Original Research

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A survey on dental students' perception regarding online learning during the COVID-19 pandemic

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Abstract

Background and aims. This study aimed to assess the students' opinion about the efficiency of online teaching and also about the methods and features to be implemented even after this pandemic period would pass.

Methods. A questionnaire was formulated in order to evaluate the students' perception about the teaching methods used by the Faculty of Dentistry, which was distributed through email.

Results. The answers of 208 students were analyzed. There were 157 women and 51 men, 119 were from Cluj County, while 89 were from other Romanian counties; 102 of the students were in the 4th year of study, while 62 were still in the preclinical years (1st, 2nd, 3rd), and the rest of 44 of the subjects, were in the 5th or 6th year of study. 85.8% of the respondents were satisfied with the traditional lectures, 51.7% considered that online lectures were more useful than the traditional. 187 (88.6%) of the students were satisfied with the traditional practical activities, while 37 (16.1%) believed that online activities were more useful to them, 111 (52.6%), believed that they were able to communicate better with the teacher during the online lectures.

Conclusions. Overall positive responses were reported regarding the acceptability and usability of online learning. The students viewed online learning helpful as a supplement to their learning rather than a replacement for traditional teaching methods.

Keywords: Covid-19 pandemic, online learning, dental students, opinion

Background and aims

Students enrolled in schools of dental medicine must gain both theoretical knowledge and also acquire important practical skills [1]. During the 6 academic years, a student should gain theoretical background (e.g. establishing a complete diagnosis, rules in tooth preparation, indications for removable or fixed prosthesis, etc.), which is a very important aspect in the learning process; also, dental students must acquire their practical skills by performing different and complex procedures on simulators, and later on real patients [1].

The Covid-19 pandemic period has been an unprecedented circumstance for educational institutions, especially universities, with even a greater impact for the specialties like dental medicine [2,3]. The coronavirus pandemic forced universities all around the world to implement fully remote educational methods, and basically to develop an efficient process of digital teaching [4].

Several studies published prior to Covid-19 pandemic evaluated both traditional (face-to-face) teaching and remote methods [5-7]. Although the mixed learning techniques can be successfully implemented, not all the universities or dental schools managed to introduce a

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combined traditional and remote teaching method.

The suspension of traditional lectures and practical activities in dental schools led to a fully online learning process. Thus, distance learning through different techniques and platforms (Microsoft Teams®, Wooclap® etc.) had to replace face-to-face learning, without any transition process.

In this context, several dentistry faculties had to implement, in a very short time table, a fully remote method of teaching. Among these faculties, Faculty of Dentistry of "Iuliu Hatieganu" University in Cluj Napoca, Romania, developed, in a very short time (10 days), a method to continue all the teaching activities (lectures and practical activities) in a virtual environment. However, the students' appraisal of the tools and values of online learning process and assessment of their attitudes represent an important factor, essential to judge the success on the new implemented system. Therefore, this study was conducted 3 months after the implementation of the online learning through Covid-19 pandemic and *aimed to assess the students' opinion about the efficiency of the new method, and to investigate their view on implementing some online teaching features even after the pandemic period would end.*

Methods

A questionnaire was formulated in order to evaluate the students' perception about the teaching methods used by the Faculty of Dentistry ("Iuliu Hatieganu" University, Cluj-Napoca, Romania). The survey was first pilot tested among five students, in order to validate the clarity of the questions, the response options and for the estimation of the time needed for completion. After making the necessary modifications, 15 questions were included in the survey, along with the social – demographic questions.

The first section of the survey included the GDPR agreement, so that only the respondents who agreed with the conditions of processing personal data could continue answering the survey.

The second section referred to general questions, regarding gender, age, residence, year of study. The third section contained 15 statements for assessing the opinion of the respondents regarding the online educational process implemented during the pandemic period. The questions in this section are resumed in table 2. The possible answers for each statement were **(**a) agree; (b) disagree; (c) uncertain.

The distribution of the questionnaires was done by email (using Google Forms web site) to students from Faculty of Dentistry, Romanian Section, of the Iuliu Hatieganu University of Medicine and Pharmacy of Cluj-Napoca.

Data analysis

The answers were downloaded from the Google Forms web site as a Microsoft Excel (Microsoft Corp., Redmond, WA) file. Further, after recording the variables, the answers were exported to a SPSS file (Statistical Package for Social Sciences software 22.0 - SPSS, Chicago, Il).

First, a descriptive analysis was performed. The Kolmogorov-Sminov normality test determined the data distribution. Afterwards, in order to determine any statistical associations between the answers and some of the social-demographic factors, the Chi-Square test was performed as well as bivariate correlations. Multivariate regression analyses were performed to evaluate the answers to the statements based on demographic factors. Statistically significant differences were those with $p \leq 0.05$. Assumptions of logistic regression such as dependent variable configuration were also verified.

Results

211 students responded the survey, but only 208 agreed with the conditions of processing of their personal data. The social-demographic characteristics of survey participants are summarized in table I.

From the 208 respondents who accepted to answer to the entire survey, there were 157 women and 51 men, 119 were from Cluj County, while 89 were from other Romanian counties. Also, 102 of the students were in the 4th year of study, while 62 were still in the preclinical years (1st, 2nd, 3rd), and the rest of 44 of the subjects, were in the 5th or 6th year of study (Table I).

195 subjects (92.4%) considered that online videos related to dentistry were useful, and 181 (85.8%) of the respondents were satisfied with the traditional lectures, before Covid-19 pandemic. When asked about their communication with the teacher during lectures, 111 (52.6%) of the respondents agreed that they could communicate better online, than face-to-face, and 175 of the students (82.9%) would prefer a combination of online and traditional lectures, after the Covid-19 pandemic would be finished (Table II).

Table I. Description of the respondents participating in the survey.

Variables	Age, years				Gender (F/M)		Residence		Study year					
	20-21	22-23	24-25	Over 25	Female	Male	Cluj county	Other counties	1st year	2nd year	3rd year	4th year	5th year	6th year
Number of participants (N) and %	36 (17.3%)	105 (50.5%)	59 (28.4%)	8 (3.8%)	157 (75.5%)	51 (24.5%)	119 (57.2%)	89 (42.8%)	2 (1%)	20 (9.6%)	40 (19.2%)	102 (49%)	12 (5.8%)	32 (15.4%)
Total	208 (100%)													

Table II. Section 3 of the survey with the answers offered for each statement.

Section 3 of the survey	Answer options	No. of respondents (208 – 100%)
1. In general, I find online lectures, based on a power point presentation, useful	Agree	190 (91.3%)
	Disagree	18 (8.7%)
	Uncertain	-
2. In general, I find online procedural videos, related to dentistry, useful	Agree	195 (93.8%)
	Disagree	13 (6.3%)
	Uncertain	-
3. Before the Covid-19 pandemic, I was satisfied with the way traditional lectures were conducted	Agree	181(87.0%)
	Disagree	27 (13.0%)
	Uncertain	-
4. I consider the online lectures, presented on a power point presentation, to be more useful than the classic courses	Agree	109 (52.4%)
	Disagree	99 (47.6%)
	Uncertain	-
5. During the online lectures, I consider that I am able to communicate better with the teacher, compared to a traditional course	Agree	111 (53.4%)
	Disagree	96 (46.2%)
	Uncertain	1 (0.5%)
6. Regarding the lectures, I prefer a combination of traditional and online learning;	Agree	175 (84.1%)
	Disagree	31 (14.9%)
	Uncertain	2 (1.0%)
7. Before the Covid-19 pandemic, I was satisfied with the way the labs / clinical practice were carried out	Agree	187 (89.9%)
	Disagree	20 (9.6%)
	Uncertain	1 (0.5%)
8. I consider the labs / clinical practice tutorials to be more useful than the traditional ones	Agree	34 (16.3%)
	Disagree	171 (82.2%)
	Uncertain	3 (1.4%)
9. The video tutorials presented were more useful than the live demonstrations during the labs / clinical practice	Agree	40 (19.2%)
	Disagree	164 (78.8%)
	Uncertain	4 (1.9%)
10. Online video tutorials should partially replace the traditional labs / clinical practice, during the academic year	Agree	54 (26.0%)
	Disagree	151 (72.6%)
	Uncertain	3 (72.6%)
11. During the online lab / practice, I consider that I was able to communicate better with the group's instructor, compared to the traditional one	Agree	73 (35.1%)
	Disagree	132 (63.5%)
	Uncertain	3 (1.4%)
12. For the practical activity, I would prefer a combination of online tutorials with traditional labs and clinical practice	Agree	185 (88.9%)
	Disagree	23 (11.1%)
	Uncertain	-
13. I would prefer the classical labs/clinical practice, compared to online tutorials	Agree	107 (51.4%)
	Disagree	97 (46.6%)
	Uncertain	4 (1.9%)
14. In general, I consider useful the online teaching to partially continue, even after the Covid-19 pandemic is over	Agree	107 (51.4%)
	Disagree	99 (47.6%)
	Uncertain	2 (1%)
15. During these weeks of online learning, I consider that I have received a lot of information that will be useful to my future career.	Agree	160 (76.9%)
	Disagree	48 (23.1%)
	Uncertain	-

Regarding the practical activities, 187 (88.6%) of the respondents were satisfied with the traditional practical activities, and 34 (16.1%) subjects considered that online activities replacing dental practice were more useful than the traditional method; also, during those online activities, 73 students (34.6%) believed that they could communicate better with their instructor. 107 respondents (50.7%) preferred the traditional way for the practical activities, and 107 (50.7%) believed that online activities regarding practical issues should continue even after Covid-19 pandemic (Table II).

Also, 160 respondents (75.8%) believed that during this online learning activity they received useful information, and 161 (76.3%) evaluated good and very good the platform used for online activities (Table II).

Pearson Chi-Square test revealed $p<0.05$ when comparing the age of the respondents to the answers for the statement "Online video tutorials should partially

replace the traditional labs / clinical practice, during the academic year" ($\chi2=13.392$, df=6, p=0.037), as well when comparing age with the answers to the statements "In general, I consider useful the online teaching to continue on a part-time basis, even after the Covid-19 pandemic is over"($\chi2=17.283$, df=6, p=0.008).

Also, when comparing the residence of the respondents with the answers to the statements included in this study, the Person Chi-Square revealed $p < 0.05$ for statement "In general, I find online lectures, based on a power point presentation, useful" ($\chi2=5.493$, df=1, p=0.019), for the statement "Before the Covid-19 pandemic, I was satisfied with the way traditional lectures were conducted" ($\chi2=5.361$, df=1, p=0.021), and for statement "The video tutorials presented were more useful than the live demonstrations during the labs / clinical practice" ($\chi2=6.095$, df=2, p=0.047).

When comparing the respondents' study year with the answers, Pearson Chi-Square revealed $p<0.05$ for the statement "I consider the online lectures, presented on a power point presentation, to be more useful than the classic courses" ($\chi2=11.826$, df=5, p=0.037), for statement "In general, I consider useful the online teaching to partially continue, even after the Covid-19 pandemic is over" ($\chi2=60.171$, df=10, p=0.000), and for the statement "During these weeks of online learning, I consider that I have received a lot of information that will be useful to me during my career." ($\chi2=13.290$, df=5, p=0.021).

Investigating any associations between the answers to the statement "In general, I consider useful the online teaching to partially continue, even after the Covid-19 pandemic is over" Pearson correlation revealed a significant association with the respondents' age (p=0.40). Multinominal regression, between the answers obtained to this particular question and the demographic variables revealed a $p>0.05$.

Discussion

Dental students' preference regarding the learning process has dramatically changed, over the last decade, mainly because of their diversity of culture, experience, and also personality [8].

Several studies published during the months of pandemic described the dramatic impact of Covid-19 in dental practice [9-12]. Also, Meng at al. and Bernnardo at al. investigated the impact on the process of dental education, suggesting that the biggest challenge during the lockdown would refer to the measures to be taken in order to ensure the continuation of dental education activities [13,14].

In addition, along with the changes to the educational system brought by the new Covid-19 pandemic, teachers and students had to rapidly adapt to the remote teaching in a very short amount of time [15]. In this context, the aim of this research was to assess dental students' opinion about the new online approach for the educational process, compared to the traditional, face-to-face, teaching methods.

Out of the 211 dental students from the Romanian section participating in the survey, only 208 agreed with the GDPR rules and continued answering, while 3 of them were excluded from the beginning, without answering the questionnaire.

With the statements included in the survey we aimed to investigate the respondents' opinion on the online learning activity compared to the traditional ones. Also, another objective of this study was to assess students' opinion regarding the possibility of partially continuing online activities even after this period of isolation.

Regarding the questions related to the lectures, 85.8% of them were satisfied with the traditional lectures, and only 51.7% considered that online lectures were more useful than the traditional one. Overall positive responses were reported when the students were asked to assess the possibility of combining traditional and online lectures: 175 respondents (82.9%) would prefer a combination between the two methods, after the pandemic is over. The results obtained are also in accordance to other surveys results, published prior to Covid-19 pandemic [16].

Also, a significant number of students, 111 (52.6%), believed that they were able to communicate better with the teacher during the online lectures, which we consider to be a positive aspect, especially during this period of high psychical stress.

During the online teaching, traditional labs and clinical practice have been replaced by video tutorials and presentations. When analyzing the answers obtained to the statements, 187 subjects (88.6%) were satisfied with the traditional practical activities, while only 37 (16.1%) believed that online activities were more useful to them, and 54 (25.6%) believed that video tutorials should replace the traditional way of performing some of the practical activities.

Only 73 (34.5%) of the respondents believed that they could communicate better with their instructor during the online video tutorials.

In the attempt to find some associations between respondents' social demographic factors and the answers to the statements included in the second part of the survey, we couldn't identify a significant association. In general, the students participating in this survey were satisfied with the traditional lectures and practical activities. The results showed a preference for partially continuing online teaching for the theoretical lectures, but not for the laboratories or practical activities.

When investigating any association between the residence (as a demographic factor) and the answers given to the questions in the survey, statistical analysis revealed that students outside Cluj County accepted in a higher percentage the online lectures. This may be due to the possibility of attending the online lectures from any location.

Also, statistical analysis revealed a strong association between the answers to the statement "In general, I consider useful the online teaching to partially continue, even after the Covid-19 pandemic is over" and the respondents' study year. The students in the 6th year disagreed with the statement in a higher percentage, presumably because they understand much better the importance of gaining practical skills during the last years of faculty, aspect which was difficult during online education.

Statistical analysis did not reveal other significant associations between the social-demographic factors and the answers given to the statements included in the survey. The respondents were also invited to write some additional comments regarding their opinion on the online educational process. Answers such as "I think it would be great to be able to participate online to the future lectures, so you can follow them in your comfort from home, but to still have practical labs in the clinics" were often encountered.

Apart from evaluating the students' opinion on the new process of dental education, another aim of this study was to investigate students' opinion when asked whether the online teaching should partially continue even after the Covid-19 pandemic is over. Descriptive analysis revealed that 51.4% of the respondents agreed to the statement, and bivariate association showed a correlation between respondents' age and the agreement with the statement ($p=0.00$). The students with the age range between 20-23 years tend to agree in a higher proportion than the older students.

This aspect could be correlated with the fact that younger students are more familiarized with digital technology than older ones, and with the fact that students during their first years of study did not have the opportunity to develop practical skills and to identify the importance of performing multiple and complex dental procedures on either simulators or patients.

Regarding the impact of Covid-19 pandemic on medical education, several studies have been published, investigating the students' opinion about this topic [17-19]. Alsoufi et al conducted a survey on students from 13 Libyan medical schools. Their findings showed an adequate degree of e-learning awareness, behaviors, and activities, highlighting the usefulness of e-learning during the COVID-19 epidemic. The results also indicate that online teaching reach out to medical students and change medical education [20].

Another survey published by Dost et al collected 2721 answers from students, from 39 medical schools across UK. The results revealed that students did not find online learning to be entertaining or fun, and there were few chances for them to ask questions. Furthermore, when asked if online education could be more engaging, students were mostly neutral, but did not think it was as beneficial as face-to-face teaching [17].

Similar conclusions were also emphasized by Saiyad et al. (2020) or Nimavat et al. (2021) regarding the online medical education during Covid-19 pandemic. The assessment of the online teaching in medical or dental training revealed encouraging results. The use of e-learning tools to complement medical learning has been well established in the literature, as e-learning resources are readily available and allow for portable, on-demand training [21,22].

Based on the results of our survey and on the results already published in the literature regarding this topic, the digitalization of medical teaching is already implemented in the educational process of several dental and medical schools. After exploring the benefits of both traditional (face-to-face) and online teaching, there seems to be an option that, in the future, a hybrid of online and in-person teaching could be used in order to optimize the benefits of these learning approaches.

Conclusion

Taking into considerations the answers offered by the students included in this survey, overall positive responses were reported regarding the acceptability and usability of online learning.

The students viewed online learning helpful as a supplement to their learning rather than a replacement for traditional teaching methods.

Further studies are recommended in order to assess both subjective and objective outcome measures of online learning taking into consideration other related factors that should be analyzed in order to implement a successful model for online dental education.

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