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ORIGINAL RESEARCH

Association of bruxism with psychological distress among dental, medical, and pharmacy students at Kermanshah University of Medical Sciences

Sahar Mafi[1], Hodays Yeganehfard[2]*, Hiwa Khaledi[3], Alireza Taslimi[4]

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Abstract

Background: Bruxism is an involuntary neuromuscular activity which may occur during wakefulness or sleep. It is considered a clinical manifestation of anxiety disorders. This study aimed to assess the association of bruxism with psychological distress in dental, medical, and pharmaceutical students at Kermanshah University of Medical Sciences.

Materials and Methods: This descriptive-analytical cross-sectional study was conducted on 359 dental, medical, and pharmacy students. Data were collected using a demographic information checklist, patients' reports regarding the presence of bruxism and its associated symptoms, and the Persian version of the Anxiety Control Questionnaire and Depression, Anxiety, and Stress Scale-21 (DASS-21). Data were analyzed by the Chi-square test and Spearman's correlation test (α=0.05).

Results: The academic level (term), grade point average (GPA), DASS-21 score, anxiety, depression, and stress had a significant association with bruxism (P<0.001). Only age had no significant association with bruxism (P=0.691).

Conclusion: A significant association was observed between bruxism and students' anxiety levels. Although the majority of students had normal levels of anxiety, the prevalence of bruxism was highest among pharmacy students.

Keywords: Anxiety; Stress, Physiological; Depression; Bruxism

Introduction

Bruxism is defined as the repetitive activity of the muscles of mastication, characterized by the grinding or clenching of the teeth that may occur during wakefulness or sleep. In healthy individuals, bruxism should be regarded as a potential risk factor for other clinical outcomes, such as temporomandibular disorders (TMDs), headache, tooth wear, and generalized tooth hypersensitivity, which can profoundly deteriorate the quality of life of patients (1). The prevalence of nocturnal bruxism reportedly ranges from 9.3% to 15.9%, while the prevalence of awakeness bruxism ranges from 22.1% to 31% in the adult population (2). Some other studies reported the overall prevalence of bruxism to range from 8% to 31.4% (3).

Bruxism is a multifactorial disorder, and its exact etiology has yet to be identified (4). Several factors, such as occlusal interferences, sleep disorders, central nervous system-related factors such as neurotransmitters and basal ganglia, and imbalance in dopamine receptor binding sites, and a probable role of genetics in the pathogenesis of bruxism have been proposed (4, 5). Bruxism may occur due to changes in the stomatognathic system (i.e., head and facial muscle disorders, occlusal interferences, TMDs, etc.) (6). Several psychosocial factors may also be associated with bruxism (4, 7). Anxiety, psychotic

Corresponding author: Hodays Yeganehfard

Department of Oral Medicine, Faculty of Dentistry, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran
Email: Yhodais@yahoo.com

[1] Department of Oral medicine, Faculty of dentistry, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran
[2] Department of Oral medicine, Faculty of dentistry, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran
[3] Department of Oral medicine, Faculty of dentistry, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran
[4] Periodontist, Tehran, Iran

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and anxiety disorders have been reported in patients with bruxism (7, 8).

Psychological distress can potentially lead to behavioral changes, negatively affect one's feelings, and influence his/her interactions and communications with others when an individual faces a strong stressor and cannot properly manage his/her emotional disturbances. It can cause eating and sleep disorders, anxiety, bipolar disorder, post-traumatic stress disorder, depression, bipolar psychosis, obsessive-compulsive disorder, and depression (9,10).

The association of healthcare and medical professions with high levels of stress has been well confirmed. Such high stress levels may originate from the process of education and educational curricula. Educational topics can also serve as an important stressor for students. The stress level of students has been the topic of many investigations, and higher levels of stress have been reported in students compared with the general population. A significant increase in stress levels has also been reported by an increase in the academic level of students. This phenomenon might be influenced by the known stressors such as shortage of time, high workload, poor patient cooperation, and the exhaustive and intense nature of work (11). Studies on the stress level of students have reported gender, academic level, marital status, financial problems, living status, and workload as the most common stressors in students (12,13).

Considering the elevated levels of stress and anxiety prevalent among students, as well as the significance of this issue and the detrimental consequences of bruxism—including temporomandibular disorders (TMDs), inflammation of the masticatory muscles, premature tooth wear, tooth fractures, headaches, sleep disturbances, enamel erosion, and tooth hypersensitivity—this study seeks to investigate the association between bruxism and psychological distress among students in dental, medical, and pharmaceutical disciplines. Furthermore, there are existing uncertainties surrounding the relationship between bruxism and anxiety, highlighting its relevance within the student population.

Materials and Methods

This descriptive-analytical cross-sectional study (Ethical code: IR.KUMS.REC. 1400.646) was conducted on 359 dental, medical, and pharmaceutical students. The sampling method was Convenience Sampling. No history of known psychological and mental disorders, intake of antipsychotic medications was among the inclusion criteria. Students who were uncooperative in filling out the questionnaires were excluded from the study.

The selected students were provided with a demographic checklist (asking for age, gender, field of education, and academic level or term of students), the Depression, Anxiety, and Stress Scale-21 (DASS-21), Anxiety Control Questionnaire, and a bruxism questionnaire. The Anxiety Control Questionnaire was designed by Rapee et al (14) and is a measure of perceived control over anxiety-related events. This questionnaire has 30 items and 2 domains of internal emotional reactions and external threats. It has questions with 5-point Likert scale answer choices, such as "I sometimes think, why even bother to try to cope with my anxiety when nothing I do seems to affect how frequently or intensely I experience it?" (15). The reliability of this questionnaire has been previously confirmed with a Cronbach's alpha > 0.70 (16).

The DASS-21 has 21 questions in three domains of depression, anxiety, and stress, each with 7 different items. The final score of each domain is the sum of the scores of its questions. The DASS-21 is used for screening of anxiety and stress symptoms (17). A 4-point Likert scale is used for scoring of the questions as follows: never: 0, occasionally: 1, sometimes: 2, and always: 3. A total score ranging from 0 to 9 indicates normal, 10-13 indicates mild, 14-20 indicates moderate, 21-27 indicates severe, and 28 and higher indicates very severe. For the depression domain, scores between 0-7 indicate normal, 8-9 indicate mild, 10-14 indicate moderate, 15-19 indicate severe, and 20 and higher indicate very severe depression. For the anxiety and stress, scores 0-14 indicate normal, 15-18 indicate mild, 19-25 indicate moderate, 26-33 indicate severe, and 34 and higher indicate very severe anxiety and stress. The validity of this questionnaire has been previously confirmed (18, 19).

The bruxism questionnaire has 9 questions with 3-point Likert scale answer choices of yes (code 1), no (code 2), and I do not know (code 3). The total score may range from 3 to 27. The validity and reliability of this questionnaire have been previously confirmed by Hashemipour et al (20). In this questionnaire, patients who respond to the first question with code 1 have bruxism. Also, the patient has bruxism if they respond to at least one of the questions of 2 to 9 with

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code 1 (8, 21-23). The questionnaires were designed electronically, and the link was sent to the participants through email or the social messengers used in each university. The participants were briefed about the study objectives at the beginning of the electronic questionnaire and were requested to fill out the questionnaires if they were willing to do so.

Normal distribution was determined by the Kolmogorov-Smirnov test. Data were analyzed by the Chi-square test and Spearman's correlation test using SPSS version 23 at 0.05 level of significance.

Results

A total of 359 students, including 125 medical students (33.8%), 120 dental students (33.4%), and 114 pharmacy students (31.8%), were enrolled in the study. The mean age of the students was 23.39±3.52 years. The majority of the students (23.1%) were in academic term 9 (year 5th). Of all, 154 students were males, and 205 were females.

Assessment of the depression, anxiety, and stress levels of the students by using DASS-21 revealed that the majority of the students were normal in terms of depression (54.6%), anxiety (54%), and stress (40.1%). The Chi-square test showed a significant association between the field of education and bruxism (P=0.006), but the association of gender and bruxism was not significant (P=0.894) (Table 1).

Table 1. Association of demographic variables with bruxism

Variable		Present	Absent	P value
		Frequency (%)	Frequency (%)	
Gender	Male	72 (46.7)	82 (53.3)	0.894
	Female	93 (45.3)	109 (54.7)	
Field of education	Dentistry	51 (42.9)	68 (57.1)	0.006
	Medicine	48 (38.7)	76 (61.3)	
	Pharmacy	66 (58.4)	47 (41.6)	

Assessment of the association of gender with depression, anxiety and stress levels of the students by the Chi-square test (Table 2) showed significant association of gender with anxiety (P=0.005), but not with depression (P=0.205) or stress (P=0.066).

Table 2. Association of gender with depression, anxiety, and stress levels of students

Variable		Male	Female	P value
		Frequency (%)	Frequency (%)	
Anxiety	Normal	78 (50.6)	116 (56.6)	0.005
	Mild	9 (5.8)	16 (7.8)	
	Moderate	48 (31.2)	37 (18.0)	
	Severe	12 (7.8)	10 (4.9)	
	Very severe	7 (4.5)	26 (12.7)	
Depression	Normal	86 (55.8)	110 (53.7)	0.205
	Mild	21 (13.6)	15 (7.3)	
	Moderate	32 (20.8)	50(24.4)	
	Severe	7 (4.5)	12 (5.9)	
	Very severe	8 (5.2)	18 (8.8)	
Stress	Normal	59 (38.3)	144 (40.1)	0.066
	Mild	18 (11.7)	39 (10.9)	
	Moderate	37 (24.0)	87 (24.2)	
	Severe	40 (26.0)	80 (22.3)	

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Very severe	0 (0.0)	9 (2.5)

Assessment of the association of field of education with depression, anxiety, and stress levels of the students by the Chi-square test revealed no significant association (P>0.05) (Table 3).

Table 3. Association of the field of education with depression, anxiety and stress levels of the students

Variable		Dentistry	Medicine	Pharmacy	P value
		Frequency (%)	Frequency (%)	Frequency (%)	
Anxiety	Normal	64 (56.1)	66 (52.8)	64 (56.1)	0.097
	Mild	5(4.2)	7 (5.6)	13 (11.4)	
	Moderate	26 (21.7)	31 (24.8)	28 (24.6)	
	Severe	8 (6.7)	9 (7.2)	5 (4.4)	
	Very severe	17 (14.2)	12 (9.6)	4 (3.5)	
Depression	Normal	69 (57.5)	68 (54.4)	59 (51.8)	0.788
	Mild	10 (8.3)	15 (12.0)	11 (9.6)	
	Moderate	23 (19.3)	28 (22.4)	31 (27.2)	
	Severe	7 (5.8)	5 (4.0)	7 (6.1)	
	Very severe	11 (9.2)	9 (7.2)	6 (5.3)	
Stress	Normal	53 (44.2)	52 (41.6)	39 (34.2)	0.671
	Mild	13 (10.8)	15 (12.0)	11 (9.6)	
	Moderate	28 (23.3)	30 (24.0)	29 (25.4)	
	Severe	23 (19.2)	24 (19.2)	33 (28.9)	
	Very severe	3 (2.5)	4 (3.2)	2 (1.8)	

Assessment of the association of age, academic level (term), grade point average (GPA), and DASS-21 with depression, anxiety and stress levels of the students by the Spearman's correlation test revealed significant positive correlations between age and DASS-21, depression and anxiety (P<0.05), and also between academic level (term) and DASS-21, depression, anxiety, and stress. GPA had a significant positive correlation with DASS-21 (P<0.05). Depression and stress had a significant inverse correlation with each other (P<0.05). Also, DASS-21 had a significant positive correlation with all the assessed variables (P<0.05) (Table 4).

Table 4. Correlation of age, academic level (term), GPA, and DASS21 with depression, anxiety, and stress.

Variable	Age		Academic level (term)		GPA		DASS-21	
	rs	P value	rs	P value	rs	P value	rs	P value
DASS-21	0.197	<0.001	0.267	<0.001	0.150	0.008	-	-
Depression	0.225	<0.001	0.272	<0.001	-0.160	0.005	0.951	<0.001
Anxiety	0.274	<0.001	0.301	<0.001	-0.080	0.159	0.840	<0.001
Stress	0.031	0.552	0.148	0.005	-0.173	0.002	0.195	<0.001

rs: Spearman's Rank Correlation

Assessment of the association of age, academic level (term), GPA, DASS-21, anxiety, depression, and stress with bruxism by the Mann-Whitney test revealed significant associations between the academic level, GPA, DASS-21, anxiety, depression, and stress with bruxism (P<0.001), and only age had no significant association with bruxism (P=0.691) (Table 5).

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Table 5. Association of age, academic level (term), GPA, anxiety, depression, and stress with bruxism

Variable	Bruxism		P value
	Present (N)	Absent (N)	
age	153	191	0.691
Academic level (term)	165	191	0.018
GPA	150	159	0.003
Anxiety	165	191	<0.001
Depression	165	191	<0.001
stress	165	191	<0.001

Discussion

The present results indicated a significant association between bruxism and anxiety in dental, medical, and pharmacy students, which was in line with the results of other studies (24, 25).

There has been an increase in evidence-based scientific data supporting the multifactorial nature of bruxism, the role of genetics, and the implication of psychological factors in this process (26). Personality traits such as susceptibility to stress and anxiety are the main psychological factors related to bruxism in children and adults (27). The pathophysiological mechanism of involvement of stress in the occurrence of bruxism is explained by the fact that people with high levels of psychological distress and anxiety tend to release their emotional tensions through bruxism (26).

Ella et al. (28), in their study on bruxers, found a significant statistical association between bruxism and stress without identifying the type of bruxism. In a study by Cavalo et al. (29), the association of stress and bruxism was only significant in males. Some other studies pointed to the role of stress in the occurrence of bruxism, particularly in awake bruxism (26, 30). However, some others refuted this association and explained that it is accidental (31).

Chronic stress and body reactions can cause tension and pain in the muscles of mastication. Moreover, the body's response to stress per se can cause neuromuscular disorders. Also, controlling individuals and those with compulsive behaviors are at higher risk of bruxism. Another study showed that bruxism and stress had a high frequency in students, compared with the general population (32). Although female students had a higher stress level in their study, they found no significant association between stress and bruxism, which was in contrast to the present findings.

Demographic variables (gender, age, and academic level) had a significant association with anxiety in the present study. Shamsaei et al. (33), Norouzinia et al. (34), and Najafi Kalyani et al. (35) reported the same results. However, the findings of Miri et al. (36), Mohebian et al. (37), and Ramazani et al. (38) were in contrast to the results of the present study, which may be attributed to differences in sample size, personal characteristics of patients, and statistical populations.

In the current study, bruxism had a significant association with field of education, GPA, and academic level of the students, but had no significant association with gender or age, which was in line with the results of other studies (25, 39). However, Yıldırım et al. (22) demonstrated a significant association between gender and bruxism in dental students. Kirarslan Karagoz et al, (39) also found a significant association between gender and bruxism. Câmara-Souza et al. (24) found a significant association between gender and anxiety, which was in contrast to the present findings. Khademi et al. (40) reported the prevalence of bruxism in students of Birjand University to be 31.1%, and pointed to the significant association of bruxism with stress, family history, and age. Variations in the reported prevalence rates for bruxism in the literature may be related to differences in the adopted diagnostic criteria and indices, socioeconomic status, cultural factors, geographical location, and demographic characteristics of the study populations (41).

Assessment of the prevalence of anxiety in dental, medical, and pharmacy students in the present study revealed normal level of anxiety in the majority of students, which was in line with the findings of Mohebian et al. (37), and Miri et al. (36). However, unlike the present study, medical and pharmacy students had a low level of anxiety in a study by Ibrahim and Abdelreheem (42), which may be due to the difference in sample size between the two studies.

Assessment of the prevalence of bruxism among the studied students revealed that the highest prevalence of bruxism was seen among the students of pharmacy. This result could be expected considering the nature of pharmacy, non-familiarity of pharmaceutical students with bruxism, and their insufficient academic information in this regard. It is recommended to add bruxism-related educational

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topics to their educational curriculum for their familiarization with bruxism. Kirarslan Karagoz et al. (39), in their study on the possibility of nocturnal and awake bruxism, chronotype, and TMD symptoms in dental students in Turkey, reported the frequency of nocturnal and awake bruxism to be 25.2% and 28.9%, respectively. Câmara-Souza et al. (24) assessed the frequency of awake bruxism and psychosocial factors among college newcomers and reported the frequency of awake bruxism to be 38.4%. Also, 31.6% of students in a study by Soares et al. (43) had bruxism. In a study by Cavallo et al. (29), the prevalence of awake and nocturnal bruxism in students was 37.9% and 31.8%, respectively. Fluerașu et al. (44) epidemiologically assessed bruxism and its association with psychological factors and showed the significant role of psychological factors in the development of nocturnal and awake bruxism. Stress and anxiety served as predisposing factors for both nocturnal and awake bruxism in their study, but depression was only associated with awake bruxism. Walentek et al. (45) assessed the relationship of psychological distress and nocturnal bruxism with confirmed diagnostic methods and concluded that the association of psychological distress and bruxism measured by instrumental procedures (polysomnography, diagnostic sheet) was poor. A positive and slightly stronger association was found between psychological distress and bruxism, as measured by non-instrumental methods such as self-reports and clinical examinations. It was noted that, given the reported correlation between psychological distress and bruxism, physicians should take this seriously and consider recommending psychotherapy.

Conclusion

A significant association was identified between bruxism and anxiety levels among students. Although the majority of participants reported normal levels of anxiety, variations within this range appeared to influence the prevalence of bruxism. Notably, pharmacy students exhibited the highest frequency of bruxism, which may reflect a greater susceptibility to stress or subclinical anxiety levels in this subgroup. These findings highlight the importance of addressing psychological well-being in students as part of preventive and therapeutic approaches to managing bruxism.

Conflict of Interests: The authors of this manuscript declare that they have no conflicts of interest, real or perceived, financial, or non-financial in this article

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