

Impact of COVID-19 pandemic on psychological aspects and bruxism in the Brazilian population: observational study

Impacto da pandemia por COVID-19 em aspectos psicológicos e bruxismo na população brasileira: estudo observacional

Laura Pereira Generoso¹, Guilherme Prevelato Oliveira¹, Lais Leite Ferreira¹, Luci Mara França Correia², Josie Resende Torres da Silva¹, Marcelo Lourenço da Silva¹

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ABSTRACT

BACKGROUND AND OBJECTIVES: The aim of the present study was to evaluate the impact of the COVID-19 pandemic on psychological aspects and its relationship with bruxism from a representative sample of the Brazilian population.

METHODS: A cross-sectional Internet-based survey was conducted in a nationally representative sample of Brazilian adults to estimate the sociodemographic correlates and characteristics of bruxism, the quality of life of individuals *World Health Organization Quality of Life-BREF* (WHOQOL) and Self-Compassion Scale (SCS) in the Brazilian population during the COVID-19 pandemic. Research was collected from May to August 2020. The data were analyzed using qualitative analysis.

RESULTS: A total of 1476 Survey forms were completed, and 1265 (85.70%) respondents declared presenting daytime clenching; over half of respondents (843, 57.11%) reported that they have grinding of teeth; and 1054 (71.41%) reported both clenching and grinding of teeth. Most of the respondents (1128, 76.42%) reported a negative perception of oral symptoms on the last month and all (1476, 100.00%) were feeling nervous or stressed during the period of social withdrawal induced by the COVID-19 pandemic. Moreover, 289 (19.58%) started having symptoms of fatigue or pain in the muscles of the face upon

awakening and 318 (21.54%) started having muscle fatigue and discomfort in the teeth upon awakening.

CONCLUSION: Findings have shown that all respondents were feeling nervous or stressed during the period of social withdrawal induced by the COVID-19 pandemic and reported bruxism symptoms. They also had lower averages of WHOQOL and SCS, suggesting worse perception of quality of life and self-compassion.

Keywords: Bruxism, Coronavirus Infections, Quality of Life.

RESUMO

JUSTIFICATIVA E OBJETIVOS: O objetivo do presente estudo foi avaliar o impacto da pandemia de COVID-19 nos aspectos psicológicos e sua relação com o bruxismo a partir de amostra representativa da população brasileira.

MÉTODOS: Foi conduzida uma pesquisa transversal baseada na internet em uma amostra representativa de adultos brasileiros para estimar os correlatos sociodemográficos e as características do bruxismo, a qualidade de vida (WHOQOL) dos indivíduos e a autocompaixão *Self-Compassion Scale* (SCS) na população brasileira durante a pandemia por COVID-19. A pesquisa foi coletada de maio a agosto de 2020. Os dados foram analisados por meio de análise qualitativa.

RESULTADOS: Foram preenchidos 1.476 formulários da Pesquisa e 1.265 (85,70%) respondentes declararam apresentar apertamento diurno; mais da metade dos entrevistados (843, 57,11%) relatou ranger de dentes; e 1.054 (71,41%) relataram tanto apertamento quanto ranger de dentes. A maioria dos entrevistados (1.128, 76,42%) relatou percepção negativa dos sintomas de bruxismo no último mês e todos (1.476, 100,00%) estavam se sentindo nervosos ou estressados durante o período de afastamento social induzido pela pandemia de COVID-19. Além disso, 289 (19,58%) iniciaram sintomas de fadiga ou dor nos músculos da face ao acordar e 318 (21,54%) iniciaram com fadiga muscular e desconforto nos dentes ao acordar.

CONCLUSÃO: Os resultados mostraram que todos os entrevistados estavam se sentindo nervosos ou estressados durante o período de afastamento social induzido pela pandemia de COVID-19 e relataram sintomas de bruxismo. Também apresentaram médias mais baixas no WHOQOL e SCS, sugerindo pior percepção de qualidade de vida e autocompaixão.

Descritores: Bruxismo, Infecções por coronavírus, Qualidade de vida.

Laura Pereira Generoso – <https://orcid.org/0000-0002-0760-4355>; Guilherme Prevelato Oliveira – <https://orcid.org/0000-0003-0612-5253>; Lais Leite Ferreira – <http://orcid.org/0000-0001-9751-8399>; Luci Mara França Correia – <https://orcid.org/0000-0002-4977-255X>; Josie Resende Silva – <https://orcid.org/0000-0002-6679-2675>; Marcelo Lourenço Silva – <https://orcid.org/0000-0002-5523-5910>.

1. Federal University of Alfenas, Faculty of Physiotherapy, Institute of Motricity Sciences, Alfenas, MG, Brazil.
2. Neurological Institute of Curitiba, Curitiba, PR, Brazil.

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Correspondence to:

Marcelo Lourenço da Silva

E-mail: lourencoms@uol.com.br

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INTRODUCTION

The temporomandibular joint (TMJ) is formed by the articulation of the mandible and the temporal bone of the cranium. It is located anteriorly to the tragus of the ear, on the lateral aspect of the face and it's the most regularly used joint in the human body, opening and closing 1,500 to 2,000 times a day, to perform the various necessary movements¹.

Motor functions, as well as suction and maintenance of the mandibular posture of the masticatory system are considered classic. Adaptive motor functions are yawning, kissing, biting, blowing, laughing, and grinding teeth².

Muscles present in this region are responsible for lifting or closing movements, depression or opening, protrusion and retrusion and for alternating lateral movements, in addition to ensuring joint stability³.

Parafunctional habits like clenching and/or grinding your teeth during the day and/or at night, chewing gum, biting your cheek, lips, and tongue, pressing the tongue against the teeth, biting nails/cuticle, gnawing on objects like pencils/pens or others, and placing the hand under the chin, are among the main etiological factors for temporomandibular disorders (TMD), as they promote and increase muscle activity above the necessary (muscle hyperactivity)⁴.

For psychiatrists, the facial and jaw muscles are responsible for the expressions of anger, fear and aggression and for smiling. The clenching of teeth, bites on the cheeks, tongue, lips and objects, sucking on fingers and biting nails, have a well-defined emotional background and serve as a discharge of tension⁵.

Epidemiological studies show that 5 to 6% of the world population will experience a painful experience involving the TMJ during their lives⁶ and the questionnaire application is widely used in research and is an important tool to identify population profiles, however, in some cases the sample number may become slightly reduced due to the need for time to apply the questionnaire and the territorial limitation. The online questionnaire has the advantage of greater reach considering the scope of the internet and the quarantine period⁷.

At the end of 2019, the New Coronavirus was named SARS-CoV-2. This New Coronavirus produced the disease classified as COVID-19, causing a series of pneumonia cases in the city of Wuhan (China). There is still no full information about the natural history, nor unquestionable effectiveness measures for the clinical management of cases of human infection by SARS-CoV-2, and there are still many details to be clarified. However, it's known that the virus has high transmissibility and causes an acute respiratory syndrome that varies from mild cases - about 80% - to very severe cases with respiratory failure - between 5 and 10% of cases. Its lethality varies, mainly according to the age group and associated clinical conditions⁸.

Therefore, the present study aims to assess the impact of the COVID-19 pandemic on psychological aspects and bruxism from a representative sample of the Brazilian population.

METHODS

STROBE Statement was used for reporting this observational study⁹. This is a cross-sectional internet-based survey research. The survey was conducted from May to August 2020 by using an electronic questionnaire on Google Forms™ platform. Adults aged 18 years old, or more were eligible to participate.

Participants first answered a sociodemographic survey followed by specific questions about TMJ pain and parafunctional oral habits during the COVID-19 pandemic. The questionnaire included 14 questions in Portuguese in sequence, (1) Gender, (2) Age, (3) Race, (4) Schooling level, (5) Marital status, (6) Household income, (7) Region, (8) Employment status, (9) Internet access, (10) Metropolitan area.

After answering the sociodemographic survey questions, the individuals were asked about (11) daytime clenching; (12) daytime grinding of teeth; (13) both daytime clenching and grinding of teeth; (14) sounds of clenching or grating teeth while sleeping, noticed by a sleeping partner; (15) fatigue in jaw muscles in the morning; (16) headache, shoulder, neck and facial pain frequently; (17) clicking sound or grating sensation when opening the mouth; (18) discomfort in jaw in the morning; (19) history of tooth restoration/fractures; (20) self-perception of tooth wear; (21) ear or behind ear pain; and (22) locked jaw in the morning or during sleep.

Moreover, the participants were asked if they noted, in the current period on the last month of social isolation due to the COVID-19 pandemic, if the following conditions started happening: (23) fatigue or pain in the muscles of the face upon awakening; and (24) muscle fatigue and discomfort in teeth upon awakening. According to study¹⁰, bruxism is present if one of the items is answered "yes".

The questionnaire also included 26 questions of the Self-Compassion Scale (SCS)¹¹, which assesses trait levels of self-compassion. The scale was developed to explicitly represent the thoughts, emotions, and behaviors associated with the various components of self-compassion. It includes items that measure how often people respond to feelings of inadequacy or suffering with self-kindness, self-judgment, common humanity, isolation, mindfulness, and over-identification.

The sequence of questions included the World Health Organization Quality of Life-BREF (WHOQOL-bref) used to assess quality of life (QoL), with 26 questions, two of which were about QoL in general (general QoL) and the others represent each of the 24 facets that make up the original instrument and are divided into four domains: "physical", "psychological", "social relationships" and "environment". Scores for each domain were transformed on a scale from zero to 100 and expressed in terms of averages, as recommended by the manual produced by the WHOQOL¹², with higher averages suggesting better perception of QoL.

Data measurement

Before answering the questionnaire, participants read and accepted the participant consent form Free and Informed Consent Term (FICT), which explained the objective and natu-

re of the study and showed they could refuse to answer any questions and withdraw at any time from the research. The questionnaire was structured as an electronic questionnaire at Google Forms™, with no open questions and with preceded alternative answers.

Bias

To reduce the risk of bias, all data, which was accessed and extracted from Google Forms™, was analyzed by two investigators. The final tabulated database was analyzed by other two investigators.

Study size

The following data were extracted for the five macro-regions of Brazil (southern, south-eastern, northern, northeastern, central-western) in a convenience manner. The questionnaire was sent to the participants via general social media as well as through electronic messages from dentists, physicians, physical therapists and the Brazilian Dental Association. The total study size was all completed, with answers from May to August 2020.

This study was approved by the Ethics Committee on Human Research of the Federal University of Alfenas (CAAE: 30830420.7.0000.5142).

Statistical analysis

Descriptive statistics were used as the data analysis method. Questionnaire responses were entered into the Microsoft Excel software. Categorical data are represented as a percentage and SCS and WHOQOL-bref average scores were presented by mean, standard deviation (SD), coefficient of variation, maximal and minimal values, and amplitude (difference between maximum and minimum values).

RESULTS

Survey forms were completed by 1476 individuals. Among the respondents, 846 (57.32%) were men and 630 (42.68%) were women. Nearly half of the respondents (633) were 18-24 years old (42.90%); 211 (14.30%) were 25-34 years; 422 (28.60%) were 35-44 years; 90 (6.12%) were 45-54 years; and only 78 (5.28%) and 41 (2.80%) were 55-64 and 65 or older, respectively. According to the ethnic data collection, 792 (50.66%) were white, 466 (30.22%) were brown, 234 (15.85%) were black, less than 1% were yellow (4, 0.27%) and none were indigenous (Table 1).

A vast majority of respondents had some college or bachelor's degree or higher education, 754 (51.08%) and 667 (45.19%), respectively. Only 41 (2.78%) had high school level and 14 (0.95%) had less than high school level. As for marital status, 805 (54.54%) had never married; 364 (24.66%) were married; 278 (18.83%) were living with a partner and only 29 (1.96%) were divorced. Regarding household income, 574 (38.89%) had household income level less than R\$999 a month and 459 (31.10%) had between R\$2000 to R\$4999; 265 (17.95%) had R\$1000 to R\$1999 and 178 (12.06%) had R\$5000 or more. From 1476 respondents, 893 (60.50%) were from the Southeast region of Brazil; 352 (23.85%) from the South; 181 (12.26%)

Table 1. Sociodemographic characteristics of the study sample (n=1476)

Characteristics	n (%)
Total sample	1476 (100)
Gender, n (%)	
Male	846 (57.32)
Female	630 (42.68)
Age group (years), n (%)	
18-24	633 (42.90)
25-34	211 (14.30)
35-44	422 (28.60)
45-54	90 (6.12)
55-64	78 (5.28)
65 or more	41 (2.80)
Race, n (%)	
White	792 (50.66)
Brown	466 (30.22)
Black	234 (15.85)
Yellow	4 (0.27)
Indigenous	0 (0.00)
Schooling level, n (%)	
Less than high school	14 (0.95)
High school	41 (2.78)
Some college	754 (51.08)
Bachelor's degree or higher	667 (45.19)
Marital status, n (%)	
Never married	805 (54.54)
Married	364 (24.66)
Divorced	29 (1.96)
Living with partner	278 (18.83)
Household income level, n (%)	
Less than R\$999	574 (38.89)
R\$1000 to R\$1999	265 (17.95)
R\$2000 to R\$4999	459 (31.10)
R\$5000 or more	178 (12.06)
Region, n (%)	
Southeast	893 (60.50)
North	12 (0.81)
Northeast	38 (2.57)
South	352 (23.85)
Midwest	181 (12.26)
Employment status, n (%)	
Working - as a paid employee	289 (19.58)
Working - self-employed	269 (18.22)
Not working - on temporary layoff	437 (29.61)
Not working - retired	121 (8.20)
Not working - disabled	21 (1.42)
Not working - student	339 (22.97)
Internet access, n (%)	
Yes	1476 (100)
No	0 (0.00)
Metropolitan area, n (%)	
Non-metropolitan	788 (53.39)
Metropolitan	682 (46.21)
Rural area	6 (0.41)

from the Midwest and only 38 (2.57%) and 12 (0.81%) from the Northeast and North, respectively.

Additionally, 437 (29.61%) were not working - on temporary layoff; 339 (22.97%) were students; 289 (19.58%) and 269 (18.22%) were working (as a paid employee or self-employed, respectively); and only 121 (8.20%) and 21 (1.42%) were retired or disabled, respectively. All participants had internet access, 682 (46.21%) were living in metropolitan areas and 788 (53.39%) in non-metropolitan areas.

Of 1476 respondents, 1265 (85.70%) declared having daytime clenching; over half of respondents (843, 57.11%) reported grinding of teeth; and 1054 (71.41%) reported both clenching and grinding of teeth. More than half of respondents (812, 55.01%) declared that a sleeping partner noticed that they were making sounds of clenching or grating teeth while sleeping. All respondents reported fatigue in jaw muscles in the morning and headache, shoulder, neck, and facial pain frequently.

Moreover, a vast majority of respondents had clicking sound or grating sensation when opening their mouth or chewing; discomfort in the jaw in the morning; and ear or behind ear pain (1266, 85.77%; 1160, 78.59%; and 933, 63.21% respectively). Over half of respondents (843, 57.11%) reported history of tooth restoration/fractures; but indicated no self-perception of tooth wear (957, 64.84%); jaw fatigue when chewing (1054, 64.84%); or locked jaw in the morning or during sleep (1265, 85.70%).

Most respondents in the study sample (1128, 76.42%) reported a negative perception of oral symptoms on the last month and they all (1476, 100.00%) were feeling nervous or 'stressed', i.e., during the period of social withdrawal induced by the COVID-19 pandemic. In addition, 869 (58.88%) reported a worsening in symptoms during the current period of social isolation due to the COVID-19 pandemic; 289 (19.58%) started having symptoms of fatigue or pain in the muscles of the face upon awakening and 318 (21.54%) started having muscle fatigue and discomfort in teeth upon awakening. Almost all respondents (1132, 76.69%) reported that symptoms as muscle fatigue and muscle

Table 2. Present deleterious oral habits and COVID-19 pandemic

Characteristics	Groups	
	Number of participants	Percent of total
	1476	100
Daytime clenching		
Yes	1265	85.70
No	211	14.30
Daytime grinding		
Yes	843	57.11
No	633	42.89
Daytime clenching and grinding		
Yes	1054	71.41
No	422	28.59
Making sounds of clenching or grating teeth while sleeping, noticed by a sleeping partner		
Yes	812	55.01
No	664	44.99

Continue...

Table 2. Present deleterious oral habits and COVID-19 pandemic – continuation

Characteristics	Groups	
	Number of participants	Percent of total
	1476	100
Fatigue in jaw muscles in the morning		
Yes	1476	100
No	0	0
Headache, shoulder, neck and facial pain frequently		
Yes	1476	100
No	0	0
Clicking sound or grating sensation when opening mouth or chewing		
Yes	1266	85.77
No	210	14.23
Discomfort in jaw in the morning		
Yes	1160	78.59
No	316	21.41
History of tooth fractures/restoration		
Yes	843	57.11
No	633	42.89
Self-perception of tooth wear		
Yes	519	35.16
No	957	64.84
Jaw fatigue when chewing		
Yes	422	28.59
No	1,054	64.84
Ear or behind ear pain		
Yes	933	63.21
No	543	36.79
Locked jaw in the morning or during sleep		
Yes	211	14.30
No	1265	85.70
Negative self-perception of oral symptoms during the last month		
Yes	1128	76.42
No	348	23.58
Feeling nervous or "stressed"		
Yes	1476	100
No	0	0
Which of the conditions described did you notice that began in the current period of social isolation due to the COVID-19 pandemic?		
Fatigue or pain in the muscles of the face upon awakening	289	19.58
Muscle fatigue and discomfort in teeth upon awakening	318	21.54
Which of the conditions described did you notice that got worse in the current period of social isolation due to the COVID-19 pandemic?		
Muscle fatigue and muscle pain	326	16.38
Headache, neck, shoulder or facial pain regularly	532	26.73
All symptoms mentioned	1132	56.88

Table 3. Scores of WHOQOL-BREF domains and the overall score

	Minimum	Maximum	Mean	Amplitude	SD	CV (%)
Physical	8.57	15.43	11.97	6.86	1.47	12.29
Psychological	6.67	17.33	9.87	10.67	2.50	25.36
Social	4.00	20.00	11.70	16.00	4.74	40.53
Environmental	4.00	20.00	14.73	16.00	3.92	26.58
Overall score	4.00	20.00	13.79	16.00	3.72	27.00

SD = standard deviation; CV = coefficient of variation.

Table 4. Overall Self-Compassion Scale (out of 30 points) and six subscales (out of 5 points).

	Minimum	Maximum	Mean	Amplitude	SD	CV (%)
Self-compassion ^a	12.45	18.00	14.71	5.55	1.91	12.99
Self-kindness	1.00	5.00	2.53	4.00	1.32	52.03
Self-judgment	1.00	5.00	3.61	4.00	1.31	36.20
Common humanity	1.00	5.00	2.82	4.00	1.30	46.17
Isolation	1.00	5.00	3.81	4.00	1.32	34.73
Mindfulness	1.00	5.00	2.79	4.00	1.25	44.63
Over-identification	1.00	5.00	4.00	4.00	1.19	29.75

SD = standard deviation; CV = coefficient of variation. ^aOverall self-compassion scores were calculated by reverse coding the self-judgment, isolation, and over-identification items then summing all six subscale means.

pain, headache, neck, shoulder, and facial pain got worse during the COVID-19 pandemic. Table 2 shows the frequency of deleterious oral habits and the impact of the COVID-19 pandemic. For WHOQOL-bref, the group of respondents had the following scores in the physical (11.97 ± 1.47 , for mean \pm SD); psychological (9.87 ± 2.50); social (11.70 ± 4.74); and environmental (14.73 ± 3.92) domains. They also presented an overall score of 13.79 ± 3.72 (Table 3).

The respondents presented the overall self-compassion of 14.71 ± 1.91 (mean \pm SD); self-kindness of 2.53 ± 1.32 ; self-judgment of 3.61 ± 1.31 ; common humanity of 2.82 ± 1.30 ; isolation of 3.81 ± 1.32 ; mindfulness of 2.79 ± 1.25 ; and over-identification of 4.00 ± 1.19 (Table 4).

DISCUSSION

The results showed that 85.70% of the respondents declared presented daytime clenching, 57.11% reported grinding of teeth and 71.41% reported both clenching and grinding of teeth. All respondents stated feeling nervous or stressed during the period of social withdrawal induced by the COVID-19 pandemic and 76.69% reported that symptoms such as muscle fatigue and muscle pain, headache, neck, shoulder, and facial pain got worse in the COVID-19 pandemic.

Analysis of the data also suggests that because SARS-CoV-2 is not yet fully known, emotions such as fear and anxiety are usually related¹³ and life stressors have been considered to lead to distress or tension in the individual and then to dysfunctional oral habits, teeth grinding or clenching¹⁴. This theory is based on some studies which reported that variations in experienced stressful daily events were significantly related to variations in reported daytime clenching activity or nighttime teeth grinding. Daytime bruxism is often seen as a habit in response to stress and anxiety¹⁵.

Regarding the demographic characteristics, the number of males responders was higher than females in this study, however the difference was not significant. Several studies do not indicate a significant difference between genders in the prevalence of bruxism¹⁶⁻¹⁸, while others report a higher prevalence in females^{19,20}. Furthermore, schooling was associated with increased TMD symptoms. People with a college, bachelor's or higher degree are at greater risk of the dysfunction and one of the hypotheses to explain this association is that people with a higher level of schooling have a higher level of stress²¹. During the COVID-19 pandemic, people with higher levels of education had greater levels of anxiety, depression, and stress^{22,23}.

Bruxism has been defined by the American Academy of Sleep Medicine as the “repetitive jaw muscle activity characterized by the clenching or grinding of teeth and/or bracing or thrusting of the mandible”²⁴. Sleep and awake bruxism are masticatory muscle activities that occur during sleep (characterized as rhythmic or non-rhythmic) and wakefulness (characterized by repetitive or sustained tooth contact and/or by bracing or thrusting of the mandible), respectively²⁵. Studies have shown that this habit can be initiated due to intensified emotional issues, worries, fears and sleep disorders^{26,27}. In this study, 85.7% of the respondents perceived the daytime dental clenching, this information is already quite relevant due to the high index presented, however, it's necessary to emphasize that this result could be even greater, since clenching is an unconscious habit, and the negative respondents could also present it but not have the perception of it.

Although sleep bruxism is a disorder and daytime bruxism another distinct entity, studies have demonstrated the influence of one over the other^{28,29}. This fact justifies the result in this research of the increase in the perception of nocturnal sound, 55% of the interviewees confirmed that the sleeping partner noticed the grinding of teeth at night. Moreover, most experts now consider sleep bruxism to be primarily a sleep-related movement disorder

with a yet to be discerned multifactorial etiology and complex multisystem physiological processes³⁰. There is a need for studies with adequate designs, preferably longitudinal, to elucidate the effects of sleep bruxism on health conditions and the direction of the possible cause-effect relationship between them, if any, since the current literature shows a heterogeneous and inconsistent relationship³¹.

With the increase in the frequency of dental clenching due to the psychosocial alteration generated by the change in lifestyle during the COVID-19 pandemic period, with a decrease in physical and social activities as well as the change in sleep schedule, other oral manifestations may also appear and have an impact on life.

The research verified in the respondents a perception of articular clicks (85.77%), pain in the ear (78.50%), pain behind the ear (63.21%) and jaw fatigue (64.84%). These changes are characteristics of TMD, which are defined as "A group of disorders involving the masticatory muscles, the temporomandibular joint and associated structures", according to the American Academy of Orofacial Pain (AAOP). It is known that TMDs have a multifactorial etiology, and, among them, the overhead generated by day and night bruxism³².

The separate evaluation of the WHOQOL facets showed that the psychological area had the worst average, i.e., demonstrating a worse evaluation in QoL, followed by social relationship and physical domains with worst average score appointed by the participants. It's worth mentioning the importance of these domains in people's health while fighting stress, since the pandemic period brought a decrease in physical activities, interaction, and social development, worsening the well-being of individuals³³. A decrease in personal relationships, sexual activity and social support were expressed in the social relationship domain. The COVID-19 pandemic affected the way individuals relate to themselves and to the people around them, an important tool to preserve their well-being and therefore their QoL³⁴.

SCS showed higher scores for the self-judgment, isolation, and over-identification subscales, indicating a decrease in self-compassion. Meanwhile, self-kindness, common humanity and mindfulness were classified as moderate. In the context of the COVID-19 pandemic, self-compassion does not aim to reduce primary suffering (e.g., pain, bruxism, TMD), but rather attempts to reduce secondary suffering (e.g., fear, anxiety, psychological stress, distress)³⁵. Considering the period of social withdrawal induced by the COVID-19 pandemic and the increased number of deaths related to the virus, it's reasonable that humans' responses to the suffering of others are regulated by both cognitive and motivational processes³⁶.

Self-compassion is largely associated with better psychological well-being and resilience, and lower negative affect among multiple community adult samples^{37,38}. In fact, self-compassion has been associated with higher levels of emotional resilience and positive affect and lower levels of depression, pain catastrophizing and pain-related disability among those with pain^{39,40}. Moreover, elevated self-criticism is associated with a range of psychological disorders (including depression, generalized anxiety disorder, post-traumatic stress disorder and social phobia) and is a risk for psychopathology after stressful life events. Therefore, therapeutic

approaches that improve self-compassion to mitigate the effects of critical self-evaluation in the context of the COVID-19 pandemic may be effective to avoid several disorders (e.g., anxiety and depression).

The present study's method had some limitations. The data were self-reported, which can be imprecise and subject to reporting bias, particularly in elderly respondents. As a self-reported questionnaire, clinical diagnosed bruxism or TMD were not included, only the self-perception of the symptoms that started or a worsening in related symptoms during COVID-19 pandemic. Moreover, scale development and validation are critical to much of the work in the health, social, and behavioral sciences suggesting subjective data, and all the questions in the present analysis were periodic, which could reflect the psychological state of the population analyzed over a period. However, psychological states change with the passage of time and with the alterations in one's surrounding environment. Furthermore, the majority of respondents were males, and this can be correct on bruxism prevalence, but not on TMD and orofacial pain.

CONCLUSION

The current study findings suggest that participants have several bruxism symptoms in a high frequency during the pandemic era, such as clenching and grinding of teeth, as well as affecting symptoms, such as muscle fatigue and muscle pain, headache, neck, shoulder, and facial pain. Moreover, the social withdrawal induced by the COVID-19 pandemic may have caused worse well-being of individuals and lower self-compassion.

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AUTHORS' CONTRIBUTIONS

Laura Pereira Generoso

Conceptualization, Project Management, Research, Writing - Preparation of the original

Guilherme Prevelato Oliveira

Data Collection, Conceptualization, Research, Methodology, Writing - Preparation of the original, Writing - Review and Editing

Lais Leite Ferreira

Resource Management, Project Management, Research

Luci Mara França Correia

Conceptualization, Project Management, Research, Writing - Preparation of the original, Writing - Review and Editing

Josie Resende Torres da Silva

Project Management, Methodology, Writing - Preparation of the original, Supervision

Marcelo Lourenço da Silva

Funding Acquisition, Resource Management, Project Management, Research, Methodology, Writing - Preparation of the original, Writing - Review and Editing, Software, Supervision

REFERENCES

1. Chang CL, Wang DH, Yang MC, Hsu WE, Hsu ML. Functional disorders of the temporomandibular joints: Internal derangement of the temporomandibular joint. *Kaohsiuung J Med Sci.* 2018;34(4):223-30.
2. Murali RV, Rangarajan P, Mounissamy A. Bruxism: Conceptual discussion and review. *J Pharm Bioallied Sci.* 2015;7(Suppl 1):S265-70.
3. Celic R, Jerolimov V, Knezovic Zlataric D. Relationship of slightly limited mandibular movements to temporomandibular disorders. *Braz Dental J.* 2004;15(2):151-4.
4. Paulino MR, Moreira VG, Lemos GA, Silva PLPD, Bonan PRF, Batista AUD. Prevalence of signs and symptoms of temporomandibular disorders in college preparatory students: associations with emotional factors, parafunctional habits, and impact on quality of life. *Cien Saude Colet.* 2018;23(1):173-86.
5. Fernandes G, Franco-Micheloni AL, Siqueira JT, Gonçalves DA, Camparis CM. Parafunctional habits are associated cumulatively to painful temporomandibular disorders in adolescents. *Braz Oral Res.* 2016;30:S1806-83242016000100214.
6. Oliveira W. Disfunções temporomandibulares. São Paulo: Artes Médicas; 2002.
7. Medeiros RA, Vieira DL, Silva EVFD, Rezende LVML, Santos RWD, Tabata LF. Prevalence of symptoms of temporomandibular disorders, oral behaviors, anxiety, and depression in Dentistry students during the period of social isolation due to COVID-19. *J Appl Oral Sci.* 2020;28:e20200445.
8. McIntosh K. Novel Coronavirus (2019-nCoV). UpToDate, Post TW (Ed), UpToDate, Waltham, MA; 2020.
9. von Elm E, Altman DG, Egger M, Pocock SJ, Gotzsche PC, Vandebroucke JP. Strengthening the reporting of observational studies in epidemiology (STROBE) statement: guidelines for reporting observational studies. *BMJ.* 2014;12(12):1495-9.
10. Raphael KG, Sirois DA, Janal MN, Wigren PE, Dubrovsky B, Nemelovsky LV, et al. Sleep bruxism and myofascial temporomandibular disorders: a laboratory-based polysomnographic investigation. *J Am Dent Assoc.* 2012;143(11):1223-31.
11. Neff KD, Bluth K, Tóth-Király I, Davidson O, Knox MC, Williamson Z, et al. Development and validation of the self-compassion scale for youth. *J Pers Assess.* 2021;103(1):92-105.
12. The World Health Organization Quality of Life assessment (WHOQOL): position paper from the World Health Organization. *Soc Sci Med.* 1995;41(10):1403-9.
13. Wang C, Pan R, Wan X, Tan Y, Xu L, Ho CS, et al. Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *Int J Environ Res Public Health.* 2020;17(5):1729.
14. Pingitore G, Chrobak V, Petrie J. The social and psychologic factors of bruxism. *J Prosthet Dent.* 1991;65(3):443-6.
15. Manfredini D, Lobbezoo F. Role of psychosocial factors in the etiology of bruxism. *J Orofac Pain.* 2009;23(2):153-66.
16. Ohayon MM, Li KK, Guilleminault C. Risk factors for sleep bruxism in the general population. *Chest.* 2001;119(1):53-61.
17. Strausz T, Ahlberg J, Lobbezoo F, Restrepo CC, Hublin C, Ahlberg K, et al. Awareness of tooth grinding and clenching from adolescence to young adulthood: a nine-year follow-up. *J Oral Rehabil.* 2010;37(7):497-500.
18. Bayar GR, Tutuncu R, Acikel C. Psychopathological profile of patients with different forms of bruxism. *Clin Oral Investig.* 2012;16(1):305-11.
19. Johansson A, Unell L, Carlsson GE, Söderfeldt B, Halling A. Gender difference in symptoms related to temporomandibular disorders in a population of 50-year-old subjects. *J Orofac Pain.* 2003;17(1):29-35.
20. Blanco Aguilera A, Gonzalez Lopez L, Blanco Aguilera E, De la Hoz Aizpurua JL, Rodriguez Torronteras A, Segura Saint-Gerons R, et al. Relationship between self-reported sleep bruxism and pain in patients with temporomandibular disorders. *J Oral Rehabil.* 2014;41(8):564-72.
21. Pascoe MC, Hetrick SE, Parker AG. The impact of stress on students in secondary school and higher education. *International J Adolesc Youth.* 2020;25(1):104-12.
22. Moghanibashi-Mansourieh A. Assessing the anxiety level of Iranian general population during COVID-19 outbreak. *Asian J Psychiatr.* 2020;51:102076.
23. Wang Y, Di Y, Ye J, Wei W. Study on the public psychological states and its related factors during the outbreak of coronavirus disease 2019 (COVID-19) in some regions of China. *Psychol Health Med.* 2021;26(1):13-22.
24. Sateia MJ. International classification of sleep disorders-third edition: highlights and modifications. *Chest.* 2014;146(5):1387-94.
25. 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;45(11):837-44.
26. Demjaha G, Kapussevska B, Pejkovska-Shahpska B. Bruxism unconscious oral habit in everyday life. *Open Access Maced J Med Sci.* 2019;7(5):876-81.
27. 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;109(6):e26-50.
28. Sato M, Iizuka T, Watanabe A, Iwase N, Otsuka H, Terada N, et al. Electromyogram biofeedback training for daytime clenching and its effect on sleep bruxism. *J Oral Rehabil.* 2015;42(2):83-9.
29. Reddy SV, Kumar MP, Sravanthi D, Mohsin AHB, Anuhya V. Bruxism: a literature review. *J Int Oral Health.* 2014;6(6):105-9.
30. Klassed GD, Rei N, Lavigne GJ. Sleep bruxism etiology: the evolution of a changing paradigm. *J Can Dent Assoc.* 2015;81:f2.
31. Traebert E, Nazário AC, Nunes RD, Margreiter NS, Pereira KCR, Costa SXS, Traebert CJ. Prevalence of sleep bruxism and association with oral health conditions in schoolchildren in a municipality in Southern Brazil. *Pesqu Bras Odontopediatria Clin Integr.* 2020;20.
32. Jiménez-Silva A, Peña-Durán C, Tobar-Reyes J, Frugone-Zambra R. Sleep and awake bruxism in adults and its relationship with temporomandibular disorders: A systematic review from 2003 to 2014. *Acta Odontol Scand.* 2017;75(1):36-58.
33. Alradhwani M, Shubber N, Sheppard J, Ali Y. Effects of the COVID-19 pandemic on mental well-being amongst individuals in society- A letter to the editor on "The socio-economic implications of the coronavirus and COVID-19 pandemic: A review". *Int J Surg.* 2020;78:147-8.
34. Di Giacomo P, Serritella E, Imondi F, Di Paolo C. Psychological impact of COVID-19 pandemic on TMD subjects. *Eur Rev Med Pharmacol Sci.* 2021;25(13):4616-26.
35. Scott W, McCracken LM. Psychological flexibility, acceptance and commitment therapy, and chronic pain. *Curr Op Psychol.* 2015;2:91-6.
36. Lamm C, Batson CD, Decety J. The neural substrate of human empathy: effects of perspective-taking and cognitive appraisal. *J Cogn Neurosci.* 2007;19(1):42-58.
37. Muris P, Petrocchi N. Protection or Vulnerability? A meta-analysis of the relations between the positive and negative components of self-compassion and psychopathology. *Clin Psychol Psychother.* 2017;24(2):373-83.
38. Zessin U, Dickhäuser O, Garbade S. The relationship between self-compassion and well-being: a meta-analysis. *Appl Psychol Health Well Being.* 2015;7(3):340-64.
39. Costa J, Pinto-Gouveia J. Experiential avoidance and self-compassion in chronic pain. *J Appl Social Psychol.* 2013;43(8):1578-91.
40. Purdie F, Morley S. Compassion and chronic pain. *Pain.* 2016;157(12):2625-7.



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