Dental Students’ Discomfort and Anxiety During the First and the Second Lockdown Due to COVID-19 Pandemic at the School of Dental Medicine, University of Zagreb

Nelagoda i anksioznost studenata dentalne medicine tijekom prvoga i drugoga zaključavanja zbog pandemije COVID-19 na Stomatološkom fakultetu Sveučilišta u Zagrebu

Abstract

Objectives: The aim of the study was to assess discomfort and anxiety of dental students caused by the COVID-19 pandemic crisis and to assess quality of the study during the crisis, as well as to compare subjective experiences and attitudes of preclinical and clinical students towards lectures and practicals during the first and the second lockdown at the School of Dental Medicine, University of Zagreb. Methods: This research was conducted using online questionnaires. The questionnaires were compiled by students for a presentation at the Brescia Colloquium 2020. The participants were integrated undergraduate and graduate dental students from the School of Dental Medicine, University of Zagreb. The questionnaires were completed by students during March 2020 and during February 2021 and were anonymous. For the statistical analysis of the data, the software package SPSS 20 (IBM Corp., Armonk, New York, USA) was used. Descriptive statistical analysis was used to determine the basic statistical parameters (frequencies, median, mod, minimum and maximum values). The significance of the differences among the tested groups was assessed by the Chi-Square or the Fisher’s Exact Tests. Results: All dental students experienced some discomfort and were worried about the future competence. No gender differences were found (p>0.05). Preclinical students were less motivated than clinical students (p<0.01) during first lockdown, while significant differences were found between preclinical and clinical students considering safety, competence and confidence to treat patients during second lockdown. Conclusions: COVID-19 pandemic impacted the wellbeing of the students, their learning and teaching at the School of Dental Medicine, University of Zagreb. Students were more overwhelmed by the pandemic during the first lockdown than during second lockdown and have adapted well to the new forms of teaching. However, they are still uncertain about competence in the clinical environment and their future career.

Introduction

The aim of the study was to point out the effects of the COVID-19 pandemic on the quality of study and to compare subjective experiences of students of dental medicine during the first and the second lockdown (2020 and 2021, respectively) at the School of Dental Medicine, University of Zagreb.

In December 2019, the first cases of novel coronavirus disease (COVID-19), caused by severe acute respiratory syndrome virus 2 (SARS-CoV-2) were reported in Wuhan, China (1). The outbreak of the COVID-19 rapidly escalated causing the worldwide pandemic, which was declared as such on January 30th, 2020 by the World Health Organis-
The pandemic has impacted not only the health care system, thus causing millions of deaths and global health care crisis, but also the course of education at Universities around the world, which had to either postpone or cancel their activities and/or to switch to alternative teaching and learning methods (online classes) (3,4). The changes in the delivery of the study programme, which were primarily introduced to stop the spread of COVID-19 and thus protect the students of dental medicine, subsequently had an impact on quality of education, as well as on students’ subjective experiences (5). The presence of coronavirus within the oral cavity and its spread during clinical work in dental offices has put our profession amongst one of the riskiest professions and has closed clinical practice and education in dental medicine (6). In the study of dental medicine, acquiring clinical skills is needed to carry out dental procedures, which is of utmost importance and heavily depends on practical exercises. In addition to lectures and seminars, the dental medicine study curriculum is composed of preclinical and clinical exercises.

Students of dental medicine were thus considerably affected by the change of teaching and learning methods and the way of work at the clinics. Having lost a significant amount of practical exercises, students’ clinical competencies were jeopardised. Furthermore, due to continuous droplet and aerosol-generating procedures, dental students working at the clinics are at higher risk of exposure to the COVID-19, thus appropriate precautionary measures must be taken to prevent and control the spread of the SARS-CoV-2 (7,8).

On March 20th, 2020 Croatian government declared closing of all educational institutions, including the School of Dental Medicine, University of Zagreb. Only 12 days later, a complete lockdown was imposed, except for pharmacies and grocery stores (9). In addition, on March 22nd, 2020 Zagreb, the capital of Croatia, was hit by a powerful earthquake with a magnitude of 5.5 according to Richter’s scale. Thus, during the first lockdown, the School of Dental Medicine was completely closed all indoor lectures, seminars and practicals. All teaching was delivered online until the end of the academic year 2019/2020.

During the second lockdown, which began on the 26th of November 2020, most schools in Croatia continued to carry out all teaching online due to the pandemic, as well as due to material damage from the earthquake. Nevertheless, the School of Dental Medicine managed to be renovated and managed to provide appropriate protection for all students and employees. Face shields, disposable protective gowns, surgical masks and gloves were provided. Additionally, the classrooms and other rooms were well ventilated and the number of persons in the room was minimized. Consequently, preclinical and clinical exercises were delivered in-person, while lectures and seminars remained online (10).

The objectives of this research were to find out the impact of the COVID-19 pandemic crisis on the students of dental medicine during the first lockdown, and to compare the results of their current experience of studying in terms of their subjective attitudes towards: the COVID-19 situation and its impact on their education, their satisfaction with the current way of the study program being delivered, the amount of pre-

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clinical/clinical practice, their competence in using PPE during the preclinical/clinical exercises, overall safety in the preclinical/clinical environment, the possibility of compensating for the lost preclinical/clinical exercises, the prospects of employment.

Materials and methods

Ethical consideration

The research, questionnaire and consent statement have been approved by the Ethics Committee of the School of Dental Medicine, University of Zagreb, protocol number 05-PA-30-XXIII-2021.

Study design and data collection

The research is based on three individual questionnaires that were carried out in May 2020 for Brescia Colloquium and of one additional questionnaire (AQ) which was carried out in February 2021. Three individual questionnaires were designed for third-year students (questionnaire TQ), fourth-year students (questionnaire FQ) and sixth-year students (questionnaire SQ). The results of the respective questionnaires were statistically analysed and compared to see the differences of studying experiences during the first and the second lockdown, and between the preclinical and clinical students and gender. The additional questionnaire (AQ) was composed of 12 questions and was a follow-up to the above-mentioned group of questionnaires (TQ, FQ and SQ). The AQ, as well as the TQ, FQ and SQ, were delivered in a form of a Google Form application in February 2021. Dental students were approached with the help of social media for filling in the online questionnaire via link. Twelve questions in the questionnaires were related to students’ opinions about studying during the COVID-19 pandemic. Individual opinions were assessed using a 4-point scale (1-Agree, 2-Neutral, 3-Disagree, 4-I don’t know). The last question was optional and collected only qualitative data. The questionnaires did not collect any personal data and were filled out voluntarily. The participants of the study gave their online consents to participate in the study by submitting an answer.

Content and Face validity

The study instrument was validated before being distributed to the study sample. To ensure content validity, the questionnaire was sent out to two academics from the School of Dental Medicine, University of Zagreb, for structured and unstructured feedback and it was later sent to three randomly chosen dental students from the School of Dental Medicine, University of Zagreb, for face validity.

Participants

The participants were 120 dental students of the School of Dental Medicine, University of Zagreb from the first to the sixth year of the integrated study program. The response rate for AQ was 19%, for TQ 47%, FQ 42% and for SQ 40%.

Inclusion criteria

Undergraduate dental students from the School of Den-

Materijal i metode

Etičko razmatranje

Istraživanje, upitnik i izjavu o pristanku odobrilo je Etičko povjerenstvo Stomatološkog fakulteta Sveučilišta u Zagrebu – protokol broj 05-PA-30-XXIII-2021.

Dizajn studije i prikupljanje podataka

Istraživanje se temelji na trima pojedinačnim upitnicima koji su pripremljeni u svibnju 2020. za Kolokvij u Bresciji u Italiji (Brescia Colloquium) i na jednomu dodatnom (AQ) koji je proveden u veljači 2021. Izrađena su tri pojedinačna upitnika – za studente treće godine (upitnik TQ), četvrte godine (upitnik FQ) i šeste godine (upitnik SQ). Dobiveni rezultati statistički su analizirani i uspoređeni kako bi se vidje razlike u iskustvima tijekom prvoga i drugoga zaključavanja, zatim između studenata pretrkličke i kliničke nastave te spolova. Dodatni upitnik (AQ) sastoji se od 12 pitanja i nastavak je spomenute skupine upitnika (TQ, FQ i SQ). AQ, te TQ, FQ i SQ dostavljeni su u obliku aplikacije Googlova obrasca. Za ispunjavanje upitnika purem interneta sa studentima dentalne medicine kontaktiralo se na društvenim mrežama. Dvanaest pitanja odnosilo se na njihovo mišljenje o studiranju tijekom pandemije bolesti COVID-19. Pojedinačna mišljenja ocijenjivana su na temelju ljestvice sa četirima točkama (1 – slažem se, 2 – neutralno, 3 – ne slažem se, 4 – ne znam). Posljednje pitanje bilo je neobvezno i prikupljali su samo kvalitativne podatke. U upitnicima nisu bila postavljena pitanja ni o kakvim osobnim podatcima i ispunjavanje je bilo dobrovoljno. Slanjem odgovora sudionici su dali pristanak za sudjelovanje u istraživanju.

Sadržaj i valjanost lica

Instrument istraživanja potvrđen je prije distribucije uzorka istraživanja. Da bi se osigurala valjanost sadržaja, upitnik je poslan dvojici akademika sa Stomatološkog fakulteta Sveučilišta u Zagrebu na strukturirane i nestrukturirane povratne informacije, a poslije je, za valjanost lica, dostavljen trojim slučajno odabranim studentima dentalne medicine sa Stomatološkog fakulteta Sveučilišta u Zagrebu.

Sudionici

Sudjelovalo je 120 studenata Stomatološkog fakulteta Sveučilišta u Zagrebu od prve do šeste godine integriranoga studijskog programa. Stopa odgovora za AQ bila je 19 %, za TQ 47 %, FQ 42 % i za SQ 40 %.

Kriteriji za uključivanje

Studenti integriranoga dodiplomskoga i diplomskoga
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Exclusion criteria
Postgraduate dental students from the School of Dental Medicine, University of Zagreb.

Statistical methods
For the statistical analysis of the data, the software package SPSS 20 (IBM Corp., Armonk, New York, USA) was used. Descriptive statistical analysis was used to determine the basic statistical parameters (frequencies, median, mod, minimum and maximum values). The significance of the differences among the tested groups was assessed by the Chi-Square or the Fisher’s Exact Tests.

Results

Results from the 2020 questionnaire (Questionnaire TQ and FQ)
The questionnaires, which included the 3rd and the 4th-year students, were answered by 79 dental students. No differences between genders were found (p>0.05). No differences existed between the preclinical and the clinical students (p>0.05), except for the motivation since clinical students were significantly more motivated (p<0.01). The results studija dentalne medicine Sveučilišta u Zagrebu.

Kriteriji za isključenje
Studenti poslijediplomskog studija dentalne medicine Sveučilišta u Zagrebu.

Statistički postupci
Za statističku analizu podataka korišten je softverski paket SPSS 20 (IBM Corp., Armonk, New York, SAD). Deskrptivnom statističkom analizom određeni su osnovni statistički parametri (učestalosti, medijan, mod/medijan/modus, minimalne i maksimalne vrijednosti). Značenje razlika među ispitivanim skupinama procijenjeno je Chi-Squareom ili Fisherovim egzaktnim testovima.

Rezultati
Rezultati upitnika za 2020. godinu (upitnici TQ i FQ)
Na pitanja u upitnicima za studente treće i četvrte godine odgovorilo je njih 79. Nisu pronađene razlike između spolova (p>0,05). Također nije bilo razlike između studenata pretkliničke i kliničke nastave (p>0,05) osim u motiviranosti – studenti kliničke nastave bili su motiviraniji (p<0,01). Rezultati su potvrdili da su svi studenti osjećali nelagodu i tjeskobu kad je riječ o akademskom i praktičnom znanju koje

| Table 1 | Attitudes of preclinical and the clinical students about discomfort, anxiety and other attitudes during the post-lockdown 2020, and significance of differences between preclinical and clinical students (X² or Fisher’s exact test). |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Question 1 | I am feeling anxious about this situation. * Preclinical/clinical |
| Don't know | 0 |
| Agree | 15 |
| Neutral | 15 |
| Disagree | 13 |
| X² or Fisher’s exact | 1.36 |
| P value | 0.51 NS |
| Question 2 | I find it hard to find the motivation to study and do the assigned work. |
| Don't know | 0 |
| Agree | 33 |
| Neutral | 7 |
| Disagree | 3 |
| X² or Fisher’s exact | 21.90 |
| P value | <0.001 ** |
| Question 3 | I think that this situation is having a huge impact on my clinical skills. |
| Don't know | 0 |
| Agree | 27 |
| Neutral | 15 |
| Disagree | 1 |
| X² or Fisher’s exact | 3.33 |
| P value | 0.23 NS |
| Question 4 | My current way of education is able to substitute clinical/preclinical exercises. |
| Don't know | 0 |
| Agree | 3 |
| Neutral | 4 |
| Disagree | 36 |
| X² or Fisher’s exact | 1.49 |
| P value | 0.53 NS |
| Question 5 | I have improved my theoretical knowledge more than I would if there was no Covid-19 pandemic. |
| Don't know | 0 |
| Agree | 24 |
| Neutral | 14 |
| Disagree | 5 |
| X² or Fisher’s exact | 7.80 |
| P value | 0.018 NS |

NS=not significant  
*=<0.05  
**=<0.01
confirmed that all students felt discomfort and anxiety towards the future of obtaining their academic knowledge, as well as their practical competencies, which were deprived of during the first lockdown (Table 1). A significant amount (65%) of the 3rd-year dental students did not feel competent to do future clinical work, with the knowledge they obtained through the course of the first lockdown (Figure 1). The results showed that only 40% of the 3rd-year students felt competent using the protective equipment necessary for the clinical work (Figure 2). During the first lockdown, 51% of the students from the 4th-year felt satisfied with the substitution of clinical exercises with online classes, considering the situation in the world (Figure 3).

Statistical analysis between preclinical and clinical students (AQ Questionnaire) from the 2021 questionnaire

All students answered twelve questions. Their opinions were almost uniform, confirming discomfort and anxiety about their future acceptance of the knowledge and practical skills, as they were deprived of exercises during the closure due to the COVID-19 pandemic (Table 2). The 12th question gathered additional comments and could be translated into qualitative data. Three answers were noted and all of them were satisfactory, e.g. "Lectures are better online because they are recorded and I can rewatch them whenever I need, seminars and preclinical exercises definitely not because students are not well prepared (I would say it's because of lack of motivation) and some professors are frustrated."

Statistička analiza između pretkliničkih i kliničkih studenata (AQ upitnik) tijekom 2021. godine

Svi su studenti odgovorili na dvanaest pitanja. Njihova mišljenja bila su gotovo jednaka, što je potvrđivalo nelagodu i tjeskobu u vezi s količinom njihova znanja i praktičnih vještini zbog smanjenog broja vježbi tijekom zatvaranja pandemije bolesti COVID-19 (tablica 2.).

Dvanaestim pitanjem prikupljeni su dodatni komentari i moglo bi ih se prevesti u kvalitativne podatke. Zabilježena su tri odgovora i svi su bili zadovoljni. Evo primjera: Predavanja su bolja kad se održavaju na daljinu jer se snimaju i mogu ih ponovno pogledati kad god mi zatrebaju, a seminari i pretkliničke vježbe nisu jer studenti nisu dobro pripremljeni (rekao bih da je to zbog gubitka motivacije), a neki profesori su frustrirani.
| Tablica 2. Stajališta studenata stomatologije iz predkliničkih i kliničkih godina studija o nelagodi i tjeskobi tijekom zaključavanja 2021. zbog COVID-19 i važnosti razlika između njih ($X^2$ ili Fisherov točni test).

| Pitanje  | Preclinical students | Clinical students | $X^2$ or Fisher’s exact | P value |
|----------|----------------------|-------------------|-------------------------|---------|
| Question 1 | Compared to the first lock-down at the beginning of the year, I feel less anxious about the COVID-19 situation. | | | |
| Don’t know | 1 | 0 | | |
| Agree | 81 | 19 | 1.14 | 0.63 NS |
| Neutral | 14 | 5 | | |
| Disagree | | | | |
| Question 2 | I think that I won’t be able to compensate missed clinical work. | | | |
| Don’t know | 11 | 1 | | |
| Agree | 32 | 9 | 1.96 | 0.58 NS |
| Neutral | 26 | 9 | | |
| Disagree | 27 | 5 | | |
| Question 3 | The School of Dental Medicine, University of Zagreb has organized compensation for the lost preclinical/clinical exercises during the first lock-down. | | | |
| Don’t know | 0 | 0 | | |
| Agree | 26 | 13 | 11.28 | 0.003 ** |
| Neutral | 47 | 11 | | |
| Disagree | 23 | 0 | | |
| Question 4 | Because of the lost preclinical/clinical exercises during the first lock-down I feel less confident working on patients this year. | | | |
| Don’t know | 28 | 0 | | |
| Agree | 32 | 15 | 13.96 | 0.002** |
| Neutral | 18 | 6 | | |
| Disagree | 18 | 3 | | |
| Question 5 | Due to the current COVID-19 situation I have an impression that I am treating less patients than before. | | | |
| Don’t know | 17 | 1 | | |
| Agree | 21 | 11 | 9.75 | 0.018** |
| Neutral | 5 | 6 | | |
| Disagree | 7 | 5 | | |
| Question 6 | I believe that the current way of preclinical/clinical exercises and online learning is having a positive effect on my education. | | | |
| Don’t know | 4 | 0 | | |
| Agree | 35 | 10 | 0.65 | 0.98 NS |
| Neutral | 21 | 5 | | |
| Disagree | 36 | 9 | | |
| Question 7 | I adapted well to the current way of how educational programme (lectures, seminars, preclinical/clinical exercises...) is being delivered. | | | |
| Don’t know | 0 | 0 | | |
| Agree | 73 | 17 | 0.59 | 0.74 NS |
| Neutral | 12 | 4 | | |
| Disagree | 11 | 3 | | |
| Question 8 | I find online lectures/seminars better than those delivered in person. | | | |
| Don’t know | 0 | 0 | | |
| Agree | 42 | 15 | 2.47 | 0.24 NS |
| Neutral | 23 | 4 | | |
| Disagree | 31 | 5 | | |
| Question 9 | I feel competent using the PPE (personal protective equipment) during the preclinical/clinical exercises. | | | |
| Don’t know | 17 | 0 | | |
| Agree | 59 | 17 | 6.46 | 0.03* |
| Neutral | 18 | 7 | | |
| Disagree | 2 | 0 | | |
| Question 10 | I feel safe and well protected in the environment of the preclinical/clinical exercises (the rooms are well ventilated; the number of people in the room is minimized...). | | | |
| Don’t know | 10 | 0 | | |
| Agree | 71 | 19 | 3.49 | 0.29 NS |
| Neutral | 9 | 4 | | |
| Disagree | 6 | 1 | | |
| Question 11 | The current pandemic crisis will have an impact on my future career as a dentist. | | | |
| Don’t know | 10 | 3 | | |
| Agree | 52 | 10 | 3.64 | 0.31 NS |
| Neutral | 13 | 7 | | |
| Disagree | 21 | 4 | | |

NS=not significant  
*=<0.05  
**=<0.01
### Table 3. Attitudes of students about discomfort and anxiety during the lockdown 2021 and significance of the differences between gender.

| Question                                                                 | Male | Female | X² or Fisher's exact | P value |
|--------------------------------------------------------------------------|------|--------|----------------------|---------|
| Question 1 Compared to the first lockdown at the beginning of the year, I feel less anxious about the COVID-19 situation. |      |        |                      |         |
| Don’t know                                                              | 0    | 1      |                      |         |
| Agree                                                                    | 15   | 85     | 1.15                 | 0.58 NS |
| Neutral                                                                  | 4    | 15     |                      |         |
| Disagree                                                                 |      |        |                      |         |
| Question 2 I think that I won’t be able to compensate missed clinical work. |      |        |                      |         |
| Don’t know                                                              | 1    | 11     |                      |         |
| Agree                                                                    | 7    | 34     | 2.54                 | 0.48 NS |
| Neutral                                                                  | 8    | 27     |                      |         |
| Disagree                                                                 | 3    | 29     |                      |         |
| Question 3 The School of Dental Medicine. University of Zagreb has organised compensation for the lost preclinical/clinical exercises during the first lockdown. |      |        | 0.95                 | 0.62 NS |
| Don’t know                                                              | 0    | 0      |                      |         |
| Agree                                                                    | 8    | 31     |                      |         |
| Neutral                                                                  | 8    | 50     |                      |         |
| Disagree                                                                 | 3    | 20     |                      |         |
| Question 4 Because of the lost preclinical/clinical exercises during the first lockdown I feel less confident working on patients this year. |      |        |                      |         |
| Don’t know                                                              | 6    | 22     | 0.92                 | 0.81 NS |
| Agree                                                                    | 7    | 40     |                      |         |
| Neutral                                                                  | 3    | 21     |                      |         |
| Disagree                                                                 | 3    | 18     |                      |         |
| Question 5 Due to the current COVID-19 situation I have an impression that I am treating less patients than before. (Only for students working at the clinics) |      |        | 1.54                 | 0.67 NS |
| Don’t know                                                              | 4    | 14     |                      |         |
| Agree                                                                    | 4    | 28     |                      |         |
| Neutral                                                                  | 3    | 8      |                      |         |
| Disagree                                                                 | 2    | 10     |                      |         |
| Question 6 I believe that the current way of preclinical/clinical exercises and online learning is having a positive effect on my education. |      |        |                      |         |
| Don’t know                                                              | 1    | 3      | 2.18                 | 0.49 NS |
| Agree                                                                    | 6    | 39     |                      |         |
| Neutral                                                                  | 6    | 20     |                      |         |
| Disagree                                                                 | 6    | 39     |                      |         |
| Question 7 I adapted well to the current way of how educational programme (lectures, seminars, preclinical/clinical exercises...) is being delivered. |      |        | 1.69                 | 0.44 NS |
| Don’t know                                                              |      |        |                      |         |
| Agree                                                                    | 14   | 76     |                      |         |
| Neutral                                                                  | 4    | 12     |                      |         |
| Disagree                                                                 | 1    | 13     |                      |         |
| Question 8 I find online lectures/seminars better than those delivered in person. |      |        |                      |         |
| Don’t know                                                              | 0    | 0      |                      |         |
| Agree                                                                    | 9    | 48     | 3.47                 | 0.17 NS |
| Neutral                                                                  | 7    | 20     |                      |         |
| Disagree                                                                 | 3    | 33     |                      |         |
| Question 9 I feel competent using the PPE (personal protective equipment) during the preclinical/clinical exercises. |      |        |                      |         |
| Don’t know                                                              | 3    | 14     | 0.41                 | 1.00 NS |
| Agree                                                                    | 12   | 64     |                      |         |
| Neutral                                                                  | 4    | 21     |                      |         |
| Disagree                                                                 | 0    | 2      |                      |         |
| Question 10 I feel safe and well protected in the environment of the preclinical/clinical exercises (the rooms are well ventilated, the number of people in the room is minimized....). |      |        |                      |         |
| Don’t know                                                              | 1    | 9      | 0.31                 | 1.00 NS |
| Agree                                                                    | 15   | 75     |                      |         |
| Neutral                                                                  | 2    | 11     |                      |         |
| Disagree                                                                 | 1    | 6      |                      |         |
| Question 11 The current pandemic crisis will have an impact on my future career as a dentist. |      |        |                      |         |
| Don’t know                                                              | 1    | 12     | 4.98                 | 0.15 NS |
| Agree                                                                    | 12   | 50     |                      |         |
| Neutral                                                                  | 5    | 15     |                      |         |
| Disagree                                                                 | 1    | 24     |                      |         |

**NS**=not significant  
*=<0.05  
**=<0.01
Statistical analysis based on gender (AQ Questionnaire)

There were no differences between female and male students. Both genders confirmed discomfort and anxiety about the future acceptance of knowledge and practical skills and competences because of closure due to the COVID-19 pandemic (Table 3).

Influence of the pandemic crisis on the future career perspectives (AQ and SQ Questionnaire)

There was a significant difference between the opinions of the 6th-year students about the influence of the pandemic crisis on their future careers as dentists. In 2020, most students were neutral and disagreed with the mentioned statement, while in 2021 they mostly agreed that COVID-19 will have an impact on their future career (p<0,01) (Figure 4).

Discussion

The spread of the COVID-19 pandemic has immediate effect on dental education, forcing universities to cancel all of their in-person activities and to switch to a virtual environment, thus forcing dental students to adapt to new forms of learning and teaching (3–5, 11). The delivery of the curricula on the online platform greatly relies on the technical capacity of dental school, students’ access to the internet and a possibility to use computers at home, as well as it relies on digital literacy of the University staff (4, 11–13). There is not much evidence showing a plausible effect on higher education, however one study does show that there could be some positive effects of COVID-19 on the students’ performance (14). According to conclusions of systemic review of Regmi K et al (2020), distance education could enhance learning and performance because of its accessibility and flexibility (15). Several studies have shown that students find e-learning gratifying (16,17). Moreover, it was also reported that both students and professors appreciated e-learning in terms of teacher-student interaction, however, remote teaching cannot replace clinical training (18). When analyzing the first and the second lockdown (2020 and 2021), 51% of the 4th-year dental students were satisfied with the online forms of teaching (Figure 3). More interestingly, during the first lockdown, majority of the participants agreed that they improved their theoretical knowledge more than they would have done if there had not been the COVID-19 pandemic (Table 1).

However, during the second lockdown, the downgrade of the students’ opinion was noted (Table 2, Table 3). The downgrade of the experience could be explained by the lack of digital literacy of some of the faculty staff and/or students’ fatigue of the online forms of teaching and learning (19,20).

The Council of European Dentists (CED) does mention in their policy paper that the European dental education insti-

Statistička analiza na temelju spola (AQ upitnik)

Nije bilo razlika između studenata i studentica. I jedni i drugi potvorili su nelagodu i tjeskobu zbog količine znanja i praktičnih vještina te kompetencije zbog zatvaranja tijekom pandemije bolesti COVID-19 (tablica 3.).

Utjecaj pandemijske krize na buduće karijere (upitnici AQ i SQ)

Znatna je razlika između mišljenja studenata šeste godine o utjecaju pandemijske krize na njihovu buduću stomatološku karijeru. U 2020. većina je bila neutralna i nije se složila sa spomenutom izjavom, a 2021. uglavnom su se složili da će koronavirus utjecati na njihovu buduću karijeru (p < 0,01) (slika 4.).

Rasprava

Širenje pandemije bolesti COVID-19 neposredno utječe na stomatološko obrazovanje – naime, sveučilišta su bila prisiljena otkazati sve svoje aktivnosti na fakultetima i organizirati nastavu na daljinu pa su se studenti i studentice morali prilagoditi novim oblicima nastave i učenja (3 – 5 , 11). Dostava kurikula na on line platformama uvelike ovisi o tehničkim mogućnostima stomatoloških fakulteta, o pristupu studenata internetu, mogućnosti korištenja računala kod kuće te o digitalnoj pismenosti nastavnika (4, 11 – 13). Nema mnogo dokaza o utjecaju na visoko obrazovanje, no u jednom istraživanju ističe se da bi moglo biti nekih pozitivnih učinaka bolesti COVID-19 na uspješnost studenata (14). Prema sustavnom pregledu koji su proveli K. Regmi i suradnici 2020., zaključeno je da bi obrazovanje na daljinu zbog svoje pristupačnosti i fleksibilnosti moglo poboljšati učenje i uspješnost (15). U nekoliko studija autori su pokazali da su studenti zadovoljni e-učenjem (16, 17). Štoviše, također je istaknuto da su i studenti i profesori cijenili nastavu na daljinu u smislu zajedničke interakcije, no daljsko poučavanje ne može zamijeniti klinički rad (18). Analizirajući prvo i drugo zaključavanje (2020. i 2021.), 51 % studenta je za vreme godine stomatološke medicine bilo je zadovoljno nastavom na daljinu (slika 3.). Što je još zanimljivije, tijekom prvog zaključavanja većina sudionika složila se da su poboljšali svoje teoretsko znanje više nego što bi to učinili da nije bilo pandemije bolesti COVID-19 (tablica 1.). No tijekom drugog zaključavanja zabilježena je promjena mišljenja (tablice 2. i 3.).

To bi se moglo objasniti nedostatkom digitalne pismenosti kod nekih nastavnika i/ili zamorom studenata od nastave na daljinu (19, 20). Vijeće europskih stomatologa (engl. Council of European Dentists – CED) u svojim dokumentima o politikama spominje da bi europske ustanove za stomatološko obrazovanje trebale ulagati u prikladnu infrastrukturu kako
tutions should invest in a suitable infrastructure to ensure the appropriate quality of online education, whilst exploiting the power of technology for learning and teaching. Moreover, students should also be supported (financially, instructive, etc.) to develop better skills in digital health, communication, resilience, advocacy, public health and well-being (21). One should note that not all students might have access to the internet or laptops to work from home (4). Despite the online forms of teaching being acceptable and appropriate to deliver seminars, lectures or non-clinical programmes, dental students worldwide have been deprived of the critical hands-on practice, which is one of the most crucial parts of their education (4, 22). Comparing the results from the first lockdown, dental students from Zagreb, are still uncertain whether they will be able to compensate for the missed clinical work (Tables 1-3). According to the paper published by Hattar et al (2021), dental students from the University of Jordan, sensed that they had missed important learning experiences, especially when it comes to the clinical practice and also have felt less involved in following up with distant learning (23). The School of Dental Medicine, University of Zagreb has organized additional preclinical/clinical exercises during the first lockdown as compensation for student terms lost during the lockdown, however only for certain subjects. Furthermore, the University has opened a possibility to volunteer at the University’s clinics, during the summer and winter break, as well as during the exam period. The subjects that consist of practical work require interactions in both preclinical and clinical settings; therefore it is not surprising that dental students from Zagreb are still uncertain about their clinical competency (Table, Table 3, 4).

The School of Dental Medicine in Zagreb had to adapt their clinical settings to ensure the safety of staff and students, and most importantly safeguard the continuity of clinical education. During the first lockdown, 40% of the students felt competent using the PPE, whereas, after the second lockdown, more students have reported they felt competent using the PPE (Figure 2, Table 2, Table 3). Such findings are logical as the students were instructed on how to properly use the PPE. The University has organized the clinical work at the University but has reduced the number of students per group; the groups were cut in half. Consequently, the amount of clinical practice was reduced for an individual student as well. The majority of students reported they felt safe and well protected in the environment of the preclinical/clinical exercises (Table 2, Table 3). Despite the efforts of School of Dental Medicine to deliver clinical practice to their students, students still believed that, due to the COVID-19, they were treating fewer patients than before and have shown the concern that the COVID-19 would have an impact on their future career as dentists (Table 2, Table 3, Figure 4). Since patient care was at a halt, academic institutions were concerned about graduating dental students. There have been uncertainties about their clinical competences and their abilities to meet clinical requirements made by the accreditation bodies, as well as the preparedness to provide dental care in the post-COVID-19 era (21). The Dental Schools Council (DSC), which is the representative body for dental schools bi osigurale odgovarajuću kvalitetu internetskog obrazovanja, istodobno iskorištavajući snagu tehnologije za učenje i poučavanje. Štoviše, studente također treba poduprijeti (financijski, podukom, itd.) u razvoju ili stjecanju boljih vještina u digitalnom zdravlju, komunikaciji, otpornosti, propagiranju, javnom zdravlju i dobrobiti (21).

Treba imati na umu da svi studenti možda nemaju prijednost internetu, ni prijenosnim računalima za rad od kuće (4). Iako su mrežni oblici nastave prihvatljivi i primjenjeni za održavanje seminara, predavanja ili nekliničkih programa, studenti dentalne medicine diljem svijeta lišeni su prijeko potrebne praktične prakse koja je jedan od najvažnijih dijelova njihova obrazovanja (4, 22). Uspoređujući rezultate iz prvog zaključavanja, studenti dentalne medicine iz Zagreba još nisu sigurni hoće li uspjuti nadoknaditi propuštene kliničke rad (tablice 1 – 3).

Prema radu koji su objavili Hattar i suradnici 2021., studenti stomatologije na Sveučilištu u Jordanu osjećaju da su propustili važan dio izobrazbe, posebno kada je riječ o kliničkoj praksi, a osjećaju se manje uključeni u praćenju nastave na daljinu (23). Stomatološki fakultet Sveučilišta u Zagrebu organizirao je nadoknadam za izgubljene pretkliničke/kliničke vježbe tijekom prvog zaključavanja, ali samo za određene predmete. Nadalje, fakultet je omogućio volontiranje na klinici tijekom ljetne i zimske stanke te u razdoblju ispita. Predmeti za koje je potreban praktični rad zahtijevaju interakciju u pretkliničkim i u kliničkim uvjetima, zato ne čudi da studenti dentalne medicine iz Zagreba još uvijek nisu sigurni u svoje kliničke sposobnosti (tablice 3. i 4.).

Stomatološki fakultet u Zagrebu morao je prilagoditi kliničku nastavu kako bi se osigurala sigurnost osoblja i studenta, što je najvažnije, da omogući kontinuitet kliničkog obrazovanja. Tijekom prvog zaključavanja 40 % studenta osjećalo se sposobnima za korištenje zaštitne radne opreme, a nakon drugoga više je njih izjavilo da su sposobni koristiti se tom opremom (slika 2., tablice 2. i 3.). To je i logično jer su studenti educirani kako se pravilno upotrebljava zaštitna radna oprema. Fakultet je organizirao klinički rad u klinici, ali sa smanjenim brojem studenata u grupi. Slijedom toga smanjene su i kliničke prakse i za pojedinog studenta. Većina studenta izjavila je da se osjećaju sigurno i dobro zaštićeno na pretkliničkim/kliničkim vježbama (tablice 2. i 3.).

Unatoč napornima stomatoloških fakulteta da omoguće svojim studentima kliničku praksu, studenti i dalje vjeruju da zbog bolesti COVID-19 obraduju manje pacijenta nego prije, te su zabrinuti da će koronavirus utjecati na njihovu karijeru (tablice 2. i 3., slika 4.). Budući da je klinička praksa bila prekinuta, pojavila se velika zabrinutost u akademskim institucijama zbog nesigurnosti jesu li diplomirani studenti dentalne medicine klinički kompetentni i hoće li moći ispuniti kliničke zabeležice akreditacijskih tijela. U vezi sa smanjenjem kliničkog iskustva od ožujka 2020. a i da će neko vrijeme svoje kliničke vještine stjecati sporije i u manjem
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Conclusions

The present study showed that the students were uncomfortable by the COVID-19 pandemic crisis during the first lockdown and the second lockdown (2020 and 2021, respectively). The students have adapted well to the new forms of teaching, and vaccination has just begun. Dental Schools in the UK, as reported by the DCS, are aware that dental students, who undertake an already demanding course, have faced challenges and stressors during the pandemic. Therefore, they are investing a lot of effort to support student wellbeing and are striving to provide students with information on any changes to their courses (25). At the School of Dental Medicine, University of Zagreb, there are no additional programmes available that would support mental health of their dental students; however more assessment is needed to measure the wellbeing of dental students.

Zaključak

Ovo istraživanje pokazalo je da su studenti zbog pandemije krize tijekom prvoga i drugoga zaključavanja osjećali nelagodu (2020. i 2021. godine). No dobro su se prilagodili novim oblicima hibridne nastave, ali svjesni su da stoma-
hybrid teaching, however, they are aware that dental education needs practice and clinical exposure, which is something that cannot be delivered online. Despite the striving of the School of Dental Medicine to compensate for the missed clinical exercises, students still feel uncertain about their clinical competence. There was no significant difference between genders, while clinical students were more motivated during the first lockdown. During the second lockdown, preclinical students felt safer but less confident to treat patients.

**Conflict of interest**

Authors declare no conflict of interest.

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