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## FREQUENCY OF SELF-REPORTED BRUXISM AMONG STUDENTS DURING THE COVID 19 PANDEMIC

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### ABSTRACT

**Introduction:** Bruxism today represents a widespread, very complex phenomenon among the entire population. Awake or daytime bruxism most often occurs unconsciously during stressful situations and is manifested by clenching the teeth, while night-time bruxism is manifested by grinding the teeth during sleep. During the COVID-19 pandemic, students were affected by new measures leading to an increase in anxiety and stress levels producing an increase in parafunctional activities.

**The aim of the research:** The aim of the research was to examine the frequency of self-reported bruxism among students during the COVID-19 pandemic and to determine the difference in the frequency of self-reported bruxism between students in relation to gender and type of study.

**Research methods:** The research was based on filling out a questionnaire that contained questions about basic information regarding the respondent such as age, gender, the attending faculty, data on the presence/absence of bruxism and the influence of certain situations on the manifestation of bruxism.

**The results:** The research proved the high prevalence of self-reported bruxism among students. It has been proven that the frequency of teeth clenching during the day is statistically and significantly higher than the frequency of teeth grinding at night. No statistically significant difference was found between the Faculty of Dentistry and the Faculty of Pharmacy in the frequency of self-reported bruxism, nor between genders. A statistically significantly higher frequency of clenching and grinding of teeth was found in students in a situation when they were under stress.

**Conclusion:** Considering the high prevalence of bruxism among the student population, it is necessary to work on developing a protocol that will contribute to the prevention of bruxism and help reduce the risk of negative consequences on the stomatognathic system.

**Keywords:** Student's population, bruxism, Covid 19.

## Introduction

The COVID-19 pandemic caused by the new Sars-CoV-2 coronavirus began in December 2019 in Wuhan (China) and continued to spread around the world. Because of globalization, climate change and numerous population migrations, there was an accelerated viral transmission and an unprecedented speed and spread of infection and the declaration of a pandemic by the World Health Organization. There were certain restrictions in people's lives and social circumstances, and the impact of the pandemic COVID-19 was visible at all levels of society, including the economic, business, educational and psychological levels. [1]

The human population has been forced to take certain epidemiological measures such as social distancing, wearing masks, closing facilities, working from home and travel restrictions to curb the transmission of the virus. This situation has led to health threats, economic uncertainty, and social isolation, each with the potential for serious adverse effects on both the physical and mental health of people. [2] These massive changes have also had consequences for students' educational experiences and their mental, physical and financial condition. In addition, this period was an *annus horribilis* for many students – an extended period of depressing news and for some it meant isolation, illness, loneliness, bereavement or financial difficulties.

Many studies have proven that students experienced increased anxiety, fear, stress and symptoms of depression while studying under the influence of COVID-19, with medical students having a higher prevalence of moderate and severe anxiety symptoms. [3, 4, 5]

Healthcare workers were at risk of contamination, had intensive working hours, lack of knowledge about the treatment of diseases caused by the Sars-CoV2 virus, which led to vital risks and challenges that caused them even ethical dilemmas. [6]

Dental practices and organizations such as the American Dental Association (ADA) have reported a significant increase in stress-related oral health

conditions during the pandemic. According to a September 2020 ADA survey, 59.4% of dentists surveys reported an increased prevalence of bruxism among their patients, 53.4% reported an increase in chipped and cracked teeth and 53% reported an increase in temporomandibular joint disorder (TMJ) symptoms. These numbers only increased as the pandemic continued. When the ADA surveyed American dentists again in 2021, over 70% of dentists reported an evident increase in patients grinding and clenching their teeth. [7, 8]

This was confirmed by studies conducted in Poland, Israel and China identifying an increase in bruxism and TMJ disorders in the general population. [9, 10]

According to the international consensus of 2013, bruxism is defined as repetitive masticatory muscle activity characterized by clenching or grinding of the teeth and/or tightening or thrusting of the lower jaw being specified as sleep bruxism or awake bruxism. [11]

The aetiology of bruxism is still not exactly determined, and it is estimated that there three groups of factors that can cause bruxism: biological factors, exogenous and psychological factors. [12]

Przystańska A. and the authors state that awake bruxism occurs as a defensive reaction in the form of permanent muscle contraction during stress and anxiety. [13]

The COVID-19 pandemic has caused various troubles for a huge number of individuals around the world and it is considered to have a stress level of great stressful experience. [1]

Given that there is little epidemiological data on the impact of the COVID-19 pandemic on the prevalence of bruxism among the student population in our country, this research was conducted.

## Materials and methods

The research was based on filling out a questionnaire that contained questions about basic data about the respondent such as age, gender, the attending faculty, data on the presence/absence of bruxism and the impact of certain situations on the manifestation of bruxism. [14]

Students of the Faculty of Dentistry and Pharmacy of the University of Sarajevo were involved in the research. Students filled out the questionnaire completely anonymously and voluntarily with informed consent. The Ethics Committee of the Faculty of Dentistry in Sarajevo has issued consent for the research of this project.

A total of 756 respondents were included in the research, of which 170 (22.5%) were men, and 586 (77.5%) were women. A total of 439 respondents were surveyed at the Faculty of Dentistry, while 317 respondents were surveyed at the Faculty of Pharmacy. The average age of the respondents was 22 years.

### Statistical methods of data analysis

Statistical data analysis was performed using IBM SPSS Statistics v.21 software. Arithmetic means and standard deviations of quantitative variables, then absolute and relative frequencies of nominal variables were calculated from the descriptive statistical analysis. Parametric methods were used in the paper, namely Student t-test for testing two independent samples, Pearson's linear correlation, One-factor analysis of variance (ANOVA) for testing three independent samples with multiple post hoc testing with Tukey HSD test. Among the non-parametric statistical methods, the chi-square test was used. The research hypotheses were tested on an alpha level of 95% confidence, i.e., 5% risk.

The results were statistically processed and presented in tables.

### The results

In terms of the frequency of self-reported bruxism among the surveyed students, a slightly higher percentage of them did not have bruxism (402 or 53.2%) compared to students who stated the presence of bruxism (354 or 46.8%). The Chi-square test did not confirm that there is a statistically significant difference between students who stated the presence of bruxism and those who did not have bruxism in the surveyed sample ( $\chi^2 = 3.048$ ;  $p < 0.081$ ). The results are shown in Table 1.

Between students of the Faculty of Dentistry and Pharmacy, the chi-square test did not confirm statistical significance ( $\chi^2 = 0.188$ ,  $p < 0.664$ ) in the frequency of self-reported bruxism, which is shown in Table 2.

The Chi-square test was used to compare the frequency of the presence of self-reported bruxism between men and women, where statistical significance was not proven ( $p < 0.496$ ), and the obtained results are shown in Table 3.

**Table 1.** The frequency of presence of self-reported bruxism

Bruxism	n	%	$\chi^2$	p
No	402	53,2	3,048	0,081
Yes	354	46,8		
Total	756	100		

$\chi^2$  – value of the chi square test

p – probability of rejecting the null hypothesis at a risk of 5%

**Table 2.** The frequency of presence of self-reported bruxism among students of the Faculty of Dentistry and Pharmacy

		Self-reported bruxism present					
		No		Yes		Total	
		n	%	n	%	n	%
Faculty	Pharmacy	172	42,8	145	41,0	317	41,9
	Dentistry	230	57,2	209	59,0	439	58,1
	Total	402	100,0	354	100,0	756	100,0

$\chi^2 = 0,188$ ,  $df=1$ ,  $p < 0,664$

**Table 3.** The frequency of self-reported bruxism between the sexes of the subjects

		Self-reported bruxism present					
		No		Yes		Total	
		n	%	n	%	n	%
Gender	Male	86	21,4	84	23,7	170	22,5
	Female	316	78,6	270	76,3	586	77,5
	Total	402	100,0	354	100,0	756	100,0

$\chi^2 = 0,463, df=1, p<0,496$

Regarding the results showing the differences between teeth clenching and teeth grinding The chi-square test showed a statistically significantly higher frequency of teeth clenching ( $p<0.000$ ) compared to the frequency of grinding, grinding and clenching together, and the obtained results are shown in Table 4.

By comparing the results between different faculties in relation to the frequency of clenching and grinding teeth, the chi-square test did not prove that there is a statistically significant difference between the Faculty of Dentistry and the Faculty of Pharmacy in the frequency of grinding, clenching and grinding and clenching together, and the results obtained are shown in Table 5.

When it comes to teeth grinding, the largest percentage of respondents had it during the night. Teeth clenching was manifested in the highest percentage during the day. The results are shown in Table 7. The respondents who noticed that they grind their teeth statistically significantly

**Table 4.** Comparison of the frequency of grinding, squeezing and grinding and squeezing

	n	%	$\chi^2$	p
Teeth grinding	30	8,5		
Clenching the teeth	201	56,8	124,2	0,000
Grinding and clenching of teeth	123	34,7		
Total	354	100,0		

n – number of subjects  
 $\chi^2$  – value of the chi square test  
 p – probability of rejecting the null hypothesis at a risk of 5%

( $p<0.000$ ) did so during the night. Respondents who noticed that they were clenching their teeth, statistically significantly noticed it during the day ( $p<0.000$ ). When it comes to the observation of squealing by another person regarding the subject's teeth grinding, it was significant during the night ( $p<0.000$ ).

**Table 5.** Comparison of the frequency of teeth grinding and clenching between the Faculty of Dentistry and Pharmacy

		Faculty				Total	
		Pharmacy		Dentistry			
		n	%	n	%	n	%
Symptoms of bruxism	Teeth grinding	16	11,0	14	6,7	30	8,5
	Clenching the teeth	77	53,1	124	59,3	201	56,8
	Grinding and clenching of teeth	52	35,9	71	34,0	123	34,7
	Total	145	100,0	209	100,0	354	100,0

$\chi^2 = 2,572, df=2, p<0,276$

**Table 7.** Comparison of daytime and nighttime bruxism frequency

		n	%	$\chi^2$	p
Have you noticed that you grind your teeth?	Yes, during the day	46	31,5	19,97	0,000
	Yes, during the night	100	68,5		
	Total	146	100,0		
Have you noticed that you are clenching your teeth?	Yes, during the day	201	63,2	22,19	0,000
	Yes, during the night	117	36,8		
	Total	318	100,0		
Did someone tell you to grind your teeth?	Yes, during the day	14	16,7	37,33	0,000
	Yes, during the night	70	83,3		
	Total	84	100,0		
Did someone tell you to clench your teeth?	Yes, during the day	37	52,1	0,13	0,722
	Yes, during the night	34	47,9		
	Total	71	100,0		

n – number of subjects,  $\chi^2$  – value of the chi square test, p – probability of rejecting the null hypothesis at a risk of 5%

By comparing the frequency of clenching and grinding teeth in certain situations among students, the chi-square test showed a statistically significantly higher frequency of clenching and grinding teeth ( $p < 0.000$ ) in a situation when they were under stress, which is attached in Table 8.

## Discussion

The coronavirus pandemic that appeared in 2019 led to numerous changes and challenges in our lives that needed to be answered. Uncertain forecasts, impossibility of forecasting and planning, public health and movement restriction measures, online classes and changes in other life circumstances are just some of the stressful factors. This led to significant psychological changes in the general population, and especially in the lives of students. A higher frequency of self-reported bruxism and TMD disorders during the

**Table 8.** Comparison of the frequency of clenching and grinding of teeth in specific situations

	n	%	$\chi^2$	p
When you're under stress	235	64,2	333,5	0,000
When you are angry	87	23,8		
When you are maximally concentrated doing something	33	9,0		
When you are tired	11	3,0		
Total	366	100		

n – number of subject  
 $\chi^2$  – value of the chi square test  
 p – probability of rejecting the null hypothesis at a risk of 5%

pandemic has been confirmed in numerous studies. [9, 10, 15, 16]

Despite multiple etiologic factors, stress, anxiety and genetic predisposition are thought to

be the dominant factors leading to involuntary masticatory muscle activity associated with teeth clenching/grinding. [17, 18, 19, 20]

Bruxism functions as a kind of perpetual motor because the increased symptoms that arise due to the abnormal functioning of the organism increasing the feeling of stress, and as a result, there is increased muscle tone and teeth grinding. [21]

In our research, the chi-square test did not confirm a statistically significant difference between the students who stated the presence of bruxism and those who did not have bruxism in the surveyed sample. However, the total percentage of 46.8% at both faculties who reported bruxism is extremely high, which indicates a high prevalence of self-reported bruxism among the student population. The total percentage of students with self-reported bruxism of 47.6% at the Faculty of Dentistry in Sarajevo correlates with the results obtained in a study among students at the Medical University in Lodz, where the total prevalence of awake bruxism was 47.8% and night-time bruxism was 58.9%. [22]

A slightly lower percentage of the presence of bruxism among students of 34.8% was reported among students of the Faculty of Dentistry in Pančevo in research conducted during the pandemic. [23]

In a study carried out at the Faculty of Medicine of the University of Split on the study of dental medicine before the COVID-19 pandemic, the frequency of bruxism was proven to be 47 % in students, which correlates with our results. [14]

The exceptionally high prevalence of bruxism (41.7%) in a study conducted among students at the Gulf-Medical University and among medical students in Vietnam (51.2%) in the period before the pandemic is explained by the fact that medical students are much more exposed to stress than their colleagues from other studies. They often feel exhausted during their studies due to the volume of material, difficulty sleeping, worries about the future as well as high parent's expectations. [24, 25] All these studies on the frequency of bruxism among students prove the extremely high prevalence of bruxism among students in general.

Regarding the difference in the frequency of bruxism between students of the Faculty of Dentistry and Pharmacy of the University of Sarajevo, statistical significance was not confirmed ( $\chi^2 = 0.188, p < 0.664$ ).

The highest percentage of surveyed students of both faculties with bruxism had symptoms of teeth clenching (26.6%), the smallest number of students had symptoms of teeth grinding during the night (4%). The chi square test showed a statistically significantly higher frequency of teeth clenching ( $p < 0.000$ ) compared to the frequency of teeth grinding. Since teeth clenching was established during the day and grinding during the night, the frequency of awake bruxism was higher compared to night-time bruxism.

Our results are consistent with the results of the research conducted by Cavallo P et al. in Italy, which also showed the prevalence of awake bruxism in 37.9% of students, while the prevalence of night-time bruxism was 31.8%. [26] A higher prevalence of awake bruxism compared to night-time bruxism was demonstrated among dental students in Iraq and in Israel. [27, 28]

Przystańska A and the authors state that awake bruxism occurs as a defensive reaction in the form of permanent muscle contraction during stress and anxiety. [13]

Regarding the difference between the genders, no statistically significant difference was proven, although the female population was more represented. Such results were expected because, in our study, a larger number of surveyed students were female. Our results agree with research in Italy and Ajman, where no significant difference between the genders was also proven. [26, 29]

In a study at the Faculty of Dentistry in Turkey, a higher rate of bruxism among female students (75.2%) than among male students (51.7%) was demonstrated. [30] As well as in research at the Faculty of Medicine of the University of Split, where the frequency of both clenching and grinding was higher in female students. [14]

During this research, the most common situations in which students noticed that they were clenching and grinding their teeth were when they

were under stress (64.2%), then slightly less when they were angry (23.8%). They clenched and grinded their teeth the least when they were maximally concentrated doing something and when they were tired. The chi-square test showed a statistically significantly higher frequency of clenching and grinding teeth ( $p < 0.000$ ) in a situation when they were under stress. According to the self-assessment of students in a study at the Faculty of Medicine in Split, the events during which students most often grinded and clenched their teeth were when they were under stress (25.2%) and when they were angry (24%). [14]

Research among health students in Pakistan has proven a link between bruxism and stress, as bruxism was more common in students who experienced stress. [31]

Numerous studies of studies have also found a connection between psychological conditions such as hypersensitivity to stress, anxiety, depression and fear with bruxism. [32, 33, 23, 34]

Since the stress is considered one of the etiological causes of bruxism, the increase in stressors during the COVID-19 pandemic led to an increase in the prevalence of bruxism, sleep disorders, and TMD, which has been confirmed in numerous studies. [35, 36, 37]

The impact of the pandemic on dental education is considered more destructive, primarily because the educational process involves the learning of practical skills that students perform directly on the patient, which results in greater stress from the infection with COVID and possible harmful consequences, as well as the possibility of transmitting the infection to the closest family members. [38]

It should be noted that the data on the prevalence of bruxism in this study were obtained only based on self-report. In order to determine the true prevalence of bruxism, it is necessary to perform a clinical examination and polysomnography in addition to self-reporting of bruxism.

## Conclusion:

Our research proved the high prevalence of bruxism among students.

The results showed that there is no statistically significant difference in the presence of bruxism between genders nor between different faculties. A higher frequency of awake bruxism compared to night-time bruxism has been proven.

Considering the high prevalence of bruxism among the student population, it is necessary to work on developing a protocol that will contribute to the prevention of bruxism and help reduce the risk of negative consequences on the stomatognathic system.

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