

Brazilian dentistry courses facing the COVID-19 pandemic

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ABSTRACT

The study aimed to analyze the situation of Brazilian dental education considering the exceptionality of the COVID-19 pandemic. An observational and analytical study was conducted with two cross-sections, using questionnaires sent to all course coordinators in Brazil, in the 1st semester of 2020 and in March 2021. At onset of the pandemic, the institutions interrupted on-site activities. There was significant association between private institutions and offering remote lectures and using these resources before the pandemic. The public sector was associated with not teaching remote lectures and not using these resources previously. Public institutions had a greater degree of difficulty in the use and access to technologies for online activities by professors and students, as well as a lower degree of preparation in relation to biosecurity protocols to resume the clinical activities. Impacts were identified in different dimensions of dental education related to the development of practical activities and the establishment of new biosecurity protocols. Nearly all private courses did not suspend activities or did it for less than one month and resumed clinical or laboratory activities at some point during the surveyed period, while public institutions required an average of 5 months for such reorganization. The COVID-19 pandemic substantially increased the use of digital media in Brazilian dental education. From this assessment, there are financial limitations of the public sector to adapt the infrastructure to the requirements of the current biosecurity protocols. In general, students are receiving support from the institution and the coordinators identified negative impacts in different dimensions of dental education, notably in the establishment of new biosecurity protocols, adequacy in the physical structure and teaching-learning process.

Descriptors: Education, Dental. COVID-19. Online Learning.

1 INTRODUCTION

The world was not prepared for the magnitude of rupture caused by the coronavirus pandemic (coronavirus disease – COVID-19), which presents alarming statistics of cumulative cases and deaths increasing every day¹, even after more than one year of preventive measures, isolation and, more recently, vaccination². In Brazil, the epidemiological moment in March 2021 was critical, with collapse of the health system throughout the country. Only in the first 10 weeks of 2021, 54% of new cases and 47% of deaths due to COVID-19 were recorded compared to 2020³.

In the field of education, the social distancing process determined, at different moments, the interruption of on-site activities in Brazilian institutions. Concerning higher education, the Ministry of Education exceptionally authorized, on March 17, 2020, the replacement of on-site teaching activities by lectures using information and communication media and technologies, prohibiting the replacement of professional internship and laboratory practices, which were later relaxed^{4,5}. Decisions to interrupt and resume on-site activities have been based on the epidemiological situation and determinations of the governments of each Brazilian city municipality and state⁶.

This is an educational gap never experienced in higher education, facing such peculiar situation of interrupting on-site activities. The institutions have adopted online education strategies, yet very important questions have been raised based on the first reports of this massive experience of online education⁷. It is assumed that regional and socioeconomic inequalities profoundly affect this practice, thus it is necessary to map them, as well as to identify its possible negative impacts, aiming to intervene to minimize them.

It is even more challenging to plan the resumption of clinical dental teaching activities during the pandemic period, since it implies broad vaccination. Clinical teaching activities during periods of disease transmission and the changes in resulting biosecurity protocols require structural investments and effective behavioral changes⁸.

In this sense, the Brazilian Association of Dental Education Association (ABENO), by institutional mission, is aligned with international similar associations in the role of discussing and facing these challenges, maintaining the training of professionals with skills and competences according to the National Curricular Guidelines for Dentistry courses in Brazil⁹.

The Brazilian dental education scenario has grown exponentially in recent years and, in March 2020, the courses accredited by the Ministry of Education totaled 73,000 annual vacancies, being 86% in private institutions¹⁰. Thus, the objective of this study was to know the situation of Brazilian dental education considering the exceptionality of the COVID-19 pandemic.

2 METHODOLOGY

This was an analytical observational study with two cross-sections, using questionnaires, approved by the National Commission for Research Ethics under report 4.003.800.

A search on the National Register of Courses and Higher Education Institutions (HEI) (e-MEC)¹¹ revealed that, in March 2020, there were a total of 544 accredited Dentistry courses, among which 460 were in operation in 424 institutions. Considering a 95% confidence interval and a maximum estimation error of 5%, the minimum sample size was calculated as 156 HEI, proportionally distributed among the five

Brazilian geographic regions.

The course coordinators were invited to participate in the study by email and the invitation was also diffused to the coordinators by WhatsApp messages and on Instagram.

An anonymous and self-administered questionnaire was used on Google Forms platform, prepared by a panel of specialists (10 Dentistry professors, members of the Education and Director Boards of ABENO). The questionnaire was validated in a pilot study on 20 professors, who did not compose the final study sample.

Initially, a survey was conducted between May and June 2020, when the research instrument containing 18 questions of simple or multiple choice or short answer, was applied, requiring an average of 5 minutes to complete. The questions referred to data from the institution (administrative category, geographic region and number of courses), followed by information on the interruption or not of on-site activities, date and stage of the academic semester when it occurred, and if emergency clinical care was being offered to the population. There were also questions about remote lectures, technological resources used, if there was previous experience of professors and students with these tools, the challenges identified for their use, if there was any support for students and the degree of preparation of course environments to resume the clinical activities. An open question for comments allowed coordinators to indicate their concerns.

Before accessing the questionnaire, the participants received detailed information about the study, presented as an Informed Consent Form. Completing the questionnaire was considered as agreement to participate in the study.

Another questionnaire was sent in March 2021 addressing the current conditions of courses

in relation to the time required to establish the online curricular activities, since the interruption of on-site activities in March 2020. The instrument also collected data on the situation of laboratory activities and clinics in the period.

Quantitative data were analyzed on the SPSS software version 22.0 (Armonk, NY, USA) using descriptive statistics and the Chi-square and non-parametric Mann-Whitney association tests, at a maximum significance level of 5% ($p \leq 0.05$). The open questions were analyzed according to Bardin content analysis technique¹².

3 RESULTS

The sample characteristics concerning the study variables are described in table 1. The first questionnaire was responded by 169 HEI, whose proportion between private and public institutions, as well as distribution in geographic regions, reflects the study population in a very balanced manner¹⁰.

Only 3 (1.8%) of the surveyed HEI had not completely stopped the on-site activities in the first semester of 2020, and 66.9% of HEIs that interrupted the activities were at the onset of the school semester. The informed date of suspension of activities was on the third week of March in 78% of HEIs.

The resources most used for remote lectures are shown in table 2. The category "other" groups 14 tools used by less than 10% of the HEIs surveyed.

When the responses were compared by administrative categories, some statistically significant associations were found (Chi-square test). There was significant association between the category of private institutions and teaching remote lectures in all disciplines and also using these resources before the pandemic. Conversely, the public sector was associated with not teaching remote lectures and not using these resources before the pandemic (table 3).

Table 1. Description of study variables

Question	Response	n	%	
Administrative category of the institution	Private	120	71.0	
	Public	49	29.0	
Brazilian geographic region	Southeast	61	36.1	
	Northeast	48	28.4	
	South	36	21.3	
	Central West	15	8.9	
	North	9	5.3	
The course is offered at:	Capital or metropolitan region	87	51.5	
	Countryside	82	48.5	
Periods of courses offered	Full time	126	74.6	
	Morning and evening	22	13.0	
	Morning and afternoon	7	4.1	
	Morning	8	4.7	
	Evening	5	3.0	
Were on-site lectures interrupted?	Afternoon	1	0.6	
	Yes	166	98.2	
	No	3	1.8	
	Stage of school semester at suspension of activities	Initial (first month)	113	66.9
Intermediate		49	29.0	
Final (last month)		6	3.6	
Is clinical care being offered for emergency cases during the period of social distancing?	No	149	88.2	
	Yes	20	11.8	
Are lectures by digital media being offered during this period?	In all disciplines	96	56.8	
	In some disciplines	49	29.0	
	No	24	14.2	
Were these technologies used before the period of social distancing?	Yes	100	59.2	
	No	69	40.8	
Degree of difficulty in the utilization of these technologies by the professors	None	5	3.0	
	Low	22	13.0	
	Medium	49	29.0	
	High	38	22.5	
	Very high	55	32.5	
	Degree of difficulty in the utilization of these technologies by the students	None	2	1.2
		Low	21	12.4
		Medium	47	27.8
High		52	30.8	
	Very high	47	27.8	
	Is the course offering some type of support to the students?	Yes	147	87.0
No		22	13.0	
Degree of preparation concerning the biosecurity protocols to resume the clinical activities after the pandemics	Totally unprepared	16	9.5	
	Unprepared	21	12.4	
	Poorly prepared	52	30.8	
	Prepared	44	26.0	
	Totally prepared	36	21.3	

Table 2. Resources most often employed for remote lectures according to the administrative category of the institutions

Resources	Institution					
	Public		Private		Total	
	n	%	n	%	n	%
Google Meet	21	80.8	51	43.2	72	42.6
Open Source LMP [†]	11	42.3	53	44.9	64	37.9
Zoom	15	57.7	47	39.8	62	36.7
YouTube	13	50.0	43	36.4	56	33.1
Microsoft Teams	3	11.5	51	43.2	54	32.0
Power Point recording	10	38.5	44	37.3	54	32.0
Moodle	15	57.7	25	21.2	40	23.7
Hangout	5	19.2	15	12.7	20	11.8
Other	8	30.7	54	45.4	62	36.7
Total	26	-	118	-	144	-

†: Learning management platforms

Table 3. Comparisons of responses according to the administrative category of the institutions

Question	Response	Institution				P
		Public		Private		
		n	%	n	%	
Are you using lectures by digital media in this period?	Yes, in all disciplines	11	22.4	85	70.8	.000**
	Yes, in some disciplines	15	30.6	34	28.3	
	No	23	46.9	1	0.8	
Did you use these technologies before the period of social distancing?	Sim	23	46.9	77	64.2	.039*
	No	26	53.1	43	35.8	

*significant $p \leq 0.05$; ** significant $p \leq 0.01$

The non-parametric Wilcoxon test identified statistically significant differences between scores (Likert scale) assigned by public HEIs, which registered a higher degree of difficulty in using/accessing the technologies for online activities by professors and students, as well as a lower degree of preparation in relation to biosecurity protocols to resume the clinical activities compared to private HEIs (table 4).

Table 5 shows a significant association (Chi-square test) between not using these technologies before the pandemic period and not offering online

education in the period, as well as between previous use of the tools and offering online education in all disciplines.

The non-parametric Wilcoxon test identified statistically significant differences between scores (Likert scale) assigned by HEI that already used remote methodologies, which registered a lower degree of difficulty in using/accessing the technologies by students compared to those that did not previously use these technologies. This was not observed concerning the degree of difficulty for professors (table 6).

Table 4. Comparisons between scores assigned by public and private institutions

Question	Institution	n	Mean score	SD [†]	P
Degree of difficulty in the utilization of these technologies by the professors (1. None, 5. Very high)	Public	49	4.2	0.9	.000**
	Private	120	3.5	1.2	
Degree of difficulty in the utilization of these technologies by the students (1. None, 5. Very high)	Public	49	4.0	0.9	.011*
	Private	120	3.6	1.1	
Degree of preparation concerning the biosecurity protocols to resume the clinical activities after the pandemics (1. Totally unprepared, 5. Totally prepared)	Public	49	2.7	1.3	.000**
	Private	120	3.6	1.1	

†: standard deviation; *significant $p \leq 0.05$; **significant $p \leq 0.01$

Table 5. Association between the utilization of digital technologies before the period of social distancing and the offer of remote education

Question	Response	Did you use these technologies before the period of social distancing?				P
		No		Yes		
		n	%	n	%	
Are you offering lectures by digital media in this period?	No	19	27.5	5	5.0	0.000*
	Yes, in some disciplines	21	30.4	28	28.0	
	Yes, in all disciplines	29	42.0	67	67.0	

*significant $p \leq 0.01$

Table 6. Comparisons between scores assigned by institutions that used the technologies before the period of social distancing and the degree of difficulty of students and professors

Question	Did the course use some of these technologies before the period of social distancing?	n	Mean score	SD [†]	P
Degree of difficulty in the utilization of these technologies by the professors (1. None, 5. Very high)	Yes	100	3.6	1.2	0.149
	No	69	3.8	1.1	
Degree of difficulty in the utilization of these technologies by the students (1. None, 5. Very high)	Yes	100	3.6	1.1	0.050*
	No	69	3.9	1.0	

†: standard deviation; *significant $p \leq 0.05$

The other variables investigated did not show any association or statistical differences according to the administrative category and previous experience with remote education.

Among the coordinators of Dentistry courses who participated in this research, 87% reported that students were receiving support from the HEI during the period of suspension of on-site activities in Brazil. This support included different possibilities. The most frequent responses were related to pedagogical support for students (83 responses), followed by technical support for the use of technology (59 responses), psychological support (49 responses) and financial support (21 responses). It should be mentioned that most responses included more than one type of institutional support, including different professionals in this process, such as course coordinators, professors, psychologists, social workers and computer technicians. The HEIs employed different institutional spaces/representations in this support for the students.

The coordinators identified impacts on different dimensions of dental education related to the development of practical activities concerning the establishment of new biosecurity protocols/use

and purchase of personal protective equipment (PPE) (28 responses) and adaptation to the physical structure in the HEIs (18 responses); the teaching-learning process/emergency remote teaching/technological literacy of students and professors (53 responses) and the completion of internships at the Public Health System (10 responses). Impacts of an emotional nature (21 responses) and on the financial sustainability of courses (13 responses) were also reported.

The coordinators expressed concern about the moment of dental education in Brazil, citing the need for competent and responsible action (19 responses) and identifying opportunities for growth and transformation for Dentistry as a science and profession (14 responses).

The situation in March 2021 is shown by the response of 128 institutions, being 81 (63.3%) private and 47 (36.7%) public. The time required by the HEI to resume curricular activities, teaching online lectures, is shown in figure 1. Private HEIs (n=71, 87.6%) did not suspend activities or did it for less than 1 month, while public schools needed an average of 5 months to reorganize the online teaching activities.



Figure 1. Distribution of public and private Higher Education Institutions concerning the time of reorganization required to offer online education activities

Figure 2 shows the situation of resumption of laboratory and/or clinical activities during the research period that were answered in March 2021. Nearly all private institutions, especially in undergraduate education, resumed clinical or laboratory activities in some time of the surveyed

period (between March/2020 and March/2021), which was observed in 43% of public institutions and the same percentage did not have any on-site activity throughout the period. In exceptional cases (14%), they resumed postgraduate activities and emergency care.

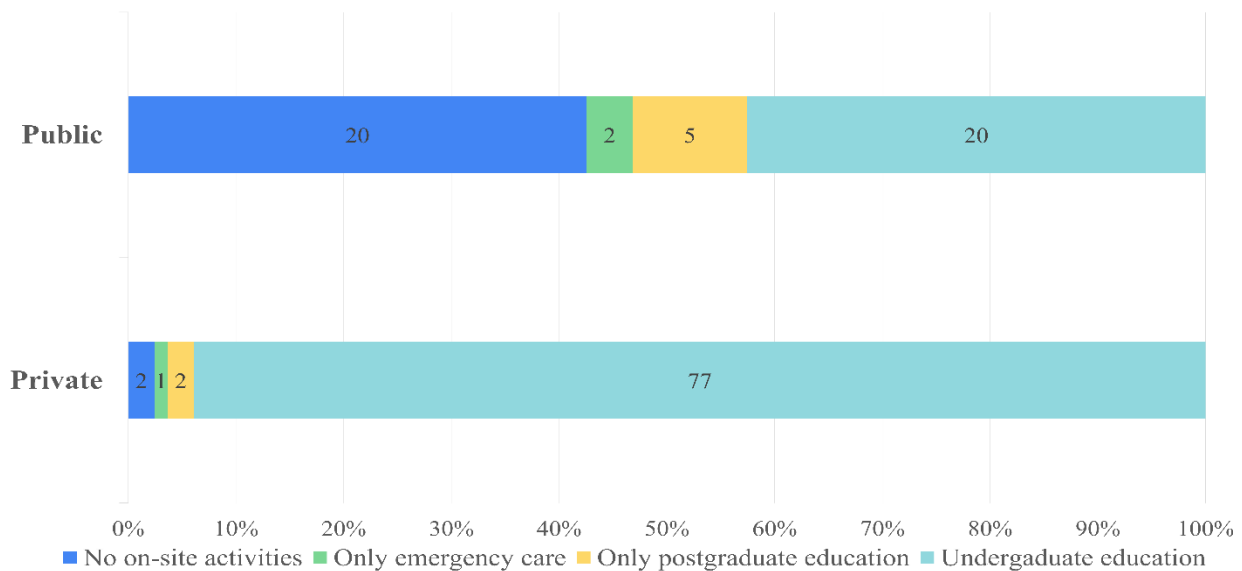


Figure 2. Distribution of public and private higher education institutions concerning the return to laboratory and/or clinical activities in the study period

4 DISCUSSION

The interruption of on-site activities in Brazilian dentistry courses after onset of the COVID-19 pandemic occurred linearly in the national territory. Considering that Brazil is a continental country and that the pandemic stages are manifested at different times and intensities in the Brazilian regions, the decision to interrupt on-site activities demonstrates a strict sense of social responsibility in the field.

However, only 11% of HEIs continued to provide emergency care since onset of the pandemic, which may have caused a gap in the provision of dental care to users. In private practice, according to a survey of the Federal Dental Council on 40,000 dentists, 82%

continued to work during this period¹³.

In this sense, this study highlights that 47.3% of course coordinators stated that they were prepared or fully prepared regarding the biosecurity protocols to resume the clinical activities. Even though this may be surprising, considering the magnitude and effects of the pandemic, the adoption of biosecurity standards in the field has been strengthened and has been structured since the human immunodeficiency virus infection and acquired immunodeficiency syndrome (HIV/AIDS) epidemic in the 1980s, when dental practice underwent important changes with the routine inclusion of protocols and PPE¹⁴.

However, this perception was significantly

different among respondents of public and private HEIs, and public HEI coordinators were the least prepared. This is possibly related to financial difficulties of the public sector to adapt the infrastructure considering the requirements of the current biosecurity protocols⁸. The new protective measures required in dentistry^{15,16} are reflected in dental education¹⁷, involving large financial resources. Data in figure 2 reinforce the differences concerning the resumption of clinical care in public and private institutions.

Approximately 86% of respondents stated that they use digital media for the development of curriculum content, even though 40% had not previously used these technologies. The study highlights the degree of difficulty of professors in the opinion of coordinators, since only 3% said they did not foresee difficulties for this. This shows that the digital literacy of dentistry professors is a weakness to be faced, considering the need of digital media imposed by the pandemic.

The option for media that allow synchronous interaction was the resource most used by public HEIs for online education, while private HEIs used other resources. The preference for free teaching platforms that would allow the content to be presented in a similar manner as the on-site teaching, e.g., professors teaching lectures transmitted entirely through the web in public HEIs, evidences the lack of prior preparation for the development of online education. Considering the several factors that interfere with the teaching-learning dynamics in this modality, the preparation for the development of these activities and the use of asynchronous means are important elements to be considered aiming at the quality and accessibility of the process¹⁸.

The higher frequency of utilization of digital platforms and less time required for the reorganization and adaptation of teaching

activities by private HEIs possibly reflects the installed capacity and accumulated experience of the sector in distance learning. Many HEIs may have benefited from the resource structure already available for other courses to move more quickly to online education. In Brazil, data on distance learning are growing and, between 2008 and 2018, the enrollment in distance learning undergraduate courses, considering all fields of knowledge, increased 182.5%, while on-site courses grew only 25.9% in the same period¹⁹.

Another relevant aspect to interpret the difference observed in responses from public and private HEIs is that there is a strong resistance against the use of digital media and distance learning resources in the public sector, since it is interpreted as a possible precariousness in teaching, with the need for a thorough review of the Quality Benchmarks for Distance Learning Higher Education²⁰.

Also, in a country with marked social differences in the access to necessary resources (computers, notebooks, mobile phones and quality internet access)²¹, this aspect is considered by public HEI managers as a limiting factor to online education and an impediment to establish education with equity of conditions for students.

The COVID-19 pandemic has substantially increased the use of digital media to address the imposed need for social distance²¹. Considering that the resumption of on-site lectures can represent an important risk for involved people²², improving the conditions for the development of online education, including the massive preparation of professors, the performance of asynchronous activities more compatible with the reality of students and the distribution of equipment and connection means seem to be relevant strategies to maintain the quality of Brazilian dental education.

Dental education was particularly affected

by the worldwide pandemic²³, and despite the level of knowledge of Brazilian students about the disease²⁴ and the necessary resilience to adapt to new learning conditions²⁵, the resumption of clinical and laboratory activities is a major challenge.

5 CONCLUSIONS

The situation of Brazilian dental education concerning the COVID-19 pandemic involved the interruption of on-site activities. Private institutions, which already offered online lectures, are offering all disciplines, while the public sector, which showed less adherence to this practice, did not use these resources before the pandemic. Similarly, public HEI coordinators reported a lower degree of preparation for the resumption of on-site activities, mainly due to the need of structural investment in clinics and laboratories. In general, the students are receiving support from HEIs and the coordinators identified negative impacts in different dimensions of dental education, markedly in the establishment of new biosecurity protocols, adequacy in physical structure and the teaching-learning process. The study also identified opportunities of growth and transformation for dentistry as a science and profession, especially challenges for dental education during the pandemic.

RESUMO

Cursos de Odontologia brasileiros frente à pandemia COVID-19

O estudo teve como objetivo analisar a situação da educação odontológica brasileira considerando a excepcionalidade da pandemia COVID-19. Foi realizado um estudo observacional e analítico com dois cortes transversais, por meio de questionários enviados a todos os coordenadores de curso no Brasil, no 1º semestre de 2020 e em março de 2021. No início da pandemia, as instituições interromperam as atividades presenciais. Houve associação significativa entre as instituições

privadas e a oferta de aulas remotas e o uso desses recursos antes da pandemia. O setor público foi associado a não ministrar aulas a distância e não utilizar esses recursos anteriormente. As instituições públicas apresentaram maior grau de dificuldade no uso e acesso às tecnologias para atividades on-line por professores e estudantes, bem como menor grau de preparo em relação aos protocolos de biossegurança para a retomada das atividades clínicas. Foram identificados impactos em diferentes dimensões da formação odontológica relacionadas ao desenvolvimento de atividades práticas e ao estabelecimento de novos protocolos de biossegurança. Quase todos os cursos privados não suspenderam as atividades ou o fizeram por menos de um mês e retomaram as atividades clínicas ou laboratoriais em algum momento do período pesquisado, enquanto as instituições públicas necessitaram em média de 5 meses para tal reorganização. A pandemia COVID-19 aumentou substancialmente o uso de recursos digitais na educação odontológica brasileira. Existem limitações financeiras do setor público para adaptar a infraestrutura aos requisitos dos atuais protocolos de biossegurança. Em geral, os estudantes estão recebendo apoio da instituição e os coordenadores identificaram impactos negativos em diferentes dimensões do ensino odontológico, notadamente no estabelecimento de novos protocolos de biossegurança, adequação da estrutura física e processo de ensino-aprendizagem. **Descritores:** Educação Odontológica. COVID-19. Aprendizagem on-line.

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