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Self-reported bruxism and stress and anxiety in adults: A study from Iran

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Original Article

Abstract

BACKGROUND AND AIM: The habit of grinding teeth together is called grinding and the scientific term is "bruxism". Bruxism usually occurs in deep sleep or when the person is under stress**.** This motivates the authors to investigate the relationship between stress and anxiety with the rate of free informed bruxism in the present work.

METHODS: This research was a cross-sectional study and the population under analysis was adults over 18 years of age who referred to dental clinics of Kerman, Iran, and also people who accompanied them (simple census). The ethical approval code was IR.KMU.REC.1399.321. The investigations included questioning the patients about the history of bruxism and clenching. The information was analyzed by chi-square test, using SPSS software with 0.05 confidence level.

RESULTS: The prevalence of self-reported bruxism was 23.2% and 15.1% among women and men, respectively. The percentage of clenching alone was 27.3%, and it was 23.5% and 25.6% in women and men, respectively. The prevalence of bruxism and clenching together was 9.8 %. In patients suffering from bruxism, the prevalence of temporomandibular signs was 24.6%, the feeling of fatigue, stiffness, or pain after awakening was 23.5%, temporomandibular joint (TMJ) sound was 6.9%, and limitation in mouth opening was 8.8%. In patients suffering from clenching, TMJ sound was 5.8%, oral pain was 8.8%, and limitation in mouth opening was 10.5%. Between 365 respondents, people who were aware of their bruxism significantly reported more anxiety.

CONCLUSION: Based on the present findings, self-reported bruxism, anxiety, and stress may be associated with each other.

KEYWORDS: Bruxism; Stress; Anxiety

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The habit of grinding teeth together is called grinding and the scientific term is "bruxism". Bruxism usually occurs in deep sleep or when the person is under stress. Although grinding teeth together during daytime can also be seen in some individuals.[1-3]

Reports show that the prevalence of bruxism is between 8 to 31 percent. Frequent muscle contractions on one side of the face and the annoying sound of bruxism at night can be loud enough to wake others from their sleep. Since bruxism usually occurs during sleep, most people are not aware of it, but constant headache or painful jaw can be a sign of bruxism. Emotional pressure (worrying, insomnia, stress, anxiety), teeth disorders (occlusal deficiencies) resulted from improper positioning of the jaws and teeth, unconscious habits, allergies, intestinal parasites, consumption of food and drinks which contain caffeine (cola, chocolate, coffee), and alcoholic drinks are causing factors of bruxism.[4-7]

There are two types of bruxism: primary type, when there is no known medical reason for its occurrence and secondary type, when bruxism is accompanied with conditions such as psychological problems (distress and anxiety), medications (such as

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antidepressants), or certain illnesses such as Parkinsonism or apnea (breathing pauses during sleep).[8] In the secondary type, bruxism will end by resolving the underlying problems. Albeit, in some cases, bruxism turns into a habit; in this situation, by eliminating the underlying problem, the habit will remain. Bruxism usually does not have a specific sign, but the pressure on the teeth can become high enough causing teeth abrasion and removal of the enamel, which can increase tooth sensitivity, fraction, and fractures. It can also lead to cusp degeneration of posterior teeth. In some cases, other signs can be seen, such as headache, toothache, tooth wear, tooth wobbling, degeneration of gums, neck pain, insomnia, ulcers or pain in the cheeks and ears, sound during opening and closing of the jaw, tooth hypersensitivity, and notching of the tongue, especially on the sides.[8-10]

In adults who are psychologically normal (i.e., those who do not suffer from anxiety or severe psychological disorders), the relationship between anxiety and bruxism is still not certain; however, it seems that momentary reactions of anxiety to high-stress events can be associated with self-reported bruxism.[11,12]

This behavior associates with several factors such as body movements, heart rate increase, and changes in breathing and muscle activity. Many sleep problems, especially frequent waking, have been the subject of some previous studies. It was revealed that anxiety and stress exacerbated bruxism and other irritations during sleep. Recent studies on media employees who have various responsibilities and are under the excessive pressure of irregular work hours show that awareness of bruxism (i.e., self-reported grinding or clenching during sleep or when awake) can be a sign of stress or unsatisfaction of the individual regarding his or her work schedule. Previous studies have shown that there is no association between gritted teeth and anxiety.[12-18] This motivates the authors to investigate the relationship between stress and anxiety with the rate of self-reported bruxism in the present work.

Methods

This research was a cross-sectional study and the population under analysis was adults over 18 years of age who referred to dental clinics of Kerman, Iran, and also people who accompanied them (simple census). The ethical approval code was EC/93-51-KNRC. The aim of this research was explained to all of the participants and if they were interested, the questionnaire was given to them by a final-year student. Besides, they were assured that the information would remain discreet and would only be used for statistical studies. In this research, Symptom Checklist-90-Revision (SCL-90-R) was used which includes 20 questions for anxiety evaluation.[18] The standard grading to each question is 1 to 5 which is given to “very frequently”, “frequently”, “sometimes”, “rarely”, and “never”, and the overall score of the questionnaire is between 20 to 100. A higher score is a sign of higher anxiety. This questionnaire was first introduced in 1979 by Cooper and Burger based on clinical experience and previous psychological analyses. Since then, this test has been used in many researches and is one of the most common tools for psychiatry diagnosis in the United States (US). This questionnaire has been standardized by Akhavan Abiri and Shairi in Iran.[19] Cohen et al. prepared a standard stress questionnaire to evaluate stress and the level of stress was measured and expressed by a five−point scale.[20] Stress is a situation which an individual feels pressured, hectic, uptight, anxious or is not able to sleep because of intellectual preoccupation. The scoring criterion for each question is 1 to 5 which is given to “not at all”, “very little”, “somewhat”, “a lot”, and “very much” and the overall score of the questionnaire is variable between 10 to 50. Obtaining a higher score is a sign of higher level of anxiety.

Self-consciousness of the amount of pressure or grinding repetition is measured by

a five-point scale (never, rarely, sometimes, very often, and always). Individuals who reported "always" or "very often" were categorized as frequent bruxers and those who reported "sometimes" were categorized as mild or non-bruxers. Besides this, questions such as "Do you clench your teeth together?", "Have you or another person heard the sound of your teeth grinding during your sleep?", "Are your teeth worn more than normal?", and "Have you experienced any of the following symptoms after waking from sleep?" were used in order to evaluate self-reported bruxism. Demographic information, such as gender, age, job, and education was recorded for the patient. Chi-square test was used to evaluate the relationship between dependent variables, while Jonckheere-Terpstra test was employed to evaluate the relation between the severity of bruxism with stress and anxiety. Multinominal logistic regression model was used to analyze the independent effects of psychological factors on the possibility of moderate and frequent bruxism. Odds ratios (ORs) and their corresponding 95% confidence intervals (CIs) were calculated, and statistical analysis was done by the SPSS software (version 21, IBM Corporation, Armonk, NY, USA).

Results

In this research, 385 questionnaires were distributed, of which, 362 were returned (response rate = 94.02%). 152 (41.9%) of the subjects were men and 210 (58.1%) were women. The average age of the participants was 28.14 ± 8.90 years and the range of their age was between 18 to 74 years old. Table 1 shows the demographic information of the participants. The response to the question regarding self-reported bruxism was 23.2% and 15.1% among women and men, respectively. The overall percentage of bruxism and clenching was reported to be 9.8% (Table 2).

Table 1. Demographic characteristics of the subjects

Characteristics		n (%)
Marital status	Single	215 (59.4)
	Married	147 (40.6)
Job	Self-employed	251 (69.3)
	Unemployed	111 (30.7)
Education	Illiterate	25 (6.9)
	High school diploma	51 (14.1)
	Diploma	178 (49.2)
	Associate degree	52 (14.4)
	Bachelor	45 (12.4)
	Master's degree or higher	11 (3.0)
Job schedule	Irregular	67 (18.5)
	Regular	184 (50.8)
	Day	215 (59.4)
	Night	36 (9.9)

The highest frequency of bruxism was reported between ages of 40 to 50 years (Table 3); the highest clenching rate was between ages of 20 to 30 years old and the amount was 46.0%. In patients suffering from bruxism, frequency of symptoms such as temporomandibular disorders (TMDs) was seen in 89 people, fatigue, stiffness, or pain in the jaw after awakening was seen in 85 people, temporomandibular joint (TMJ) sounds in 25 people, and limited mouth opening was seen in 32 people. In patients with teeth clenching, signs such as TMJ sounds were seen in 21 people, oral pain was seen in 32 people, and limited mouth opening in 38 people. Among patients suffering from bruxism, the major symptoms were oral pain and fatigue. The most frequent symptoms among patients suffering from teeth clenching were fatigue, stiffness, or jaw pain after awakening (Table 4).

Table 2. Absolute and relative abundance of self-reported bruxism and clenching

	Never	Rarely	Sometimes	Often	Always
	n (%)	n (%)	n (%)	n (%)	n (%)
Do you suffer from bruxism?	210 (58.1)	85 (23.5)	24 (6.6)	25 (6.9)	18 (5.0)
Do you clench your teeth together?	200 (55.2)	63 (17.4)	26 (7.2)	30 (8.3)	43 (11.9)
Have you or another person noticed frequent teeth grinding during your sleep?	235 (64.9)	50 (13.8)	22 (6.1)	28 (7.7)	27 (7.5)

Table 3. The relationship between demographic variables and the severity of bruxism based on self-reports

Variable		Mild or non-bruxer	Moderate bruxer	Frequent bruxer	P
		n (%)	n (%)	n (%)	
Gender	Man	130 (35.9)	10 (2.7)	12 (3.6)	0.010*
	Woman	165 (45.6)	14 (3.8)	31 (8.5)	
Age (year)	≤ 30	75 (20.0)	5 (1.4)	5 (1.4)	0.030*
	31-40	45 (11.6)	6 (1.7)	9 (2.5)	
	41-50	152 (42.0)	10 (2.8)	20 (5.5)	
	51-60	18 (5.0)	2 (0.6)	6 (1.7)	
	> 60	5 (1.4)	1 (0.3)	3 (0.8)	
Irregular working hours	Yes	27 (7.5)	20 (5.5)	20 (5.5)	0.080
	No	268 (74.0)	4 (1.1)	23 (6.4)	
Stress	Yes	132 (36.5)	16 (4.4)	31 (8.6)	0.001*
	No	163 (45.0)	8 (2.2)	12 (3.3)	
Anxiety	Yes	140 (40.1)	18 (5.0)	32 (8.8)	0.001*
	No	150 (41.4)	6 (1.7)	11 (3.0)	

*P < 0.05 is significant

There was not any relationship between clenching and bruxism with TMDs except pain in the temples after awakening (P = 0.001).

This research indicated that 36 individuals suffered from severe anxiety and 62 individuals were under severe stress. The average scores of anxiety and stress were 51.12 ± 6.90 and 32.15 ± 5.12, respectively. Among 365 people who responded, reports of anxiety were significantly higher in individuals who were aware of bruxism (P = 0.001).

Discussion

In this research, the prevalence of bruxism was 23.2% and 15.1% among men and women, respectively, and the frequency of teeth clenching alone was 27.3%. The highest frequency of bruxism was seen between ages of 40 to 50 years. Clenching was mostly seen between ages of 20 to 30 years with the rate of 46.0%. In various researches, regarding different populations and ages, variable results about the prevalence of bruxism and teeth clenching have been reported. In the study of Winocur et al., the bruxism was 14%,[21] which is in agreement with Ahlberg et al. research which showed that 13.5% of subjects claimed to be frequent bruxers.[14]

According to other studies, women have reported higher degrees of bruxism compared to men;[20] however, they are not completely compatible with Liddell and Locker study which indicated that men experienced bruxism more than women.[22]

In Ciancaglini et al. research,[23] the prevalence of bruxism was 31.4% and in Carlsson research, the prevalence of bruxism and clenching was 10.0% and 2.0%,[24] respectively. In Ahlberg et al.[18] research, the prevalence of bruxism and clenching combined was 20.0%.

Table 4. The relative and absolute abundance of temporomandibular signs and the severity of bruxism, based on self-report

	Yes		No	
	Bruxism	Clenching	Bruxism	Clenching
	n (%)	n (%)	n (%)	n (%)
Stiffness or pain in the jaw after awakening	85 (23.5)	55 (15.2)	277 (76.5)	307 (84.8)
Jaw pain or teeth locking together after awakening	89 (24.6)	32 (8.8)	273 (75.4)	330 (91.2)
Temple pain after awakening	45 (12.4)	32 (8.8)	317 (87.6)	330 (91.2)
Limited mouth opening after awakening	32 (8.8)	38 (10.5)	330 (91.2)	324 (94.5)
Sense of pressure in jaw joint	38 (10.5)	25 (6.9)	324 (89.5)	337 (93.1)
Having to move the lower jaw for replacement	32 (8.8)	28 (7.7)	330 (91.2)	334 (92.3)
Sensing noise in the jaw joint after awakening which disappears afterwards	25 (6.9)	21 (5.8)	337 (93.1)	341 (94.2)

In Glaros et al. research,[25] the prevalence of bruxism and clenching combined was over 10.0% to 19.0% and in Choi et al.[26] research, the prevalence of bruxism was 8.0% and clenching was 9.9%. In Chen et al.[27] research, the prevalence of bruxism and clenching was 39.4%. In Demir et al.[28] research, the prevalence of bruxism was 12.6%, and finally in Shirani and Maleki[29] research, bruxism and clenching were 13.0% and 34.0%, respectively, among a student population.

Based on the results of this study, the most frequent signs among patients suffering from bruxism were oral pain and fatigue. In individuals suffering from teeth clenching, the most frequent signs were fatigue, stiffness, or jaw pain after awakening. However, these results need to be further studied. The most frequent oral symptom in patients suffering from teeth clenching was tooth wear (42.0%) and the major temporomandibular sign was joint clicking (37.5%).

In various literature, bruxism and clenching have been considered as possible factors for the development of TMDs;[30] however, in other studies, different results have been obtained. In Ciancaglini et al. study, a significant relationship between bruxism and TMDs, especially limited jaw movement, has been shown;[23] this is different from the results of the present study, regarding limited jaw movement. In Pullinger and Seligman[31] and also Gavish et al study,[32] no relationship between bruxism and TMDs was found.

In the present study, a relationship between bruxism and clenching with TMDs except temple pain after awakening was found. According to a research which reviewed 63 articles regarding TMDs, the relationship between bruxism and TMDs still remains uncertain and requires further investigation.[33] Among 365 respondents, those who were aware of bruxism reported significantly more anxiety. Severe anxiety and stress both had a significant relationship with frequent bruxing. Regression analysis indicated a significant relationship between severe stress and bruxism, which is similar to the original study. It is worth mentioning that the definition of bruxism in this study was based on self-reported bruxism and was not clinically confirmed.

In two other researches which studied bruxism in individuals who routinely experienced higher levels of stress, the prevalence among Brazilian police was 50.0%[34] and among Israeli air force pilots was 69.0%.[35] Lavigne et al. suggested that the result of the questionnaires may be biased because of natural fluctuations in bruxism activity with time, risk of false or poor memory of bruxism, or anxiety and unawareness of this habit.[36]

In this study, bruxism was mostly reported between ages of 40 to 50, while several studies have reported that people with anxiety have a higher risk of bruxism at any age.[8,34,35,37] Some other studies were not able to confirm this relationship.[36,38] In the present research work, a clear difference is found between frequent bruxers with mild or non-bruxers regarding their anxiety and stress scores, which is similar to the result of Ahlberg et al.[14]

In the adult population who are psychologically healthy (i.e., individuals who do not have severe anxiety or psychological disorders), the relationship between anxiety and bruxism is still not certain. However, it seems that transient anxiety reactions to high-stress events can be associated with self-reported bruxism.[39] It has been shown that sleep bruxism is a part of complex impulse reaction in the central nervous system (CNS) which occurs during sleep depth fluctuations and is accompanied with body movement, heart rate increase, respiratory changes, and muscle activity. Since the prevalence of sleep disorders, especially frequent awakening, was seen in the previous studies, it is possible that anxiety and stress increase bruxism activity and other impulses during sleep. The fact that this includes self-reported bruxism is still not clear.[12]

Recent studies on multimedia employees who have several responsibilities and are

under the pressure of irregular working hours, sever and constant changes of technology, and deadline and demands regarding live broadcasting indicate that self-consciousness of bruxism can be a sign of stress and dissatisfaction of their work schedule;[13] however, previous studies have not controlled anxiety and the intensity of bruxism.[14]

Current results confirm studies regarding the relationship between bruxism and anxiety in adults. Except Ohayon et al. study which was performed on a large population and the results were different.[40] Study of literature shows that awake bruxism may be mostly associated with psychological factors and psychopathologic complications, while information about the aetiology obtained in sleep laboratories did not confirm the relationship between psychosocial disorders and bruxism which was diagnosed with polysomnography (PSG).[10]

Clinical diagnostic methods are used for researches performed on large samples regarding bruxism. In a recent work by Manfredini and Lobbezoo, the majority of information regarding the relationship between psychological symptoms and bruxism was obtained by clinical and/or self-reported bruxism.[9] Moreover, unlike PSG studies, this study found a relationship between bruxism and psychological disorders. Studies have shown that questionnaires (which have also been used in this study) are sufficiently reliable.[19,20] However, the reliability of self-reported questionnaires must be proven by PSG studies on sleep bruxism and electromyographic (EMG) recordings on awaked bruxism, performed by a portable apparatus.[20]

This study has some limitations. One is Lack of cooperation of a number of people and the other is failure to perform clinical examination of patients.

Conclusion

Based on the present findings, self-reported bruxism, anxiety, and stress may be associated with each other.

Conflict of Interests

Authors have no conflict of interest.

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