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Original Research Article

Dental students' perceptions towards the remote learning to preclinical training

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Abstract

Objective: Challenges imposed by the covid-19 pandemic on the dental education program included adaptations to remote education. The aim of this study was to assess dental students' perceptions towards the remote learning (e-learning) to preclinical training. **Material and methods:** One hundred sixty dental students from the second to the fourth year were included. The questionnaire was filled out on Google Forms. All data was collected from May to July 2021. **Results:** Eighty-three dental students answered the questionnaire (51.9%). A minority of students rated online theoretical learning as excellent (8.4%). Concerning preclinical training after e-learning, excellent values ranged from 4.5% to 26.7%. Most students were willing to take dental residency programs (92.8%). The main areas of choice are dentistry, endodontics, oral surgery, and prosthodontics. **Conclusion:** Dental students reported many difficulties during preclinical training after e-learning. Most students intend to attend a residency program in dentistry, endodontics, oral surgery and prosthodontics.

Introduction

In January 2020, the World Health Organization issued a public emergency alert of international concern. It was a new strain of coronavirus called SARS-CoV-2 (Severe Acute Respiratory Syndrome). On March 11, the situation was classified as a pandemic. In Brazil and the rest of the world, the pandemic brought several political, social, psychological and educational problems. In this context, remote teaching began to be adopted in higher education due to the unfavorable scenario of face-to-face classes due to social distancing to contain the spread of the disease [13].

Daily activities, dental care and dental education also were impacted by the covid-19 pandemic. The mouth was considered a gateway for contamination by the virus due to droplets from speech and sneezing. Dentists became the professionals with the highest risk of contamination due to the aerosols produced during dental care. In the clinics, there was a reduction in the flow of patients, prioritizing only urgent procedures. The anamnesis was conducted by telephone, and biosafety procedures became imperative and focused during dental care [15].

This context imposed immediate challenges for dental education. With restrictive measures such as social distancing, isolation and quarantine, face-to-face education activities were almost entirely suspended. Thus, dental education institutions were forced to adapt to remote learning (e-learning) quickly, adopting virtual classes [14].

The transformation of the higher education system consists of reflecting the changes that are taking place in our society, including political and cultural values, responding the national needs and creating new realities and opportunities. Hence the importance of studies that focus on these perspectives and enhance the construction of learning and student identities, aware of the need for constant self-evaluations and transformations that consider their actions and their roles in higher education, as happened during the pandemic [9].

In this way, analyzing the main difficulties of dental students facing remote classes and the decrease in face-to-face practical classes became necessary and relevant. It is still being determined what impact this will have in the long term on the teaching-learning process. Thus, the aim of this study was to assess dental students' perceptions towards the remote learning to preclinical training during the covid-19 pandemic.

Material and methods

This study was approved by the Ethics Committee, reference number CAAE 37967520.7.0000.8040, in compliance with guidelines for research involving human beings. Informed consent of the patients was obtained for the study.

This cross-sectional study was carried out from May to July 2021. After the research presentation, a link to Google Forms (Google Forms, Google Inc., Mountain View, CA, EUA) structured questionnaire was sent to undergraduate dental students from the second to the fourth year (third, fifth, sixth, seventh and eighth semesters) (Supplementary 1). The sample included 160 undergraduate dental students. The curriculum is completed in ten semesters spanning five years. Descriptive statistics was used for frequency distribution. Data extraction was performed using Microsoft Excel software.

Results

Demographic data of participants

Eighty-three (n=83) dental students answered the questionnaire (51.9%). Forty-seven students (57.8%) were 21 or older, and 36 (42.2%) were between 18 and 20. Sixty-five (79.5%) identified themselves as female, and 18 (20.5%) as male.

Dental students of the seventh semester represented 36 students (43.4%), followed by the fifth semester, with 23 students (28.9%), third semester with 9 (10.8%), eighth with 8 (9.6%) and sixth semester, with 6 (7.2%).

Dental students' perceptions

In table I it is possible to observe dental students' perceptions of e-learning and preclinical training after e-learning. Of the participants, 26 students (32.5%) rated e-learning as good and excellent. Regarding preclinical training, however, the results differ according to the area, with pediatric dentistry and oral surgery being the most ranked as good and excellent, with 44 students (53.4%) and 50 students (60.8%), respectively. Orthodontics was the worst classified, with 13 students (15.9%) classifying it as good and excellent. Dentistry, endodontics and stomatology had 37 (45%), 32 (38.7%) and 28 (33.8%), respectively, of the students classifying the subjects as good and excellent.

Table I – Ratings of students' perception regarding e-learning and preclinical practice after e-learning

Statements	Poor	Fair	Good	Very good	Excellent
E-learning	4.8%	9.6%	53.0%	24.1%	8.4%
Dentistry	12.2%	17.1%	25.6%	35.4%	9.8%
Endodontics	9.3%	20.0%	32.0%	30.7%	8.0%
Oral Surgery	2,7%	9.5%	27.0%	37.8%	23.0%
Orthodontics	11,4%	22.7%	50.0%	11.4%	4.5%
Pediatric dentistry	0.0%	15.6%	31.1%	26.7%	26.7%
Stomatology	13.5%	16.2%	36.5%	20.3%	13.5%

Regarding dental specialties that will be more difficult for students after graduation (open-ended question), prosthodontics was the most answered, 45 (54.9%), followed by endodontics 35 (42.7%), stomatology 29 (35.4%), orthodontics 28 (34.1%), dentistry 26 (31.7%), oral surgery 16 (19.5%) and pediatric dentistry 14 (17.1%).

Continuing professional development

When the students were asked about continuing professional development, 77 (92.8%) believed they would take a dental residency (figure 1). Thirty-two (38.6%) students intend to pursue a master's degree, 24 (28.9%) a doctorate and 19 (22.9%) a postdoctoral degree (figure 1).

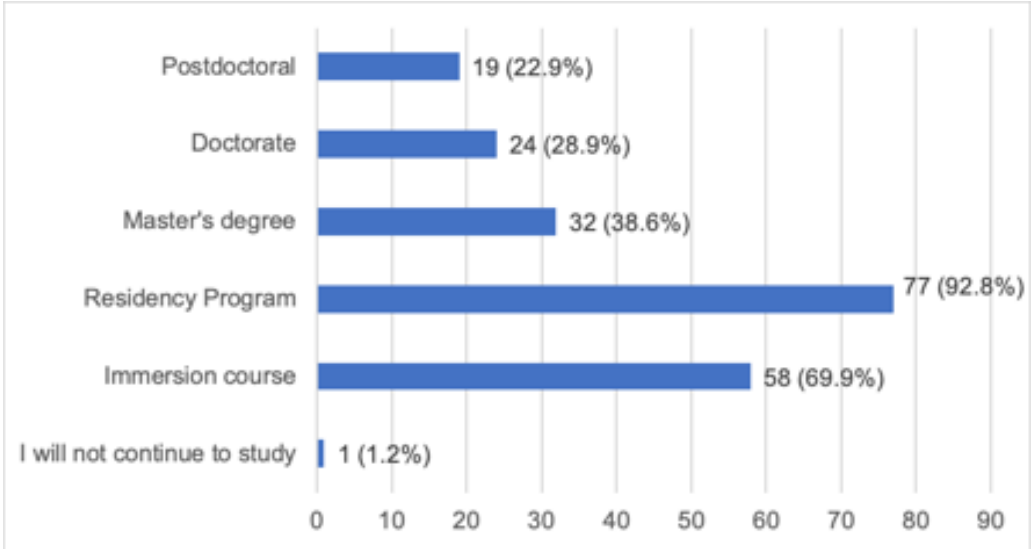

Figure 1 – Dental student responses regarding the intention to postgraduate studies

Eighty-two (98.8%) students want to take a dental residency program. Dentistry and oral surgery appeared practically tied as the chosen area, with 44 students (53.7%) and 43 students (51.8%), respectively, closely followed by prosthodontics, with 34 students (41.5%) (figure 2).

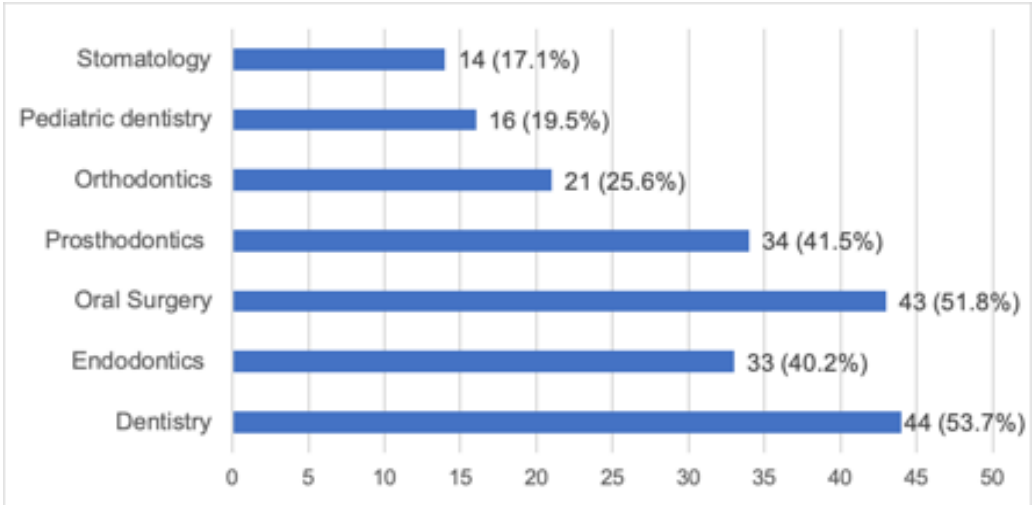

Figure 2 – Students' responses regarding taking a dental residency course (more than one alternative was possible)

Discussion

The impact of covid-19 was universally felt yet the response to the pandemic varies with the setting and goals of the organization or community [5]. Undoubtedly, the covid-19 pandemic presented unique opportunities to take disruptive innovation to never imagined or desired levels. Dentistry is an art and profession in constant evolution and change. Adhesives, composites, digital radiographs and cone beam computed tomography are commonplace today, but they were the result of research and innovation driven by a desire to improve outcomes.

Conventional dental education is a triad relationship among student, university and patient. During the covid-19 pandemic, this was adversely impacted by guidelines issued by various regulatory authorities. The need for "social distancing" and limiting all "in-person" communication, including educational activities, was a consequence of the pandemic. All dental schools have ended their conventional classroom learning sessions, hands-on and clinical training. Learning has shifted to alternative, remote methods of didactic online, synchronous and e-learning lectures, webinars, simulated problem-solving sessions, written assignments to be submitted online and computer-based exams, and exams written, scanned and uploaded for grading remotely by examiners [7].

Borges *et al.* [4] evaluated dental students' opinions about the validity of the video as a facilitator of the restoration technique understanding and the laboratory procedure's implementation. The authors concluded that 100% of the students considered the video as a valuable resource for helping the understanding and laboratory execution of the technique; 94.87% observed the improvement of the learning process due to the dynamic vision presented in the video in comparison with the static vision from the slides. Only 29.49% considered the video an appropriate substitute for the practice demonstration given by the professor [4].

The Dental Program is based on the theory-practice relationship, in which students usually receive theoretical content and undergo practical (preclinical) training. Practice during the degree in dentistry takes place first at a laboratory level, using mannequins, and then at a clinical level, with the care of patients. Practical laboratory training on mannequins and clinical treatments on patients is essential for the training of future dentists, so the online lecture format is solely applicable to theoretical content. No method can replace clinical practice with patient care. Professors and students agree that training based on clinical routine is particular and cannot be replaced by more advanced technology [14].

Online training is limited in dentistry. Some contents of some disciplines can be approached virtually, such as orthodontics and dental radiology, for example, as patient data are collected and later discussed with students in remote meetings, even without the presence of the patient. In this case, the study is oriented toward elaborating on the initial diagnosis and the treatment plan. In addition, laboratory activities with appropriate mannequins and the use of personal protective equipment (PPE) should be encouraged, especially for students still in the early stages of graduation. Practical classes can be enriched with digital dentistry, using software that recreates three-dimensional models of the stomatognathic system, facilitating the learning

process [14]. Dental care involves using high-speed handpieces and ultrasonic instruments, producing a significant amount of aerosols. Therefore, the risk of cross-infection between dentist and patient during dental practice in offices and clinics is exceptionally high. Thus, it is not advisable to administer practical classes in dental schools during the intense transmissibility of the disease [14].

Simulation training at times of high risk of transmission of covid-19 in dental services is an alternative and safe way to acquire clinical skills without direct contact with patients. Fine motor skills and excellent manual dexterity are essential for dental students to treat patients independently. The written or verbal description of the tactile sensation is difficult to understand. The "virtual lab environment" with "haptics" can be incorporated into existing simulation training modules. *Haptics* is a haptic feedback technology that uses haptic sensation and control to interact with computer applications. Teaching and evaluating student performance are facilitated by tactile interactive software available on the market. In Dentistry, it can be used to acquire skills ranging from applying anatomical models to local anesthesia, identifying the periodontal disease, preparing the root canal access cavity and placing dental implants. Incorporating *haptics* into the routine of Dentistry courses will allow students to treat a virtual patient and facilitate objective feedback on the procedure during and after completion. The faculty can evaluate all aspects of the procedure at any time, either on-site or remotely [7].

According to a study carried out by Pathak *et al.* [10] to assess the "perception and attitude of students about e-learning", it was found that 48.4% of students preferred both means of learning, e-learning and face-to-face interaction in the classroom [10]. Additionally, 16.9% of students preferred the e-learning method exclusively, and 34.7% preferred the traditional classroom method [10]. Another study showed that 57.3% of students preferred e-learning, while 42.7% believe the traditional learning method in the classroom is better [2]. E-learning still needs to be a reality entirely accepted by students. As pointed out by this study, a minority of students rated online theoretical learning as excellent. Regarding practical learning, the results differ a little, varying according to the subject, but even so, no subject was widely classified as excellent.

The Association for Dental Education in Europe (ADEE) sent an online questionnaire to 153 dental schools in Europa to learn the panorama of dental schools during the covid-19 pandemic [11]. Responses were collected between March 25 and April 5, 2020, and covered the following areas: clinical activities, non-clinical teaching, assessments, emotional support and future implications. The results showed that theoretical teaching was being carried out in 90% of the schools. In 72% of schools, assessments were postponed as clinical assessments could not be carried out. The well-being of students and professors was managed centrally by 50% of the faculties through specific pages on the internet and online meetings. Finally, 90% of colleges believe the covid-19 crisis will permanently affect dental learning [11].

Most of the students in this study were over 21 years old, female and mainly studying in the fifth and seventh semesters, periods of deep learning and practical improvement in the presence of patients. Even with so many adversities in dental education during the pandemic, or due to it, most students are willing to continue professional development, such as a residency or master's degree. The areas of choice differed significantly. The main chosen areas were dentistry, endodontics, oral surgery and prosthodontics, areas where the presence of the patient is fundamental for the consolidation of learning.

The impact of pandemic of covid-19 affected dental education a lot. The model of dental education should be innovated to suit different situations, and novelty intelligent technology should be applied for future dental education [6]. Dentistry must strive for closer integration with medicine and the health care system at all levels, namely education, patient care and research. Dental schools should strive to remain contemporary through active contributions to the community in education, research, technology transfer, and patient care. Alternative models of dental education practice and performance evaluation must be continuously developed. The plan for the future must balance idealism, realism and prudence to consider major scientific, economic and social changes [7].

Al-Azzam *et al.* [1] found that 7.02% of the students did not change simple health behaviors, and 18.43% were not interested in taking the vaccine. The authors highlight the importance of enacting new laws for reopening universities, applying high fines for violators, and obligating students to take the vaccine since university settings have high levels of social contact with populations from different communities and countries [1].

It is important to point out the limitations of this study. This study was conducted only in one dental school. Additional multicenter research is warranted. A correlation between the responses

about e-learning and preclinical training was not conducted. The analysis was limited to descriptive percentages. Concerning closed-ended questions, only a part of the specialties recognized in Brazil was listed, limiting the analysis and conclusions.

The dental students reported a high impact of covid-19 on their dental education [8]. There is no question that this difficult time will impact dental profession in significant ways [12]. However, covid-19 pandemic presented unique opportunities to take disruptive innovation to levels never imagined (or desired) [3].

Conclusion

Students reported many difficulties during preclinical classes after e-learning. Pediatric dentistry was the best-evaluated preclinical practice after e-learning. The majority of students intend to enroll in a dental residency program. The main areas chosen to carry out these courses are dentistry, endodontics, oral surgery and prosthodontics.

References

1. Al-Azzam N, Elsalem L, Gombedza F. A cross-sectional study to determine factors affecting dental and medical students' preference for virtual learning during the covid-19 outbreak. Heliyon. 2020;6(12):e05704.

2. Almulhim AY, Almulhim SA, Almulhim AA, Khan AS. The impact of e-learning modalities on medical students in KSA during the covid-19 pandemic. J Taibah Univ Med Sci. 2020;15(5):437-438.

3. Artese F. A pandemia do covid-19 revelando oportunidades e desafios na formação em Ortodontia. Dental Press J Orthod. 2020;25(3):7-8.

4. Borges AB, Pucci CR, Torres CRG, Barcellos DC. Utilização de vídeo como recurso complementar de ensino em dentística operatória. Braz Dent Sci. 2009;12(3):6-10.

5. Brandolin BA, Watson CA, Resnick SJ, Allen KL, Ritter AV. The inconspicuous nature of covid-19 and its impact to dentistry. Semin Orthod. 2020;26(4): 176-82.

6. Chang TY, Hong G, Paganelli C, Phantumvanit P, Chang WJ, Shieh YS et al. Innovation of dental education during covid-19 pandemic. J Dent Sci. 2021;16(1):15-20.

7. Chopra SS, Sahoo NK. Pandemic proofing dental education. Med J Armed Forces India. 2021;77(Suppl 1):S31-S36.

8. Dias CA, Karam SA, Cumerlato CBF, Sartori LRM, Fernandez MS, Silva NRJ et al. Covid-19 pandemic and impact on dental education: perception of Brazilian dental students. Braz J Oral Sci. 2022;22:e237471.

9. Lage RH, Almeida SKTT, Vasconcelos GAN, Assaf AV, Robles FRP. Ensino e aprendizagem em Odontologia: análise de sujeitos e práticas. RBEM. 2017;41(1):22-9.

10. Pathak A., Makwana K., Sharma P. A study on student's perception and attitude towards e-learning. J Gujarat Res Soc. 2019;21(16):274-82.

11. Quinn B, Field J, Gorter R, Akota I, Manzanares M-C, Paganelli C et al. Covid-19: the immediate response of european academic dental institutions and future implications for dental education. Eur J Dent Educ. 2020;24(4):811-4.

12. Saeed SG, Bain J, Khoo E, Siqueira WL. Covid-19: finding silver linings for dental education. J Dent Educ. 2020;84(10):1060-3.

13. Silva GC, Araújo GC, Ferreira JF, Ribeiro LA, Silva MRB, Carvalho RCL et al. Ensino da Odontologia no contexto da pandemia da covid-19. BJHR. 2021;4(2):9228-43.

14. Tomaz AFG, Silva DNA, Borges REA. Metodologias em EaD e suas implicações no ensino em Odontologia durante a pandemia da covid-19: revisão de literatura. EaD em Foco. 2021;11(2).

15. Verde TC, Freitas SAA, Dias ASS, Linhares TS, Martins YS, Guimarães WR. Desafios clínicos, didáticos e pedagógicos no ensino e exercício da Odontologia frente a pandemia de covid-19. São Luís: Editora Pascal; 2020.

Supplementary 1

1) How do you rate your theoretical learning in the virtual environment with remote learning (e-learning) (synchronous online classes in which the professor teaches the class at the scheduled time and live)?
- Excellent
- Very Good
- Good
- Fair
- Poor

2) Regarding the ability in the preclinical, how do you rate yourself? Answer by marking the following alternatives: Excellent (5), Very Good (4), Good (3), Fair (2), Poor (1).
- Dentistry
- Endodontics
- Oral Surgery
- Orthodontics
- Pediatric dentistry
- Stomatology

3) Would your learning be more efficient in an exclusively face-to-face environment?
- Yes
- No

4) Do you believe that you will finish your training theoretically qualified?
- Yes
- No

5) What is your ambition to improve your knowledge and practice?
- I will not continue to study
- Immersion course
- Residency Program
- Master's degree
- Doctorate
- Postdoctoral

6) Which specialty(es) do you think will have more difficulties after graduation? You can choose more than one alternative.
- Dentistry
- Endodontics
- Oral Surgery
- Prosthodontics
- Orthodontics
- Pediatric dentistry
- Stomatology

7) In which specialty(es) do you at least intend to specialize? You can choose more than one alternative.
- Dentistry
- Endodontics
- Oral Surgery
- Prosthodontics
- Orthodontics
- Pediatric dentistry
- Stomatology