education. Of the respondents, 151 (47.6%) had attended ME training, with most of them attending a dedicated workshop (74, 49%). Training was typically attended only once (87, 58.4%), and usually more than three years ago (76, 50.3%). No statistically significant differences in ME training attendance were observed between men and women ($p = 0.521$). However, significant differences were found regarding years of practice, with those having fewer years attending training less frequently ($p = 0.001$). The respondents with specialization attended ME training more frequently than those without it (72.2% vs. 40.9%; $p < 0.0001$). Additionally, the respondents in secondary and tertiary healthcare clinics attended ME training more often than those in primary care clinics (65.9% vs. 44.6%; $p = 0.009$) and participated more frequently in workshops dedicated to MEs (62.1% vs. 44.5%; $p = 0.009$). Summary data on self-assessed ability to manage MEs are presented in Table 3. The highest number of respondents (138, 43.5%) felt extremely prepared to manage vasovagal reactions, while the highest number felt extremely unprepared for cardiac arrest (75, 24%). Only 14 of the respondents (4.4%), felt extremely prepared for an overall ME management. Table 4 shows differences in self-assessed readiness to manage MEs between various groups. Men ex-

pitanja je trebalo odgovarati Da/Ne. U petom dijelu mjerno je znanje i sposobnost sudionika da se koriste lijekovima za HMS-ove, također koristeći se Likertovom ljestvicom od pet točaka. U šestom dijelu prikupljalo se mišljenja o potrebi za daljnjim obrazovanjem o HMS-ovima, učestalosti takve izobrazbe i je li potrebna i dentalnim asistentima. Uпитnik, temeljen na sličnim anketama iz literature, testiran je na pilot-uzorku od 20 stomatologa. Test-retest analiza odredila je koeficijent unutarnje konzistencije (Cronbachova alfa) od 0,75, što upućuje na dobru pouzdanost i ponovljivost. Podatci su organizirani u tabličnom formatu koristeći se Microsoft Excelom® (Microsoft Inc., Redmond, WA, SAD) i statistički obrađeni u softveru SPSS® (IBM Inc., Armonk, NY, SAD). Normalnost distribucije testirana je Shapiro-Wilkovim testom. Za nominalne varijable korišteni su postotci, a za kontinuirane varijable izračunata je srednja vrijednost \pm standardna devijacija. Budući da su podatci normalno distribuirani, t-test je korišten za ispitivanje razlika između grupa za kontinuirane varijable, a χ^2 test za nominalne varijable. P-vrijednosti manje od 0,05 ($p < 0,05$) smatrane su statistički značajnima. S obzirom na to da je cilj bio uključiti što veći broj ispitanika, upitnik je poslan svim aktivnim stomatolozima u Hrvatskoj – analiza snage nije provedena.

Rezultati

U studiju je bilo uključeno 319 aktivnih stomatologa u Republici Hrvatskoj. Tri četvrtine njih bile su žene (239 ili 75 %), a 80 muškarci (25 %). Većina ispitanika (247 ili 77 %) bili su opći stomatolozi koji rade u primarnim zdravstvenim ustanovama. Gotovo polovina ispitanika (131, ili 41,2 %) živjela je gradovima s više od 500 000 stanovnika. Detalji o općim demografskim podacima nalaze se u tablici 1. U tablici 2. detalji su o edukaciji za HMS. Od ispitanika, njih 151 (47,6 %) pohađao je tečajeve o HMS-u, pri čemu je većina sudjelovala u specijaliziranim radionicama (74 ili 49 %). Na edukaciji je većina bila samo jedanput (87, ili 58,4 %), i to najčešće prije više od tri godine (76 ili 50,3 %). Nisu zabilježene statistički značajne razlike u pohađanju tečajeva između muškaraca i žena ($p = 0,521$). Međutim, značajne razlike uočene su u vezi s godinama prakse, pri čemu su oni s manje prakse rjeđe odlazili na edukacije ($p = 0,001$). Ispitanici sa specijalizacijom pohađali su tečajeve za HMS češće od onih bez specijalizacije (72,2 % prema 40,9 %; $p < 0,0001$). Nadalje, ispitanici u sekundarnim i tercijarnim zdravstvenim ustanovama češće su se educirali o HMS-u nego oni u primarnoj zdravstvenoj zaštiti (65,9 % prema 44,6 %; $p = 0,009$) i sudjelovali su češće u radionicama posvećenima HMS-ovima (62,1 % prema 44,5 %; $p = 0,009$). Sažeti podatci o samoprocjeni, kad je riječ o sposobnosti upravljanja HMS-ovima, nalaze se u tablici 3. Najveći broj ispitanika (138 ili 43,5 %) osjećao se potpuno spremnima za zbrinjavanje vazovagalnih reakcija, a najveći broj smatrao se potpuno nespremnim za zastoje srca (75, ili 24 %). Samo 14 ispitanika (4,4 %) istaknulo je da su potpuno spremni za ukupno zbrinjavanje HMS-ova. Tablica 4. prikazuje razlike u samoprocjeni spremnosti za zbrinjavanje HMS-ova među različitim

Table 1 General and Demographic Data of Respondents**Tablica 1.** Opći i demografski podatci ispitanika

Gender • Spol	N (%)
Female • Ženski	239 (75)
Male • Muški	80 (25)
Years of practice • Godine staža	N (%)
Less than 5 • Manje od 5	71 (22.3)
5 – 10	81 (25.5)
11 – 15	52 (16.4)
16 – 20	34 (10.7)
21 – 25	22 (6.9)
26 – 30	24 (7.5)
More than 30 • Više od 30	34 (10.7)
No data • Nema podataka	1
Specialization • Specijalizacija	N (%)
No specialization • Nemam specijalizaciju	247 (77.7)
Oral Surgery • Oralna kirurgija	17 (5.3)
Dental Prosthetics • Stomatološka protetika	13 (4.1)
Periodontology • Parodontologija	3 (0.9)
Endodontics and Restorative Dentistry • Endoncija i restaurativna stomatologija	9 (2.8)
Pediatric and Preventive Dentistry • Dječja i preventivna stomatologija	11 (3.5)
Oral Pathology/Oral Medicine • Oralna patologija/Oralna medicina	7 (2.2)
Orthodontics • Ortodonticija	6 (1.9)
Family Dentistry • Obiteljska stomatologija	5 (1.6)
No data • Nema podataka	1
City/town size where the Dental Clinic is • Veličina grada/mjesta u kojemu se nalazi ordinacija	N (%)
More than 500 000 inhabitants • Više od 500 000 stanovnika	131 (41.2)
100 000 – 500 000 inhabitants • stanovnika	46 (14.5)
50 000 – 100 000 inhabitants • stanovnika	17 (5.3)
10 000 – 50 000 inhabitants • stanovnika	48 (15.1)
5 000 – 10 000 inhabitants • stanovnika	38 (11.9)
1 000 – 5 000 inhabitants • stanovnika	35 (11)
Less than 1 000 inhabitants • Manje od 1 000 stanovnika	3 (0.9)
No data • Nema podataka	1
Place of Employment • Mjesto zaposlenja	N (%)
Health center clinic • Ordinacija u domu zdravlja	83 (26.9)
Private clinic with HZZO contact • Privatna ugovorna ordinacija	106 (34.3)
Private clinic without HZZO contact • Privatna ordinacija bez ugovora s HZZO-om	77 (24.9)
Dental Polyclinic Zagreb/Split • Stomatološka poliklinika Zagreb/Split	26 (8.4)
School of Dental Medicine Zagreb/Rijeka/Split/Osijek • Stomatološki fakultet Zagreb/Rijeka/Split/Osijek	14 (4.5)
Dental clinic/polyclinic/department in hospital • Stomatološka ordinacija/poliklinika/odjel u sastavu bolnice	3 (1 %)
No data • Nema podataka	10

pressed significantly higher readiness for all MEs compared to women, except for vasovagal reactions and hypoglycemia. No significant differences were observed based on years of practice. The respondents with specialization felt more prepared for all MEs compared to those without it, except for hyperventilation and foreign body in the airway. The respondents in secondary and tertiary clinics felt more prepared for all MEs than those in primary clinics. Those working in larger cities (>500,000 inhabitants) felt more prepared to manage toxic reactions to anesthetics, angina pectoris, and cardiac arrest compared to those working in smaller towns (1,000–5,000 inhabitants). Attendees of ME training also felt more prepared for various MEs than those who did not attend it. Table 5 presents data on clinic equipment for man-

grupama. Muškarci su izrazili znatno veću spremnost za sve HMS-ove u usporedbi sa ženama, osim za vazovagalne reakcije i hipoglikemiju. Nisu uočene značajne razlike u vezi s godinama prakse. Ispitanici sa specijalizacijom osjećali su se spremnijima za sve HMS-ove u usporedbi s onima bez specijalizacije, osim za hiperventilaciju i strano tijelo u dišnim putovima. Ispitanici u sekundarnim i tercijarnim ustanovama osjećali su se spremnijima za sve HMS-ove nego oni u primarnim ustanovama. Oni koji rade u većim gradovima (> 500 000 stanovnika) osjećali su se spremnijima za zbrinjavanje toksičnih reakcija na anestetike, angine pektoris i zastoja srca u usporedbi s onima u manjim mjestima (1000 – 5000 stanovnika). Polaznici edukacija o HMS-ovima također su se osjećali spremnijima za razne hitne slučajeve u odnosu pre-

Table 2 Education on Medical Emergencies
Tablica 2. Edukacija o hitnim medicinskim stanjima

Have you ever attended training on medical emergencies? • Jeste li ikada bili na edukaciji o hitnim medicinskim stanjima?	N (%)	Gender • Spol p-value • p-vrijednost	Years of Practice • Staž p-value • p-vrijednost	Specialization • Specijalizacija p-value • p-vrijednost	Primary vs. Secondary / Tertiary • Primarna vs. sekundarna / tercijarna p-value • p-vrijednost
YES • DA	151 (47,6)	0.521	0.001*	< 0.0001*	0.009*
NO • NE	166 (52,4)				
No data • Nema podataka	2				
If you answered „YES” to the previous question, what type of training was it? • Ako ste na gornje pitanje odgovorili DA, o kakvoj je vrsti edukacije bila riječ?	N (%)				
Workshop dedicated exclusively to medical emergencies • Radni tečaj posvećen isključivo hitnim medicinskim stanjima	74 (49)	0.434	0.933	0.132	0.009*
Theoretical course dedicated exclusively to medical emergencies • Teorijski tečaj posvećen isključivo hitnim medicinskim stanjima	32 (21.2)				
Lecture as part of another continuing education course • Predavanje u sklopu drugog tečaja trajne izobrazbe	45 (29.8)				
How many times have you attended such a course? • Koliko puta ste pohađali takav tečaj?	N (%)				
1	87 (58.4)	0.334	0.446	0.024*	0.385
2	41 (27.5)				
3	11 (7.4)				
More than 3 times • Više od 3 puta	10 (6.7)				
No data • Nema podataka	2				
When was the last time you attended that type of training? • Kada ste posljednji put bili na takvoj edukaciji?	N (%)				
In the last year • U posljednjih godinu dana	11 (7.3)	0.112	0.024*	0.977	0.795
In the last 1 – 2 years • U posljednjih 1 – 2 godine	38 (25.2)				
In the last 2 – 3 years • U posljednjih 2 – 3 godine	26 (17.2)				
More than 3 years ago • Prije više od 3 godine	76 (50.3)				

* statistically significant difference ($p < 0.05$) • statistički značajna razlika ($p < 0,05$)

aging MEs. The most common drug available was adrenaline, present in nearly all clinics (315, 98.7%). Other drugs were less prevalent: diazepam (163, 51.1%), acetylsalicylic acid (118, 37%), nitroglycerin (78, 24.4%), inhalation bronchodilator (104, 32.6%), glucagon (30, 9.4%), and glucose paste (22, 6.9%). Equipment availability was limited, with an Ambu bag (109, 34.2%) and laryngeal mask (12, 3.8%) being the most and least common items, respectively. Statistically significant differences in the availability of drugs and equipment were found regarding years of practice, specialization, place of employment, healthcare level, and ME training attendance. Those with fewer years of practice had aminophylline, oropharyngeal tubes, and Ambu bags less frequently. Specialists had higher availability of inhalation bronchodilators, glucagon, nitroglycerin, diazepam, oxygen, Ambu bags, nasal cannulas, oropharyngeal tubes, and la-

ma onima koji nisu bili na izobrazbi. Tablica 5. prikazuje podatke o opremljenosti ordinacija za zbrinjavanje HMS-ova. Najčešće dostupan lijek bio je adrenalin – nalazio se u gotovo svim ordinacijama (315, ili 98,7 %). Ostali lijekovi bili su rjeđe dostupni: diazepam (163, ili 51,1 %), acetilsalicilna kiselina (118, ili 37 %), nitroglicerina (78, ili 24,4 %), inhalacijski bronhodilatator (104, ili 32,6 %), glukagon (30, ili 9,4 %) i glukozna pasta (22, ili 6,9 %). Dostupnost opreme bila je ograničena, pri čemu su ambu-baloni (109, ili 34,2 %) i laringealna maska (12, ili 3,8 %) bili najčešće i najmanje prisutne stavke. Statistički značajne razlike u dostupnosti lijekova i opreme uočene su u vezi s godinama prakse, specijalizacijom, mjestom zaposlenja, razinom zdravstvene zaštite i pohađanjem tečajeva o HMS-ovima. Oni s manje godina prakse imali su rjeđe aminofilin, orofaringealni tubus i ambu-balon. Specijalisti su imali višu dostupnost inhala-

Table 3 Summary Data on Self-assessed Ability to Manage Medical Emergencies
Tablica 3. Skupni podatci o samoprocjeni sposobnosti za zbrinjavanje hitnih medicinskih stanja

Medical Emergency • Hitno medicinsko stanje	Extremely Unprepared • Izrazito nespreman/a 1 N (%)	Somewhat Unprepared • Pomalo nespreman/a 2 N (%)	Neither Prepared nor Unprepared • Ni spreman/a ni nespreman/a 3 N (%)	Somewhat Prepared • Pomalo spreman/a 4 N (%)	Extremely Prepared • Izrazito spreman/a 5 N (%)	No data • Nema podataka N
Vasovagal reaction • Vazovagalna reakcija	10 (3.2)	12 (3.8)	54 (17)	103 (32.5)	138 (43.5)	2
Toxic reaction to anesthetic • Toksična reakcija na anestetik	41 (13)	73 (23.2)	131 (41.6)	49 (15.5)	21 (6.7)	4
Vasoconstrictor reaction • Reakcija na vazokonstriktor	28 (8.9)	74 (23.5)	125 (39.7)	56 (17.8)	32 (10.1)	4
Anaphylactic reaction • Anafilaktična reakcija	52 (16.6)	78 (24.9)	95 (30.4)	58 (18.5)	30 (9.6)	6
Hypoglycemia • Hipoglikemija	9 (2.9)	31 (9.8)	75 (23.8)	115 (36.5)	85 (27)	4
Epileptic seizure • Epileptični napadaj	13 (4.1)	33 (10.4)	101 (32)	107 (33.9)	62 (19.6)	3
Angina pectoris attack • Napadaj angine pectoris	35 (11.2)	65 (20.9)	114 (36.7)	65 (20.9)	32 (10.3)	8
Myocardial infarction • Infarkt miokarda	54 (17.3)	82 (26.3)	103 (33)	49 (15.7)	24 (7.7)	7
Hyperventilation • Hiperventilacija	15 (4.8)	25 (7.9)	95 (30.2)	99 (31.4)	81 (25.7)	4
Asthmatic attack • Astmatični napadaj	25 (8)	55 (17.7)	122 (39.2)	82 (26.4)	27 (8.7)	8
Foreign body in the airway • Strano tijelo u dišnom putu	55 (17.5)	74 (23.5)	97 (30.8)	64 (20.3)	25 (7.9)	4
Cardiac arrest • Srčani arrest	75 (24)	83 (26.5)	98 (31.3)	32 (10.2)	25 (8)	6
Overall readiness • Ukupna spremnost	17 (5.4)	58 (18.4)	159 (50.3)	68 (21.5)	14 (4.4)	3

ryngeal masks. The respondents in secondary/tertiary clinics reported greater availability of glucagon, nitroglycerin, oxygen, nasal cannulas, oropharyngeal tubes, and laryngeal masks. Those working in larger cities had more nitroglycerin and oxygen. ME training attendees also reported higher availability of nitroglycerin, diazepam, oxygen, breathing masks, Ambu bags, nasal cannulas, oropharyngeal tubes, and laryngeal masks. Table 6 summarizes respondents' self-assessed readiness to use drugs and equipment. Respondents felt most prepared to use acetylsalicylic acid (100, 32.7%) and least prepared to use the laryngeal mask (174, 57.1%). Table 7 presents differences in readiness to use drugs and equipment among groups. Men felt more prepared to use all drugs and equipment than women. Those with more years of practice felt more prepared to use inhalation bronchodilators ($p = 0.007$), glucagon ($p = 0.009$), glucose ($p = 0.014$), and nitroglycerin ($p = 0.027$). Specialists felt more prepared for all drugs and equipment compared to non-specialists. The respondents in secondary/tertiary clinics felt more prepared for all drugs and equipment, except Ventolin ($p = 0.185$), glucose ($p = 0.211$), and acetylsalicylic acid ($p = 0.274$). No sig-

nijskih bronhodilatatora, glukagona, nitroglicerina, diazepama, kisika, ambu-balona, nazalnih kanila, orofaringealnih tubusa i laringealnih maski. Ispitanici u sekundarnim/tercijarnim ustanovama imali su više glukagona, nitroglicerina, kisika, nazalnih kanila, orofaringealnih tubusa i laringealnih maski. Oni u većim gradovima imali su više nitroglicerina i kisika. Polaznici edukacija o HMS-ovima također su prijavili veću dostupnost nitroglicerina, diazepama, kisika, maske za disanje, ambu-balona, nazalnih kanila, orofaringealnih tubusa i laringealnih maski. Tablica 6. sažima samoprocjenu o spremnosti ispitanika za korištenje lijekova i opreme. Ispitanici su se najspremnijima osjećali kad je riječ o korištenju acetilsalicilne kiseline (100, ili 32,7 %), a najmanje u slučaju uporabe laringealne maske (174, ili 57,1 %). U tablici 7. predstavljene su razlike u spremnosti za korištenje lijekova i opreme među grupama. Muškarci su se osjećali spremnijima za korištenje svih lijekova i opreme u usporedbi sa ženama. Oni s više godina prakse smatrali su se spremnijima za korištenje inhalacijskih bronhodilatatora ($p = 0,007$), glukagona ($p = 0,009$), glukoze ($p = 0,014$) i nitroglicerina ($p = 0,027$). Specijalisti su se smatrali spremnijima za sve lijekove

Table 4 Readiness to Manage Medical Emergencies - Differences by Groups
Tablica 4. Spremnost za zbrinjavanje hitnih medicinskih stanja – razlike po skupinama

Medical Emergency • Hitno medicinsko stanje	Gender • Spol p-value • p-vrijednost	Years of Practice • Staž p-value • p-vrijednost	Specialization • Specijalizacija p-value • p-vrijednost	Primary vs. Secondary/ Tertiary • Primarna vs. sekundarna/ tercijarna p-value • p-vrijednost	Place of Work • Mjesto rada p-value • p-vrijednost	Education • Edukacija p-value • p-vrijednost
Vasovagal reaction • Vazovagalna reakcija	0.293	0.095	0.020*	0.008*	0.198	0.295
Toxic reaction to anesthetic • Toksična reakcija na anestetik	0.008*	0.053	< 0.0001*	< 0.0001*	0.048*	0.004*
Vasoconstrictor reaction • Reakcija na vazokonstriktor	0.003*	0.185	< 0.0001*	< 0.0001*	0.318	0.005*
Anaphylactic reaction • Anafilaktična reakcija	0.005*	0.499	0.046*	0.003*	0.097	0.126
Hypoglycemia • Hipoglikemija	0.092	0.467	0.004*	0.004*	0.397	0.127
Epileptic seizure • Epileptični napadaj	0.027*	0.643	0.005*	0.003	0.669	0.149
Angina pectoris attack • Napadaj angine pektoris	0.011*	0.056	< 0.0001*	< 0.0001*	0.020*	< 0.0001*
Myocardial infarction • Infarkt miokarda	0.016*	0.086	< 0.0001*	< 0.0001*	0.055	< 0.0001*
Hyperventilation • Hiperventilacija	0.041*	0.193	0.111	0.002*	0.273	0.261
Asthmatic attack • Astmatični napadaj	0.004*	0.066	0.013*	0.001*	0.494	0.006*
Foreign body in the airway • Strano tijelo u dišnom putu	0.002*	0.519	0.407	< 0.0001*	0.706	0.074
Cardiac arrest • Srčani arrest	0.031*	0.722	0.025*	< 0.0001*	0.013*	0.001*
Overall readiness • Ukupna spremnost	< 0.0001*	0.362	< 0.0001*	< 0.0001*	0.071	0,022*

* statistically significant difference ($p < 0.05$) • statistički značajna razlika ($p < 0,05$)

nificant differences were noted concerning city size, except for oxygen use ($p = 0.007$). ME training attendees felt more prepared to use adrenaline ($p = 0.027$), aminophylline ($p = 0.009$), corticosteroids ($p = 0.006$), acetylsalicylic acid ($p = 0.042$), oxygen ($p = 0.044$), breathing masks ($p = 0.037$), nasal cannulas ($p < 0.001$), oropharyngeal tubes ($p < 0.001$), and laryngeal masks ($p = 0.003$). Table 8 presents attitudes towards ME education. Nearly all respondents (316, 99.1%) believed ME education should be mandatory for all dentists, and almost as many (313, 99%) believed it should be mandatory for dental assistants. Most respondents (291, 92.7%) supported workshops dedicated exclusively to MEs. Opinions on the frequency of education varied: most (143, 45.4%) favored annual sessions, while 111 (35.2%) preferred biennial sessions, and 57 (18.1%) supported quinquennial sessions. Four respondents (1.3%) believed that such a training should occur only once in a lifetime. Due to the near-universal agreement on the need for education, further statistical analysis by groups was not conducted.

i opremu u usporedbi s onima bez specijalizacije. Ispitanici u sekundarnim/tercijarnim ustanovama osjećali su se spremnijima za sve lijekove i opremu, osim za Ventolin ($p = 0,185$), glukozu ($p = 0,211$) i acetilsalicilnu kiselinu ($p = 0,274$). Nisu zabilježene značajne razlike u vezi s veličinom grada, osim za korištenje kisika ($p = 0,007$). Polaznici edukacija o HMS-ovima osjećali su se spremnijima za korištenje adrenalina ($p = 0,027$), aminofilina ($p = 0,009$), kortikosteroida ($p = 0,006$), acetilsalicilne kiseline ($p = 0,042$), kisika ($p = 0,044$), maske za disanje ($p = 0,037$), nazalnih kanila ($p < 0,001$), orofaringealnih tubusa ($p < 0,001$) i laringealnih maski ($p = 0,003$). Tablica 8. prikazuje stajališta prema edukaciji o HMS-ovima. Gotovo svi ispitanici (316, ili 99,1 %) smatrali su da bi edukacija o HMS-ovima trebala biti obvezna za sve stomatologe, a gotovo isto toliko (313, ili 99 %) istaknulo je da bi morala biti obvezna i za dentalne asistente. Većina ispitanika (291, ili 92,7 %) podržala je radionice isključivo o HMS-ovima. Mišljenja o učestalosti edukacije su varirala – većina (143, ili 45,4 %) podržavala je godišnje sesije, njih 111 (35,2 %) preferiralo je edukaciju svake dvije godine, a 57 (18,1 %) svakih pet godina. Četiri ispitanika (1,3 %) smatrala su da bi edukacija trebala biti samo jedanput tijekom života. Zbog gotovo jednoglasnog stajališta o potrebi za edukacijom, daljnja statistička analiza po grupama nije provedena.

Table 5 Clinic Equipment for Managing Medical Emergencies
Tablica 5. Opremljenost ordinacije za zbrinjavanje hitnih medicinskih stanja

Drug/Equipment • Lijek/oprema	N (%)	Years of Practice • Staž p-value • p-vrijednost	Specialization • Specijalizacija p-value • p-vrijednost	Primary vs. Secondary/ Tertiary • Primarna vs. sekundarna/ tercijarna p-value • p-vrijednost	Place of Work • Mjesto rada p-value • p-vrijednost	Education • Edukacija p-value • p-vrijednost
Adrenaline • Adrenalin	315 (98.7)	0.419	0.601	0.740	0.824	0.269
Antihistamine (e.g., Sinopen) • Antihistaminik (npr. Sinopen)	309 (96.9)	0.002*	0.431	0.345	0.572	0.168
Aminophylline • Aminoflin	246 (77.1)	0.483	0.395	0.179	0.195	0.129
Corticosteroid • Kortikosteroid	280 (87.8)	0.441	0.377	0.359	0.622	0.211
Inhalation bronchodilator (e.g., Ventolin) • Inhalacijski bronhodilatator (npr. Ventolin)	104 (3.6)	0.261	0.035*	0.213	0.269	0.117
Glucagon • Glukagon	30 (9.4)	0.691	0.036*	0.027*	0.140	0.160
Glucose paste • Glukoza u pasti	22 (6.9)	0.107	0.370	0.369	0.617	0.098
Acetylsalicylic acid • Acetilsalicilna kiselina	118 (37)	0.694	0.526	0.467	0.215	0.302
Nitroglycerin • Nitroglicerin	78 (24.4)	0.711	0.001*	0.004*	0.007*	0.003*
Diazepam • Diazepam	163 (51.1)	0.240	0.004*	0.119	0.204	0.012*
Oxygen • Kisik	93 (29.1)	0.302	0.002*	0.016*	0.019*	< 0.0001*
Breathing mask • Maska za disanje	87 (27.3)	0.075	0.060	0.084	0.742	0.002*
Ambu bag • ambu-balon	109 (34.2)	0.014*	0.039*	0.093	0.296	< 0.0001*
Nasal cannula • Nazalna kanila za kisik	27 (8.5)	0.639	0.010*	0.027*	0.202	0.002*
Oropharyngeal tube (airway) • Orofaringealni tubus (airway)	46 (14.4)	0.016*	0.004*	0.001*	0.852	< 0.0001*
Laryngeal mask (i-Gel) • Laringealna maska (i-Gel)	12 (3.8)	0.474	0.001*	0.016*	0.347	0.013*
No data • Nema podataka	2					

* statistically significant difference ($p < 0.05$) • statistički značajna razlika ($p < 0,05$)

Table 6 Self-assessed Knowledge and Ability to Use Drugs for Managing Medical Emergencies**Tablica 6.** Samoprocjena znanja i sposobnosti za korištenje lijekova za primjenu lijekova za zbrinjavanje hitnih medicinskih stanja

Drug/Equipment • Lijek/oprema	Extremely Unprepared • Izrazito nesproman/a 1 N (%)	Somewhat Unprepared • Pomalo nesproman/a 2 N (%)	Neither Prepared nor Unprepared • Ni spreman/a ni nesproman/a 3 N (%)	Somewhat Prepared • Pomalo spreman/a 4 N (%)	Extremely Prepared • Izrazito spreman/a 5 N (%)	No response • Nisu odgovorili N
Adrenaline • Adrenalin	22 (7)	55 (17.5)	100 (31.7)	72 (22.9)	66 (20.9)	4
Antihistamine (e.g., Sinopen) • Antihistaminik (npr., Sinopen)	23 (7.3)	41 (13)	109 (34.5)	75 (23.7)	68 (21.5)	3
Aminophylline • Aminofilin	28 (8.9)	57 (18.1)	121 (38.4)	58 (18.4)	51 (16.2)	4
Corticosteroid • Kortikosteroid	22 (7)	49 (15.6)	107 (34.1)	72 (22.9)	64 (20.4)	5
Inhalation bronchodilator (e.g., Ventolin) • Inhalacijski bronhodilatator (npr., Ventolin)	31 (10)	36 (11.6)	81 (26)	80 (25.7)	83 (26.7)	8
Glucagon • Glukagon	69 (22.7)	58 (19.1)	110 (36.1)	37 (12.2)	30 (9.9)	15
Glucose paste • Glukoza u pasti	70 (22.8)	56 (18.2)	68 (22.2)	50 (16.3)	63 (20.5)	12
Acetylsalicylic acid • Acetilsalicilna kiselina	36 (11.8)	33 (10.8)	68 (22.2)	69 (22.5)	100 (32.7)	13
Nitroglycerin • Nitroglicerin	30 (9.6)	32 (10.3)	55 (17.6)	95 (30.4)	100 (32.1)	7
Diazepam • Diazepam	22 (7.2)	34 (11.1)	75 (24.5)	87 (28.4)	88 (28.7)	13
Oxygen • Kisik	51 (16.4)	38 (12.2)	92 (29.6)	67 (21.5)	63 (20.3)	8
Breathing mask • Maska za disanje	51 (16.6)	46 (14.9)	76 (24.7)	64 (20.8)	71 (23)	11
Nasal cannula • Nosna kanila	150 (49)	66 (21.6)	49 (16)	20 (6.5)	21 (6.9)	13
Oropharyngeal tube (airway) • Orofaringealni tubus (airway)	165 (53.9)	66 (21.6)	42 (13.7)	16 (5.2)	17 (5.6)	13
Laryngeal mask (i-Gel) • Laringealna maska (i-Gel)	174 (57.1)	66 (21.6)	43 (14.1)	16 (5.2)	6 (2)	14

Table 7 Readiness to Use Drugs/Equipment for Managing Medical Emergencies - Differences by Groups
Tablica 7. Spremnost za primjenu lijekova/opreme za zbrinjavanje hitnih medicinskih stanja – razlike po skupinama

Drug/Equipment • Lijek/oprema	Gender • Spol p-value • p-vrijednost	Years of Practice • Staž p-value • p-vrijednost	Specialization • Specijalizacija p-value • p-vrijednost	Primary vs. Secondary/ Tertiary • Primarna vs. sekundarna/ tercijarna p-value • p-vrijednost	Place of Work • Mjesto rada p-value • p-vrijednost	Education • Edukacija p-value • p-vrijednost
Adrenaline • Adrenalin	0.003*	0.829	0.006*	0.013*	0.090	0.027*
Antihistamine (e.g., Sinopen) • Antihistaminik (npr. Sinopen)	0.002*	0.525	0.002*	0.005*	0.337	0.067
Aminophylline • Aminofilin	0.007*	0.298	0.006*	0.031*	0.331	0.009*
Corticosteroid • Kortikosteroid	0.002*	0.201	< 0.0001*	0.023*	0.091	0.006*
Inhalation bronchodilator (e.g., Ventolin) • Inhalacijski bronhodilatator (npr. Ventolin)	0.030*	0.007*	0.027*	0.185	0.364	0.077
Glucagon • Glukagon	0.001*	0.009*	0.009*	0.018*	0.580	0.051
Glucose paste • Glukoza u pasti	0.016*	0.014*	0.017*	0.211	0.628	0.363
Acetylsalicylic acid • Acetilsalicilna kiselina	0.003*	0.065	0.001*	0.274	0.192	0.042*
Nitroglycerin • Nitroglicerina	0.027*	0.027*	0.001*	0.008*	0.092	0.207
Diazepam • Diazepam	0.001*	0.574	0.001*	0.014*	0.129	0.057
Oxygen • Kisik	< 0.0001*	0.311	0.006*	0.023*	0.007*	0.044*
Breathing mask • Maska za disanje	< 0.0001*	0.447	0.029*	0.027*	0.102	0.037*
Nasal cannula • Nosna kanila	< 0.0001*	0.288	< 0.0001*	< 0.0001*	0.248	< 0.0001*
Oropharyngeal tube (airway) • Orofaringealni tubus (airway)	< 0.0001*	0.847	< 0.0001*	< 0.0001*	0.065	< 0.0001*
Laryngeal mask (i-Gel) • Laringealna maska (i-Gel)	< 0.0001*	0.364	< 0.0001*	0.001*	0.289	0.003*

* statistically significant difference (p < 0.05) • statistički značajna razlika (p < 0,05)

Table 8 Attitudes towards Education on Medical Emergencies

Tablica 8. Stajališta o edukaciji o hitnim medicinskim stanjima

Do you think that education on medical emergencies that can occur in dental practice should be mandatory for all dentists? • Mislite li da bi edukacija o hitnim medicinskim stanjima koja se mogu dogoditi u ordinaciji dentalne medicine trebala biti obvezna za sve stomatologe? (%)	N (%)
YES • DA	316 (99.1)
NO • NE	3 (0.9)
If you answered „YES” to the previous question, what form should the education take? • Ako ste na gornje pitanje odgovorili DA, kakav bi trebao biti oblik edukacije?	
Workshop dedicated exclusively to medical emergencies • Radni tečaj posvećen isključivo hitnim medicinskim stanjima	291 (92.7)
Theoretical course dedicated exclusively to medical emergencies • Teoretski tečaj posvećen isključivo hitnim medicinskim stanjima	11 (3.5)
Lecture as part of another continuing education course • Predavanje u sklopu drugog tečaja trajne izobrazbe	12 (3.8)
No data • Nema podataka	5
How often should such education be held? • Koliko često bi se takva edukacija trebala održavati?	N (%)
Annually • Jedanput na godinu	143 (45)
Every two years • Jedanput u dvije godine	114 (35.8)
Every five years • Jedanput u pet godina	57 (17.9)
Once in a lifetime • Jedanput u cijelom radnom vijeku	4 (1.3)
No data • Nema podataka	1
Do you think that dental assistants should also undergo such education? • Mislite li da bi i dentalni asistenti također trebali takvu edukaciju?	N (%)
YES • DA	313 (99)
NO • NE	3 (1)
No data • Nema podataka	3

Discussion

Despite global health improvements, chronic diseases such as cardiovascular disorders and stroke remain significant health burdens. Dentists are increasingly treating elderly patients with multiple comorbidities and polypharmacy (28). The COVID-19 pandemic has added complexity, especially in managing younger, uncooperative patients with extensive medical histories and multiple medications, necessitating thorough clinical assessments (29,30). Theoretical knowledge alone is insufficient for managing medical crises without practical experience (12). The public expects dentists to be prepared for emergencies, believing preparedness eliminates the crisis (4). Practicing emergency scenarios in controlled environments enhances provider confidence, communication, teamwork, and patient safety (31). The Resuscitation Council recommends annual training (12), while the European Resuscitation Council and the American Heart Association suggest biennial updates (32). This study is the first to evaluate self-reported readiness for managing MEs and the availability of essential drugs and equipment in Croatian dental practices. The sample included 319 active dentists, representing 7.9% of the 4,038 active dentists in Croatia (data from the Croatian Dental Chamber). Marks et al. (33) surveyed 7% of active dentists in Belgium, and Umek et al. (19) included 19.2% of active dentists in Slovenia. Most respondents (77.7%) were general dentists, with 86.1% working in polyvalent clinics and 13.9% of them working in larger institutions. General dentists face unique challenges due to their distance from better-equipped healthcare institutions. Over half (52.4%) of respondents had not attended ME training, similar to Belgium, where 37.2% of dentists had not attended a course since becoming active (33). In contrast, 85.1% of Slovenian dentists had attended post-graduation training (19). The relatively low participation rate in Croatia may be due to limited training availability (one or two sessions annually). Nearly all respondents (99.1%) believed that ME training should be mandatory for dentists, with 99% advocating its inclusion for dental assistants. Most of them (45%) supported annual training, thus reflecting a strong desire for improved emergency preparedness (3,6,23,34,35). Dental school curricula should also prioritize the quality and scope of ME training. Regarding ME readiness, 32.5% felt prepared and 43.5% felt extremely prepared to manage vasovagal reactions, consistent with Khami et al. (36) and Shaath et al. (37), who reported readiness rates of 79.2% and 51%, respectively. However, 23.8% of dentists felt extremely unprepared for cardiac arrest, a finding similar to other countries (3,38,39). Al-Iryani et al. (38) reported that 18% of dentists lacked confidence in managing any ME, while Marks et al. (33) noted low readiness in Belgium. Girdler and Smith reported that only 12.9% of dentists felt ready for MEs (40). Three-quarters of respondents were female, which is consistent with prior studies (2,3,9,41–43). Male respondents demonstrated higher readiness for most emergencies, except vasovagal reactions and hypoglycemia, highlighting a gender gap in emergency preparedness (45). No significant differences in readiness were associated with years of practice. The re-

Rasprava

Unatoč poboljšanjima globalnoga zdravlja, kronične bolesti poput kardiovaskularnih poremećaja i moždanoga udara i dalje su značajan zdravstveni teret. Stomatolozi sve češće liječe starije pacijente s višestrukim komorbiditetima i polifarmacijom (28). Pandemija bolesti COVID-19 dodatno je zakomplicirala situaciju, posebno u radu s mladim, nesuradljivim pacijentima s opsežnim medicinskim anamnezama i višestrukim lijekovima, što zahtijeva temeljitu kliničku procjenu (29, 30). Teoretsko znanje samo po sebi nije dovoljno za zbrinjavanje medicinskih kriza bez praktičnog iskustva (12). Javnost očekuje da stomatolozi budu spremni za hitna stanja, vjerujući da spremnost eliminira krizu (4). Vježbanje hitnih scenarija u kontroliranim uvjetima povećava povjerenje pružatelja usluga, poboljšava komunikaciju, timski rad i sigurnost pacijenata (31). Vijeće za reanimaciju preporučuje godišnju izobrazbu (12), a Europsko vijeće za reanimaciju i Američko udruženje za srce sugeriraju ažuriranje svake dvije godine (32). Ova studija je prva koja procjenjuje samoprijavljenu spremnost za zbrinjavanje HMS-ova i dostupnost esencijalnih lijekova i opreme u hrvatskim dentalnim praksama. Uzorak je obuhvatio 319 aktivnih stomatologa, što je 7,9 % od ukupno 4038 aktivnih stomatologa u Hrvatskoj (podatci Hrvatske komore dentalne medicine). Marks i suradnici (33) ispitali su 7 % aktivnih stomatologa u Belgiji, a Umek i suradnici (19) obuhvatili su 19,2 % aktivnih stomatologa u Sloveniji. Većina ispitanika (77,7 %) bili su opći stomatolozi, pri čemu je njih 86,1 % radilo u polivalentnim ordinacijama, a 13,9 % u većim ustanovama. Opći stomatolozi suočeni su s posebnim izazovima zbog udaljenosti od bolje opremljenih zdravstvenih institucija. Više od polovine (52,4 %) ispitanika nije bilo na edukaciji za HMS, slično kao u Belgiji gdje 37,2 % stomatologa nije pohađalo tečaj od početka rada (33). Suprotno tomu, 85,1 % slovenskih stomatologa bilo je na izobrazbi nakon diplomiranja (19). Razmjerno nizak postotak pohađanja u Hrvatskoj može biti posljedica ograničene dostupnosti izobrazbe (jedan ili dva programa na godinu). Gotovo svi ispitanici (99,1 %) smatrali su da bi izobrazba za HMS trebala biti obvezna za stomatologe, a 99 % također je zagovaralo uključivanje dentalnih asistenata. Većina (45 %) podržavala je godišnju izobrazbu, što odražava snažnu želju za poboljšanjem pripremljenosti za hitna stanja (3, 6, 23, 34, 35). Kurikulum stomatoloških fakulteta također bi trebao dati prioritet kvaliteti i opsegu izobrazbe o HMS-ovima. Kad je riječ o spremnosti za HMS, 32,5 % ispitanika osjećalo se spremnima, a 43,5 % iznimno spremnima za zbrinjavanje vazovagalnih reakcija, što je u skladu s rezultatima Khami i suradnika (36) i Shaatha i suradnika (37) koji su zabilježili stope spremnosti od 79,2 % i 51 %. Međutim, 23,8 % ispitanika osjećalo se izrazito nespremnima za zastoje srca, što je slično nalazima u drugim zemljama (3, 38, 39). Al-Iryani i suradnici (38) izvijestili su da 18 % stomatologa nema samopouzdanja da bi upravljali bilo kojim HMS-om, a Marks i suradnici (33) zabilježili su nisku spremnost u Belgiji. Girdler i Smith izvijestili su da je samo 12,9 % stomatologa osjećalo spremnost za HMS-ove (40). Tri četvrtine ispitanika bile su žene, što je u skladu s dosadašnjim studijama (2, 3, 9, 41 – 43). Muški is-

spondents in secondary and tertiary clinics expressed higher readiness for all MEs, likely due to more complex cases and better education. ME training significantly influenced self-assessed readiness, aligning with other studies (33,40,46). Since MEs occur across healthcare settings, training should be mandatory and periodically repeated, as skills tend to decline six months after training (47). Adrenaline was the most commonly available drug (98.7%), which is consistent with previous studies (13,48,49). Common drugs for managing anaphylactic shock included antihistamines (96.9%), aminophylline (77.1%), and corticosteroids (87.8%), likely due to regulations mandating an „anaphylactic shock therapy kit” in all dental clinics (50,51). However, other emergency drugs and equipment were less available. Diazepam was present in 51.1% of clinics, acetylsalicylic acid in 37%, and nitroglycerin in 24.4%. Only 29.1% of clinics had oxygen cylinders, in contrast to Khanjani et al. (52), where oxygen was the most common equipment. Insufficient equipment for managing MEs has been noted in other studies. Umek et al. (19) found that only 3.31% of Slovenian clinics had all ten recommended devices, while Joshi et al. (53) reported that 46.8% of Nepalese clinics were adequately equipped. Dentists in larger cities had more nitroglycerin and oxygen, thus reflecting disparities in resources between urban and rural areas. Those who attended ME training had more equipment and drugs, thus indicating better risk perception and preparedness.

However, self-assessed readiness to use emergency drugs and equipment was generally low. For example, while 22.5% of dentists felt prepared and 32.7% of them felt extremely prepared to use acetylsalicylic acid, 21.6% of them felt unprepared, and 57.1% of them felt extremely unprepared to use laryngeal masks. Specialists and ME-trained respondents consistently reported higher readiness to use emergency drugs and equipment, thus reinforcing the correlation between knowledge and confidence (58,59). Several limitations should be noted. First, the sample represents only 7% of active dentists in Croatia, limiting generalizability. Second, recall bias may have influenced the reported availability of emergency equipment. While MEs are rare but significant events, likely well-remembered by dental teams, self-selection bias may also affect findings, and social desirability bias could influence self-reported readiness. Nonetheless, this study provides valuable insights into dentists' preparedness for managing MEs and the availability of essential equipment in Croatian dental practices.

Conclusion

The dentists in secondary and tertiary healthcare clinics are better prepared and more educated to handle all medical emergencies compared to those working in primary healthcare settings. Overall, the availability of equipment and drugs for managing MEs is inadequate, with the exception

pitanici pokazali su veću spremnost za većinu hitnih stanja, osim za vazovagalne reakcije i hipoglikemiju, što upućuje na rodne razlike u pripremljenosti za hitna stanja (45). Nisu zabilježene značajne razlike u spremnosti u vezi s godinama prakse. Ispitanici u sekundarnim i tercijarnim ustanovama izrazili su veću spremnost za sve HMS-ove, vjerojatno zbog složenijih slučajeva i bolje edukacije. Izobrazba za HMS značajno je utjecala na samoprocjenu spremnosti, što je u skladu s drugim studijama (33, 40, 46). Budući da se HMS-ovi pojavljuju u svim razinama zdravstvene skrbi, edukacija bi trebala biti obvezna i periodično ponavljana, jer se vještine obično smanjuju šest mjeseci poslije izobrazbe (47). Adrenalin je bio najčešće dostupan lijek (98,7 %), što je u skladu s dosadašnjim istraživanjima (13, 48, 49). Uobičajeni lijekovi za anafilaktični šok uključuju antihistaminike (96,9 %), aminofilin (77,1 %) i kortikosteroide (87,8 %), vjerojatno zbog propisa koji nalažu „komplet za anafilaktični šok” u svim dentalnim ordinacijama (50, 51). No drugi hitni lijekovi i oprema bili su manje dostupni. Diazepam je bio u 51,1 % ordinacija, acetilsalicilna kiselina u 37 %, a nitroglicerina u 24,4 %. Samo 29,1 % ordinacija imalo je boce s kisikom, za razliku od podataka u studiji Khanjanija i suradnika (52) koji ističu da je kisik bio najčešća oprema. Nedovoljna oprema za zbrinjavanje HMS-ova zabilježena je i u drugim studijama. Umek i suradnici (19) otkrili su da je samo 3,31 % slovenskih ordinacija imalo svih deset preporučenih uređaja, a Joshi i suradnici (53) izvijestili su da je 46,8 % nepalskih ordinacija bilo adekvatno opremljeno. Stomatolozi u većim gradovima imali su više nitroglicerina i kisika, što odražava razlike u resursima između urbanih i ruralnih područja. Oni koji su pohađali izobrazbu za HMS imali su više opreme i lijekova, što upućuje na bolju percepciju rizika i pripremljenost. Međutim, samoprocjena spremnosti za korištenje hitnih lijekova i opreme općenito je bila niska. Na primjer, dok se 22,5 % osjećalo spremnima, a 32,7 % izrazito spremnima za korištenje acetilsalicilne kiseline, 21,6 % smatralo se nespremnima, a 57,1 % iznimno nespremnima za korištenje laringealnih maski. Specijalisti i ispitanici koji su bili na izobrazbi za HMS dosljedno su prijavljivali veću spremnost za korištenje gotovo svih hitnih lijekova i opreme, što jača vezu između znanja i samopouzdanja (58, 59). Valja istaknuti nekoliko ograničenja. Kao prvo, uzorak je činilo samo 7 % aktivnih stomatologa u Hrvatskoj, što ograničava generalizaciju rezultata. Drugo, pristranost prisjećanja mogla je utjecati na prijavljenu dostupnost hitne opreme. Iako su HMS-ovi rijetki, ali značajni događaji i vjerojatno ih dobro pamte dentalni timovi, pristranost u samoselekciji mogla je također utjecati na rezultate, a socijalna poželjnost na samoprocjenu spremnosti. Ipak, ovo istraživanje pruža vrijedne uvide u pripremljenost stomatologa za zbrinjavanje HMS-ova i dostupnost osnovne opreme u hrvatskim dentalnim ordinacijama.

Zaključak

Stomatolozi u sekundarnim i tercijarnim zdravstvenim ustanovama bolje su pripremljeni i educirani za zbrinjavanje svih hitnih medicinskih stanja u usporedbi s onima u primarnoj zdravstvenoj zaštiti. Općenito, dostupnost opreme i lijekova za zbrinjavanje HMS-ova nije dovoljna, osim adrenalina

of adrenaline and other medications for anaphylactic shock. There is a clear need and strong interest among dentists for comprehensive ME management training, which should be conducted more frequently—ideally on an annual basis—and made mandatory for all dentists, regardless of workplace. Additionally, establishing a national ME registry in Croatia is necessary to monitor ME trends. Reforms in dental school curricula are essential to enhance the confidence and competence of future dental practitioners in managing MEs. Implementing these measures will reduce the threat of MEs and improve patient survival rates.

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na i drugih lijekova za anafilaktični šok. Postoji jasna potreba i snažan interes među stomatolozima za sveobuhvatnom edukacijom o zbrinjavanju HMS-ova koja bi se trebala organizirati češće – idealno na godišnjoj razini – i biti obvezna za sve stomatologe, bez obzira na mjesto rada. Dodatno, uspostava nacionalnog registra za HMS u Hrvatskoj nužna je za praćenje trendova u HMS-ovima. Reforme kurikuluma na stomatološkim fakultetima ključne su za jačanje samopouzdanja i kompetencija budućih stomatoloških praktičara u zbrinjavanju hitnih stanja. Provođenjem tih mjera smanjit će se prijetnja kad je riječ o HMS-ovima i poboljšati stope preživljavanja pacijenata.

Sukob interesa: Autori nisu bili u sukobu interesa.

Doprinos autora: **B. Š.** – pretraživanje literature, pisanje teksta, popis literature prema uputama, prilagodba referencija; **M. F.** – dizajn, pretraživanje literature, interpretacija podataka, pisanje teksta, popis literature prema uputama; **M. S.** – dizajn, interpretacija podataka; **V. B.** – dizajn, pretraživanje literature, interpretacija podataka, pisanje teksta. Svi autori odobrili su konačnu verziju.

Sažetak

Cilj: Hitna medicinska stanja (HMS) neposredna su prijetnja životu i zdravlju pacijenata te se mogu dogoditi i u dentalnim ordinacijama. Svrha ovog istraživanja bila je procijeniti koliko su stomatolozi u Hrvatskoj spremni za zbrinjavanje HMS-a i koliko su njihove ordinacije opremljene potrebnim lijekovima i opremom. **Materijali i metode:** U istraživanje je bilo uključeno 319 aktivnih stomatologa i svi su ispunili internetski upitnik koji je obuhvaćao demografske podatke, obrazovanje o hitnim medicinskim stanjima, samoprocjenu sposobnosti upravljanja u takvim slučajevima, zatim opremljenost ordinacije, znanje i sposobnost za korištenje lijekova te mišljenja o potrebama za dodatnim obrazovanjem. Normalnost distribucije testirana je Shapiro-Wilkovim testom. Za nominalne varijable korišteni su postotci, a za kontinuirane varijable srednja vrijednost ± standardna devijacija. Za analizu razlika između grupa korišteni su t-test i χ^2 test. **Rezultati:** Većina ispitanika (77 %) bili su opći stomatolozi. Adrenalin je bio najčešće dostupan lijek (98,7 %), a ostali rjeđe. Ispitanici u sekundarnim i tercijarnim zdravstvenim ustanovama pokazali su veću spremnost i bolju educiranost za zbrinjavanje HMS-ova te su znatno češće pohađali tečajeve o hitnim stanjima u usporedbi s onima u primarnim zdravstvenim ustanovama ($p = 0,009$). Nadalje, ispitanici sa specijalizacijom i iskustvom u sekundarnim i tercijarnim ustanovama imali su više lijekova i opreme te su se češće educirali o hitnim stanjima ($p < 0,0001$ i $p = 0,001$). **Zaključak:** Edukacije o zbrinjavanju HMS-ova trebale bi se održavati češće, na godišnjoj razini, i trebale bi biti obvezne za sve stomatologe, neovisno o mjestu rada.

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Adresa za dopisivanje
dr. Bruno Špiljak, doktorand
Sveučilište u Zagrebu
Stomatološki fakultet
Zavod za oralnu medicinu
Gundulićeva 5, 10 000 Zagreb,
Hrvatska
tel: 00 385 91 189 7720
bspiljak@sfdz.unizg.hr

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