



## HEALTH SCIENCES

# Effects of the COVID-19 Pandemic on College Students in Brazil

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**Abstract:** The implementation of restrictive measures during the pandemic drastically changed the routine and habits of the population. In the academic sphere, the sudden closure of universities difficulted any advance planning. The objective of this study was to verify the effects of the pandemic on the routine, physical and mental health of students at a public university in southern Brazil. This is a cross-sectional study that applied a questionnaire from May to August 2020. The target population comprised 528 undergraduates. The questionnaire addressed questions about sociodemographic characteristics, physical and mental health. A response was obtained from 406 participants. During the quarantine period evaluated, the main results were: 66.2% reported worsening of anxiety symptoms; 57.6% declared that their physical health was “reasonable” to “bad”. As for the quality of sleep there was an increase in 98.8% in the responses “bad sleep quality” and “very bad sleep quality”; increase in 26.6% for presence bruxism; 12.5% for orofacial pain, 3.8% for headache. It is concluded that there were several negative effects, among these effects, it was observed higher levels of anxiety, worsening physical health and quality of sleep, increase in the prevalence of bruxism, as well as the presence of orofacial pain and headache.

**Key words:** Bruxism, COVID-19, pandemics, students.

## INTRODUCTION

The World Health Organization (WHO) declared, in March 2020, a global pandemic situation due to the significant growth in cases of coronavirus (COVID-19) (Fauci et al. 2020). The first pandemic of the 21st century has overwhelmed health systems and has placed unprecedented economic pressure (Oliveira et al. 2021). In Brazil, the Ministry of Health confirmed the first case of COVID-19 at the end of February 2020, when the first restrictions measures were implemented to contain the spread of the virus, including social distancing, closing shops, religious centers, schools, universities, and restrictions on the movement of people (Iwaya et al. 2020, Melo et al. 2020).

The implementation of these restrictive measures drastically altered the routine and habits of the population, generating economic and psychological repercussions. Some studies point to a higher incidence of sleep disorders, psychological disorders, and post-traumatic stress disorder during this period (Mihashi et al. 2009, Casagrande et al. 2020).

In the academic sphere, the sudden closure of schools and universities difficulted any planning to the development of alternatives for remote teaching. Education has faced new demands, customs, and practices that have been challenging the conduct of teachers, managers, and governors. Consequently, many academics were in social isolation and without face-to-face contact or remote teaching for many months

(Carvalho 2020, Ferreira & Barbosa 2020). Several studies with the university population also express concern about this situation, which has proven to be challenging for administrators and professors in the educational processes in undergraduate and graduate courses. In dentistry, the key challenge is to postpone direct patient care, which is an essential component of the curriculum (Farias Bezerra et al. 2021, Aragão et al. 2022).

The demand and university routine, leads to students to present high levels of anxiety, many of them go through transitions, pressures, and many challenges during the course. These challenges, now added to social isolation, uncertainties about the return to face-to-face classes, and the global pandemic situation tend to increase the risk of mental health sequels (Meng et al. 2020, Azevedo et al. 2018). In addition, for undergraduates in Dentistry, the concern is even greater, because remote teaching does not allow the realization of practical activities that are prerequisites for the completion of the course, which causes delays in their formation and serious consequences in the short and long term (Quinn et al. 2020).

Evaluating the effects of the pandemic on the university population, new strategies and interventions can be developed to minimize the negative disorders aroused (Júnior et al. 2020, Odriozola-González et al. 2020). Therefore, the objective of this study was to verify the effects of the pandemic on the routine, physical and mental health of students of the Dentistry course at a public university in southern Brazil.

## **MATERIALS AND METHODS**

### **Ethical considerations**

The research was submitted and approved by the Ethics Committee for Research on Human Beings of the Federal University of Santa Catarina (UFSC),

under protocol number 20176719.7.0000.0121. All participants voluntarily provided their consent through the Free and Informed Consent Term, in which they were informed about the purpose of the study, advantages, and disadvantages regarding participation, as well as the guarantee of confidentiality of the participants' identity.

### **Study population and sample**

The target population comprised undergraduates of the dentistry college at UFSC. The respondents in the target population were sampled by cluster sampling. The Dentistry course has regularly enrolled 528 students from the 1st to the 10th phase.

### **Assessment instruments**

The present research is a cross-sectional observational study that applied a questionnaire from May to August 2020, in the online modality, by Google Forms®. The questionnaire link was sent to all students by e-mail registered with the course secretary.

The questionnaire, developed by the authors of this study, addressed questions about sociodemographic characteristics, physical and emotional health, place of residence, social isolation, consumption of alcohol, illicit drugs, income, news about the pandemic, sleep quality, presence of possible sleep bruxism (SB) and awake bruxism (AB), and the presence of orofacial pain and headache, before and during the pandemic. Only "possible bruxism" was considered because the diagnostic method used was only the patient's report (self-report or third-party report), this criterion agrees with the last International Consensus of 2018 (Lobbezoo et al. 2018).

### **Data analysis**

Quantitative data are expressed as percentages or absolute numbers. Simple prevalence

calculations were performed using the statistical program Statistical Package for the Social Sciences – SPSS.

## RESULTS

A response was obtained from 406 participants (76.9% response rate). There were two attempts to resend an email with the link to the people that did not respond, but there was no response of 122 people. As for sociodemographic data mean age and standard deviation of  $22.3 \pm 3.5$  were obtained, in addition, 73.9% (300) participants were women and 26.1% (106) men. Most participants were single 94% (382), white 79% (321), childless 98.5% (400) and heterosexual 85.9% (349).

The responses to the questionnaire were organized into two tables. The first table (Table I) compares the responses “before the pandemic” with “after the pandemic,” while Table II contains only the responses “during the pandemic”. The main results are described below.

About the place of residence, during the quarantine, there was an increase of 75.4% (306) of students who returned to live with their parents. Regarding the self-perception of physical health, before the pandemic, most participants 54.2% (220) declared it to be “good”, while during the evaluated period of the pandemic, 57.6% (234) declared it to be “reasonable” or “bad”.

As for the self-perception of sleep quality during quarantine, there was a 98.8% (401) increase in the responses “bad sleep quality” and

**Table I. Questions and answers (before and during the quarantine) of the questionnaire used in the research, answers expressed in absolute number of students.**

Questions	Answers before the quarantine	Answers during quarantine
Who do you live with?	109 friends; 27 partner; 195 parents; 75 alone	14 friends; 35 partner; 342 parents; 15 alone
Physical health	46 great; 220 good; 120 reasonable; 20 bad	35 great; 137 good; 150 reasonable; 84 bad
Sleep quality	50 great; 276 good; 66 bad; 14 bad.	58 great; 189 good; 118 bad; 41 bad.
Presence of possible awake bruxism	18 don't know; 170 no; 218 yes.	7 don't know; 136 no; 263 yes.
Presence of possible sleep bruxism	13 don't know; 160 no; 233 yes	19 don't know; 140 no; 247 yes;
Pain in the temporomandibular joint and/or face	4 don't know; 218 no; 184 yes	1 don't know; 198 no; 207 yes.
Headache (pain in the temporal region)	13 don't know; 129 no; 264 yes	12 don't know; 120 no; 274 yes.

\*Answers expressed in absolute number of students.

“very bad sleep quality”. As for anxiety symptoms, 66.2% (269) of the participants answered that, during the quarantine, their anxiety “worsened”. To the question “how do you feel emotionally during quarantine” 72.6% (295) responded that they were “emotionally unstable”. As for income, more than half, 53.4% (217), of the participants reported that their income was reduced during the quarantine. Most participants, 97.8% (397), reported being in isolation during the period evaluated.

As for the consumption of alcoholic beverages for most participants, 63.8% (259), “there was no difference in consumption” or are “drinking less alcohol” during the quarantine period evaluated. In addition, regarding the

consumption of illicit substances, 66.7% (271) declare “not to consume any type of illicit substance”. Most participants, 91.4% (371), read and/or watched “a lot” or “some” news about the COVID-19 pandemic. And finally, most participants reduced the practice of physical activity to 62.8% (255).

## DISCUSSION

Many students who participated in the present research experienced a range of psychological consequences, such as emotional instability and an increased prevalence of anxiety symptoms. Additionally, has shown an increase in both AB and SB, as well as the development

**Table II. Questions and answers during the quarantine of the questionnaire used in the research.**

Questions	Answers during quarantine
Anxiety symptoms worsened during quarantine?	41 not applicable; 96 no; 269 yes.
How do you feel emotionally during quarantine?	80 well; 295 unstable; 31 bad.
Income affected during quarantine?	108 no; 81 don't have income; 217 yes
Is in isolation during quarantine?	9 no; 397 yes.
Alcohol consumption during quarantine?	76 don't consume; 131 no difference; 71 yes, drinking more; 128 yes, drinking less.
Consumption of illegal substances during quarantine?	271 don't consume; 102 no difference; 10 yes, using more; 23 yes, using less.
Read or watch news about the pandemic?	84 many; 287 some; 35 few
Practicing physical activities during quarantine?	255 yes, decreased frequency; 96 yes, the frequency has increased; 55 does not practice physical activity.

\*Answers expressed in absolute number of students.

of painful symptoms in the TMJ, face, temporal muscle region and increased consumption of illicit substances and alcohol. Undoubtedly, the physical and mental health of students was profoundly affected within this context and proven in several other studies involving the Brazilian student population (Pelucio et al. 2022, Camargo Júnior et al. 2023). Pre-pandemic studies in Brazil involving university students had already highlighted a high prevalence of mental disorders in this population, and these issues have now been exacerbated (Graner & Cerqueira 2019).

The emotional instability observed in the studied sample was aggravated by the sudden interruption in routine, isolation from colleagues, fear of contamination, cancellation of projects and extension activities. These sudden changes can compromise academic development and lead to psychological disorders, including anxiety symptoms, observed in more than 66% of this sample. Similar studies among college students, including Brazilians, found a significant increase in anxiety compared to previous COVID-19 levels (Quinn et al. 2020, Coelho et al. 2020, Wathelet et al. 2020, Pelucio et al. 2022).

The pandemic's social and psychological consequences, including loneliness, heightened anxiety, and concerns about losing family and trust in social institutions, particularly among children and adolescents, have been extensively debated (Smith & Lim 2020, Van Tilburg et al. 2021). Anxiety may be associated with the amount of pandemic-related news consumption, given that over 90% of the sample engaged in this habit. While technology, including social networks, can alleviate loneliness, it's also a major source of potentially inaccurate information for young people (Smith et al. 2018, Mota et al. 2021). The World Health Organization (WHO) recommends relying on official communication channels,

where information is filtered and verified before reaching the audience (Bendau et al. 2021).

Another interesting finding observed in the present study was an increase in the prevalence of AB among the evaluated students. The literature shows that the occurrence of AB has a strong correlation with anxiety (Przystańska et al. 2019). Sustained contraction of the muscles of the face and/or dental tightening is related to fighting or escaping body situations, and this situation is very present in individuals suffering from anxiety (Marker et al. 2017). Considering the etiology of AB, a higher prevalence of this condition during the evaluated quarantine period was expected. It is established that AB is closely associated with emotional stress and psychosocial factors. This aligns with the outcomes of our study, revealing that 66% of the participants reported an exacerbation of anxiety symptoms during the quarantine period. As much as for humanity it is not such an unusual situation, the COVID-19 pandemic is something entirely new and fraught with uncertainty, especially for younger people. The perfect setting for the installation of anxiety symptoms (Baptista et al. 2001, Saltzman et al. 2020, Rofaeel et al. 2021).

On the other hand, the smaller increase in the prevalence of SB during quarantine in our study could be explained by the fact that SB is controlled by the central nervous system and that there is little influence of psychosocial factors on its etiology, in contrast to AB. However, other similar studies found an increase in SB, with over 70% of the sample presenting this condition (Prado et al. 2022). SB can be primary, where there is no identified causal factor, or secondary to several risk factors such as the use of certain illicit drugs and alcohol. In the present study, only a small portion 2.5% (10) declared that they were consuming more illicit drugs, and 17.5% (71) reported drinking more alcohol, which may explain the small increase in prevalence of

SB (Tavares et al. 2016, Manfredini & Lobbezoo 2009, Melo et al. 2019).

Another relevant piece of data was the increase in the prevalence of headaches in the temporal region, TMJ, and/or face pain. These symptoms are often reported in patients with temporomandibular disorders (TMD), in this study it was not possible to make a diagnosis of TMDs, but only a survey of the main symptoms that accompany this disorder. Therefore, we can only say that these are symptoms related to the presence of a muscular TMD when we talk about headache and face pain, and a joint TMD when we talk about pain in the TMJ region. TMDs are considered a significant public health problem, ranking second among the musculoskeletal conditions that most result in pain and disability, and are one of the main causes of pain of non-dental origin in the orofacial region. These individuals present limitation in daily activities and negative impact on quality of life, affecting more young and middle-aged adults, which is the sample evaluated in this study (De Leeuw & Klasser 2018, Bitiniene et al. 2018).

Another point to be discussed is the self-perception of students' physical health, where more than half of the sample reported having "bad" or "reasonable" physical health during quarantine. The lack of physical exercise generated by social isolation may be related to this perception, as well as to the fall in the sleep quality of the participants. These findings are aligned with the results of similar studies in the Brazilian population (Prado et al. 2022). The regular practice of physical exercise is well-documented to yield antidepressant and anxiolytic effects, enhancing sleep quality and shielding the body from the adverse impacts of stress (Araújo et al. 2007). Furthermore, it promotes the release of endorphins and dopamine, which have analgesic and calming

properties, thus making a positive contribution to sleep quality (Haack et al. 2020).

It can be noted that more than half of the participants had their income affected during the quarantine period. This fact may have worsened their physical and mental health conditions. Bezerra et al. (2020) showed a correlation between the decrease in family income and the increase in psychological disorders. Although the government has implemented assistance policies, in some cases, the amount received is not enough to meet all the needs of a family. Wathélet et al. (2020) investigated some risk factors for the development of psychological disorders during the pandemic in French University students. The risk factors found were the decrease in family income, as well as living in low-quality housing, and having a low frequency of physical activities.

Some limitations of the study are important to be addressed. The effects of the pandemic investigated here were within the context of the active reality of COVID-19 quarantine, marked by numerous uncertainties and global lifestyle changes. At the time of questionnaire administration, UFSC had suspended both in-person and remote classes with no definite plans for resumption, this scenario of uncertainties may have exacerbated all the effects mentioned here. The online data collection, necessitated by social distancing measures, served as alternative to traditional paper-and-pencil surveys. For this reason, clinical evaluation for participants was unfeasible during this period, leading to a reliance on self-reported diagnoses for SB and TMD.

The situation generated by COVID-19 aggravated existing issues in face-to-face teaching and anticipated others, demonstrating the urgent need for massive investment in physical and personnel structure. Therefore, after exposing some effects of the pandemic



on undergraduate students, some solutions are suggested to reduce the negative impacts of this period on education: It could be suggested the institution of a permanent national policy to promote mental health in public education; intersectoral actions with primary care to guarantee psychological care in schools; actions aimed at recovering and accelerating learning and optimizing the curriculum and support the implementation of technological innovations in education (Santos 2020, Pimenta 2022, Arns et al. 2022).

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**Author contributions**

All authors contributed extensively to the work. Lígia Figueiredo Valesan, Ana Caroline Salvador, Júlia Roberta Régis and Mariana Coan were responsible for data collection, investigation and writing of the article. Adriana Battisti Archer, Ana Cristina Scremin Denardin was responsible for methodology, supervision, and writing. Beatriz Dulcineia Mendes de Souza was responsible for the idealization, methodology, supervision, review and editing of the article. All authors read and approved the final manuscript.

