Original Article

The Relationship of Psychological Status and Sociodemographic Factors with Bruxism among Undergraduate Dental Students: A National Survey

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Abstract

Background: Although its etiology is not fully known, the accepted view is that bruxism is a multifactorial disorder. **Aims:** This study aims to evaluate the prevalance of self-reported bruxism and to investigate its relationship with psychological and sociodemographical factors amongst undergraduate dental students in Zonguldak, Turkey. **Subjects and Methods**: 250 dental students were asked to fill the bruxism questionnaire – to detect the prevelance of bruxism; personal information form – to determine sociodemographic variables; and symptom checklist-90-R (SCL-90-R) – to asses psychological state. Data were analyzed statistically by Kolmogorov Smirnov, Shapiro Wilk, Mann Whitney *U*, and Kruskal Wallis tests through Statistical Package for the Social Sciences (SPSS) program. **Results:** The prevalance of self-reported bruxism was 40%. 46% of the students showed higher levels of psychological symptoms. SCL-90-R subscales showed statistically significant differences in students with bruxism compared to those without bruxism ($P < 0.05$). It was observed that bruxism was associated with gender ($P < 0.05$) and both bruxism and psychological symptom levels were statistically higher in females ($P < 0.05$). **Conclusions:** The findings revealed that, although bruxism was common among dental students, gender and psychosocial factors are also mostly associated with the etiology of bruxism. In this context, during the challenging dentistry education period, it is important to direct students who are found to have high levels of psychological symptoms to psychological counseling and guidance services.

Keywords: *Bruxism, demography, dental, psychology, social factors, students*

Introduction

Bruxism is a non-functional repetitive jaw-muscle activity characterized by grinding or clenching the teeth.[1] Awake bruxism is a type of bruxism characterized by the continuous or repetitive activity between the teeth during wakefulness, while sleep bruxism is defined as the rhythmic (phasic) or non-rhythmic (tonic) activity of the masticatory muscles during sleep.[2]

Bruxism has many negative effects on the intraoral structures and the chewing system, that creates destructive effects.[3] It is an important reason for the emergence of many problems and/or the rapid progression of problems such as dental abrasions, fractures in restorations, pain, hypertrophy in chewing muscles, and temporomandibular joint (TMJ) disorders.[4] Epidemiological studies indicate that it may occur in 8–31% of the population, regardless of gender differences.[5] Although the etiology is not known exactly, it has been suggested that bruxism is a multifactorial disorder.[6] In bruxism etiology, pathophysiological and psychosocial central factors, and also peripheral factors such as occlusion and orofacial

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region anatomy may be effective.[7,8] Studies reported that due to the psychosocial factors, stress may be the main triggering factor for bruxism.[8,9] Stress may be associated with bruxism because salivary cortisol and catecholamine levels were elevated among bruxers, indicating stressful situations.[10]

Possible sleep/awake bruxism is based on self-report only; probable sleep/awake bruxism on self-report plus clinical inspection; definite sleep bruxism on self-report, clinical inspection, plus polysomnography; and definite awake bruxism on self-report, clinical inspection, plus electromyography.[2] It is evident that the use of self-reports to assess the presence or absence of bruxism is convenient for both clinicians and researchers, especially in epidemiological studies.[3]

University education includes a period when young people step into adulthood and their relationships change very rapidly. The prevalence of depression and other psychiatric disorders may increase during university education because of social, cultural, and economic changes that negatively affect young people.[11] Studies showed that the prevalence of bruxism is also high among university students.[12,13] Dental education has a very broad and difficult curriculum that can create high level of stress in the context of theoretical and practical applications in dental students during education.[14] The aim of this study was to examine the prevalance of self- report bruxism and to evaluate its relationship with sociodemographic and psychological factors in dental students.

Materials and Methods

This study was conducted among undergraduate dental students from Zonguldak Bülent Ecevit University, Turkey in accordance with the Declaration of Helsinki ethical principles for medical research involving human subjects and was approved by the Clinical Research Ethics Committee of Zonguldak Bülent Ecevit University (Ref # 2020/05). The sample size was calculated by G* Power 3.1 power analysis (Foul, Erdfelder, Lang, & Buchner, 2007). The minimum sample size for independent group comparisons with 0.3 effect size, $\alpha = 0.05$ and 90% power was determined as 164. The sample size was expanded and determined as 250. In this context, a total of 250 volunteer dental students among first to fifth year, 50 from each class, aged between 18 and 26, of both genders participated in the study. Participants were informed about the purpose, content, objectives, and procedures of the study. The authors also stated that participation is completely voluntary and there are no sanctions for those who refuse or withdraw to participate.

The presence and prevalance of bruxism was based on self-report and detected according to a questionnaire consisting of six questions that directed to the students. Individuals who answered "yes" to at least two of the questions specified in the questionnaire were identified as bruxist.[9,15] Sociodemographic characteristics (gender, age, class, income status, the status of willingly choosing the profession, place of stay, smoking status, previous psychiatric treatment, family status, and chronic health problem) of the students were collected through personal information form records that contain ten questions. Students' psychological assessment was conducted by Psychological Symptom Checklist. The symptom checklist-90-R (SCL-90-R) test that was developed for psychological symptom screening, is a measurement test used as a psychological symptom screening scale to determine the level of symptom or negative stress response experienced by normal people. The SCL-90 is a multidimensional symptom self-report inventory developed.[16] By using 90 items (somatization, obsessive–compulsive behavior, interpersonal sensitivity, depression, anxiety, anger and hostility, phobic reaction, paranoid thought, psychotic symptoms, additional scale related to more sleep and eating problems), the scale determines the level and the areas in which the psychological symptoms of the person are related. Each item in the psychological symptom checklist scored by following values: 0 – none; 1 – a small amount of; 2 – medium level; 3 – quite a lot; 4 – advanced level. The general symptom index (GSI) average was obtained by adding the scores for all items and dividing by 90. It was concluded that the higher the score from this test, the higher the psychological symptom level.[17] In this study, the GSI reference score was accepted as 1.00.[16]

Data were analyzed with International Business Machines (IBM) SPSS V23 (SPSS Inc., Chicago, IL, USA). Conformity to normal distribution was examined by Kolmogorov Smirnov and Shapiro Wilk tests. Mann Whitney *U* test and Kruskal Wallis test were used to compare data that did not show normal distribution. The data that did not show normal distribution were given as median (minimum–maximum). Chi-square test was used for comparison of categorical data. Categorical data were presented as frequency (%). The level of significance was taken as $P < 0.05$.

Results

The participants of the study was 250 dental students, 165 female (66%), and 85 male (34%), aged 18–26. Based on the questionnaire and self-report, 40% of dental students were detected as bruxist.

Table 1 presents the comparison of sociodemographic characteristics and presence of bruxism. According to the study findings, only the effect of gender is statistically

Table 1: Comparison of sociodemographic characteristics and presence of bruxism with Chi-square test

	Yes (*n*=100) (*n*-%)	None (*n*=150) (*n*-%)	Total (*n*=250) (*n*-%)	Test statistics	*P*
Gender					
Male	24 (28.2)	61 (71.8)	85 (34)	χ^2=7.427	**0.006***
Female	76 (46.1)	89 (53.9)	165 (66)		
Age					
18-20	47 (47)	72 (48)	119 (47.6)	χ^2=0.379	0.827
21-23	45 (45)	69 (46)	114 (45.6)		
24-26	8 (8)	9 (6)	17 (6.8)		
Grade					
First grade	18 (18)	32 (21.3)	50 (20)	χ^2=5.333	0.255
Second grade	18 (18)	32 (21.3)	50 (20)		
Third grade	26 (26)	24 (16)	50 (20)		
Fourth grade	16 (16)	34 (22.7)	50 (20)		
Fifth grade	22 (22)	28 (18.7)	50 (20)		
Income status					
Medium	83 (83)	112 (74.7)	195 (78)	χ^2=2.599	0.273
Good	13 (13)	31 (20.7)	44 (17.6)		
Bad	4 (4)	7 (4.7)	11 (4.4)		
Smoking status					
Smoker	15 (15)	17 (11.3)	32 (12.8)	χ^2=0.432	0.511
Non smoker	85 (85)	133 (88.7)	218 (87.2)		
Previous psychological treatment					
Untreated	87 (87)	137 (91.3)	224 (89.6)	χ^2=0.789	0.374
Treated	13 (13)	13 (8.7)	26 (10.4)		
Chronic health problem					
Have	8 (8)	4 (2.7)	12 (4.8)	χ^2=3.735	0.053
Non	92 (92)	146 (97.3)	238 (95.2)		
Choosing the profession willingly					
Unwillingly	17 (17)	20 (13.3)	37 (14.8)	χ^2=0.382	0.424
Willingly	83 (83)	130 (86.7)	213 (85.2)		
Place of stay at university					
Homestay	8 (8)	16 (10.7)	24 (9.6)	χ^2=1.114	0.774
At home with friends	20 (20)	33 (22)	53 (21.2)		
Alone at home	15 (15)	25 (16.7)	40 (16)		
In dormitory	57 (57)	76 (50.7)	133 (53.2)		
The situation of mother and father living together					
Yes	92 (92)	136 (90.7)	228 (91.2)	χ^2=0.133	0.715
No	8 (8)	14 (9.3)	22 (8.8)		

**P*<0.05 indicates statistical significance; categorical data were shown as frequency (%)

significant in the presence of bruxism (P = 0,006). Bruxism was detected in 28.2% of males and 46.1% of females. The bruxism was not associated with age, class, income, smoking status, previous psychological treatment, and presence of chronic health problems ($P > 0.05$) [Table 1].

In comparison of SCL-90-R and GSI according to the presence of bruxism; All subscales of SCL-90-R and GSI values were found to show a statistically significant difference ($P < 0.001$) [Table 2].

At least one psychological symptom is observed in 185 students (74%). While 81 students with bruxism (81%) have at least one psychological symptom, 19 (19%) do not have any psychological symptoms.

In the study, a GSI value above 1 indicated a high psychological symptom level, and the value 1 and below indicated low psychological symptom. In this context it was determined that while 115 students (46%) had a high psychological symptom level, 135 (54%) had a low psychological symptom level.

In comparison of SCL-90-R and GSI according to gender, it was observed that somatization, obsessive–compulsive behavior, interpersonal sensitivity, depression, anxiety, anger and hostility, and general

Table 2: Comparison of SCL-90-R and GSI according to the presence of bruxism with Mann Whitney *U* test

	Yes Mean (min–max) Mean±SD	None Mean (min–max) Mean±SD	Total Mean (min–max) Mean±SD	Test statistics	*P*
Somatization	1.42 (0-2.83) 1.38±0.67	1 (0-2.42) 1.04±0.61	1.17 (0-2.83) 1.18±0.65	*U*=5332.5	**<0.001***
Obsessive–compulsive behavior	1 (0-3.1) 1.15±0.69	0.7 (0-2.7) 0.81±0.54	0.8 (0-3.1) 0.95±0.63	*U*=5319.5	**<0.001***
Interpersonal sensitivity	1.44 (0-3.78) 1.5±0.87	1 (0-3.44) 0.99±0.68	1.11 (0-3.78) 1,2±0.8	*U*=4914.5	**<0.001***
Depression	1.23 (0-3.38) 1.42±0.81	0.85 (0-3.15) 0.95±0.7	1.04 (0-3.38) 1.14±0.78	*U*=4920	**<0.001***
Anxiety	1.3 (0-3) 1.35±0.74	0.8 (0-3) 0.97±0.63	1.1 (0-3) 1.12±0.7	*U*=5234	**<0.001***
Anger and hostility	1.33 (0-4) 1.39±0.85	0.83 (0-3.17) 0.92±0.73	1 (0-4) 1.11±0.81	*U*=5031.5	**<0.001***
Phobic anxiety	1 (0-3.43) 1.11±0.81	0.71 (0-2.29) 0.75±0.56	0.71 (0-3.43) 0.9±0.7	*U*=5591.5	**0.001***
Paranoid ideation	0.92 (0-4) 1.1±0.88	0.67 (0-3.33) 0.8±0.68	0.83 (0-4) 0.92±0.78	*U*=5962.5	**0.006***
Psychotic symptoms	0.9 (0-3.3) 1.06±0.83	0.5 (0-2.8) 0.65±0.55	0.7 (0-3.3) 0.81±0.7	*U*=5347	**<0.001***
Additional ingredients	0.57 (0-3.29) 0.73±0.72	0.29 (0-2.29) 0.48±0.52	0.43 (0-3.29) 0.58±0.62	*U*=5795.5	**0.002***
General Symptom Index (GSI)	1.14 (0–2.97) 1.24±0.69	0.79 (0-2.44) 0.85±0.53	0.93 (0-2.97) 1.01±0.63	*U*=10007.5	**<0.001***

**P*<0.05 indicates statistical significance; since data not normally distributed, were given as median (minimum-maximum); SD: standard deviation

Table 3: Comparison of SCL-90-R and GSI according to gender with the Mann Whitney *U* test

	Female (*n*=165) Mean (min–max)	Male (*n*=85) Mean (min–max)	Test statistics	*P*
Somatization	1.25 (0-2.83)	0.92 (0-2.25)	*U*=5415,5	0.003*
Obsessive–compulsive behavior	0.9 (0-3.1)	0.6 (0-2.5)	*U*=4858,5	<0.001*
Interpersonal sensitivity	1.22 (0-3.78)	0.89 (0-2.89)	*U*=5187,5	0.001*
Depression	1.15 (0-3.31)	0.85 (0-3.38)	*U*=5120	<0.001*
Anxiety	1.1 (0-3)	0.9 (0-2.6)	*U*=5892,5	0.038*
Anger and hostility	1.17 (0-4)	0.83 (0-4)	*U*=5334,5	0.002*
Phobic anxiety	0.71 (0-3.43)	0.71 (0–3.14)	*U*=6454,5	0.301
Paranoid ideation	0.83 (0-4)	0.67 (0-3.33)	*U*=6341,5	0.214
Psychotic symptoms	0.7 (0-3.3)	0.7 (0-2.6)	*U*=6045	0.073
Additional ingredients	0.43 (0-3.29)	0.43 (0-2.29)	*U*=6769	0.650
General symptom index (GSI)	1.01 (0-2.97)	0.79 (0.02-2.52)	*U*=5470,5	0.004*

**P*<0.05 indicates statistical significance; since data not normally distributed, were given as median (minimum–maximum)

Table 4: Comparison of SCL-90-R and GSI according to voluntary selection of the profession with Mann Whitney *U* test

	Voluntarily (*n*=213) Mean (min–max)	Involuntarily (*n*=37) Mean (min–max)	Teststatistics	*P*
Somatization	1 (0-2.83)	1.42 (0.25-2.42)	*U*=2883	**0.009***
Obsessive–compulsive behavior	0.8 (0-3.1)	1.1 (0-2.7)	*U*=2986.5	**0.019***
Interpersonal sensitivity	1.11 (0-3.78)	1.33 (0-3.44)	*U*=2951	**0.015***
Depression	1 (0-3.31)	1.38 (0-3.38)	*U*=3124	**0.044***
Anxiety	1 (0-3)	1.3 (0-3)	*U*=3256.5	0.092
Anger and hostility	1 (0-4)	1.33 (0-4)	*U*=2960	**0.015***
Phobic anxiety	0.71 (0-3.43)	0.71 (0-2.14)	*U*=3804	0.736
Paranoid ideation	0.67 (0-4)	0.83 (0-2.67)	*U*=3389.5	0.173
Psychotic symptoms	0.6 (0-3.3)	0.8 (0-2.2)	*U*=3458.5	0.234
Additional ingredients	0.43 (0-3.29)	0.57 (0-2.29)	*U*=3033.5	**0.024***
General Symptom Index (GSI)	0.9 (0-2.97)	1.14 (0.18-2.52)	*U*=3046.5	**0.028***

**P*<0.05 indicates statistical significance; data not normally distributed, were given as median (minimum–maximum)

Table 5: Comparison of SCL-90-R and GSI according to previous psychiatric treatment with Mann Whitney *U* test

	Treated (*n*=26) Mean (min–max)	Untreated (*n*=224) Mean (min–max)	Test statistics	*P*
Somatization	1.71 (0.58-2.5)	1.08 (0-2.83)	*U*=1501.0	**<0.001***
Obsessive–compulsive behavior	1.3 (0.2-3.1)	0.8 (0-2.9)	*U*=1773.0	**0.001***
Interpersonal sensitivity	1.78 (0.33-3.67)	1.11 (0-3.78)	*U*=1646.0	**<0.001***
Depression	1.73 (0.08-3.08)	1 (0-3.38)	*U*=1742.5	**0.001***
Anxiety	1.45 (0.3-2.7)	1 (0-3)	*U*=1981.5	**0.008***
Anger and hostility	1.58 (0.17-4)	1 (0-4)	*U*=1976.5	**0.007***
Phobic anxiety	1.29 (0-3.14)	0.71 (0-3.43)	*U*=1795.5	**0.001***
Paranoid ideation	1.25 (0-4)	0.67 (0-3.5)	*U*=1987.0	**0.008***
Psychotic symptoms	1.3 (0,1-3)	0.6 (0-3.3)	*U*=1759.5	**0.001***
Additional ingredients	0.57 (0-3.29)	0.43 (0-2.43)	*U*=2208.5	**0.042***
General Symptom Index (GSI)	1.49 (0.32-2.93)	0.9 (0-2.97)	*U*=1662.5	**<0.001***

**P*<0.05 indicates statistical significance; data not normally distributed, were given as median (minimum–maximum)

symptom index (GSI) values showed a statistically significant difference ($P < 0.05$) [Table 3]. It was observed that in these subscales the scores of females were statistically higher than males.

The study results of comparing SCL-90-R and GSI according to the voluntary selection of the profession; somatization, obsessive–compulsive behavior, interpersonal sensitivity, depression, anger and hostility, additional items and general symptom index (GSI) values showed statistically significant difference ($P < 0.05$) [Table 4]. The scores on these subscales were significantly higher in those who choose their job involuntarily.

Comparison of SCL-90-R and GSI according to previous psychiatric treatment showed that the scores in all subscales of SCL-90-R and the GSI value were statistically higher in students who previously received psychiatric treatment ($P < 0.05$) [Table 5].

Discussion

The present study demonstrated that, bruxism was associated with gender and there was a positive relationship between the psychological state and the presence of bruxism in dental students. Methods such as self-reports (interview/questionnaire), clinical examination, portable EMG, and PSG can be used in the assessment of bruxism.[7] The questionnaire method that used in this study, is frequently preferred in clinical studies and researchs and also has advantages such as ease of application and being applied to large audiences.[15,18]

Although there are studies in the literature expressing bruxism prevalance, which is seen at varying rates and depending on different factors, among undergraduate students[19,20] there is no study that specially reveals the difference between dental students and other students. In the current study the prevalance of possible bruxism according to dental students' reports was in agreement with other Turkish studies.[12,21,22] In the study conducted by Şener *et al.*[12] the prevalance of bruxism awareness among 510 students studying at Selçuk University Faculty of Dentistry was found to be 33.9%. Also in a similar study, Serra-Negra *et al.*[23] stated that the prevalance of self-reported awake bruxism among Brazilian, Protuguese, and Italian dental students was 33.7%. In this study, the prevalance was found to be 40% among 250 dental students. The variations in results may be attributed to the different diagnostic methods, differences in culture, and life experience in university settings and population differences between studies.[24]

Studies have indicated an association between bruxism and personality characteristics,[2,6,25] psychosocial factors,[25,26] and psychological stress.[26,27] Also, anxiety and neurotic personality features are also reported to be related to bruxism.[2,27]

Some mental problems and problems in coping with them may occur in university students with high stress.[11] Therefore, in this study the psychological symptom screening scale was used to determine the mental state of the dental students with a relatively difficult teaching process and the relationship between psychological state and bruxism was evaluated.

In this study, there was an association between bruxism and gender. This result is consistent with some study findings in the literature.[28,29] However, in the study of Melis and Abou-Atme,[30] it was reported that there was no difference between males and females in terms of bruxism prevalence. Differences between the results may be due to the variations of society behavior, psychology, and sociology.

There are studies reporting that sleep bruxism is more common in depressed, emotionally stressed and anxious individuals, and stressful days increase chewing muscle activity during sleep (bruxism stress theory).[18,25] In this study, in accordance with the aforementioned studies,

the anxiety value differed according to the presence of bruxism. While the median value of anxiety was 1.3 in the presence of bruxism, it was 0.8 in the absence of it. In 46% of the 250 participants, the psychological symptom level was found to be high according to the psychological symptom screening test (SCL-90-R) scale, in this context GSI scores were also found to be >1, and it was observed that the general psychopathology average of the study group was compatible with the literature.[31] The differences between the presence of bruxism and all SCL-90-R subscales were significant. This result may be explained by the role of psychosocial factors on bruxism etiology, which is frequently mentioned in the literature.[7,25,31]

The results of the study revealed the relationship between students' gender and psychological symptom levels. Similar to some study findings,[32,33] it was observed that, female students had higher subscale scores and GSI value than male students.

Demirel *et al*.[32] (2001) reported that students who voluntarily chose the department they read showed higher scores in all subscales except for the anger and hostility subscale, compared to the others. Similarly, in the present study it was observed that students who chose their profession without awareness had higher psychological symptoms. Although there is no similar study in the literature; in this study higher frequency of bruxism and higher SCL-90-R subscale scores were observed in students who had previously received psychiatric treatment.

The present study has some limitations. The evaluation of the same students in different years and the use of more objective measurements such as clinical observation and EMG records for diagnosis will add different dimension to the study. Considering that the participants were dental students having high awareness of bruxism and providing easier access to health services, it can be concluded that this situation may have had an effect on the study results, therefore more comprehensive studies on the subject are needed.

Conclusion

The present study demonstrated that bruxism was common among dentistry students and associated with gender and psychosocial factors. The significant differences between the presence of bruxism and all SCL-90-R subscales may be attributed to the role of psychosocial factors in the etiology of bruxism that was frequently mentioned in the literature. Although the general psychological symptom level was low, the rate of at least one psychological symptom was found to be quite high in students with bruxism. Therefore it is recommended that students with high levels of psychological symptoms should be identified and directed to psychological counseling and guidance services.

Ethics approval and consent to participate

The Clinical Research Ethics Committee of Zonguldak Bülent Ecevit University gave approval for the study.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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