Social capital and possible bruxism during the COVID-19 pandemic among Brazilian undergraduates

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Abstract: This study investigated the prevalence of possible bruxism and its association with social capital among undergraduates during the coronavirus disease (COVID-19) pandemic. This cross-sectional study was conducted at a private university in Southern Brazil. Data were collected through a self-administered electronic questionnaire (Google Forms). Possible bruxism was measured using the following question: "*Do you grind your teeth or clench your jaws?*". Social capital was evaluated using individual social networks. Data on self-perceived oral health, anxiety, sociodemographics, and information related to university graduates were also collected. Adjusted logistic regression models with a hierarchical approach were used to evaluate associations. The results are presented as odds ratios (ORs) and 95% confidence intervals (95%CIs). Altogether, 345 undergraduates participated in the study, with a mean age of 21.8 years (standard deviation = 5.21). The prevalence of bruxism in the sample was 57.1%. Undergraduates with low social capital had 2.06 times greater odds of bruxism than their counterparts (OR 2.06; 95%CI 1.11–3.83). Female undergraduates (OR 2.40, 95%CI 1.39–4.12), those who were in the final year of university (OR 1.13, 95%CI 1.04–1.21), and those who perceived they needed dental treatment (OR 1.91; CI: 1.21–3.02) also had greater odds of possible bruxism. In conclusion, the prevalence of possible bruxism was high among undergraduate students during the COVID-19 pandemic and associated with lower social capital levels. Knowledge of these factors is important to identify risk groups and plan strategies to control bruxism in this population.

Keywords: Bruxism; Observational Study; Psychology; Social Capital; Students.

Introduction

The coronavirus disease (COVID-19) pandemic is considered an important stressor worldwide, and studies have demonstrated its impact on physical and mental health.[1] People worldwide experienced social isolation, uncertainties regarding the disease, socioeconomic problems,[2] and the loss of close people during this long period of the pandemic. In addition to the pandemic's impact on general health, this scenario can also reflect individuals' oral health. Studies have suggested an increase

in the prevalence of oral problems such as orofacial pain, signs and symptoms of temporomandibular disorders, and bruxism.[3]

Bruxism is defined as the motor behavior of the masticatory muscles and is characterized by repetitive tooth contact, which can be associated with mandibular contraction. It is classified as sleep or awake bruxism according to its circadian manifestation. A previous study has emphasized the involvement of masticatory muscle activities during both sleep and wakefulness.[4] In general, both bruxism manifestations have been investigated in parts because of their relationship with important oral signs and symptoms such as abrasion and tooth mobility, fracture of restorations, hypertrophy of the masseter muscle, and myalgias.[5] Although the etiology and pathophysiology of both types of bruxism remain unclear, they have a multifactorial origin mediated by the nervous systems.[6] The etiological factors for both circadian manifestations include psychosocial factors, such as stress, anxiety, sleep quality,[7,8] and external factors, including caffeine, nicotine, alcohol, and certain medications.[9]

Bruxism has been also classified as "possible" bruxism based merely on the patient's positive self-report; "probable" bruxism based on positive clinical inspection and positive self-report; and "definite" bruxism when, in addition to positive self-report and clinical inspection, is also based on instrumental assessment.[4] Studies have reported that the prevalence of possible bruxism in adults and adolescents varies from 17%–34.5%.[10,11] In general, its prevalence is higher in the third and sixth decades of life and tends to decrease with age.[12]

Undergraduate students are prone to developing bruxism because of increased anxiety and stress during college,[5] high pressure and workload of studies, as well as exams and assignments. Other factors, such as leaving home and an increase in responsibility and independence, are also possible predictors of bruxism among undergraduates.[13] In this context, the COVID-19 pandemic may have produced an even more stressful environment, since the vaccine was not yet available and treatment was uncertain at the time; young students lived with the recurring fear of viral infection and

transmission to their families.[14] Previous studies have demonstrated that in stressful scenarios, psychosocial aspects can act as protective factors against individual behaviors, including bruxism,[15] among these factors is social capital, which has an important influence on health.[16]

Social capital has been defined as an action resource that may evolve from the social networks and relationships to which individuals belong and allow them to enjoy emotional support and exchange information, in addition to affective ties and mutual trust.[17,18] Thus, social capital interacts with individual coping strategies and protects against stress and anxiety.[19] Therefore, exploring this factor in the context of pandemics, disasters, and other events that may affect an individual's social life is extremely relevant.[20,21] Although studies have investigated the association between psychosocial factors and bruxism,[10,22] to what extent a lack of support and social contact has harmed undergraduate students and their relationship with bruxism in a pandemic scenario remain unknown. This study aimed to evaluate the association between social capital and the prevalence of possible bruxism among undergraduate students during the first year of the COVID-19 pandemic. We hypothesized that undergraduates with low social capital would be more likely to present with possible bruxism than those with high social capital.

Methodology

This study was reported according to the Strengthening the Reporting of Observational Studies in Epidemiology[23] and the Checklist for Reporting Results of Internet E-Survey guidelines.[24]

Study design, ethical considerations, and sample

This cross-sectional study included undergraduate students from a private university in Erechim, Southern Brazil. The city has an estimated population of 96,087 individuals,[25] of which approximately nearly 14,000 undergraduate students were enrolled at the university where the study was conducted. Data were collected from July to August 2020 during the

first year of the COVID-19 pandemic. The study was performed in accordance with the Declaration of Helsinki and approved by the Human Research Ethics Committee of the Regional Integrated University of Auto Uruguai and Missões (protocol number: 36368720.4.00005351).

Male and female undergraduate students aged ≥18 years who were regularly enrolled at the university campus of Erechim in 2020 were considered eligible for this study. The exclusion criteria were unwillingness to participate in the study and students with physical, cognitive, or sensory disabilities. The sample size was calculated using the G.Power 3.1.9.2 program, and the following parameters were considered: an alpha of 0.05, a study power of 80%, and an effect size of 0.20 (which is considered small). The sample size was estimated at 321 individuals, of which an additional 20% was added to compensate for possible refusal. The required sample comprised 385 students. Considering the wide range of response rates in studies using online surveys,[26] all undergraduate students enrolled at the university in 2020 who had active institutional e-mail addresses at the time of the study were invited to participate. Thus, approximately 1500 students were contacted (random sampling).

Data collection and variables

Data were collected using a self-administered electronic questionnaire addressing possible bruxism and sociodemographic, behavioral, and psychosocial information on the Google Forms platform (Google Inc., Mountain View, USA). Invitations to participate in the study were sent via e-mail, containing a short text explaining the research and providing a link to access the electronic questionnaire. The invitation e-mail was sent for two months. After the first invitation, an interval of one week was established until the second reminder e-mail was sent. Two weeks later, another reminder e-mail was sent regarding the most recent recruitment attempt.

The online questionnaire contained a quick description of the study's aims and general orientation. Informed consent was obtained from the researcher and institution responsible for the study information

were provided. Finally, the participants were asked, "*Do you agree to participate in the study voluntarily?*" with possible answers of "yes" or "no". By selecting "yes", the participant was directed to the questionnaire; by selecting "no", the survey was ended. The electronic questionnaire contained 35 closed-ended questions; however, because this study was part of a larger survey, only questions that refer to the topic of interest in this study are presented.

The outcome considered was self-reported bruxism, which was classified as possible bruxism[4] and evaluated using the following question: "*Do you grind your teeth or clench your jaws?*" with the possible options: 0 = "no," 1 = "yes, sleeping," 2 = "yes, awake," and 3 = "yes, sleeping and awake." This question was based on the American Academy of Sleep Medicine[27] definition, and has also been similarly employed in previous studies.[10,11,28] For data analysis, we considered the presence of some type of bruxism (options 1, 2, and 3).

For evaluating social capital, the participants answered questions regarding their social networks, as follows: "*Did you visit a neighbor/friend or did a neighbor/friend visit you in the last 12 months?*" and "*Did you visit a relative/family or did a relative/family visit you in the last 12 months?*" with the possible answers: 0 = "no," 1 = "yes, less than once a month," 2 = "yes, at least once a month," and 3 = "yes more than once a month." For the data analysis, these variables were dichotomized as less frequent (0 and 1) *versus* more frequent (3 and 4). These questions were used in previous studies as proxies for individual social capital.[29,30]

Variables were also collected and considered possible confounders of the associations. Sociodemographic characteristics including sex (male or female), age (in years), undergraduate course period, and financial aids, such as scholarships or loans, were recorded as "yes" or "no." Undergraduates also answered the General Anxiety Disorder Questionnaire to verify their anxiety.[31] This tool includes seven items that measure the frequency of signs and symptoms of anxiety in the last two weeks arranged on a four-point scale ranging from 0 (not once) to 3 (almost every day). The total score ranged from 0 to 21. A positive indicator of signs and symptoms of anxiety disorders is considered

a value ≥ 10.[31] Regarding oral health measures, the participants answered the following question: "*How would you describe the health of your teeth and mouth*?" The response options were 0 = "excellent," 1= "very good," 2 = "good," 3 = "fair", and 4 = "poor",[32] which were later dichotomized as "excellent, very good, or good" (0,1, and 2, respectively) and "fair or poor" (3 and 4, respectively). Individuals also evaluated the need for treatment by answering the question, "*Do you think you need dental treatment*?" with three possible answers: 0 = "yes," 1 = "no", or 2 = "do not know".[33] Only the first two response options were considered in the data analysis.

Pilot study

A pilot study was conducted to test the feasibility of the questionnaire and methodology used. Individuals who were evaluated in the pilot study (n = 25) were excluded from the final sample. No changes were made during the data-gathering process.

Statistical analysis

Data analysis was performed using the STATA 14 software (StataCorp.2014 Stata Statistical Software: Release 14.1. College Station, USA). A descriptive analysis of the sample characteristics was performed. The distribution of the individual characteristics according to the prevalence of possible bruxism was also determined.

Unadjusted and adjusted logistic regression analyses were performed to evaluate the associations among social capital, possible bruxism, and related factors. The statistical models were tested using a hierarchical approach built by adapting the theoretical model of the social determinants of health proposed by the World Health Organization (Figure).[16] However, only variables with p < 0.20 in the unadjusted analysis were considered in the adjusted model. The quality of fit was measured using Pseudo R^2. The results are presented as odds ratios (ORs), 95% confidence intervals (CIs), and p-values.

Results

Of the 1,494 undergraduate students invited, 345 participated in the study. The overall prevalence of possible bruxism was 57.1%. Among the individuals who reported having bruxism, 53.3% reported having sleep bruxism, 14.7% reported having awake bruxism, and 32% reported having both. Most participants were female (77.7%) and did not receive financial aid (63.7%). The sample mean age was 21.8 (standard deviation 5.21) years. Approximately 53.0% of the participants had not completed half of the undergraduate course. Regarding social capital, 83.8% of the participants visited or had received a visit from family or relatives, and 45.4% visited or frequently visited a neighbor or friend. Regarding
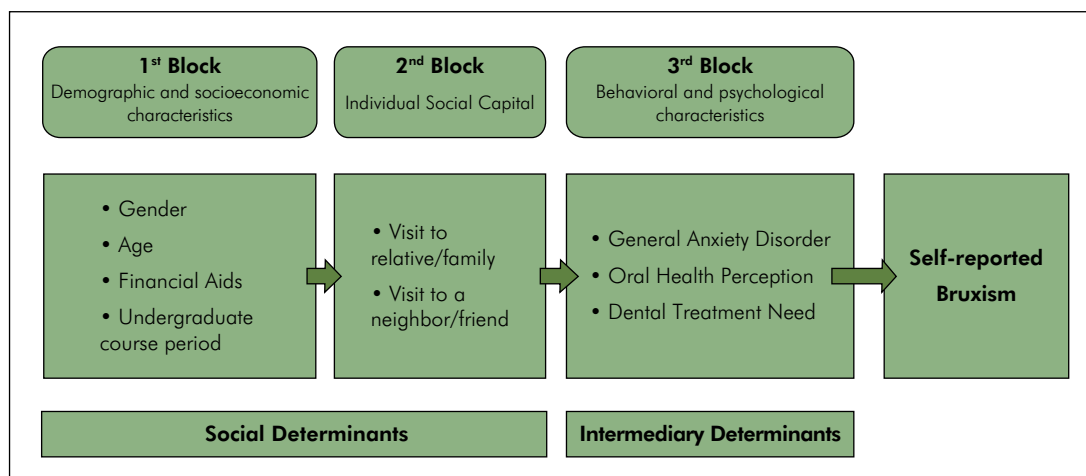

Figure. Theoretical model for the study of social determinants of health, adapted from Solar and Irwin, 2010.

anxiety assessment, 27.8% of the participants presented with signs and symptoms of an anxiety disorder. Most participants rated their oral health as excellent, followed by very good and good, and 47.5% perceived that they needed dental treatment.

Table 1 presents the sample distribution according to the prevalence of possible bruxism and unadjusted logistic regression analyses. Approximately 69.1% of the individuals who had a low frequency of visits to a relative or family presented with possible bruxism (p = 0.050). Among undergraduates with a low frequency of visiting friends and neighbors, the prevalence of possible bruxism was 57.9% (p = 0.738). Significant associations were identified between possible bruxism and sex (p = 0.005), undergraduate course period (p = 0.008), anxiety disorder (p = 0.048), and perceived need for dental treatment (p = 0.002).

Table 1. Sample distribution and unadjusted Logistic Regression analysis among predictors variables and Possible bruxism (in undergraduate students (n = 345), Erechim, RS, Brazil.

Variables	Possible bruxism		Unadjusted	p-value*
	No	Yes	OR (95%CI)	
Block 1: Demographic and socioeconomic variables				
Sex				0.005
Male	44(57.1)	33 (42.9)	1	
Female	104 (38.8)	164(61.2)	2.10 (1.26–3.52)	
Age (mean [SD])	21.7 SD 5.56	21.8 SD 4.95	1.00 (0.96–1.05)	0.852
Financial aids				0.411
No	96 (44.4)	120 (55.6)	1	
Yes	49 (39.8)	74 (60.2)	1.20 (0.77–1.90)	
Undergraduate course period (mean [SD])	4.8 SD 2.8	5.7 SD 3.0	1.10 (1.03–1.19)	0.008
Block 2: Social capital				
Visit to a relative/family				0.050
More frequent	128 (45.1)	156 (54.9)	1	
Less frequent	17 (30.9)	38 (69.1)	1.83 (0.99–3.40)	
Visit to a neighbour/friend				0.738
More frequent	105 (43.0)	139 (57.0)	1	
Less frequent	40 (42.1)	55 (57.9)	1.03 (0.85–1.26)	
Block 3: Behaviours and psychosocial factors				
General anxiety disorder				0.048
Absent	115 (46.2)	134 (53.8)	1	
Present	33 (34.4)	63 (65.6)	1.64 (1.00–2.67)	
Oral health perception				0.650
Excellent, very good and good	123 (43.3)	161 (56.7)	1	
Fair and poor	22 (40.0)	33 (60.0)	1.15 (0.64–2.07)	
Dental treatment need				0.002
No	90 (50.6)	88 (49.4)	1	
Yes	55 (34.2)	106 (65.8)	1.97 (1.27–3.06)	

Values are n (%) unless otherwise indicated; Some variables do not include all 345 participants due to missing data. OR, odds ratio; CI, confidence interval; *obtained from Wald Test.

Table 2. Adjusted Logistic Regression analysis using a hierarchical approach for predictors variables and possible bruxism among undergraduate students (n = 345), Erechim, RS, Brazil.

Variables	Adjusted OR (95% CI)			p-value*
	Model 1[a]	Model 2[b]	Model 3[c]	
Block 1: Demographic and socioeconomic variables				
Sex				0.002
Male	1			
Female	2.40 (1.39–4.12)			
Undergraduate course period (mean [SD])	1.13 (1.04–1.21)			0.002
Block 2: Social capital				
Visit to a relative/family				0.022
More frequent		1		
Less frequent		2.06 (1.11–3.83)		
Block 3: Behaviours and psychosocial factors				
General anxiety disorder				0.110
Absent			1	
Present			1.51 (0.91–2.53)	
Dental treatment need				0.005
No			1	
Yes			1.91 (1.21–3.02)	

OR, odds ratio; CI, confidence interval; [a]variables are adjusted to each other; [b]model adjusted for the variables of the first block; [c]model adjusted for the variables of the first and second blocks; *Obtained from Wald Test.

The adjusted logistic regression models using a hierarchical approach are presented in Table 2. Undergraduates that visited a relative or family less frequently had an OR of 2.06, suggesting possible bruxism compared to those who visited their relative or family more frequently (OR 2.06; 95% confidence interval (95%CI): 1.11–3.83). Female participants were also more likely to report possible bruxism (OR 2.40; 95%CI: 1.39–4.12) than male participants. The closer the student was to the end of the undergraduate course, the greater the odds of reporting bruxism (OR 1.13; 95%CI: 1.04–1.21). Participants who perceived they required some dental treatment demonstrated a 91% higher odds of presenting with possible bruxism (OR 1.91; 95%CI: 1.21–3.02) than their counterparts.

Discussion

This study evaluated the prevalence of possible bruxism and its association with social capital among undergraduate students during the COVID-19 pandemic. In addition to demonstrating a high prevalence of self-reported bruxism in this sample, our results confirmed the conceptual hypothesis that levels of social capital are related to possible bruxism. Undergraduates who visited a relative or family member less frequently presented with more odds of possible bruxism. Visiting friends and neighbors was not related to the outcome. Possible bruxism was also associated with demographic and psychosocial factors, such as sex and perception of dental treatment needs. Although previous studies have evaluated the relationship between psychosocial factors and bruxism,[10,22] the role of social capital in this outcome in undergraduates during the pandemic has not yet been explored.

Our findings revealed that the general prevalence of possible bruxism was 57.1%. Previous studies[10,13] that evaluated undergraduate students have reported lower prevalence rates of bruxism than those reported in our study. This variation in prevalence may have

occurred because of the different methods used to investigate the outcomes. Although no consensus on the best method to assess bruxism has been reported in the literature, for epidemiological studies, the identification of possible bruxism diagnosed from an individual's self-report has been considered an acceptable strategy.[4] In addition, our study was conducted during the COVID-19 pandemic, a situation that has imposed several changes in different aspects of individuals' lives,[2] which may explain the high prevalence of possible bruxism in this group of undergraduate students.

Our results demonstrated that lower levels of social capital are associated with bruxism. Undergraduate students who visited or received family visits less frequently had a higher probability of self-reported bruxism. Individuals who participate in a social network benefit from the social support provided by this connection, which has a positive impact on feelings of belonging and coping, and acts as a protective factor against stress.[15,34] Furthermore, high levels of social networks may generate a stimulus for individuals to practice healthier behaviors because of the dissemination of norms and peer pressure.[15,34] Thus, the thick ties provided by familiar support during the COVID-19 pandemic act to buffer the effects of stress and anxiety in individuals' life,[18] and consequently, the possible bruxism prevalence. The lack of association between the variable referring to visiting friends or neighbors and possible bruxism can be explained by the fact that during the COVID-19 pandemic, social contact outside the home environment was discouraged, and family ties were strengthened.[21]

Regarding demographic variables, women were more likely to report bruxism than men, which is consistent with that reported in a previous study.[22] It has been argued that women are often more sensitive to stress and concerns related to work, studies, and household duties. Thus, this stress can stimulate tooth clenching and generate muscle tension.[4] In addition, women with negative thoughts or actions were more likely to develop anxiety and depression disorders than men.[35] These psychological factors are directly associated with bruxism and orofacial pain,[7,8] which explain our findings.

Our findings also suggested that the closer an undergraduate student was to the end of the course, the greater the chance of reporting possible bruxism. A previous study conducted with undergraduate students during the COVID-19 pandemic revealed that those in their last year of college presented higher levels of anxiety disorders than students in the early years,[35] which may be related to bruxism. Although no association between these factors was identified in our study, approximately 27.8% of the college students presented with signs and symptoms of anxiety. The impact of the financial crisis resulting from the pandemic on family income in Brazil and concerns for the professional future may explain why students close to the end of the course were more likely to self-report buxism.[36] The COVID-19 pandemic has been atypical. In this sense, it may have contributed to worry, fear of contracting the disease, anxiety, and other risk factors triggering psychological disorders such as depression.[37] Students who have negative thoughts and anxiety during social withdrawal are more likely to experience some depression.[35] Thus, stressful events such as the COVID-19 pandemic can impact an individual's long-term well-being.

Undergraduate students who reported requiring dental treatment were more likely to have possible bruxism than their counterparts. This perception may have been affected by the signs and symptoms associated with bruxism, such as tooth wear and orofacial pain. In this sense, the presence of these factors may have determined the undergraduate students' perceptions of dental treatment by undergraduate students.[10] The existence of bruxism, as well as its perception by the individual, can also impact the oral health-related quality of life,[22] an aspect that is also linked to the perception of dental treatment needs.[38]

This study had some limitations that need to be addressed. Our study data considered only one of the steps adopted in the investigation of the presence of bruxism, self-reporting by individuals, which may have limited our findings. However, this type of investigation allows the diagnosis of what has been defined as possible bruxism, which is easily applicable and widely accepted in the previous literature.[4] Therefore, clinical assessment was not

performed, which prevented us from recording the signs and symptoms of this condition, such as tooth wear and orofacial pain. However, the complexity of the diagnosis of bruxism has been discussed, particularly in young individuals. Furthermore, bruxism was evaluated by considering a single question and not differentiating between awake and sleep bruxism. Nevertheless, the two types of circadian manifestations of bruxism have a multifactorial origin[4] and share some common risk factors.[7,8,9] They are being investigated, in part, because of their negative consequences on oral health and the possibility of tracing some kind of self-reported bruxism.[4] In addition, complementary approaches to self-reported bruxism were not considered, and quantifying the frequency and intensity of muscle activity in the participants was not possible.

Another aspect to be discussed is that our sample only considered students from a single university, which makes it homogeneous and limits the external validity of the findings. In addition, the low participation rate of our study may have been a concern. Since students' institutional e-mails were used as a form of recruitment, the number of students who actually received or viewed the e-mail was not identified, which limited the accuracy of the response rate. Nevertheless, these issues are inherent in e-surveys with young people,[24,26] and the number of participants included in our study was sufficient to supply the minimum sample size required to achieve a pre-established significance level and study power. Another concern that limits our findings is the measurement of social capital, which considers only a few proxies for individual social networks and may not fully capture its construct. However, in addition to the concepts and ways of measuring social capital that are still divergent and not directly measured,[17] our study considered indicators broadly used in previous literature.[29,30] Finally, not all major causal factors were considered, such as licit and illicit drug

use and sleep quality; only anxiety was assessed in the study. However, we focused on anxiety because it is a variable that can be influenced by social capital and influence possible bruxism,[39] and because of its increased prevalence in the pandemic period. In fact, one in three adults worldwide have anxiety.[40]

Nevertheless, this study has several strengths that need to be highlighted. This survey was conducted in the critical scenario of the COVID-19 pandemic and obtained a satisfactory number of participants belonging to an important population group. Thus, our findings provide important information regarding the role of psychosocial factors, such as social capital, which may act as a protective factor against stress in adverse situations. Identifying the specific social determinants and individuals who are most likely to report bruxism can help in decision-making and targeting strategies aimed at mitigating the adverse effects produced by the context of the pandemic on specific groups. Moreover, future studies that consider these aspects in depth and with a longitudinal design as well as studies on the post-pandemic period should be conducted.

Conclusion

The prevalence of possible bruxism was high among undergraduate students during the COVID-19 pandemic, and this condition was associated with low social capital. Moreover, female students who were closer to the end of their graduation and had perceived dental treatment needs were more likely to present with possible bruxism.

Acknowledgments

References

1. Samji H, Wu J, Ladak A, Vossen C, Stewart E, Dove N, et al. Review: mental health impacts of the COVID-19 pandemic on children and Youth: a systematic review. Child Adolesc Ment Health. 2022 May;27(2):173-89. https://doi.org/10.1111/camh.12501

2. Aknin LB, De Neve JE, Dunn EW, Fancourt DE, Goldberg E, Helliwell JF, et al. Mental health during the first year of the COVID-19 pandemic: a review and recommendations for moving forward. Perspect Psychol Sci. 2022 Jul;17(4):915-36. https://doi.org/10.1177/17456916211029964

3. Emodi-Perlman A, Eli I, Smardz J, Uziel N, Wieckiewicz G, Gilon E, et al. Temporomandibular disorders and bruxism outbreak as a possible factor of orofacial pain worsening during the COVID-19 pandemic-concomitant research in two countries. J Clin Med. 2020 Oct;9(10):3250. https://doi.org/10.3390/jcm9103250

4. Lobbezoo F, Ahlberg J, Raphael KG, Wetselaar P, Glaros AG, Kato T, et al. International consensus on the assessment of bruxism: report of a work in progress. J Oral Rehabil. 2018 Nov;45(11):837-44. https://doi.org/10.1111/joor.12663

5. Manfredini D, Lobbezoo F. Relationship between bruxism and temporomandibular disorders: a systematic review of literature from 1998 to 2008. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2010 Jun;109(6):e26-50. https://doi.org/10.1016/j.tripleo.2010.02.013

6. Klasser GD, Rei N, Lavigne GJ. Sleep bruxism etiology: the evolution of a changing paradigm. J Can Dent Assoc. 2015;81:f2.

7. Manfredini D, Lobbezoo F. Role of psychosocial factors in the etiology of bruxism. J Orofac Pain. 2009;23(2):153-66.

8. Emodi-Perlman A, Manfredini D, Shalev T, Bracci A, Frideman-Rubin P, Eli I. Psychosocial and behavioral factors in awake bruxism self-report versus Ecological Momentary Assessment. J Clin Med. 2021 Sep;10(19):4447. https://doi.org/10.3390/jcm10194447

9. Baat C, Verhoeff MC, Ahlberg J, Manfredini D, Winocur E, Zweers P, et al. Medications and addictive substances potentially inducing or attenuating sleep bruxism and/or awake bruxism. J Oral Rehabil. 2021 Mar;48(3):343-54. https://doi.org/10.1111/joor.13061

10. Costa AR, Oliveira ES, Oliveira DW, Tavano KT, Murta AM, Gonçalves PF, et al. Prevalência e fatores associados ao bruxismo em universitários: um estudo transversal piloto. Rev Bras Odontol. 2017;74(2):120-5. https://doi.org/10.18363/rbo.v74n2.p.120

11. Winocur E, Messer T, Eli I, Emodi-Perlman A, Kedem R, Reiter S, et al. Awake and sleep bruxism among Israeli adolescents. Front Neurol. 2019 Apr;10:443. https://doi.org/10.3389/fneur.2019.00443

12. Manfredini D, Winocur E, Guarda-Nardini L, Paesani D, Lobbezoo F. Epidemiology of bruxism in adults: a systematic review of the literature. J Orofac Pain. 2013;27(2):99-110. https://doi.org/10.11607/jop.921

13. Owczarek JE, Lion KM, Radwan-Oczko M. The impact of stress, anxiety and depression on stomatognathic system of physiotherapy and dentistry first-year students. Brain Behav. 2020 Oct;10(10):e01797. https://doi.org/10.1002/brb3.1797

14. Manchia M, Gathier AW, Yapici-Eser H, Schmidt MV, Quervain D, Amelsvoort T, et al. The impact of the prolonged COVID-19 pandemic on stress resilience and mental health: a critical review across waves. Eur Neuropsychopharmacol. 2022 Feb;55:22-83. https://doi.org/10.1016/j.euroneuro.2021.10.864

15. Amati V, Meggiolaro S, Rivellini G, Zaccarin S. Social relations and life satisfaction: the role of friends. Genus. 2018;74(1):7. https://doi.org/10.1186/s41118-018-0032-z

16. Solar O, Irwin A. A conceptual framework for action on the social determinants of health. Geneva: World Health Organization; 2010.

17. Rostila M. The facets of social capital. J Theory Soc Behav. 2011;41(3):308-26. https://doi.org/10.1111/j.1468-5914.2010.00454.x

18. Kalaitzaki A, et al. Social capital, social support and perceived stress in college students: the role of resilience and life satisfaction. Stress Health. 2021 Aug;37(3):454-65. https://doi.org/10.1002/smi.3008

19. Mato M, Tsukasaki K. Factors promoting sense of coherence among university students in urban areas of Japan: individual-level social capital, self-efficacy, and mental health. Glob Health Promot. 2019 Mar;26(1):60-8. https://doi.org/10.1177/1757975917691925

20. Gero K, Hikichi H, Aida J, Kondo K, Kawachi I. Associations between community social capital and preservation of functional capacity in the aftermath of a major disaster. Am J Epidemiol. 2020 Nov;189(11):1369-78. https://doi.org/10.1093/aje/kwaa085

21. Pitas N, Ehmer C. Social capital in the response to COVID-19. Am J Health Promot. 2020 Nov;34(8):942-4. https://doi.org/10.1177/0890117120924531

22. Câmara-Souza MB, Carvalho AG, Figueredo OM, Bracci A, Manfredini D, Garcia RCR. Awake bruxism frequency and psychosocial factors in college preparatory students. Cranio. 2020;14:1-7. https://doi.org/10.1080/08869634.2020.1829289

23. Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP. Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. BMJ. 2007 Oct;335(7624):806-8. https://doi.org/10.1136/bmj.39335.541782.AD

24. Eysenbach G. Improving the quality of Web surveys: the Checklist for Reporting Results of Internet E-Surveys (CHERRIES). J Med Internet Res. 2004 Sep;6(3):e34. https://doi.org/10.2196/jmir.6.3.e34

25. Instituto Brasileiro de Geografia e Estatística. Cidades e Estados. Erechim. Rio de Janeiro: Instituto Brasileiro de Geografia e Estatística; 2010 [cited 2021 Month day]. Available from: https ://cidad es.ibge.gov.br/brasil/rs/erechim

26. Blumenberg C, Barros AJ. Response rate differences between web and alternative data collection methods for public health research: a systematic review of the literature. Int J Public Health. 2018 Jul;63(6):765-73. https://doi.org/10.1007/s00038-018-1108-4

27. American Academy of Sleep Medicine. International Classification of Sleep Disorders. 3rd ed. Westchester: American Academy of Sleep Medicine; 2014.

28. Perlman AE, Lobbezoo F, Zar A, Rubin PF, Selms MK, Winocur E. Self-reported bruxism and associated factors in Israeli adolescents. J Oral Rehabil. 2016 Jun;43(6):443-50. https://doi.org/10.1111/joor.12391

29. Lamarca GA, Leal MC, Sheiham A, Vettore MV. The association of neighbourhood and individual social capital with consistent self-rated health: a longitudinal study in Brazilian pregnant and postpartum women. BMC Pregnancy Childbirth. 2013 Jan;13(1):1. https://doi.org/10.1186/1471-2393-13-1

30. Guedes RS, Piovesan C, Antunes JL, Mendes FM, Ardenghi TM. Assessing individual and neighborhood social factors in child oral health-related quality of life: a multilevel analysis. Qual Life Res. 2014 Nov;23(9):2521-30. https://doi.org/10.1007/s11136-014-0690-z

31. Spitzer RL, Kroenke K, Williams JB, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. Arch Intern Med. 2006 May;166(10):1092-7. https://doi.org/10.1001/archinte.166.10.1092

32. Thomson WM, Mejia GC, Broadbent JM, Poulton R. Construct validity of Locker's global oral health item. J Dent Res. 2012 Nov;91(11):1038-42. https://doi.org/10.1177/0022034512460676

33. Cunha IP, Mialhe FL, Pereira AC, Vedovello SA, Bulgareli JV, Frias AC, et al. Self-perceived dental treatment need among adolescents: a hierarchical analysis. Community Dent Oral Epidemiol. 2020 Apr;48(2):130-6. https://doi.org/10.1111/cdoe.12510

34. Rouxel PL, Heilmann A, Aida J, Tsakos G, Watt RG. Social capital: theory, evidence, and implications for oral health. Community Dent Oral Epidemiol. 2015 Apr;43(2):97-105. https://doi.org/10.1111/cdoe.12141

35. Xiao H, Shu W, Li M, Li Z, Tao F, Wu X, et al. Social distancing among medical students during the 2019 Coronavirus Disease Pandemic in China: disease awareness, anxiety disorder, depression, and behavioral activities. Int J Environ Res Public Health. 2020 Jul;17(14):5047. https://doi.org/10.3390/ijerph17145047

36. Chaturvedi K, Vishwakarma DK, Singh N. COVID-19 and its impact on education, social life and mental health of students: A survey. Child Youth Serv Rev. 2021 Feb;121:105866. https://doi.org/10.1016/j.childyouth.2020.105866

37. Fedorenko EJ, Kibbey MM, Contrada RJ, Farris SG. Psychosocial predictors of virus and social distancing fears in undergraduate students living in a US COVID-19 "hotspot". Cogn Behav Ther. 2021 May;50(3):217-33. https://doi.org/10.1080/16506073.2020.1866658

38. Seirawan H, Sundaresan S, Mulligan R. Oral health-related quality of life and perceived dental needs in the United States. J Public Health Dent. 2011;71(3):194-201. https://doi.org/10.1111/j.1752-7325.2011.00246.x

39. Ahlberg J, Lobbezoo F, Ahlberg K, Manfredini D, Hublin C, Sinisalo J, et al. Self-reported bruxism mirrors anxiety and stress in adults. Med Oral Patol Oral Cir Bucal. 2013 Jan;18(1):e7-11. https://doi.org/10.4317/medoral.18232

40. Delpino FM, Silva CN, Jerônimo JS, Mulling ES, Cunha LL, Weymar MK, et al. Prevalence of anxiety during the COVID-19 pandemic: asystematic review and meta-analysis of over 2 million people. J Affect Disord. 2022 Dec;318:272-82. https://doi.org/10.1016/j.jad.2022.09.003