



# Knowledge about and emotional impact of COVID-19 among Brazilian dental students


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Received: Jul 14, 2021

Approved: Jul 22, 2022

Last Revision: Feb 07, 2023



**Abstract** As a result of the COVID-19 pandemic, remote teaching activities have been implemented as a social distancing measure. The objective of this study was to assess the knowledge that Brazilian dental students have about COVID-19, as well as the possible impact of the pandemic on these students' emotional and social conditions. This is a cross-sectional study using primary-data collection by means of a structured questionnaire. The latter was open from August 11 to September 11, 2020, with weekly submissions, and with convenience sampling. Data were subjected to descriptive analysis. The research included students attending the first to the tenth period of Dentistry courses, from different Brazilian regions. A total of 520 responses were collected from 14 states in the country. The students proved to have a high level of knowledge about COVID-19; 77.31% did not feel safe, 85.96% claimed to be afraid of the future, and 96.15% stated that their undergraduate courses went through losses. Moreover, 69.56% reported a worsening in their emotional state, 83.08% perceived themselves as being more stressed, 58.46% said they developed insomnia, and 51.25% stated that the pandemic had a negative effect on family finances. It is concluded that Brazilian dental students have knowledge about COVID-19, and the pandemic has negatively affected them in terms of emotional and social aspects.

**Descriptors:** Pandemics. COVID-19. Students, Dental. Mental Health. Anxiety.

## Conocimientos y repercusiones emocionales de la COVID-19 entre estudiantes brasileños de odontología

**Resumen** A raíz de la pandemia del COVID-19, se implementaron actividades de enseñanza a distancia como medida de distanciamiento social. El objetivo de este estudio fue evaluar el conocimiento de los estudiantes brasileños de odontología sobre el COVID-19, así como el posible impacto de la pandemia en las condiciones emocionales y sociales de estos estudiantes. Se trata de un estudio transversal con recogida de datos primarios a través de un cuestionario estructurado. El cuestionario estuvo vigente del 11 de agosto al 11 de septiembre de 2020, con envíos semanales, con muestreo por conveniencia. Los datos fueron sometidos a análisis descriptivo. La investigación abarcó estudiantes del primero al décimo período de la carrera de Odontología, de diferentes regiones brasileñas. Se recogieron 520 respuestas de 14 estados del país. Los estudiantes demostraron un alto nivel de conocimiento sobre el COVID-19, el 77,31 % no se sentía seguro, el 85,96 % manifestó tener miedo al futuro y el 96,15 % manifestó haber tenido pérdidas en su carrera de grado. Entre los estudiantes, el 69,56 % reportó un empeoramiento en su estado emocional, el 83,08 % se sintió más estresado, el 58,46 % dijo haber desarrollado insomnio y el 51,25 % dijo que la pandemia tuvo un efecto negativo en la economía familiar. Se concluye que los estudiantes de odontología brasileños son conscientes de la COVID-19 y la pandemia los ha afectado negativamente en los aspectos emocionales y sociales.

**Descriptor:** Pandemia. COVID-19. Estudiantes de Odontología. Salud Mental. Ansiedad.

## Conhecimento e repercussões emocionais da COVID-19 entre estudantes de Odontologia brasileiros

**Resumo** Em decorrência da pandemia de COVID-19, implementou-se atividades remotas de ensino, como medida de distanciamiento social. O objetivo deste estudo foi avaliar o conhecimento dos graduandos de Odontologia brasileiros sobre a COVID-19, bem como o possível impacto da pandemia nas condições emocionais e sociais destes estudantes. Trata-

se de um estudo transversal com coleta de dados primários, por meio de questionário estruturado. O questionário ficou vigente no período de 11 de agosto a 11 de setembro de 2020, com envios semanais, com amostragem de conveniência. Os dados foram submetidos à análise descritiva. A pesquisa abrangeu discentes do primeiro ao décimo período do curso de Odontologia, das diferentes regiões brasileiras. Foram coletadas 520 respostas, de 14 estados do país. Os alunos demonstraram ter um alto nível de conhecimento sobre a COVID-19, 77,31% não se sentiam seguros, 85,96% alegaram medo em relação ao futuro e 96,15% afirmaram ter havido prejuízos no seu curso de graduação. Dentre os alunos, 69,56% relataram piora no estado emocional, 83,08% perceberam-se mais estressados, 58,46% afirmaram ter desenvolvido insônia e 51,25% afirmaram que a pandemia afetou negativamente as finanças familiares. Conclui-se que os graduandos de Odontologia brasileiros têm conhecimento sobre a COVID-19 e a pandemia os afetou negativamente em relação aos aspectos emocionais e sociais.

**Descritores:** Pandemia. COVID-19. Estudantes de Odontologia. Saúde Mental; Ansiedade.

## INTRODUCTION

COVID-19, caused by the new coronavirus – SARS-CoV-2 –, has triggered a significant global crisis due to its rapid spread, as well as high morbidity and mortality rates. Since the beginning of the pandemic until June 2021, more than 175 million cases of the disease and more than 3 million deaths have been reported worldwide<sup>1</sup>.

The spread of the disease brought about significant challenges not only for Medicine and Dentistry, but also for all health fields<sup>2</sup>. Dentistry professionals are among those at a higher risk of contagion, due to contact with blood and saliva, aerosols, and proximity to the patient during clinical care<sup>3-6</sup>, as the patient cannot wear their mask. Routine dental procedures were temporarily suspended in several countries<sup>2</sup>, with care services being restricted to urgent and emergency cases<sup>7</sup>. Several measures, including the use of additional personal protective equipment (PPE), such as face shield and PFF2 respirator, were proposed by national and international guidelines in order to minimize the risk of infection<sup>8,9</sup>. However, the availability of resources became a challenge, especially in developing countries, such as Brazil<sup>10</sup>. Furthermore, face-to-face educational activities were suspended in many countries, which caused losses mainly for courses that require the development of technical skills.

Social isolation, on a scale that had never been experienced before by this generation, can result in reduced quality of life and negatively impact eating habits, sleep, physical activities, etc.<sup>11-13</sup> The situation of the COVID-19 pandemic led to an increase in psychiatric disorders worldwide, such as stress, as well as depressive and anxiety disorders<sup>14,15</sup>. Besides, home confinement was associated with increased intra-family violence, and the consequences of excessive use of the internet and social media need to be explored<sup>16</sup>.

Strategies aimed at reducing the impacts of the pandemic were fundamental<sup>17</sup>. Institutions and educators faced the challenge of accommodating the abrupt changes in teaching methods, finding solutions to mitigate skills deficit and ensuring safe clinical practice in the resumption of clinical activities. It is imperative that students and professors are aware of the signs and symptoms of COVID-19, its forms of transmission, as well as of the biosafety protocols that must be adopted in the clinical environments of the courses. Thus, the objective of this study was to assess the knowledge that dental students in Brazil have about COVID-19 and to detect the possible impact of the pandemic on these students' emotional and social conditions.

## METHODS

This study was approved by the Ethics Committee on Research Involving Human Beings of the Ribeirão Preto School of Dentistry [*Faculdade de Odontologia de Ribeirão Preto*] (FORP-USP), under opinion No. 4.124.841, CAAE

33598420.6.0000.5419. This is a cross-sectional study using primary-data collection by means of a structured electronic questionnaire.

The collection instrument was prepared on the Google Forms platform (Google Inc. Mountain View, CA, USA) and sent to undergraduate Dentistry students attending the first to the tenth period, from all geographic regions of Brazil, using social networks (Facebook and Instagram) and messaging application (WhatsApp Messenger). A free and informed consent form (FICF) was described at the beginning of the questionnaire, which was divided into three sections: A (sociodemographic and academic-background aspects), B (knowledge about measures to prevent the transmission of COVID-19 in dental clinics), and C (psychosocial aspects). The questionnaire was open from August 11 to September 11, 2020, with recursive weekly submissions via social media, thus consolidating a convenience sample.

The information collected was pre-processed in electronic spreadsheets in order for the responses to be validated, thus eliminating errors and duplication. In order to achieve the proposed objectives and have an overview, a descriptive statistical analysis was performed through absolute and relative frequencies for the variables of interest. The Statistical Analysis System (SAS) v. 9.2 (SAS Institute, Cary NC, USA) was used for quantification.

## RESULTS

A total of 520 students from 14 Brazilian states participated; their demographic profile and academic background are described in Table 1. Their knowledge about and use of preventive measures against the transmission of COVID-19 are described in Table 2.

As for the future of their studies and training, 402 (77.31%) said they did not feel safe, and 447 (85.96%) claimed to be afraid of the future. Regarding the support provided by educational institutions, 325 (62.50%) stated that they did not feel helpless, and 340 (65.38%) said that if they had taken the entrance examination on the date of the survey, they would choose the Dentistry course again.

A total of 480 (92.49%) students had remote learning offered by the courses, 237 (47.49%) full-time, and 428 (82.47%) did not find it difficult to access the digital platforms. With regard to performance during remote learning, 276 (54.87%) of the students judged their performance to be unsatisfactory.

Before the pandemic, 449 (86.51%) considered their face-to-face activities satisfactory. When asked about feeling that their undergraduate course had been affected by the pandemic, 500 (96.15%) of the students said yes, and, among them, more than half considered that there was a drop in performance after the start of the pandemic.

As for the resumption of clinical care, 376 (72.31%) of the graduating students did not feel safe to return, and 380 (73.08%) claimed to be afraid to resume their clinical activities. The fear of contamination during consultations was reported by 473 (91.14%) respondents, and 505 (97.30%) of the students were afraid of being contaminated and working as a vehicle of contamination to the family environment. When questioned about contamination, 520 (100%) of the students were able to correctly inform the incubation period of the virus.

Still on family, they were asked if they were seeing their families face-to-face during the pandemic, and 488 (94.03%) said yes. Of these, 163 (32.73%) stated that they felt comfortable being with family members. On family economy, 266 (51.25%) stated that the pandemic had a negative effect on family finances.

Regarding changes in social life during the pandemic, 361 (69.56%) reported a worsening in their emotional state. A total of 334 (64.35%) students stated that they were engaging in leisure activities or hobbies. Regarding eating habits, 236 (45.47%) reported having had a worsening in their eating habits.

When asked about harmful habits, such as drinking, smoking and others, 487 (93.65%) said they do not smoke, 336 (64.62%) do not drink alcohol, and 508 (97.69%) do not have any other harmful habits. Also, when asked about the frequency of these habits, 80 (15.41%) said they had increased their frequency.

Of all interviewees, 444 (85.55%) considered themselves spiritualized, as they had a religion or belief, and, with regard to emotional aspects, 432 (83.08%) of the undergraduates perceived themselves to be more stressed, while 304 (58.46%) stated they had developed insomnia after the start of the pandemic. When asked about the use of anxiolytics and antidepressants during the pandemic, 73 (14.09%) said they were taking these drugs, and 159 (30.69%) started taking herbal medicines.

**Table 1.** Students' sociodemographic and academic-background profile.

<b>Variable</b>	<b>n</b>	<b>%</b>
<i>Sex</i>		
Female	421	80.96
Male	99	19.04
<i>Age group</i>		
18 to 20 years	167	32.12
21 to 30 years	327	62.88
31 to 40 years	22	4.23
41 to 50 years	3	0.58
51 to 60 years	1	0.19
<i>Educational institution type</i>		
Private	265	50.96
Public	255	49.03
<i>Educational institution state</i>		
Alagoas	43	8.27
Bahia	37	7.12
Ceará	2	0.38
Goiás	106	20.38
Mato Grosso do Sul	3	0.58
Minas Gerais	43	8.27
Paraná	143	27.50
Pará	23	4.42
Pernambuco	9	1.73
Rio Grande do Norte	1	0.19
Rio de Janeiro	12	2.31
Santa Catarina	1	0.19
São Paulo	96	18.46
Tocantins	1	0.19
<i>Course period</i>		
1st period	29	5.58
2nd period	41	7.88
3rd period	35	6.73
4th period	57	10.96
5th period	53	10.19
6th period	68	13.08
7th period	50	9.62
8th period	96	18.46
9th period	50	9.62
10th period	41	7.88

**Table 2.** Knowledge about measures to prevent the transmission of COVID-19 in dental clinics.

Variable	n	%
<i>Hand washing</i>		
Before seeing each patient	6	1.15
Before and after seeing each patient	511	98.27
After seeing each patient	2	0.38
<i>Use of hand sanitizer</i>		
No	26	5.00
Yes	494	95.00
<i>Using hand sanitizer can replace washing hands during dental care</i>		
No	456	87.86
I do not know	36	6.94
Yes	27	5.20
<i>PPE used</i>		
Cap	504	96.92
Balaclava hood	111	21.35
Disposable apron	484	93.08
Shoe cover	265	50.96
Protective goggles	472	90.77
Face shield	493	94.81
Surgical mask	356	68.46
N95/PFF2 respirator	380	73.08
<i>Financial difficulty in purchasing PPE</i>		
No	131	25.24
I do not know	155	29.87
Yes	233	44.89
<i>The pandemic has affected your family's financial conditions</i>		
Negatively affected	266	51.25
Positively affected	16	3.08
Did not affect	237	45.66
<i>Using additional PPE makes care service harder</i>		
No	178	34.23
I do not know	120	23.08
Yes	222	42.69
According to the recommendations of the Clinical Management Protocol for COVID-19 in Specialized Care of the Brazilian Ministry of Health/2020, the correct sequence for PPE donning and doffing is:		
<i>Donning</i>		
Apron, cap, mask, goggles or face shield, gloves	467	89.81
Gloves, goggles/face shield, cap, apron, mask	52	10.00
Apron, cap, mask, goggles or face shield, gloves	1	0.19
<i>Doffing</i>		
Apron, cap, mask, goggles or face shield, gloves	467	89.81
Gloves, goggles/face shield, cap, apron, mask	52	10.00
Apron, cap, mask, goggles or face shield, gloves	1	0.19

## DISCUSSION

Most students (83.08%) felt more stressed after the start of the pandemic; 58.46% have been suffering from insomnia, and 69.56% felt their emotional state worsened with the change in social life. This high number of psychological harms to students has been reported in other studies assessing the degree of anxiety, depression and stress, thus showing how damaging the pandemic may have been to the mental health of students<sup>18-20</sup>.

The Federal Council of Dentistry [*Conselho Federal de Odontologia*] (CFO) points to a significant growth in the offer of Dentistry courses in Brazil; in 2015, there were 220 courses, with this number rising to 412 in 2019<sup>21-22</sup>. According to

the 2018 Higher Education Census, there were 125,585 students enrolled in Dentistry courses. Considering the increase in registered courses, the number of enrolled students probably doubled; therefore, it is possible to outline the scenario on the number of students affected by the pandemic<sup>23,24</sup>. However, until the time of submission of this article, no studies conducted with dental students were found, despite this being a field of activity that has suffered strong impacts due to its high risk of contagion<sup>25</sup>. The questionnaire response rate in this study was 520 students, from Brazil's 5 regions, and it is worth noting that this may be a limitation of this study.

As for sleep, a study on Greek students' mental health<sup>26</sup> evaluated sleep quantity; although it rose by 66.3% after the pandemic, its quality worsened by 43.0%, which corroborates the findings of the present study concerning insomnia, which affected nearly 60% of the participants.

Prolonged social distancing has impacted the mental health of the general population, causing anxiety, mood and sleep disorders, as well as post-traumatic stress symptoms, anger and confusion<sup>27,28</sup>. Among the students, there has been an increase in the prevalence of stress symptoms associated with the social distancing resulting from prolonged quarantine<sup>29</sup>. The present study observed that, after the change in social life, the emotional state of the undergraduate students became worse, which can be explained by a lack of interpersonal communication, as it interferes with one's psychological condition, exacerbating mental and emotional damage<sup>15</sup>.

There is evidence of a greater risk of damage to mental health during COVID-19 in students who live alone and have less contact with family and friends<sup>15</sup>. Most students (94.03%) are living with their families during the pandemic. Of these, 32.73% consider this coexistence comfortable, while 28.31% find it reasonable, and 20.68%, very comfortable. This can be explained by the fact that living only with parents during this period may have generated an exacerbation of protective factors<sup>18,30</sup>. Even with a comfortable family life, 83% of the students felt more stressed, which may have been a consequence of these students' lack of socialization<sup>15,27,28</sup>.

Another important aspect when it comes to mental health protection is financial stability or condition, as observed in university students from China and Switzerland<sup>14,18</sup>. In this survey, 51.25% of the students had their financial condition negatively affected by the pandemic. Perhaps, this factor can contribute in some way to boosting anxiety and stress. Moreover, financial losses may have a direct impact on the purchase of PPE, which were priced abusively at the time of this research.

In the present study, 50.96% of the students were attending a private institution, and 48.85%, a public one, which does not reflect the real scenario of educational institutions registered in the country, with the vast majority being private institutions<sup>21</sup>. Most of the students – 62.50% – did not feel neglected by their institutions during the pandemic, as 92.49% of the latter provided remote teaching, which 82.47% of respondents had no difficulty accessing. Nevertheless, 96.15% considered that their course is being harmed as a result of the pandemic. It was observed that fear (85.96%) and insecurity (77.31%) referring to the future of studies and training are strongly present in dental students in Brazil.

It is important to evaluate these aspects, as changes in the educational environment, in the progress of their studies and in future opportunities in the labor market caused by the pandemic are considered stressors for the mental health of students<sup>14</sup>. Academic delays were positively related to anxiety in university students in Bangladesh, being associated with both the effects of the pandemic on studies and future employment<sup>19,25</sup>.

The effects on mental health negatively affect academic performance, which may generate negative perspectives in these students regarding the future of their studies and profession<sup>17</sup>. Among the students in this research, 86.51% judged their performance satisfactory as to the development of academic activities before the pandemic, with this number dropping to 45.15% afterwards, which may be contributing to all this insecurity regarding future performance and leading to losses in education, which really are incalculable. Also, considering that Dentistry is a field where clinical practice is fundamental in the profession learning process, one question to be deciphered in the future is: will pandemic students be able to overcome the lags that may have occurred?

The data from this research brought relevant information. Although the students had access to a computer and the internet, less than half watched the entire remote classes. Asynchronous remote education can compromise the learning process. Therefore, it needs to be well designed, with interactive, interesting and short activities. In addition, greater communication, implementation of dynamic classes, encouragement for students' active participation in classes, academic projects, activities that can include and welcome these students, integration of other health professionals, such as psychiatrists, psychologists, therapists, nutritionists and physical educators, among other professionals, could mitigate the effects caused on the mental health of these students<sup>31</sup>.

The psychological impacts, such as fear and insecurity about the resumption of services, reported by dental undergraduates in this study, may be related to the fact that dental surgeons are among the professionals at a high risk of contamination by oral fluids (saliva/blood) and aerosols, and the possibility of being a vector for spreading the disease to close people, as 91.14% of the students are afraid of being contaminated, and 97.30% are afraid of working as a vector for their family members<sup>25</sup>.

With regard to knowledge of the disease among the undergraduate Dentistry students, the latter were able to inform the incubation period, as well as the means of transmission of the new coronavirus. These data are important because asymptomatic patients in the incubation period can transmit the disease<sup>32</sup>. A study carried out in the city of Mangalore, India, assessed the level of knowledge of undergraduate students and observed that 95.5% of them are aware of how the infection spreads<sup>33</sup>. When the knowledge of dental surgeons was checked, more than (80%) proved to be aware of these facts<sup>34</sup>. The World Health Organization (WHO) suggests avoiding contact with people who are infected and adopting hygiene measures, which are essential in preventing the transmission of the virus, such as washing hands regularly, avoiding touching the eyes, nose and mouth with the hands<sup>35,36</sup>. In this study, 98.27% of the students are aware of the need to wash their hands before and after seeing each patient.

The undergraduates who participated in this study had a high level of general knowledge about COVID-19. Using a questionnaire, a recent study evaluated awareness about COVID-19 and practices for its control, obtaining 71.2% of correct answers, with the latter being found in a higher number among undergraduate medical students – 74.10%<sup>35</sup>. In an assessment of university students' knowledge about COVID-19, 69.47% gave correct answers, evidencing a high level of knowledge<sup>25</sup>.

Another measure that significantly reduces the risk of transmission of this disease is the use of PPE, such as respirators, disposable masks, protective glasses, face shield, and disposable apron<sup>35</sup>. As for the adoption of these measures in dental care, most would wear a respirator (73.08%), disposable surgical mask (68.46%), protective goggles (90.77%), face shield (94.81%), disposable apron (93.08%), and cap (96.92%). However, a little more than half would wear shoe cover (50.96%). In addition, the majority (78.65%) would not wear a balaclava-type hood. Most of these students are aware of the need to wear PPE, as observed in other studies with dental students and dental surgeons<sup>35,37</sup>. Moreover, it is necessary to know the correct order for taking the gear on and off so as to avoid contamination during these PPE donning and doffing procedures. The students proved to have a good knowledge about these matters, which was greater for donning (90%) than for doffing (75%). Because the greatest risk of contagion occurs when one puts on their gear, efforts must be made in the sense of reinforcing training during this stage.

As a further consideration, it should be noted that dental students in Brazil are not, up to the present moment, being included in the priority categories for vaccination against COVID-19. These are students from a health field at a high risk of contagion and who should be treated by government agencies with greater attention. It is also noteworthy that, due to the new variants that are affecting younger people, and with greater severity, the availability of vaccines is urgent so that the return to face-to-face activities can happen safely. It is worth stressing that the return of students and educational units will allow reducing losses related to the oral health of the population during the pandemic, partly as a result of the interruption in elective care at teaching units.

## CONCLUSION

Considering the results of this research, it can be concluded that Brazilian Dentistry students have significant practical and scientific knowledge about the new coronavirus. However, it is noticeable how much these students are emotionally affected and aware of the drop in the quality of teaching and learning, in combination with fear and insecurity about the future. Therefore, there is a clear need for greater attention to these students, from an educational, emotional and social point of view.

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**Conflict of Interest:** The authors declare that there is no conflict of interest.

**Funding:** No funding to declare.

**Authors' Contribution:** Study design and planning: LMM, CPT, AMQ, MCB. Data collection, analysis, and interpretation: LMM, CMCS, RSC, PIZB, GCI. Writing or revising the manuscript: LMM, CPT, CMCS, MCB, AMQ. Approval of the final version: :LMM, CMCS, RSC, PIZB, GCI, CPT, AMQ, MCB. Public responsibility for the content of the article: LMM.