TELEDENTISTIKA U BOSNI I HERCEGOVINI: ANALIZA ZNANJA, STAVOVA I PRAKSE MEĐU STUDENTIMA STOMATOLOGIJE, STOMATOLOZIMA I NASTAVNIM KADROM NA STOMATOLOŠKIM FAKULTETIMA ZASNOVANA NA UPITNIKU

ORIGINALNI RAD

ORIGINAL ARTICLE

TELEDENTISTRY IN BOSNIA AND HERZEGOVINA: A QUESTIONNAIRE-BASED ANALYSIS OF KNOWLEDGE, ATTITUDES AND PRACTICES AMONG DENTAL STUDENTS, DENTISTS AND ACADEMIC STAFF AT DENTAL FACULTIES

Enita Nakaš[1], Jasmina Bogdanović[2], Tarik Hamza Ribić[1]

[1] Univerzitet – Sarajevska škola za nauku i tehnologiju, Medicinski fakultet, Odsjek za stomatologiju, Sarajevo, Bosna i Hercegovina

[2] Javna ustanova Medicinska škola, Doboj, Bosna i Hercegovina

[1] *University Sarajevo School of Science and Technology, Sarajevo Medical School, Department of Dentistry, Sarajevo, Bosnia and Herzegovina*

[2] *Public Institution Medical School, Doboj, Bosnia and Herzegovina*

SAŽETAK

Uvod/Cilj: Svetska zdravstvena organizacija nastoji da poboljša kvalitet zdravstvene zaštite kroz digitalnu transformaciju. U Bosni i Hercegovini nema dovoljno informacija o znanju, stavovima i praksi studenata stomatologije, stomatologa i nastavnog kadra na stomatološkim fakultetima u vezi sa telemedicinom. Cilj ove studije je da se procene nivo znanja, stavovi i praksa u kontekstu implementacije telemedicine.

Materijali i metode: Sprovedena je „onlajn" anketa između aprila i juna 2025. godine među stomatolozima, studentima stomatologije i nastavnim kadrom na stomatološkim fakultetima širom Bosne i Hercegovine. Upitnik je sadržavao pitanja o znanju, stavovima i praksama povezanim sa teledentistikom.

Rezultati: Anketu je popunio ukupno 181 ispitanik, od kojih su 54,1% činili stomatolozi, 38,1% studenti stomatologije i 7,7% nastavni kadar na stomatološkim fakultetima širom Bosne i Hercegovine. Većina (89,5%) ispitanika nije bila upoznata s propisima koji regulišu telemedicinu. Oko 43% ispitanika je čulo za teledentistiku, dok je 96% ispitanika navelo da nema dovoljno znanja o teledentistici i izrazilo želju za formalnijim obrazovanjem iz ove oblasti. Među stomatolozima, 75% je izrazilo spremnost za pružanje određenih teledentističkih usluga u svojoj praksi.

Zaključak: Stomatolozi u Bosni i Hercegovini trenutno imaju ograničeno znanje i praktične veštine u području teledentistike, ali pokazuju pozitivne stavove prema njenoj primeni. Rezultati ukazuju na potrebu da studenti stomatologije, stomatolozi i nastavni kadar u BiH unaprede kompetencije iz oblasti teledentistike kroz kontinuirano stručno usavršavanje. Uspešna implementacija zahteva odgovarajuću digitalnu infrastrukturu, institucionalnu podršku i regulatorne okvire, kao i integraciju teledentistike u obrazovanje kroz mikrokvalifikacione programe.

Ključne reči: teledentistika, telemedicina, stomatolozi, studenti stomatologije

ABSTRACT

Introduction/Objective: The World Health Organization strives to improve the quality of healthcare through digital transformation. In Bosnia and Herzegovina, there is insufficient information about the knowledge, attitudes, and practices of dental students, dentists, and teaching staff at dental faculties in relation to telemedicine. The aim of this study was to assess the level of knowledge, attitudes, and practices in the context of telemedicine implementation.

Materials and methods: An online survey was conducted between April and June 2025 among dentists, dental students, and teaching staff at dental faculties across Bosnia and Herzegovina. The questionnaire included questions about knowledge, attitudes, and practices related to teledentistry.

Results: The survey was completed by a total of 181 respondents, of whom 54.1% were dentists, 38.1% were dental students, and 7.7% were teaching staff at dental faculties throughout Bosnia and Herzegovina. The majority of respondents (89.5%) were unaware of the regulations governing telemedicine. About 43% of respondents had heard of teledentistry, while 96% of respondents stated that they do not have enough knowledge about teledentistry and expressed a desire for a more formal education in this field. Among dentists, 75% expressed a willingness to provide certain teledentistry services in their practice.

Conclusion: Dentists in Bosnia and Herzegovina currently have limited knowledge and practical skills in the field of teledentistry, but they show positive attitudes towards its application. The results indicate the need for dental students, dentists, and teaching staff in BiH to improve competencies in the field of teledentistry through continuous professional development. Successful implementation requires adequate digital infrastructure, institutional support and regulatory frameworks, as well as the integration of teledentistry into education through micro-credential programs.

Keywords: teledentistry, telemedicine, dentists, dental students

Autor za korespondenciju:
Jasmina Bogdanović
Javna ustanova Medicinska škola
Pop Ljubina 31, 74000 Doboj, Bosna i Hercegovina
Elektronska adresa: bogdanovicjasmina@hotmail.com

Corresponding author:
Jasmina Bogdanović
Public Institution Medical School
31 Pop Ljubina Street, 74000 Doboj, Bosnia and Herzegovina
E-mail: bogdanovicjasmina@hotmail.com

Primljeno • *Received*: June 16, 2026; **Revidirano • *Revised*:** August 23, 2026; **Prihvaćeno • *Accepted*:** September 7, 2026; ***Online first*:** September 25, 2026

DOI: 10.5937/smclk7-68181

UVOD

Svetska zdravstvena organizacija (SZO) definiše telemedicinu kao primenu informacionih i komunikacionih tehnologija u razmeni validnih informacija u cilju dijagnostikovanja, lečenja i prevencije bolesti i povreda, istraživanja i evaluacije, kao i kontinuirane edukacije zdravstvenih radnika, a sve u interesu unapređenja zdravlja pojedinaca i njihovih zajednica. Teledentistika je oblast telemedicine, danas poznata i kao virtuelna stomatološka konsultacija, koja predstavlja inovativni pristup stomatološkoj zdravstvenoj zaštiti usmeren na povećanje dostupnosti stomatoloških usluga [1].

Teledentistika podrazumeva pružanje stomatoloških usluga putem informacionih i komunikacionih tehnologija, pri čemu se pružalac i korisnik zdravstvene zaštite nalaze na različitim mestima. Ovaj model smanjuje nejednakosti u pristupu stomatološkoj zdravstvenoj zaštiti, naročito kod starijih osoba, zatvorenika i stanovništva u udaljenim ruralnim područjima, dok dodatne prednosti uključuju smanjenje troškova i unapređenje kvaliteta stomatološke zdravstvene zaštite [2]. Pomoću teledentistike, stomatolozi mogu da pružaju savete, obavljaju trijažu, postavljaju preliminarne dijagnoze i edukuju pacijente putem različitih digitalnih komunikacionih kanala, uključujući pametne telefone, video-pozive i platforme društvenih mreža [3]. Pandemija bolesti KOVID-19 bila je značajan pokretač razvoja teledentistike. Tokom pandemije, zdravstveni sistemi su bili pod velikim pritiskom, dok je rizik od infekcije u stomatološkim ustanovama bio povećan [4]. U tom periodu, teledentistika je postala sve značajniji alat za praćenje pacijenata, davanje saveta i zbrinjavanje hitnih stomatoloških stanja, naročito kada je direktan kontakt bio ograničen [3,5].

Pružanje zdravstvene zaštite na daljinu uz podršku informacionih i komunikacionih tehnologija obuhvata različite modalitete, kao što su mobilno zdravstvo, elektronski zdravstveni kartoni, teleedukacija, telepraćenje, teledijagnostika, telekonsultacije i digitalna promocija oralnog zdravlja. Posebno se ističe i tzv. „gejmifikacija", koja koristi elemente igara za menjanje zdravstvenih ponašanja i može se primenjivati na različitim digitalnim platformama [2]. U zavisnosti od vremenskog okvira prenosa informacija, teledentistika se deli na konsultacije u realnom vremenu, model „*store-and-forward*" i komunikaciju u približno realnom vremenu [6]. U odnosu na oblast primene, razvijene su poddiscipline kao što su teleprotetička stomatologija, teleparodontologija, teleortodoncija, teleoralna hirurgija i telepedodoncija [2].

Prednosti teledentistike uključuju rano otkrivanje i pravovremeno lečenje bolesti usta i zuba, bolju dostupnost zdravstvenih usluga i smanjenje profesionalne izolacije putem komunikacije i konsultacija sa kolega-

INTRODUCTION

The World Health Organization (WHO) defines telemedicine as the use of information and communication technologies for the exchange of valid information for diagnosis, treatment, and prevention of disease and injuries, research and evaluation, and continuing education of healthcare providers, all in the interest of advancing the health of individuals and their communities. Teledentistry is a field within telemedicine, today also known as virtual dental consultation, which represents an innovative approach to dental care aimed at increasing the accessibility of dental services [1].

Teledentistry refers to the provision of dental services through the use of information and communication technologies, where the provider and the recipient of care are located in different places. This model reduces inequalities in access to dental care, particularly for elderly individuals, prisoners, and populations in remote rural areas, while additional benefits include reduced costs and improved quality of dental care [2]. Through teledentistry, dentists can provide advice, perform triage, establish provisional diagnoses, and educate patients via various digital communication channels, including smartphones, video calls, and social media platforms [3]. The COVID-19 pandemic was a significant driver of teledentistry development. During the pandemic, healthcare systems were under substantial pressure, while the risk of infection in dental settings increased [4]. During this period, teledentistry became an increasingly important tool for monitoring patients, providing advice, and managing emergency dental conditions, particularly when direct contact was limited [3,5].

Remote healthcare delivery supported by information and communication technologies includes various modalities such as mobile health, electronic health records, tele-education, telemonitoring, telediagnostics, teleconsultations, and digital oral health promotion. Gamification is also highlighted, as it uses game elements to modify health behaviors and can be applied across different digital platforms [2]. Depending on the time frame of information transfer, teledentistry is divided into real-time consultations, the "store-and-forward" model, and near real-time communication [6]. In relation to the field of application, subdisciplines such as teleprosthodontics, teleperiodontology, teleorthodontics, teleoral surgery, and telepedodontics have been developed [2].

The advantages of teledentistry include early detection and timely treatment of oral diseases, improved access to healthcare services, and reduced professional isolation through communication and consultation with colleagues and specialists, which contributes to

ma i specijalistima, što doprinosi unapređenju kvaliteta zdravstvene zaštite pacijenata, uz istovremeno smanjenje lista čekanja i jačanje interdisciplinarne saradnje [4]. Pacijenti generalno navode da su zadovoljni ovim oblikom zdravstvene zaštite, a pojedine studije ukazuju na pozitivnu korelaciju u poređenju sa tradicionalnim stomatološkim pregledom licem u lice [7]. Primena teledentistike naročito dolazi do izražaja kod trijaže pacijenata, pri konsultacijama i u edukaciji [8].

Mobilna tehnologija dodatno unapređuje dostupnost stomatološke zdravstvene zaštite, uz istovremeno smanjenje vremenskih i finansijskih troškova. Sistematski pregledi literature ukazuju na to da teledentistika doprinosi smanjenju indeksa dentalnog plaka, gingivalnog indeksa i učestalosti lezija bele mrlje. Nadalje, rezultati randomizovanih kontrolisanih studija pokazuju da intervencije sprovedene putem servisa za razmenu poruka na društvenim mrežama, uključujući nedeljne edukativne infografike, video-sadržaje i poruke podrške, imaju pozitivan efekat na ponašanja dece i roditelja u vezi sa oralnim zdravljem [9].

Dodatni dokazi potiču iz jedne studije sprovedene u vojnoj stomatološkoj ustanovi, koja je potvrdila da teledentistika može da predstavlja pouzdan alat za postavljanje dijagnoza i unapređenje stomatološke zdravstvene zaštite, u poređenju sa konvencionalnim kliničkim pregledima [1]. Dosadašnja literatura dodatno podržava teledentistiku kao efikasan alat za prevenciju bolesti, promociju oralnog zdravlja, dijagnostikovanje i rano otkrivanje karijesa [3]. Teledentistika obuhvata daljinski stomatološki skrining zasnovan na fotografskim podacima, koji predstavlja jednostavan i efikasan alat za rano otkrivanje bolesti usta i zuba [10].

Pandemija bolesti KOVID-19 je pokazala da teledentistika nije samo privremeno rešenje, već važna komponenta savremene stomatološke prakse [11]. Njena relevantnost potvrđena je u različitim zdravstvenim sistemima, uključujući sisteme u Australiji, Kanadi i Saudijskoj Arabiji [12]. Međutim, efikasna primena teledentistike u stomatološkoj praksi zavisi od odgovarajućeg znanja i obuke stomatoloških zdravstvenih radnika [3]. Stoga se naglašava da obrazovanje o teledentistici treba integrisati u planove i programe nastave na osnovnim studijama stomatologije kako bi se obezbedila njena pravilna i široko rasprostranjena primena u kliničkoj praksi [7].

S druge strane, primena teledentistike izaziva zabrinutost u pogledu zakonske regulative, licenci, zaštite podataka i integracije u rutinske kliničke tokove rada [2,5]. Identifikovane su i brojne prepreke, uključujući nedostatak poverenja među pacijentima i pružaocima zdravstvenih usluga, nedovoljnu digitalnu pismenost i zabrinutost u pogledu isplativosti. Potrebna su dalja

improved quality of patient care, while simultaneously reducing waiting lists and strengthening interdisciplinary collaboration [4]. Patients generally report satisfaction with this form of care, and some studies indicate a positive correlation compared to the traditional face-to-face dentist examination [7]. The applications of teledentistry are particularly evident in patient triage, consultations, and education [8].

Mobile technology further enhances access to dental care while reducing time and financial costs. Systematic literature reviews indicate that teledentistry contributes to reductions in the dental plaque index, gingival index, and the incidence of white spot lesions. Furthermore, results from randomized controlled trials (RCTs) demonstrate that interventions delivered via social media messaging services, including weekly educational infographics, video content, and supportive messages, have a positive effect on the oral health behaviors of children and parents [9].

Additional evidence comes from a study conducted in a military dental institution, which confirmed that teledentistry can be a reliable tool for establishing diagnoses and improving dental care, as compared to conventional clinical examinations [1]. Current literature further supports teledentistry as an effective tool for prevention, oral health promotion, diagnosis, and early detection of caries [3]. Teledentistry includes remote dental screening based on photographic data, which represents a simple and effective tool for early detection of oral diseases [10].

The COVID-19 pandemic demonstrated that teledentistry is not merely a temporary solution, but an important component of modern dental practice [11]. Its relevance has been confirmed in various healthcare systems, including Australia, Canada, and Saudi Arabia [12]. However, effective implementation of teledentistry in dental practice depends on adequate knowledge and training of dental professionals [3]. Therefore, it is emphasized that education on teledentistry should be integrated into undergraduate dental curricula to ensure its proper and widespread application in clinical practice [7].

On the other hand, the implementation of teledentistry raises concerns regarding legal regulations, licensing, data protection, and integration into routine clinical workflows [2,5]. Numerous barriers have also been identified, including lack of trust among patients and providers, insufficient digital literacy, and concerns regarding cost-effectiveness. Further research is needed on clinical implementation, policy evaluation, economic benefits, as well as data security and confidentiality [2]. Most studies on dentists' knowledge, attitudes, and skills regarding teledentistry have been

istraživanja kliničke primene, evaluacije politika, ekonomskih koristi, kao i bezbednosti i poverljivosti podataka [2]. Većina studija o znanju, stavovima i veštinama stomatologa u vezi sa teledentistikom sprovedena je u razvijenim zemljama, dok su podaci iz zemalja u razvoju ograničeni ili ne postoje [13].

Ova studija predstavlja prvu analizu znanja, stavova i prakse studenata stomatologije, stomatologa i nastavnog kadra u vezi sa teledentistikom u Bosni i Hercegovini, čime doprinosi boljem razumevanju njihove spremnosti za primenu digitalnih rešenja u zdravstvenoj zaštiti.

Zdravstveni sistem u Bosni i Hercegovini predstavlja dodatni kontekstualni izazov za primenu teledentistike. Naime, složena organizacija zdravstvenog sistema, podeljenog na dva entiteta i jedan distrikt, otežava ujednačenu primenu zdravstvenih politika i digitalnih rešenja. Pored toga, nejednak pristup zdravstvenoj zaštiti posebno je izražen u udaljenim ruralnim područjima, migrantskim kampovima, kazneno-popravnim ustanovama, kao i među starijim i ranjivim populacijama. Iako se elektronska komunikacija i konsultacije putem elektronske pošte i društvenih medija već koriste u praksi, nedostatak sistematskog pristupa, nedovoljno znanje i neadekvatan pravni okvir ograničavaju širu primenu teledentistike.

Iz navedenih razloga, cilj ove studije je da proceni znanje, stavove i praksu u vezi sa teledentistikom među studentima stomatologije, stomatolozima i nastavnim kadrom u Bosni i Hercegovini, kao i njihovu spremnost za prihvatanje digitalnih rešenja. Cilj studije jeste i da identifikuje ključne prepreke i mogućnosti za unapređenje edukacije o teledentistici, njenog prihvatanja i primene u okviru zdravstvenog sistema Bosne i Hercegovine.

MATERIJALI I METODE

Za prikupljanje podataka u ovoj studiji preseka korišćen je elektronski upitnik, koji je distribuiran putem zvaničnih internet stranica Komore doktora stomatologije Republike Srpske i Stomatološke komore Federacije Bosne i Hercegovine, kao i putem elektronske pošte i različitih platformi društvenih mreža (*WhatsApp®, Facebook®, Instagram® i LinkedIn®*). Pre distribucije upitnika, studenti stomatologije, stomatolozi i nastavni kadar su zamoljeni da daju informisani pristanak za dobrovoljno učešće u studiji. Studiju je odobrio Etički komitet Sarajevske škole za nauku i tehnologiju (br. SMS-180125, 18. februar 2025. godine). Za procenu znanja, stavova i prakse u vezi sa teledentistikom među studentima stomatologije, stomatolozima i nastavnim kadrom korišćen je prethodno validiran upitnik. Upitnik je prethodno korišćen u sličnoj studiji sprovedenoj u Francuskoj, čiji su originalni autori odobrili njegovu primenu [14].

conducted in developed countries, while data from developing countries remain limited or non-existent [13].

This study provides the first analysis of the knowledge, attitudes, and practices of dental students, dentists, and academic staff regarding teledentistry in Bosnia and Herzegovina, contributing to a better understanding of their readiness for the implementation of digital healthcare solutions.

The healthcare system in Bosnia and Herzegovina represents an additional contextual challenge for the implementation of teledentistry. Specifically, the complex organization of the healthcare system, divided into two entities and a district, hinders the uniform implementation of health policies and digital solutions. Furthermore, unequal access to healthcare is particularly pronounced in remote rural areas, migrant camps, correctional institutions, and among elderly and vulnerable populations. Although electronic communication and consultations via e-mail and social media are already used in practice, the lack of a systematic approach, insufficient knowledge, and an inadequate legal framework limit wider implementation of teledentistry.

For these reasons, this study aims to assess knowledge, attitudes, and practices regarding teledentistry among dental students, dentists, and academic staff in Bosnia and Herzegovina, as well as their readiness to adopt digital solutions. The study also aims to identify key barriers and opportunities for improving teledentistry education, acceptance, and implementation within Bosnia and Herzegovina's healthcare system.

MATERIALS AND METHODS

To collect data for this cross-sectional study, an electronic questionnaire was employed and disseminated via the official websites of both the Republic of Srpska Chamber of Doctors in Dentistry and the Dental Chamber of the Federation of Bosnia and Herzegovina, as well as via email and various social media platforms (WhatsApp®, Facebook®, Instagram®, and LinkedIn®). Before distributing the questionnaire, dental students, dentists, and academic staff were asked to provide informed consent to participate voluntarily in the study. The study was approved by the Ethics Committee of the Sarajevo School of Science and Technology (No. SMS-180125, February 18, 2025). A previously validated questionnaire was used to assess knowledge, attitudes, and practices regarding teledentistry among dental students, dentists, and academic staff. The questionnaire had previously been used in a similar French study, whose original authors approved its application [14].

The questionnaire was adapted to the local language and health environment in Bosnia and Herze-

Upitnik je prilagođen lokalnom jeziku i zdravstvenom okruženju u Bosni i Hercegovini, uz očuvanje originalne validirane strukture. Upitnik se sastojao od tri segmenta: procene znanja, stavova i prakse u vezi sa teledentistikom. U studiji je primenjen metod prigodnog uzorkovanja. Učešće je bilo u potpunosti dobrovoljno, a konačni uzorak činili su svi studenti stomatologije, stomatolozi i nastavnici koji su ispunjavali kriterijume za učešće i koji su popunili upitnik tokom perioda istraživanja. Veličina uzorka je stoga bila određena brojem ispitanika koji su ispunjavali kriterijume za učešće i dobrovoljno odgovorili na anketu.

Statističke analize sprovedene su korišćenjem softvera *SPSS 23* (*Armonk, NY: IBM Corp.*). Rezultati anketnog upitnika prikazani su kao apsolutne i relativne učestalosti, dok je za poređenje podataka korišćen Fišerov egzaktni test. Kruskal–Valisov test primenjen je za poređenje rednih odgovora na tvrdnje (merenih na petostepenoj Likertovoj skali, od 1 = „u potpunosti se slažem" do 5 = „uopšte se ne slažem") između tri podgrupe (studenata, stomatologa i nastavnog kadra). Post hoc parna poređenja statistički značajnih razlika sprovedena su korišćenjem Man–Vitnijevog U testa uz Bonferonijevu korekciju za višestruka poređenja, pri čemu je nivo statističke značajnosti postavljen na $p < 0{,}0167$ ($\alpha = 0{,}05/3$). Man–Vitnijev U test je takođe korišćen za poređenje rednih odgovora na određene tvrdnje između dve grupe: doktora i nastavnika koji su primenjivali teledentistiku i onih koji je nisu primenjivali. Nivo statističke značajnosti za sva merenja bio je postavljen na $p < 0{,}05$. Za prikaz podataka korišćen je *Microsoft Excel 2010*.

REZULTATI

U anketi je učestvovao ukupno 181 ispitanik. Učestvovale su i žene (n = 115; 63,5%) i muškarci (n = 66; 36,5%). Najveći broj ispitanika činili su stomatolozi (n = 98; 54,1%) i studenti stomatologije (n = 69; 38,1%). Nešto više od polovine ispitanika bilo je starosti između 31 i 60 godina (Tabela 1). Žene su bile zastupljenije u svim kategorijama ispitanika prema zanimanju. U grupi studenata stomatologije, približno 70% (n = 48) su činile žene; u grupi stomatologa, 59,2% (n = 58) su bile žene; a u grupi nastavnika/saradnika na stomatološkim fakultetima 64,3% (n = 9) su bile žene (Tabela 2). Više od polovine ispitanika u grupi studenata je bilo starosti od 20 do 25 godina (76,8%), dok je 81% stomatologa bilo starosti između 31 i 60 godina. Približno 71% nastavnika/saradnika na stomatološkim fakultetima je bilo starosti između 46 i 60 godina.

Znanje

Najveći broj ispitanika (n = 85; 47%) smatrao je da je telemedicina oblast primene e-zdravstva, dok je prigovina while preserving the original validated structure. The questionnaire consisted of three segments: assessment of knowledge, attitudes, and practices regarding teledentistry. The study used a non-probability convenience sampling method. Participation was entirely voluntary, and the final sample consisted of all eligible dental students, dentists, and academic staff who completed the questionnaire during the study period. The sample size was, therefore, determined by the number of eligible participants who voluntarily responded to the survey.

Statistical analyses were performed using SPSS 23 software (Armonk, NY: IBM Corp.). The results of the survey questionnaire are presented in absolute and relative frequencies, while Fisher's exact test was used to compare the data. The Kruskal–Wallis test was applied for comparing ordinal responses to the statements (measured on a five-point Likert scale ranging from 1 = "I completely agree" to 5 = "I completely disagree") across the three subgroups (students, dentists, and academic staff). Post hoc pairwise comparisons of statistically significant differences were performed using the Mann–Whitney U test with Bonferroni correction for multiple comparisons, with the level of statistical significance set at $p < 0.0167$ ($\alpha = 0.05/3$). The Mann-Whitney U test was also used for comparing the ordinal responses to the statements of two groups, doctors and academic staff who practiced teledentistry and those who did not. The significance level for all measurements was set at $p < 0.05$. Microsoft Excel 2010 was used to display data.

RESULTS

A total of 181 respondents completed the survey, including women (n = 115; 63.5%) and men (n = 66; 36.5%). The majority of respondents were dentists (n = 98; 54.1%) and dental students (n = 69; 38,1%). Slightly more than half of the respondents were between 31 and 60 years of age (Table 1). Women were more represented across respondent occupations. In the group of dental students, approximately 70% (n=48) were women; in the group of dentists, 59.2% (n = 58) were women; and in the group of academic staff /associates at dental universities 64.3% (n = 9) were women (Table 2). More than half of the respondents in the group of students were 20–25 years old (76.8%), while 81% of dentists were between 31 and 60 years old. Approximately 71% of academic staff /associates at dental universities were between 46 and 60 years of age.

Knowledge

The largest number of respondents (n = 85; 47%) considered telemedicine to be an area of application of

Tabela 1. Sociodemografske karakteristike ispitanika

Table 1. Sociodemographic characteristics of respondents

	Ukupno / *Total* (*N* = 181)	
	n	%
Pol / *Gender*		
Muški / *Male*	66	36.5 %
Ženski / *Female*	115	63.5 %
Starosno doba (godine) / *Age group (years)*		
<20	3	1.7 %
20-25	53	29.3 %
26-30	28	15.5 %
31-45	56	30.9 %
46-60	37	20.4 %
>60	4	2.2 %
Zanimanje / *Profession*		
Student stomatologije / *Student of dentistry*	69	38.1 %
Doktor stomatologije / *Dentist*	98	54.1 %
Nastavnik/saradnik na stomatološkom fakultetu / *Academic staff*	14	7.7 %
Fakultet* / *Faculty**		
Univerzitet u Sarajevu / *University of Sarajevo*	37	20.4 %
Univerzitet u Banjoj Luci / *University of Banja Luka*	56	30.9 %
Univerzitet u Istočnom Sarajevu / *University of East Sarajevo*	29	16.0 %
Sveučilište u Mostaru / *University of Mostar*	14	7.7 %
Internacionalni univerzitet u Sarajevu / *International University of Sarajevo*	1	0.6 %
Sarajevska škola za nauku i tehnologiju / *Sarajevo School of Science and Technology*	10	5.5 %
Univerzitet u Travniku / *University of Travnik*	7	3.9 %
Drugo / *Other*	27	14.9 %

* Fakultet koji pohađaju (studenti) ili koji su pohađali (doktori i nastavnici/suradnici)

**Faculty they are attending (students) or have attended (doctors and academic staff)*

bližno 34% (*n* = 62) smatralo da je e-zdravstvo oblast primene telemedicine (Slika 1). Manji broj ispitanika smatrao je da su obe tvrdnje tačne, dok je samo 1% (*n* = 2) ispitanika odabrao odgovor da su obe tvrdnje tačne uz tvrdnju da su telemedicina i e-zdravstvo sinonimi (sve tvrdnje su tačne).

Jednaki broj ispitanika (16%; *n* = 29) je smatrao da telekonsultacije i medicinska pomoć na daljinu predstavljaju oblasti telemedicine u praksi. Ukupno 13% (*n* = 23) ispitanika smatralo je da, pored navedenog, te-

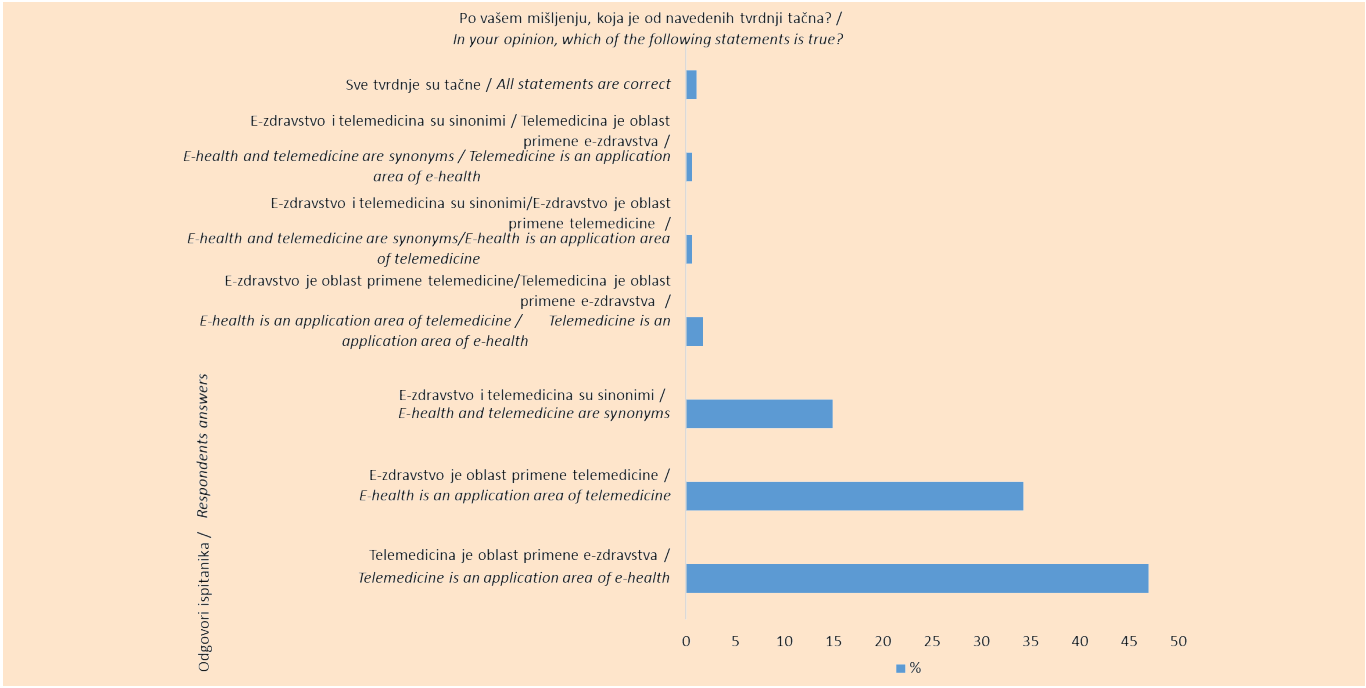
e-health, while approximately 34% (*n* = 62) believed that e-health is an area of application of telemedicine (Figure 1). A smaller number of respondents held the opinion that both statements are correct, while only 1% (*n* = 2) of respondents selected the opinion that both statements are correct along with the statement that telemedicine and e-health are synonyms (all statements are correct).

An equal number of respondents (16%; *n* = 29) considered teleconsultations and remote medical assistance to be areas of telemedicine in practice. A to-

Tabela 2. Odgovori u odnosu na razlike među polovima, prema zanimanju

Table 2. Responses in relation to gender differences among professions

Zanimanje / *Profession*	*n*	Muškarci / *Male (n)*	%	Žene / *Female (n)*	%
Student stomatologije / *Student of dentistry*	69	21	30%	48	70%
Doktor stomatologije / *Dentist*	98	40	40.81 %	58	59.2%
Nastavnik/saradnik na stomatološkom fakultetu / *Academic staff*	14	5	35.71 %	9	64.3 %

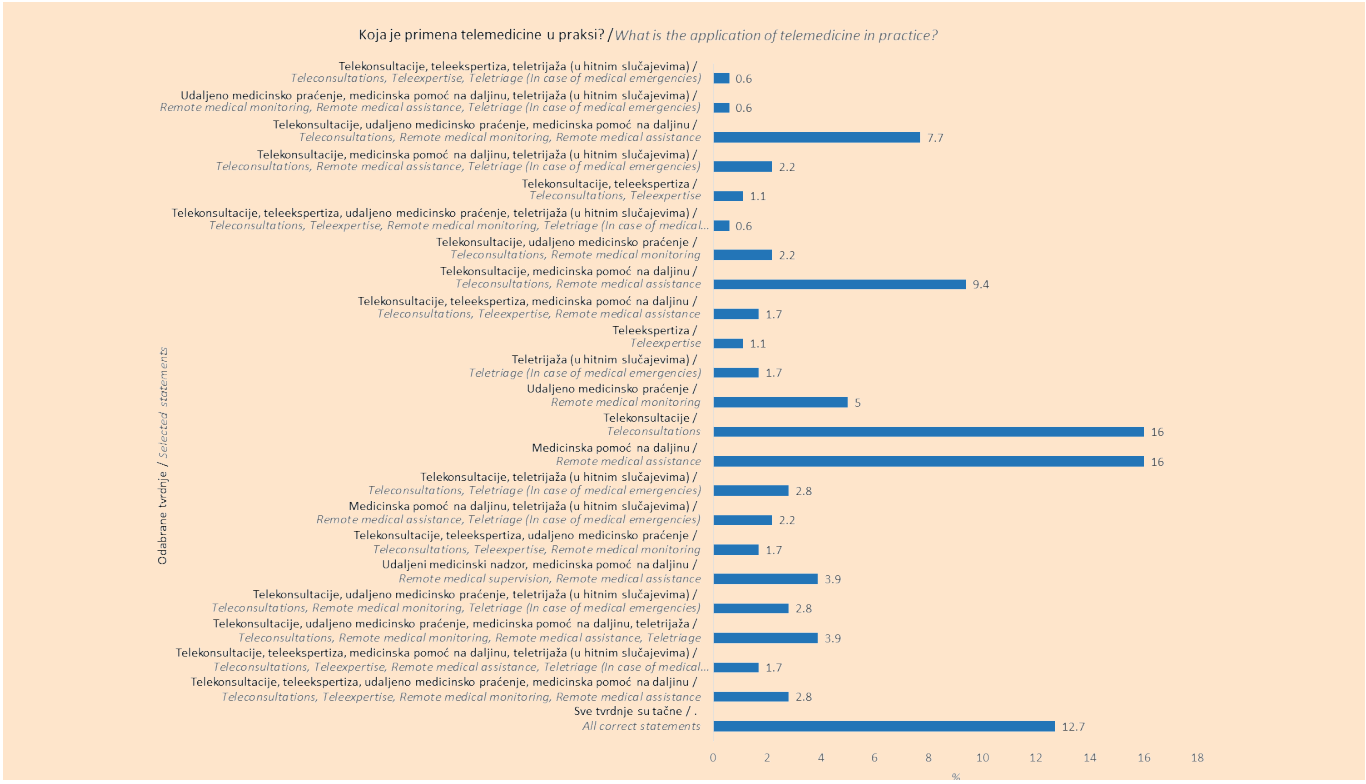


Slika 1. Respondents' attitudes towards the application of telemedicine and e-health

Figure 1. PRISMA diagram of selected articles included in the analysis of the application of statistical methods in neurological research.

leekspertiza, daljinsko medicinsko praćenje i teletrijaža (u slučajevima hitnih medicinskih stanja) takođe predstavljaju sastavne delove telemedicine u praksi. Samo mali broj ispitanika odabrao je jednu ili najviše tri tačne tvrdnje (Slika 2).

tal of 13% (n = 23) of the respondents believed that, in addition to the aforementioned, tele-expertise, remote medical monitoring, and tele-triage (in cases of medical emergencies) are also integral parts of telemedicine in practice. Only a small number of respondents selected one or up to three correct statements (Figure 2).



Slika 2. Stavovi ispitanika prema primeni telemedicine u praksi

Figure 2. Respondents' attitudes towards the application of telemedicine in practic

Velika većina ispitanika (89,5%) nije bila upoznata sa propisima koji regulišu telemedicinu u Bosni i Hercegovini. Oko 43% ispitanika je čulo za teledentistiku, dok je oko 35% čulo za neku od aktivnosti koje se primenjuju u teledentistici. Približno 20% njih upoznalo se sa tim aktivnostima putem internet stranica, oko 18% putem članaka, 17% na konferencijama, dok je oko 32% navelo druge izvore informacija. Kada je reč o aktivnostima o kojima su se informisali putem ovih izvora, najveći broj ispitanika je odabrao telekonsultacije (34%) i medicinsku pomoć na daljinu.

Samo 7% ispitanika je steklo znanje o teledentistici tokom formalnog obrazovanja, uglavnom u okviru izbornog predmeta (53%) ili tokom stažiranja (29,4%). Takođe, oko 96% ispitanika je smatralo da nema dovoljno znanja o teledentistici, dok je 86,2% izrazilo želju za dodatnim formalnim obrazovanjem ili obukom na ovu temu. Kao najpoželjniji oblici dodatnog obrazovanja su navedene konferencije (27,5%), onlajn nastava (34,6%) i kursevi (25%).

Nije utvrđena statistički značajna razlika u odgovorima na pitanja kojima je procenjivano znanje o teledentistici između studenata stomatologije, stomatologa i nastavnog kadra na stomatološkim fakultetima.

Obrazovanje

Više od polovine ispitanika (64,6%) nije pružilo nijednu uslugu teledentistike tokom studiranja, dok 25,4% nije bilo sigurno da li su pružili neku od ovih usluga ili ne. Samo 10% ispitanika potvrdilo je primenu teledentistike tokom studiranja, uključujući približno 15% stomatologa, 7% ($n = 1$) nastavnika/saradnika i 3% ($n = 2$) studena-

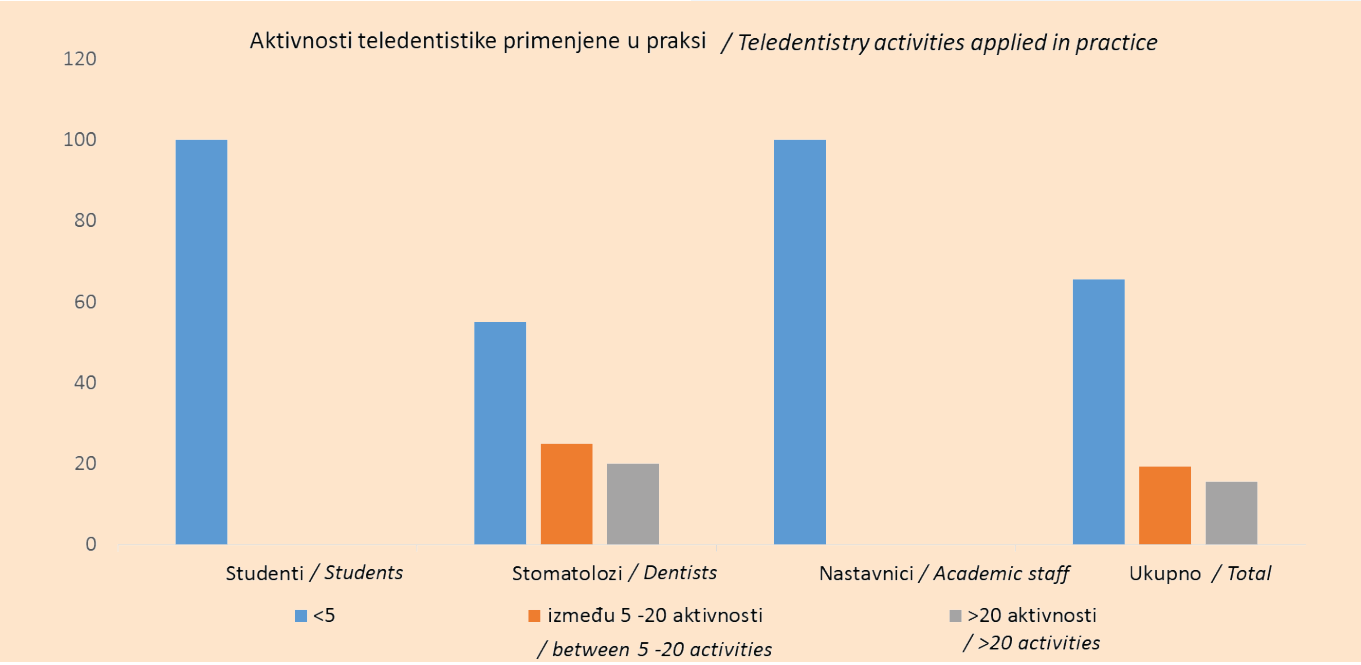
A vast majority of respondents (89.5%) were not familiar with telemedicine regulations in Bosnia and Herzegovina. About 43% of respondents had heard of teledentistry, while around 35% had heard of some activity applied in teledentistry. Approximately 20% of them became acquainted with these activities through websites, about 18% through articles, 17% at conferences, while around 32% indicated other sources of information. Regarding the activities they learned about through these sources, the largest number selected teleconsultations (34%) and remote medical assistance.

Only 7% of respondents acquired knowledge about teledentistry during their formal education, mostly within an elective course (53%) and internship (29.4%). Likewise, about 96% of respondents believed they did not have sufficient knowledge of teledentistry, while 86.2% expressed the desire to have more formal education or training on this topic. The preferred forms of additional education were conferences (27.5%), online teaching (34.6%), and courses (25%).

There was no significant difference in the responses to the questions assessing knowledge of teledentistry among dental students, dentists, and academic staff at dental universities.

Education

More than half of the respondents (64.6%) did not perform any teledentistry services during their studies, while 25.4% were not sure whether they had performed any or not. Only 10% of respondents confirmed the application of teledentistry during their studies, including approximately 15% of dentists, 7% ($n = 1$) of



Slika 3. Učestalost (%) odgovora na pitanje o broju aktivnosti teledentistike primenjenih u praksi

Figure 3. Frequency (%) of responses to the question about the number of teledentistry activities applied in practice

ta. Među ispitanicima koji su potvrdili primenu teledentistike u praksi, 20% je to činilo putem pisanog izveštaja, 13,3% putem obavezne sesije, a 57% kroz druge aktivnosti. Preostali ispitanici primenjivali su teledentistiku u praksi kroz kombinaciju prethodno navedenih aktivnosti.

Kada je reč o obimu primene teledentistike tokom studiranja, više od polovine ispitanika koji su potvrdili njenu primenu (65,4%) je navelo da je sprovelo manje od pet aktivnosti. Više od pet aktivnosti su obavili samo stomatolozi (Slika 3). Ipak, više od polovine njih (57,1%) je bilo veoma zadovoljno onim što je sprovedeno, dok je samo 7% bilo nezadovoljno. Nisu utvrđene statistički značajne razlike u zavisnosti od zanimanja ispitanika u pogledu broja aktivnosti (p = 0,150) niti u iskazanom stepenu zadovoljstva (p = 0,170).

Praksa

Približno 30% (n = 34) stomatologa je primenjivalo neki oblik teledentistike u svojoj praksi tokom godine koja je prethodila istraživanju. Najčešće primenjivana metoda su bile samo telekonsultacije (33,3%) ili telekonsultacije u kombinaciji sa teletrijažom i izdavanjem recepata (33,3%). Medicinsku pomoć na daljinu je pružalo 12% stomatologa, dok je jednak procenat (6%) primenjivao sve oblike telemedicine ili neki drugi oblik. Takođe, isti procenat stomatologa je naveo da je sproveo manje od pet intervencija teledentistike, odnosno između pet i 20 intervencija (39,4%). Slični rezultati su utvrđeni među nastavnicima/saradnicima na stomatološkim fakultetima, od kojih je oko 36% (n = 5) potvrdilo primenu teledentistike u praksi tokom godine koja je prethodila istraživanju, konkretno putem telekonsultacija i medicinske pomoći na daljinu. Nastavnici i saradnici su uglavnom bili veoma zadovoljni pruženim uslugama i sprovedenim intervencijama (n = 4).

Ukupno 12% (n = 4) stomatologa je izrazilo nezadovoljstvo teledentistikom i aktivnostima sprovedenim u okviru nje tokom godine koja je prethodila istraživanju, dok je većina stomatologa bila zadovoljna ili veoma zadovoljna (32,4% i 56%, redom). Pored toga, 75% stomatologa je izrazilo želju da u svojoj praksi pruža neki oblik usluge teledentistike. Kada je reč o aktivnostima teledentistike, najčešće su birane telekonsultacije, bilo samostalno ili u kombinaciji sa medicinskom pomoći na daljinu i teleekspertizom, kao i dostavljanje recepata putem elektronske pošte i teletrijaža. Najčešća sredstva za kontaktiranje oralnih hirurga i pacijenata bila su: telefon (82% i 87%, redom), Vajber (67% i 75,5%, redom) i elektronska pošta (54% i 58%, redom). SMS poruke su češće slane pacijentima (53%) nego oralnim hirurzima (24,5%).

Poznavanje propisa koji regulišu telemedicinu nije bilo povezano sa njenom primenom u praksi (p = 0,159) niti sa brojem sprovedenih intervencija (p = 0,599) (Tabela 3).

academic staff/associates, and 3% (n = 2) of students. Among the respondents who confirmed the application of teledentistry in practice, 20% did so through a written report, 13.3% through a mandatory session, and 57% through other activities. The remainder applied teledentistry in practice through a combination of the aforementioned activities.

Regarding the extent of teledentistry application during studies, more than half of the respondents who confirmed its application (65.4%) reported fewer than five activities. More than five activities were performed only by the dentists (Figure 3). Nevertheless, more than half of them (57.1%) were very satisfied with what had been done, and only 7% were dissatisfied. There were no significant differences depending on the respondent's occupation in the number of activities (p = 0.150) or in the expression of satisfaction (p = 0.170).

Practice

Approximately 30% (N = 34) of dentists performed some form of teledentistry in their practice during the year preceding the study. The most frequently applied method was teleconsultation alone (33.3%) or in combination with tele-triage and prescription delivery (33.3%). Remote medical assistance was provided by 12% of the dentists, while an equal proportion (6%) used all forms of telemedicine or something else. Likewise, the same proportion of dentists reported fewer than five teledentistry interventions and between five and 20 interventions (39.4%). Similar results were found among academic staff /associates at dental universities, about 36% (n = 5) of whom confirmed the application of teledentistry in practice during the year preceding the study, specifically through teleconsultations and remote medical assistance. Academic staff/associates were generally very satisfied with the services and interventions provided (n = 4).

A total of 12% (n = 4) of dentists expressed dissatisfaction with teledentistry and the activities performed within it in the year preceding the study, while a majority of dentists were satisfied or very satisfied (32.4% and 56%, respectively). Moreover, 75% of dentists expressed the desire to provide some form of teledentistry service in their practice. Regarding teledentistry activities, the most frequently selected were teleconsultations, either alone or in combination with remote medical assistance and tele-expertise, as well as prescription delivery via e-mail and tele-triage. The most common means of contacting oral surgeons and patients were the following: telephone (82% and 87%, respectively), Viber (67% and 75.5%, respectively), and e-mail (54% and 58%, respectively). SMS messages were sent more frequently to patients (53%) than to

Tabela 3. Povezanost poznavanja propisa telemedicine i primene teledentistike u prak

Table 3. Relationship between knowledge of telemedicine regulations and application of teledentistry in practice

Da, dobro poznajem / *Yes, I know it well n (%)*		**Poznavanje propisa telemedicine u Bosni i Hercegovini / *Knowledge of telemedicine regulations in Bosnia and Herzegovina***		
		Da, dobro poznajem / *Yes, I know it well n (%)*	**Da, malo poznajem / *Yes, I know a little n (%***	**Ne poznajem / *I don't know n (%)***
Praktikovanje teledentistike / *Practicing teledentistry*	**Da / *Yes***	2 (6.1%)	4 (12.1 %)	27 (81.8 %)
	Ne / *No*	1 (1.3%)	6 (7.6 %)	72 (91.1 %)
Broj aktivnosti / *Number of activities*	**<5 intervencija / < *5 interventions***	2 (15.4 %)	1 (7.7 %)	10 (76.9 %)
	5–20 intervencija / *5–20 interventions*	0 (0 %)	3 (23.1 %)	10 (76.9 %)
	>20 intervencija / > *20 interventions*	0 (0 %)	1 (14.3 %)	6 (85.7 %)

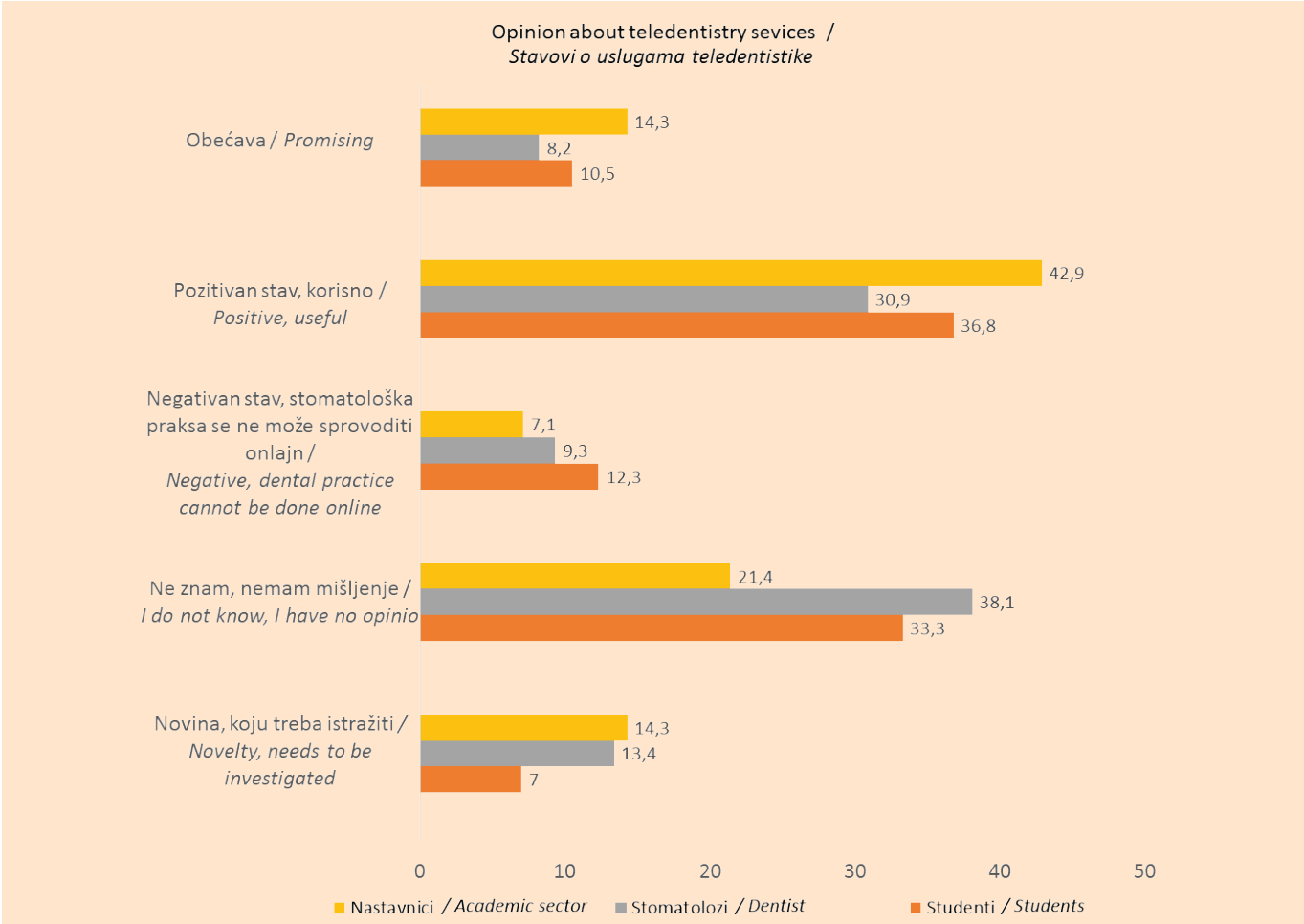
Stavovi i uverenja

Oko 93% ispitanika je iznelo svoje opšte mišljenje o uslugama teledentistike, za koje su nezavisno formulisali odgovore. Identifikovani stavovi i uverenja su podeljeni u nekoliko kategorija. Približno 34% ispitanika je izrazilo pozitivan stav prema teledentistici, njenoj korisnosti i shvatanju teledentistike kao budućnosti stomatologije, dok je oko 10% bilo uvereno da teledentistika ima potencijal i perspektivu. Međutim, 10% oral surgeons (24.5%).

Knowledge of telemedicine regulations was not associated with its application in practice $p = 0.159$) or the number of interventions performed ($p = 0.599$) (Table 3).

Attitudes and beliefs

A total of about 93% of respondents expressed their general opinion on teledentistry services, for which they independently formulated answers. The identified atti-



Slika 4. Distribucija stavova i uverenja o teledentistici na osnovu percepcija ispitanika

Figure 4. Distribution of attitudes and beliefs about teledentistry based on respondents' perceptions

ispitanika je imalo negativan stav, smatrajući da se stomatološka praksa ne može obavljati udaljeno preko interneta, dok značajan broj ispitanika (35%) nije imao stav, bilo zbog nedovoljnog razumevanja ove oblasti bilo zbog nenavođenja jasnog razloga. Nadalje, približno 11% ispitanika je smatralo da je teledentistika inovacija koju tek treba istražiti, ali je istovremeno verovalo da bi mogla biti korisna za pružanje manje pomoći ili konsultacija sa pacijentom. Nije utvrđena razlika u iskazanim stavovima u odnosu na zanimanje ispitanika ($p = 0,795$). Distribucija učestalosti iskazanih stavova o teledentistici prema zanimanju ispitanika je prikazana na Slici 4.

Stavovi prema teledentistici su takođe procenjivani korišćenjem skupa tvrdnji, sa mogućnostima odgovora u rasponu od „u potpunosti se slažem" do „uopšte se ne slažem". Više od polovine ispitanika je izrazilo pozitivan stav u pogledu značaja teledentistike za unapređenje zdravstvene zaštite pacijenata i njihovog pristupa zdravstvenim uslugama, kao i za unapređenje stomatološke zdravstvene zaštite. Pored toga, približno 73% ispitanika je želelo da primenjuje teledentistiku u svom budućem profesionalnom radu, dok je oko 66% smatralo da pacijenti preferiraju usluge teledentistike (Tabela 4).

Nisu utvrđene statistički značajne razlike u zabeleženim učestalostima procenjivanih tvrdnji u odnosu na starosne grupe ispitanika ili potvrđeni nivo formalnog obrazovanja ($p > 0,05$). Međutim, stomatolozi i nastavnici/saradnici na univerzitetima koji su primenjivali teledentistiku, značajno su češće, u poređenju sa onima koji je nisu primenjivali, izražavali slaganje sa tim da je teledentistika rešenje za unapređenje zdravstvene zaštite pacijenata ($p < 0,001$), pristupa zdravstvenoj zaštiti ($p < 0,001$) i pružanja stomatološke zdravstvene zaštite ($p < 0,001$). Takođe su značajno češće smatrali da teledentistika predstavlja mogućnost za unapređenje stomatološke prakse ($p < 0,001$) i izražavali spremnost da je koriste u budućnosti ($p < 0,001$). Pored toga, doktori i nastavnici koji su primenjivali teledentistiku značajno su ređe ovaj oblik prakse doživljavali kao pretnju stomatološkoj praksi ($p = 0,023$). Nasuprot tome, doktori i nastavnici koji nisu primenjivali teledentistiku su imali tendenciju da izražavaju veće rezerve u pogledu svih procenjivanih tvrdnji.

Poređenje prema zanimanju ispitanika (studenti stomatologije, doktori stomatologije i nastavni kadar na univerzitetima) pokazalo je statistički značajne razlike u pogledu tvrdnji da je teledentistika rešenje za unapređenje zdravstvene zaštite pacijenata ($p = 0,039$), da predstavlja mogućnost za unapređenje stomatološke prakse ($p = 0,012$), da postoji želja za primenom teledentistike u budućnosti ($p = 0,008$) i da je pacijenti

tudes and beliefs were divided into several categories. Approximately 34% of respondents expressed a positive opinion about teledentistry, its usefulness, and its view as the future of dentistry, while around 10% were convinced of its potential and promising prospects. However, 10% of respondents held a negative opinion, believing that dental practice cannot be conducted online, while a considerable number (35%) had no opinion, either due to a lack of understanding of the field or without providing a clear reason. Furthermore, approximately 11% of respondents considered teledentistry to be an innovation that still needed to be explored but nonetheless believed it could be useful as a form of minor assistance or consultation with a patient. There was no difference in the expressed opinions in relation to the respondents' occupation ($p = 0.795$). The distribution of the frequencies of expressed opinions on teledentistry by respondent occupation is shown in Figure 4.

Attitudes towards teledentistry were also assessed using a set of statements, with response options ranging from strongly agree to strongly disagree. More than half of the respondents expressed a positive attitude regarding the importance of teledentistry in improving patient care and access, as well as enhancing dental care. Moreover, approximately 73% wished to practice teledentistry in their future professional work, and around 66% believed that patients preferred teledentistry services (Table 4).

There were no significant differences in the recorded frequencies of the assessed statements with respect to respondent age groups or confirmed formal education level ($p > 0.05$). However, dentists and academic staff/associates at universities who had practiced teledentistry were significantly more likely than those who had not practiced it to agree that teledentistry is a solution for improving patient care ($p < 0.001$), access to care ($p < 0.001$), and the provision of dental care ($p < 0.001$). They were also significantly more likely to perceive teledentistry as an opportunity to enhance dental practice ($p < 0.001$) and to express a willingness to use it in the future ($p < 0.001$). In addition, doctors and academic staff who had practiced teledentistry were significantly less likely to perceive this form of practice as a threat to dental practice ($p = 0.023$). In contrast, doctors and academic staff who had not practiced teledentistry tended to express greater reservations across all assessed statements.

Comparison by the respondents' profession (dental students, doctors of dentistry and academic staff at universities) revealed statistically significant differences regarding the statements that teledentistry is a solution for improving patient care ($p = 0.039$), that it is an opportunity for improving dental practice

Tabela 4. Učestalosti i poređenje odgovora na tvrdnje o značaju teledentistike

Table 4. Frequencies and comparison of responses to statements about the importance of teledentistry

Tvrdnja / *Statement*	Ogovor / *Answer*	Ukupno / *Total* $N = 181$ *n* (%)	Student / Student $n = 69$ *n* (%)	Stomatolog / Dentist $n = 98$ *n* (%)	Nastavnik / Academic staff $n = 14$ *n* (%)*	*p*-value*
Teledentistika je relevantno rešenje za poboljšanje zdravstvene nege pacijenata. / *Teledentistry is a relevant solution for improving patient care.*	U potpunosti se slažem / *I completely agree*	76 (42.0%)	20 (29.30%)	50 (51.30%)	6 (42.9%)	0.039
	Slažem se / *I agree*	59 (32.6%)	29 (42%)	27 (27.6%)	3 (21.4%)	
	Uzdržan-a / *Restrained*	28 (15.5%)	11 (15.9%)	14 (14.3%)	3 (21.4%)	
	Ne slažem se / *I don't agree*	18 (9.9%)	9 (13%)	7 (7.1%)	2 (14.3%)	
	Uopšte se ne slažem / *I completely disagree*	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
Teledentistika je relevantno rešenje za poboljšanje pristupa zdravstvenoj nezi. / *Teledentistry is a relevant solution for improving access to patient care.*	U potpunosti se slažem / *I completely agree*	77 (42.5%)	21 (30.4%)	50 (51%)	6 (42.9%)	0.089
	Slažem se / *I agree*	64 (53.4%)	32 (46.4%)	28 (28.6%)	4 (28.6%)	
	Uzdržan-a / *Restrained*	26 (14.4%)	9 (13%)	15 (15.3) %	2 (14.3%)	
	Ne slažem se / *I don't agree*	14 (7.7%)	7 (10.1%)	5 (5.1%)	2 (14.3%)	
	Uopšte se ne slažem / *I completely disagree*	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Teledentistika je relevantno rešenje za poboljšanje pristupa stomatološkoj nezi. / *Teledentistry is a relevant solution for improving access to dental care.*	U potpunosti se slažem / *I completely agree*	77 (42.5%)	22 (31.9%)	49 (50%)	6 (42.9%)	0.144
	Slažem se / *I agree*	61 (33.7%)	29 (42%)	27 (27.6%)	5 (35.7%)	
	Uzdržan-a / *Restrained*	29 (16%)	11 (15.9%)	17 (17.3%)	1 (7.1%)	
	Ne slažem se / *I don't agree*	14 (7.7%)	7 (10.1%)	5 (5.1%)	2 (14.3%)	
	Uopšte se ne slažem / *I completely disagree*	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
Teledentistika je pretnja stomatološkoj praksi. / *Teledentistry is a threat to dental practice.*	U potpunosti se slažem / *I completely agree*	14 (7.7%)	2 (2.9%)	9 (9.2%)	3 (21.4%)	0.949
	Slažem se / *I agree*	31 (17.1%)	16 (23.2%)	14 (14.3%)	1 (7.1%)	
	Uzdržan-a / *Restrained*	43 (23.8%)	18 (26.1%)	23 (23.5%)	2 (14.3%)	
	Ne slažem se / *I don't agree*	92 (50.8%)	32 (46.4%)	52 (53.1%)	8 (57.1%)	
	Uopšte se ne slažem / *I completely disagree*	1 (0.6%)	1 (1.4%)	0 (0.0%)	0 (0.0%)	
Teledentistika je prilika za unapređivanje stomatološke prakse. / *Teledentistry is an opportunity to improve dental practice.*	U potpunosti se slažem / *I completely agree*	85 (47%)	23 (33.3%)	56 (57.1%)	6 (42.9%)	0.012
	Slažem se / *I agree*	62 (34.3%)	28 (40.6%)	28 (28.6%)	6 (42.9%)	
	Uzdržan-a / *Restrained*	22 (12.2%)	13 (18.8%)	8 (8.2%)	1 (7.1%)	
	Ne slažem se / *I don't agree*	12 (6.6%)	5 (7.2%)	6 (6.1%)	1 (7.1%)	
	Uopšte se ne slažem / *I completely disagree*	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Želim da praktikujem teledentistiku u svojoj budućoj stomatološkoj praksi. / *I want to practice teledentistry in my future dental practice.*	U potpunosti se slažem / *I completely agree*	73 (40.3%)	18 (26.1%)	48 (49%)	7 (50%)	0.008
	Slažem se / *I agree*	60 (33.1%)	26 (37.7%)	29 (29.6%)	5 (35.7%)	
	Uzdržan-a / *Restrained*	31 (17.1%)	17 (24.6%)	13 (13.3%)	1 (7.1%)	
	Ne slažem se / *I don't agree*	17 (9.4%)	8 (11.6%)	8 (8.2%)	1 (7.1%)	
	Uopšte se ne slažem / *I completely disagree*	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Pacijenti preferiraju primenu teledentistike. / *Patients prefer the use of teledentistry.*	U potpunosti se slažem / *I completely agree*	42 (23.2%)	9 (13%)	29 (29.6%)	4 (28.6%)	0.012
	Slažem se / *I agree*	77 (42.5%)	28 (40.6%)	43 (43.9%)	6 (42.9%)	
	Uzdržan-a / *Restrained*	46 (25.4%)	25 (36.2%)	17 (17.3%)	4 (28.6%)	
	Ne slažem se / *I don't agree*	16 (8.8%)	7 (10.1%)	9 (9.2%)	– (–)	
	Uopšte se ne slažem / *I completely disagree*	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	

*** Kruskal–Valisov test / * *Kruskal–Wallis Test***

preferiraju (p = 0,012). Post hok analiza, uz Bonferonijevu korekciju (α = 0,0167), pokazala je statistički značajne razlike između studenata i stomatologa za sve četiri tvrdnje (p = 0,003, p = 0,001, p = 0,001 i p = 0,001, redom). Nisu utvrđene statistički značajne razlike između studenata i nastavnog kadra niti između stomatologa i nastavnog kadra.

DISKUSIJA

Ova studija pruža sveobuhvatnu procenu znanja, stavova i prakse u vezi sa teledentistikom među studentima stomatologije, stomatolozima i nastavnim kadrom u Bosni i Hercegovini, ukazujući na potrebu za razvojem prilagođenih pristupa usmerenih na podsticanje primene teledentistike. Istraživanje pokazuje jasan raskorak između stavova i znanja. U našem uzorku, 73% odgovora je odražavalo zainteresovanost za teledentistiku, dok je samo 43% odgovora ukazivalo na stvarno znanje o teledentistici. Ovi nalazi ukazuju na to da je ovaj nivo znanja nedovoljan za uvođenje usluge teledentistike bez edukacije i sistemske podrške.

Čini se da prethodno iskustvo u teledentistici predstavlja važan faktor u oblikovanju pozitivnih stavova prema ovoj oblasti i njenom kliničkom značaju. Ispitanici koji su primenjivali teledentistiku su češće prepoznavali značaj teledentistike kao sredstva za unapređenje zdravstvene zaštite pacijenata, pristupa zdravstvenoj zaštiti i pružanja stomatološke zdravstvene zaštite, ali i kao mogućnosti za unapređenje stomatološke prakse, dok su je ređe doživljavali kao pretnju stomatološkoj praksi.

Kada je reč o profesionalnoj grupi, utvrđene su statistički značajne razlike između studenata stomatologije i stomatologa u njihovim stavovima prema teledentistici kao sredstvu za unapređenje zdravstvene zaštite pacijenata i stomatološke prakse, njihovoj spremnosti da je koriste u budućnosti, kao i u njihovim procenama preferencija pacijenata u pogledu njenog korišćenja. Međutim, nisu utvrđene statistički značajne razlike između studenata stomatologije i nastavnog kadra, niti između stomatologa i nastavnog kadra. Stoga se uočene razlike između studenata i stomatologa mogu više dovesti u vezu sa razlikama u kliničkoj izloženosti i praktičnom iskustvu nego sa samom profesionalnom grupom. Studenti stomatologije mogu da budu bolje upoznati sa digitalnim tehnologijama, ali da istovremeno imaju manje iskustva u njihovoj primeni u realnom kliničkom okruženju, dok stomatolozi imaju neposrednije iskustvo u pogledu praktičnih prednosti i ograničenja teledentistike.

Nalazi koji se odnose na zadovoljstvo ostvarenim uslugama teledentistike ukazuju na to da teledentistika može da predstavlja prihvatljivu i korisnu uslugu

(p = 0.012), that there is a desire to practice teledentistry in the future (p = 0.008) and the preference for its use by patients (p = 0.012). Post hoc analysis with Bonferroni correction (α = 0.0167) demonstrated statistically significant differences between students and dentists for all four statements (p = 0.003, p = 0.001, p = 0.001, and p = 0.001, respectively). No statistically significant differences were observed between students and academic staff or between dentists and academic staff.

DISCUSSION

The present study provides a comprehensive assessment of the knowledge, attitudes, and practices regarding teledentistry among dental students, dentists, and academic staff in Bosnia and Herzegovina, highlighting the necessity for developing customized approaches to promote the adoption of teledentistry. The research shows a clear gap between attitudes and knowledge. In our sample, 73% of responses reflected interest in teledentistry, whereas only 43% reflected actual knowledge about teledentistry. These findings suggest that this level of knowledge is insufficient to launch a teledentistry service without education and systemic support.

Previous experience with teledentistry appears to be an important factor in shaping positive attitudes towards teledentistry and its clinical relevance. Participants who had practiced teledentistry were more likely to recognize it as a means of improving patient care, access to healthcare, and the delivery of dental care, as well as an opportunity to enhance dental practice, while being less likely to perceive it as a threat to dental practice.

With regard to the professional group, statistically significant differences were observed between dental students and dentists in their perceptions of teledentistry as a means of improving patient care and dental practice, their willingness to use it in the future, and their perceptions of patients' preference for its use. However, no statistically significant differences were observed between dental students and academic staff or between dentists and academic staff. The differences observed between students and dentists may therefore be related more to differences in clinical exposure and practical experience than to professional affiliation itself. Dental students may be more familiar with digital technologies while having less experience in their application within real-world clinical settings, whereas dentists have more direct experience of the practical benefits and limitations of teledentistry.

The findings regarding satisfaction with teledentistry services suggest that teledentistry can represent an acceptable and useful service when appropriately implemented. No statistically significant differences

kada se primenjuje na odgovarajući način. Nisu utvrđene statistički značajne razlike u zadovoljstvu između ispitivanih profesionalnih grupa, pri čemu je više od polovine ispitanika navelo da je zadovoljno uslugama ostvarenim putem teledentistike. Ovi nalazi podržavaju potencijalnu prihvatljivost teledentistike među različitim profesionalnim grupama i ukazuju na to da ona može da predstavlja vrednu komponentu savremene stomatološke zdravstvene zaštite kada se na odgovarajući način primenjuje.

Rezultati naše studije su u skladu sa objavljenim rezultatima iz Francuske [14]. Nacionalno istraživanje sprovedeno u Sudanu je pokazalo je da je 59,8% stomatoloških radnika imalo pozitivan stav, što se naročito odnosilo na one sa postdiplomskim obrazovanjem i nastavničkim ulogama, dok su specijalisti bili manje skloni prihvatanju teledentistike [15]. Posmatrano u celini, ovi podaci ukazuju na to da raskorak između stavova i znanja nije specifičan za Bosnu i Hercegovinu, ali u sistemima sa ograničenim resursima i složenom administrativnom strukturom, kao što je Bosna i Hercegovina, njegove posledice po pružanje usluga mogu biti izraženije.

Pregled sproveden u 19 zemalja je pokazao ograničenu svakodnevnu kliničku primenu teledentistike, pri čemu je samo šest zemalja (31,6%) imalo uspostavljene politike i programe teledentistike, uz naglasak da je za prelazak sa pilot projekata na širu primenu potrebno uspostaviti odgovarajuće pravne okvire, mehanizme finansiranja i obuku zdravstvenih radnika [13].

Nismo prikupljali podatke o godinama radnog iskustva. Stoga nismo mogli direktno da ispitamo razlike povezane sa dužinom radnog staža. Buduće studije bi trebalo da prikupljaju ove podatke kako bi se uticaj faze profesionalne karijere mogao razgraničiti od uticaja iskustva iz prakse. Podjednako su važni strukturisani načini za razmatranje slučajeva između stomatologa, kao i za dobijanje drugog stručnog mišljenja. Podrška strukovnih udruženja i sekundarnih/tercijarnih službi potrebna je kako bi stomatološka zdravstvena zaštita na daljinu bila bezbedna i praktično izvodljiva [16]. Protokoli za trijažu i eskalaciju na nivou zdravstvene službe, uz jasno definisane uloge strukovnih udruženja i bolničkih službi, pokazuju na koji način se telekonsultacije mogu bezbedno i efikasno integrisati u zdravstvenu zaštitu [17].

Dostupnost stomatologa je neravnomerna u Bosni i Hercegovini, a većina stomatologa u Republici Srpskoj radi u privatnoj praksi (~60%). Na osnovu rezultata našeg istraživanja, potvrđena je potreba za uvođenjem teledentistike i uspostavljanjem standardizovanog puta e-konsultacija za konsultacije između stomatologa i dobijanje drugog stručnog mišljenja, kojim bi zajednički upravljale stomatološke komore i sekun-

in satisfaction were observed among the examined professional groups, with more than half of the participants reporting satisfaction with the services provided through teledentistry. These findings support the potential acceptability of teledentistry across different professional groups and suggest that, when appropriately implemented, it may be a valuable component of contemporary dental care.

Our study results are consistent with results published in France [14]. A national survey in Sudan showed that 59.8% of dental professionals expressed a positive attitude, especially those with postgraduate education and academic roles, while specialists were less accepting [15]. Taken together, these data suggest that the gap between attitudes and knowledge is not unique to Bosnia and Herzegovina, but in resource-constrained and administratively complex systems like Bosnia and Herzegovina, its consequences may be more pronounced for service delivery.

A 19-country review reported limited daily clinical use of teledentistry, with only six countries (31.6%) having established teledentistry policies and programs, and emphasized that moving beyond pilots requires enabling legal frameworks, funding mechanisms, and workforce training [13].

We did not collect data on the years of work experience. Therefore, we could not test work experience gradients directly. Future studies should collect this information to differentiate the impact of career stage from hands-on experience. Equally important are structured routes for dentist-to-dentist case discussion and for second opinions. Support from professional associations and secondary/tertiary services is needed to make remote dental care safe and workable [16]. Service-level triage and escalation protocols, with clear roles for professional associations and hospital services, demonstrate how remote consultations can be integrated safely and efficiently [17].

Dentist availability is uneven across Bosnia and Herzegovina, and most dentists in the Republic of Srpska work in private practice (~60%). Based on the results of our survey, the need for implementing teledentistry, establishing a standardized e-consultation pathway for consultations between dentists and for second opinions, jointly managed by dental associations and secondary/tertiary dental services, with on-call specialist input, and directly addressing the uneven distribution of dentists in Bosnia and Herzegovina, has been demonstrated. These findings highlight the importance of implementing additional preventive programs delivered through teledentistry to help prevent the development of various types of malocclusions such as those addressed in interceptive orthodontics.

darne/tercijarne stomatološke službe, uz mogućnost uključivanja dežurnog specijaliste, čime bi se direktno odgovorilo na neravnomernu distribuciju stomatologa u Bosni i Hercegovini. Ovi nalazi ukazuju na značaj uvođenja dodatnih preventivnih programa koji bi se realizovali putem teledentistike, kako bi se pomoglo u sprečavanju razvoja različitih vrsta malokluzija, poput onih kojima se bavi interceptivna ortodoncija. Naša studija je identifikovala nepostojanje politika, nedostatke u nastavnim planovima i programima i nejasnoće u regulativi kao faktore koji otežavaju primenu teledentistike [18,19].

Nizak nivo znanja stomatologa o teledentistici pripisuje se nedostatku formalnog obrazovanja na ovu temu. Istraživanje je pokazalo da je samo 7% ispitanika steklo znanja o teledentistici kroz formalno obrazovanje. Povećanje nivoa znanja i sticanje novih veština povezanih sa teledentistikom su od ključnog značaja za njenu primenu u kliničkoj praksi. Međutim, naša studija nije direktno analizirala nastavne planove i programe osnovnih i postdiplomskih studija u Bosni i Hercegovini. Buduće studije bi trebalo da analiziraju i mapiraju sadržaje i ishode učenja koji se odnose na teledentistiku kroz sve cikluse stomatološkog obrazovanja, uključujući programe specijalizacije, kako bi se obezbedila precizna osnova za integraciju teledentistike u nastavne planove i programe i reformu politika. Naši rezultati potvrđuju da nedovoljna zastupljenost teledentistike u nastavnim planovima i programima dovodi do nedovoljnog znanja, zbog čega je neophodna njena integracija u kurikulum.

Kada je reč o stavovima prema teledentistici među ispitanicima iz različitih grupa, utvrđena je statistički značajna razlika. Razlike su uočene u percepciji teledentistike kao relevantnog rešenja za unapređenje zdravstvene zaštite pacijenata, u percepciji teledentistike kao mogućnosti za unapređenje stomatološke prakse, u spremnosti za prihvatanje teledentistike u budućnosti i u proceni preferencija pacijenata u pogledu korišćenja usluga teledentistike. Post hok analiza je dodatno pokazala postojanje značajnih razlika između studenata i stomatologa, dok nisu utvrđene statistički značajne razlike između studenata i nastavnog kadra, niti između stomatologa i nastavnog kadra. Ovi nalazi ukazuju na to da se percepcija teledentistike razlikuje u zavisnosti od nivoa profesionalnog iskustva. Moguće je da su studenti, zbog veće izloženosti digitalnim tehnologijama, otvoreniji prema inovacijama u sistemima pružanja zdravstvene zaštite. Nasuprot tome, stomatolozi mogu imati drugačiju percepciju, budući da su neposrednije izloženi praktičnim, organizacionim i regulatornim izazovima povezanim sa implementacijom teledentistike.

Our study identified a policy vacuum, curricular deficit, and regulatory ambiguity as factors impeding the adoption of teledentistry [18,19].

Dentists' low knowledge of teledentistry is attributed to a lack of formal education on the subject. The survey revealed that only 7% of respondents learned about teledentistry through formal education. Increasing the level of knowledge and acquiring new skills related to teledentistry is crucial for its application in clinical practice. However, our study did not directly review the undergraduate and postgraduate curricula in Bosnia and Herzegovina. Future studies should review and map teledentistry content and learning outcomes across all cycles of dental education, including specialization programs, to provide a precise basis for curriculum integration and policy reform. Our results confirm that insufficient curriculum exposure to teledentistry results in poor knowledge, thus necessitating curriculum integration.

Regarding attitudes toward teledentistry among respondents from different groups, a statistically significant difference was observed. Differences were identified in the perception of teledentistry as a relevant solution for improving patient care, in the perception of teledentistry as an opportunity to enhance dental practice, in the willingness to adopt teledentistry in the future, and in the assessment of patient preferences for using teledentistry services. Post hoc analysis further revealed the presence of significant differences between students and dentists, whereas no statistically significant differences were found between students and academic staff, or between dentists and academic staff. These findings indicate that perceptions of teledentistry vary depending on the level of professional experience. Conceivably, students, due to greater exposure to digital technologies, are more open to innovations in healthcare delivery systems. In contrast, dentists may have a different perception, as they are more directly exposed to the practical, organizational, and regulatory challenges associated with the implementation of teledentistry.

The dental students' openness and acceptance of innovative digital solutions are rooted in their knowledge of clinical effectiveness, access to dental services, and the quality of care provided. Talla et al. highlighted the importance of perceiving teledentistry as a useful and easy-to-use dental service, which represents a key predictor of the intention to adopt teledentistry in future practice [20]. During their education and professional development, students are generally more open to innovation and its integration into clinical reasoning. Education plays a crucial role in shaping positive perceptions, as it provides opportunities to acquire knowl-

Otvorenost i prihvatanje inovativnih digitalnih rešenja među studentima stomatologije zasnivaju se na njihovom znanju o kliničkoj efikasnosti, dostupnosti stomatoloških usluga i kvalitetu pružene zdravstvene zaštite. Tala i saradnici su istakli značaj doživljavanja teledentistike kao korisne i jednostavne stomatološke usluge, što predstavlja ključni prediktor namere za prihvatanje teledentistike u budućoj praksi [20]. Tokom obrazovanja i stručnog usavršavanja, studenti su generalno otvoreniji prema inovacijama i njihovoj integraciji u kliničko rezonovanje. Edukacija ima ključnu ulogu u oblikovanju pozitivnih percepcija, jer pruža mogućnosti za sticanje znanja i veština u oblasti digitalnih zdravstvenih rešenja i podstiče spremnost za njihovu buduću primenu u stomatološkoj praksi.

Šire posmatrano, identifikovane prepreke – nedostaci u politikama, nedostaci u nastavnim planovima i programima i regulatorne nejasnoće – ukazuju na potrebu za koordinisanim delovanjem na nivou obrazovanja, regulative u profesiji i zdravstvene politike. Shodno tome, sistemi zdravstvene zaštite i obrazovanja moraju se prilagoditi novim tehnološkim dostignućima u kliničkoj praksi.

Složena organizacija zdravstvenog sistema, koji je u Bosni i Hercegovini podeljen na dva entiteta, jedan distrikt i nekoliko kantona, predstavlja prepreku jednostavnim rešenjima za primenu teledentistike. Međutim, teledentistika i dalje predstavlja sredstvo za ostvarivanje pristupa stomatološkoj zdravstvenoj zaštiti, dobijanje drugog stručnog mišljenja i profesionalnu saradnju, uprkos administrativnim izazovima. Prednosti ove studije uključuju dizajn studije preseka i primenu validiranog upitnika za procenu znanja, stavova i prakse u vezi sa teledentistikom. Ograničenja uključuju sprovođenje ankete putem interneta, što je moglo dovesti do prekomerne zastupljenosti stomatologa sa visokim nivoom informatičke pismenosti, kao i izostanak sistematske analize nastavnih planova i programa osnovnih i postdiplomskih studija, zbog čega stvarni obim formalne edukacije iz oblasti teledentistike može biti manji od prijavljenog.

ZAKLJUČAK

Studenti stomatologije, stomatolozi i nastavni kadar u Bosni i Hercegovini su pokazali ograničeno znanje i praktično iskustvo u pogledu teledentistikom, uz istovremeno ispoljavanje generalno pozitivnih stavova prema njenoj primeni.

Uspešna primena teledentistike u Bosni i Hercegovini zahteva adekvatnu digitalnu infrastrukturu, pouzdanu internet konekciju, institucionalnu podršku i odgovarajuće regulatorne okvire.

edge and skills in digital health solutions and fosters readiness for their future application in dental practice.

More broadly, the identified barriers – policy gaps, curriculum deficiencies and regulatory ambiguity – highlight the need for coordinated action at the education, professional regulation and health policy levels. Consequently, it follows that the health and education systems need to adapt to new technological advances in clinical practice.

The complex organization of the healthcare system, which is divided into two entities, one district and several cantons in BiH, presents an obstacle to simple solutions for the implementation of teledentistry. However, teledentistry remains a tool for accessing dental care, second opinions, and professional collaboration despite administrative challenges. The strengths of the present study include its cross-sectional design and the use of a validated questionnaire to assess knowledge, attitudes, and practices related to teledentistry. Limitations include the online administration of the survey, which may have resulted in the overrepresentation of IT-literate dentists, as well as the absence of a systematic review of undergraduate and postgraduate syllabi, which may mean that the actual extent of formal teledentistry education is lower than reported.

CONCLUSION

Dental students, dentists, and academic staff in Bosnia and Herzegovina demonstrated limited knowledge and practical experience regarding teledentistry, while maintaining generally positive attitudes towards its adoption.

The successful implementation of teledentistry in Bosnia and Herzegovina requires adequate digital infrastructure, reliable Internet connectivity, institutional support, and appropriate regulatory frameworks.

Integration of teledentistry into dental education and continuing professional development, including the introduction of micro-credential training, could contribute to improving competencies and readiness for its wider implementation.

Further research should examine patients' perspectives and evaluate the effectiveness and long-term sustainability of teledentistry services in Bosnia and Herzegovina.

ACKNOWLEDGEMENTS

The authors wish to thank Prof. Nicolas Giraudeau, PhD, for his kind support, as well as all the respondents who kindly took the time to complete the survey.

Conflict of interest: None declared

Integrisanje teledentistike u stomatološko obrazovanje i kontinuirano stručno usavršavanje, uključujući uvođenje programa obuke za sticanje mikroakreditacija (engl. *micro-credential training*), moglo bi doprineti unapređenju kompetencija i spremnosti za njenu širu primenu.

Buduća istraživanja bi trebalo da ispitaju gledišta pacijenata i procene efikasnost i dugoročnu održivost usluga teledentistike u Bosni i Hercegovini.

IZJAVE ZAHVALNOSTI

Autori zahvaljuju prof. dr. Nikolasu Žirodou na njegovoj ljubaznoj podršci i svim ispitanicima koji su velikodušno odvojili vreme da popune anketu.

Sukob interesa: Nije prijavljen.

LITERATURA / *REFERENCES*

1. Vader V, Kosaraju A, Gedge JL, Mitchell TM, Ruff RR, Vandewalle KS. Evaluating the Diagnostic Inter-rater Reliability Between Virtual and In-person Sick-call Examinations at a Military Dental Treatment Facility. Mil Med. 2025 Apr 23;190(5-6):e1211-5. doi: 10.1093/milmed/usae509.
2. Giraudeau N. e-Health Care in Dentistry and Oral Medicine: A Clinician's Guide [Internet]. Cham: Springer; 2018 [cited 2026 Apr 26]. 154 p. Available from: https://doi.org/10.1007/978-3-319-69450-4/.
3. Nassani MZ, Al-Maweri SA, AlSheddi A, Alomran A, Aldawsari MN, Aljubarah A, et al. Teledentistry-Knowledge, Practice, and Attitudes of Dental Practitioners in Saudi Arabia: A Nationwide Web-Based Survey. Healthcare (Basel). 2021 Dec 4;9(12):1682. doi: 10.3390/healthcare9121682.
4. Aldhamen S, Al Dosari B. Perceptions Toward the Usefulness and Benefits of Teledentistry in the Ministry of National Guard Health Affairs (MNGHA) in Saudi Arabia. Cureus. 2023 Aug 20;15(8):e43792. doi: 10.7759/cureus.43792.
5. Kern JS, Paulssen J, Marx-Schütt K, Rizk M, Marx N, Bock A, et al. Awareness, knowledge, and acceptance of teledentistry among dental practitioners: a cross-sectional survey. BMC Oral Health. 2026 Feb 24;26(1):554. doi: 10.1186/s12903-026-07931-5.
6. Talla PK, Michaud PL, Durand R, Emami E. Attitudes, Practices and Needs Related to Implementation of Teledentistry in Canadian Dental Schools: A Cross-Sectional Survey Study. J Can Dent Assoc. 2025 Dec;91:13.
7. Akçiçek G, Katı E, Zengin HY. Evaluation of undergraduate dental students' awareness, knowledge, and attitudes towards teledentistry: does a course enhance this? BMC Med Educ. 2025 Jan 31;25(1):160. doi: 10.1186/s12909-025-06758-y.
8. Cheuk R, Adeniyi A, Farmer J, Singhal S, Jessani A. Teledentistry use during the COVID-19 pandemic: perceptions and practices of Ontario dentists. BMC Oral Health. 2023 Feb 4;23(1):72. doi: 10.1186/s12903-023-02772-y.
9. Choonhawarakorn K, Kasemkhun P, Leelataweewud P. Effectiveness of a message service on child oral health practice via a social media application: A randomized controlled trial. Int J Paediatr Dent. 2025 Mar;35(2):446-55. doi: 10.1111/ipd.13256. Erratum in: Int J Paediatr Dent. 2026 Sep;36(5):729. doi: 10.1111/ipd.70105.
10. Azimi S, Bennamoun B, Mehdizadeh M, Vignarajan J, Xiao D, Huang B, et al. Teledentistry Improves Access to Oral Care: A Cluster Randomised Controlled Trial. Healthcare (Basel). 2025 Sep 12;13(18):2282. doi: 10.3390/healthcare13182282.
11. Lalli AK, Sarangal V, Anand D, Arora G, Khurana S, Kaur A. Influence of gender, age and education on the knowledge and attitudes towards teledentistry among dental students at a dental college in Northern India. Bioinformation. 2025 Dec 15;21(12):4980-6. doi: 10.6026/973206300214980.
12. Alavi SE, Gholami M, Malik L, Matti R, Oktaei S, Al-Najafi F, et al. Assessment of teledentistry in improving access to dental care: a systematic review. Aust Dent J. 2025 Mar;70(1):4-41. doi: 10.1111/adj.13045.
13. El Tantawi M, Lam WYH, Giraudeau N, Virtanen JI, Matanhire C, Chifamba T, et al. Teledentistry from research to practice: a tale of nineteen countries. Front Oral Health. 2023 Jun 16;4:1188557. doi: 10.3389/froh.2023.1188557.
14. Giraudeau N, Bauer M, Tramini P, Inquimbert C, Toupenay S. A national teledentistry study on the knowledge, attitudes, training and practices of private dentists. Digit Health. 2022 Mar 7;8:20552076221085069. doi: 10.1177/20552076221085069.
15. Alabass SO, Elhadi YAM, Saeed Alhussain MM, Siddig RE, Abdalla Elfaki AO, Yousif Elgayli EE, et al. Acceptance and readiness for tele-dentistry among dental professionals amidst conflict in Sudan. BMC Oral Health. 2025 Jul 6;25(1):1123. doi: 10.1186/s12903-025-06501-5.
16. Johnson V, Brondani MA, von Bergmann H, Grossman S, Wallace B, Donnelly LR. Development and Implementation of a Dental School-Based Oral Health Helpline: A Pilot Project. J Can Dent Assoc. 2025 Apr;91:6.
17. Evans C, Clancy G, Evans K, Booth A, Nazmeen B, Sunney C, et al. How to Implement Digital Clinical Consultations in UK Maternity Care: the ARM@DA Realist Review. Health Soc Care Deliv Res. 2025 May;13(22):1-77. doi: 10.3310/WQFV7425.
18. Fond zdravstvenog osiguranja Republike Srpske. Aplikacija ePrevencija – značajan iskorak u zdravstvenom sistemu [Internet]. Banja Luka: Fond zdravstvenog osiguranja Republike Srpske; 2025 Oct 15 [cited 2026 Jan 20]. Available from: https://zdravstvo-srpske.org/2025/10/15/aplikacija-eprevencija-znacajan-iskorak-u-zdravstvenom-sistemu/.
19. Džemidžić V, Tiro A, Redžepagić-Vražalica L, Nakaš E. The Need for Orthodontic Treatment Among 12-14 Years Old Bosnian Schoolchildren. Acta Stomatol Croat [Internet]. 2012 [cited 2026 Apr 26];46(2):105-10. Available from: https://hrcak.srce.hr/84235/.
20. Talla PK, Kamalabadi YM, Durand R, Michaud PL, Emami E. Applying an extended theoretical approach to identifying Canadian dental students' acceptance of teledentistry: A cross-sectional study. Digit Health. 2024 Sep 12;10:20552076241258472. doi: 10.1177/20552076241258472.