

ORIGINAL ARTICLE

Stress among dental students transitioning from remote learning to clinical training during coronavirus disease 2019 pandemic: A qualitative study

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Abstract

Objectives: To identify dental students' perceptions of stress over returning to in-person clinical training after remote learning required from the coronavirus disease 2019 (COVID-19) pandemic.

Methods: This was a qualitative observational study. The sample was composed of undergraduate students ($n = 47$) in the final year of São Paulo State University, School of Dentistry, Araraquara program. The data were collected using a questionnaire created in Google Forms. The data was analyzed using the discourse of the collective subject technique.

Results: More than half of the students (63.8%) reported experiencing stress in the transition from remote learning to clinical training. According to the students, the main causes of this stress were fear of COVID-19 infection or contamination (31.5%) and insecurity in their clinical treatment skills after having gone so long without training (25.5%). Half of the students surveyed (51.1%) exhibited at least one stress-related symptom. For most of the students (70.2%), remote learning was insufficient to prepare them for returning to in-person clinical activities. Performing laboratory pre-clinical activities prior to clinical training was the suggestion most frequently cited by the students (25.5%), as a way to avoid some of the stress associated with their return to in-person learning. The main coping strategies adopted by the students upon their return to in-person learning were making the most of their clinical training, planning cases, and studying relevant topics before treating patients (48.9%).

Conclusion: The dental students perceived high levels of stress during the transition from remote learning to clinical training.

KEYWORDS

dental students, distance learning, psychological stress

1 | INTRODUCTION

The serious and contagious nature of the novel coronavirus 2019 (COVID-19), combined with its high mortality rate, required social distancing policies to be implemented worldwide in an attempt to contain and control its spread.¹⁻⁵ These policies had impacts on societies, economies, and education.^{1,6-11}

The impacts of the COVID-19 pandemic on education systems were unprecedented.^{12,13} Due to the nature of dental work, in which patients and dentists come into close contact and produce airborne particles and droplets during patient care, dental schools suspended their in-person activities.^{1,2,14,15,16}

To avoid interruption of students' educational programs and to facilitate the return to in-person activities when schools were allowed to reopen, traditional learning was replaced with online systems.^{6,7,8,17} At the São Paulo State University (UNESP), School of Dentistry, Araraquara, theoretical classes were taught online. Although most meetings were synchronous, classes were recorded and available for students to access whenever they wanted. This strategy was adopted so that they could attend the theoretical classes before carrying out the practical activities upon their return. However, because dentistry degree programs are largely clinical in nature, the practical training, development of manual dexterity, and patient care make up the bulk of undergraduate dentistry program curricula.^{9,13,16,18}

Distance education offers limited opportunities to develop clinical skills.¹³ Therefore, dental schools have been forced to rethink their protocols to allow for safer in-person learning^{2,6} as they began to reopen as of the second semester of 2020.^{19,20}

According to Kaurani et al.,²¹ the COVID-19 pandemic has compromised the balance between containing the spread of the virus and the development of theoretical, psychosocial, and fine motor skills necessary for adequate patient care, due to the abrupt interruption of face-to-face teaching. In a survey conducted in Pakistan, dental students were shown to be completely dissatisfied with online teaching during the pandemic.²² Although this teaching modality is effective and necessary during the pandemic, it seems important to improve the online educational and pedagogical approach for continuing education in dentistry.²³

Because the interruption of in-person learning may have affected skills and competencies acquired prior to the COVID-19 pandemic,^{24,25} the return to in-person activities may be a challenge for students. In addition to the usual stress of dentistry degree programs, students had to learn in the midst of a global health crisis, school closures,

and disruptions of the practice and improvement of their clinical skills,⁷ which resulted in higher levels of stress during the social distancing phase of the pandemic.^{3,7-9,12,13,18} However, little is known about these students' perceptions and experiences regarding their return to in-person educational activities. Therefore, conducting qualitative research to observe these perceptions is important.

Thus, the objective of this study was to observe dental students' perceptions of stress in the transition from remote learning to clinical training after the social distancing required by the COVID-19 pandemic.

2 | MATERIALS AND METHODS

2.1 | Study sample and design

The study was approved by the local ethics committee (CAAE registry number 45116821.4.0000.5416). This was a cross-sectional and qualitative observational study with a convenient non-probability sampling design. All students enrolled in the fifth and final year of the undergraduate degree program in dentistry offered by the School of Dentistry of UNESP, Araraquara ($n = 75$) were invited to participate. Students were of all genders, with ages ranging from 20 to 25 years. All participants provided informed consent to participate. To ensure data confidentiality, the names of the participants were transformed into identification numbers after completing the form.

2.2 | Data collection

The data was collected using an online questionnaire (using google forms) with open-ended questions that enabled students to freely express themselves regarding the topics raised. The questions were prepared based on pertinent literature and, after its elaboration, the questionnaire was pre-tested in a pilot study. The questions on the form were: 1. Did you feel prepared to return to in-person academic activities? 2. How has the post-social-distancing transition from remote learning to in-person learning been for you? 3. Has the transition from remote learning to clinical training caused you any type of stress? 4. If you have experienced stress, why do you think that was? 5. Have you exhibited any signs of stress upon returning to in-person learning? 6. Do you think that remote learning was able to prepare you for your return to clinical training? 7. What educational aspects do you think could be improved to prevent stress upon the return to clinical training? 8. What coping strategies have you used to deal with this return to in-person learning?

The questionnaire was sent to students' school email addresses. The data were collected in May 2021 with a 1-month deadline for completion. It is important to note that the students returned in person to the university in January 2021.

2.3 | Data analysis

The qualitative approach used in this study was based on the social representation theory.²⁶ So, the data was analyzed using the discourse of the collective subject technique²⁶ with the aid of the Qualiquantisoft software. This technique consists of a series of operations carried out on the raw material obtained from the individual discourse that, at the end of the process, results in collective discourse, that is, mental models obtained from the literal response of the most significant content of the discourse.²⁶

In addition to the qualitative data analysis, a quantitative analysis was performed using descriptive statistics in order to create a relative frequency distribution of the results organized by the categories associated with each question.

3 | RESULTS

The response rate was 62.6% (47 students). Table 1 presents the quantitative results.

The majority of the students (51.1%) reported that they felt prepared to return to in-person learning. For many of them (29.8%), the return was considered difficult and challenging. One student (ID02) explained, "after so many months at home without contact with many people, every day has been a challenge." Another student (ID34) wrote, "I've become insecure when it comes to treating patients sometimes, partially because I went so long without practicing, and partially because of the fear of getting sick." Meanwhile, 19.1% of the students reported that they had experienced initial difficulty, but overcame it. One student (ID38) wrote, "The hardest part was the initial phase of the return because there was still so much fear and uncertainty around COVID. Now, I feel calmer and more prepared to deal with the situation. I also feel more confident about performing procedures after such a long time away." An equal percentage of students (19.1%) reported feeling relief, as well as fear or anxiety. One student (ID05) wrote, "I'm excited to be able to go back to class, but at the same time, I'm worried about my health and the health of my family because of my exposure to this risk of contamination." Similarly, another student (ID25) explained, "it has been great to get back to my routine and have in-person activities, but the fear of not being isolated anymore is significant too."

TABLE 1 Summary of the discourse of the collective subject organized by the categories associated with each question

Questions	%
1. Did you feel prepared to return to in-person academic activities?	
A. Yes	51.1
B. Somewhat	4.3
C. No	44.7
2. How has the post-social-distancing transition from remote learning to in-person learning been for you?	
A. It has been fine.	31.9
B. I experienced some initial difficulties but have overcome them.	19.1
C. It generated conflicting feelings.	19.1
D. It has been difficult and challenging.	29.8
3. Has the transition from remote learning to clinical training caused you any type of stress?	
A. Yes	63.8
B. No	36.2
4. If you have experienced stress, why do you think that was?	
A. I have not experienced stress.	36.2
B. I've experienced stress because I'm afraid of contracting COVID-19.	31.9
C. I've experienced stress because I went a long time without practical activities.	25.5
D. I've experienced stress for other reasons.	8.5
5. Have you exhibited any signs of stress upon returning to in-person learning?	
A: No	48.9
B. Yes	51.1
6. Do you think that remote learning was able to prepare you for your return to clinical training?	
A. Yes	29.8
B. No	70.3
7. What educational aspects do you think could be improved to prevent stress upon the return to clinical training?	
A. A review of the prior content, hands-on activities, and the sharing of clinical experiences.	19.1
B. Additional laboratory training prior to clinical training.	25.5
C. Compliance with the remote learning standards approved by the institution.	12.8
D. Better relationships between students and professors.	8.5
E. Something else.	6.4
F. I don't know what could be done.	12.8
G. Nothing.	17.0
H. No answer provided	4.3

(Continues)

TABLE 1 (Continued)

Questions	%
8. What coping strategies have you used to deal with this return to in-person learning?	
A. Making the most of my clinical training and studying content before training sessions.	48.9
B. Following the biosafety protocols taught by the institution to make this return to in-person learning safer.	36.2
C. Therapy.	23.4
D. Faith and hope.	4.3
E. Trying to find learning opportunities outside of the institution.	2.1
F. No answer provided	4.3

More than half of the students (63.8%) reported experiencing stress in the transition from remote learning to clinical training. The reasons presented were fear of COVID-19 infection (31.9%). As one student (ID07) explained, "I think I was stressed because I was scared to get COVID at school and to spread it to my family." Another student (ID21) reported experiencing "fear of infection and transmission." Of the students who completed the questionnaire, 25.5% reported feeling insecure about treating patients after such an extensive period without practice. One student (ID28) wrote, "I think I felt stressed because I was insecure about treating patients again after so long, scared that I wouldn't know how to do the procedures anymore." Another (ID43) wrote, "this long period of isolation made me lose some of my skills, and that frustrated me in the clinic." Meanwhile, 8.5% of the respondents cited other reasons for their stress. One (ID40) explained, "I think that, because I'd spent so long in a restricted environment, hardly leaving the house and having contact with so few people, such a drastic and fast change ended up proving difficult."

Among the students who exhibited manifestations of stress (51.1%), the most commonly cited symptoms were tachycardia, shortness of breath, dizziness, shaking, anxiety attacks, malaise, and jaw clenching. One student (ID32) reported, "In the first month (after returning to in-person learning), I felt some malaise and frequent headaches." Another one (ID38) wrote, "In the first weeks after our return, I experienced many nights of insomnia."

Most of the students (70.3%) reported that remote learning was insufficient to prepare them for returning to in-person clinical activities. The students reported different reasons for this stress, including the need for practical training in dentistry degree programs. As one student (ID01) wrote, "remote learning served as merely a bridge between us and the university, so we wouldn't completely cut off contact." Another (ID43) wrote, "remote learning

provided us with a lot of knowledge, but clinical experience is essential for us to put this knowledge into practice, as well as for us to learn about the emotional side of this work." Another student (ID07) reported, "I believe that remote learning cannot replace theory-based classes, let alone practical classes, largely because remote learning results in theory-based classes and practical classes being taught at different times." As evidenced by the last quotation, another issue raised was the time between the theory-based classes and the practical application of the material. Similarly, another respondent (ID37) noted, "I think the worst part has been the large gap in time between the theory and practice." Another student (ID44) stated, "because we couldn't have our practical classes immediately after our theory classes, we forgot a lot of what we had learned."

To ease the transition between remote learning and practical classes and, ultimately, to prevent such high levels of stress, many students (25.5%) suggested the use of laboratory activities prior to their clinical training. To quote one respondent (ID28), "I believe (stress) could have been reduced through a gradual return [to practical training] with some practical lab work." Another (ID13) wrote, "Maybe, (stress could have been reduced) by including some laboratory or pre-clinical activities." Other students (19.1%) suggested a review of material learned previously, with ideas such as (ID28) "a quick review of some of the topics taught during remote learning" and (ID37) "presenting clinical cases as videos that demonstrate procedures, such as surgical procedures, restorative dentistry procedures, and preventive procedures and create flashcards or other materials with the sequences of the procedures to help students in their review and also with their confidence."

It was observed that the most common coping strategy cited by the students was to make the most of their clinical courses and to review the relevant material before clinical training sessions (48.9%). One student (ID02) wrote, "I'm trying to make the most of the clinic hours so that my education does not feel so behind." Another one (ID07) reported, "Before our clinical sessions, I study the procedures I am going to perform so I can feel more confident and prepared." The second most commonly cited method was adopting the biosafety protocols they had learned (36.2%). As one student (ID06) explained, "I'm being careful in terms of hygiene and protection, being as careful as possible in terms of biosafety." Another (ID14) noted that they were "trying to protect (themselves) with PPE so (they) feel safe enough to treat patients." Finally, another student (ID21) reported, "I try to trust that the PPE will protect us, and I correctly follow the biosafety protocols."

4 | DISCUSSION

The need to return to in-person activities before the pandemic was completely controlled, combined with the prolonged period of social distancing without practical training, required dental students to go through a readaptation process at their higher education institutions.²⁷ Thus, the objective of this study was to observe dental students' perceptions of stress in the transition from remote learning to clinical training after the social distancing required by the COVID-19 pandemic. It was observed that the participating students perceived high levels of stress. The main causes were fear of contracting COVID and of spreading it to others, despite all of the practical training in safety protocols offered by the institution, and insecurity in their clinical treatment skills. This fear of infection by the virus has also been reported by other studies.^{8,28-30} The extended period that these students went through without practicing dental procedures (10 months from the suspension of activities in March 2020 to the return to in-person learning in January 2021) left them feeling insecure about the skills learned prior to the pandemic, which resulted in a fear of mistakes or of not being able to perform the necessary procedures. This same perception of the negative impact of the pandemic on practical training was also reported by Jum'ah et al.¹⁶

According to Agius et al.,⁹ the abrupt and prolonged pause in daily activities made students fear that they would lose their manual dexterity skills. According to Klaassen et al.,¹⁵ social distancing hindered students' contact and strained their relationships with their peers and professors. Furthermore, the training dental students receive is influenced by a range of factors, including the institutions' teaching styles, training methods, and educational settings.¹³ It is possible that the way in which dentistry was taught during the pandemic may have contributed to students' feelings of unpreparedness for their return to in-person classes. This may have resulted in their perceptions that the return was either difficult and challenging or initially difficult, in addition to their contradictory feelings of fear and relief.

It is also important to note that the students considered herein returned to school in January 2021 after extensive planning, the establishment of biosafety protocols to protect the university community and its patients, preparation and re-organization of physical spaces, and relevant training for students, faculty, and staff. Despite these efforts, the students experienced stress. However, it is important to consider that they returned to an unprecedented scenario, so reasonable levels of stress could be expected.

The students reported exhibiting manifestations of stress and the most commonly cited symptoms when they returned to school were tachycardia, shortness of

breath, dizziness, shaking, anxiety attacks, malaise, and jaw clenching. Ammar et al. (2020)⁸ verified high anxiety levels associated with physical symptoms such as muscle contraction, hyperventilating, tachycardia, sweating, tremors, fatigue, and sleep difficulty.

Social distancing measures were implemented around the world because of the pandemic, and the School of Dentistry of UNESP, Araraquara was also required to adapt its in-person teaching methods to remote approaches in an attempt to minimize negative effects on students' learning. Despite this, students did not feel that remote teaching prepared them for the return to clinical training.

According to Hattar et al.,¹³ for remote learning to meet students' educational needs, it requires planning, training, and standardization among the faculty in terms of appropriate assessment strategies and the technology used. The rapid and unexpected change from traditional, in-person teaching to remote teaching did not allow for the appropriate level of planning. An adaptation period was necessary for local governments to approve remote learning tools and for professors to learn how to use them. In the present study, the students perceived the difficulties experienced by the faculty in adapting to the new teaching modality.

Despite everyone's best efforts, the inability to offer practical training online created a challenge that could not be met. In an undergraduate program like dentistry, remote learning cannot replace the learning experiences that come from practical training.^{7,13,30,31} To try to minimize this gap between theoretical and practical training, the use of cutting-edge technologies, such as virtual reality-based simulation devices, could be adopted. Alternatively, the schools may provide the students with portable handpieces and materials, so they can practice at home.^{21,23} However, this type of technology is not common in all countries, due to the scarcity of resources,²⁹ as in most public Brazilian dental schools.

It was observed that the months between their theory-based courses and their practical in-person training was an important issue raised by the students. The lack of practical training and the initial difficulties produced by the sudden onset of remote learning may explain students' perceptions that this method did not prepare them for their return to in-person learning.

In order to deal with the return to in-person learning and to reduce stress levels, the students adopted coping strategies. One of the strategies that the students reported using in order to reduce their stress levels was the strict compliance with the institution's infection and cross-contamination prevention protocols established for COVID-19 as suggested by Ahmed et al.²⁹ Other strategies used were to make the most of the learning opportunity while treating patients and to study the relevant theoretical material before providing dental care. The importance

of strictly adhering to infection and cross-contamination prevention protocols, as well as of fully engaging oneself in one's cases and studies, may have gone unnoticed by students in their pre-pandemic routines. The change in students' behavior with regard to these issues may be considered a positive effect of the pandemic on their learning process.

It is important for educators to consider that students experienced a completely different educational setting during the pandemic. For this reason, the strategies used in teaching and grading prior to the pandemic should be reviewed to guarantee that the transition from remote learning to in-person learning will be successful. To help the students at this moment, the educators could be more careful with students' needs and challenges in this new era. Akinkugbe et al.¹⁸ suggest that, while the pandemic and its consequences cannot be completely controlled, dentistry education must learn from the experience and embrace regular, transparent, and compassionate communication. Klaassen et al.¹⁵ emphasize that the student–professor relationship must be a tool for reducing students' stress in the post-pandemic world, highlighting the importance of strengthening these relationships and developing mechanisms to offer support in unpredictable situations. According to Hattar et al.,¹³ the return to in-person activities is an important opportunity to reflect on the effects of the pandemic on dental education. This reflection can consider new teaching methods to apply to the next generation of dental students.³²

Dental schools should be prepared to assist students if a shutdown/move to online learning happens again. In order to do that, it is important that university professors undergo comprehensive professional development training.^{23,33} In addition, it is also interesting that schools structure themselves to promote simultaneous transmissions of practices in real patients soon after the application of theoretical classes so that students can reduce the gap between theory and practice.²³ Although it is a high-cost resource, investing in virtual reality systems can be a way to apply students' clinical skills in a real-life situation.^{23,32} Another good investment would be in modern and advanced teaching platforms and tools that allow a better student experience during the online learning phase.³⁴

Though this study was observational and cross-sectional in nature and, therefore, cannot prove causality, and despite its non-probabilistic sampling design, it was performed after dental students returned to their in-person studies, but at a time when the pandemic had not been completely controlled. The information presented herein may aid in the implementation of strategies to address the difficulties associated with the return to in-person learning.

5 | CONCLUSION

It can be concluded that the dental students considered herein perceived high levels of stress during the transition from remote learning to clinical training. The main causes of the stress were fear of COVID-19 infection or contamination and insecurity in their clinical treatment skills after having gone so long without training. For most of the students, remote learning was insufficient to prepare them for returning to in-person clinical activities. The main coping strategies adopted by the students upon their return to in-person learning were making the most of their clinical training, planning cases, and studying relevant topics before treating patients.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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