

## RESEARCH

# Is any academic discipline a risk factor for developing smoking habit and/or possible sleep bruxism? A study on university students

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### ABSTRACT

**Is any academic discipline a risk factor for developing smoking habit and/or possible sleep bruxism? A study on university students**

**Background:** The aim of this study was to evaluate whether different disciplines of education have any impact on developing a smoking habit and/or possible sleep bruxism in university students from different disciplines of education, and to assess the potential relationship between smoking and possible sleep bruxism.

**Methods:** The study was conducted retrospectively using data from questionnaires completed by a total of 457 university students including 195 males (43%) and 262 females (57%) with an age range of 17-34 years who admitted to the Department of Oral and Maxillofacial Radiology of the Faculty of Dentistry, Cumhuriyet University for dental care between 2012 and 2014. On these questionnaires, responses to questions had been recorded. A chi-square test was utilized for the statistical analyses of the study findings using the SPSS 20.0 software.

**Results:** Smoking habit was significantly more prevalent in engineering students and males ( $p < 0.05$ ). Although the frequency of possible sleep bruxism was higher in smoking students compared to non-smokers, the difference was not significant. Neither gender nor education discipline was significantly associated with possible sleep bruxism ( $p > 0.05$ ).

**Conclusion:** While different education disciplines were found to have an impact on smoking habit, they had no effect on possible sleep bruxism.

### KEYWORDS

**Bruxism, faculty, smoking habit, university student**

### ÖZ

**Belli eğitim disiplinleri sigara alışkanlığı ve/veya muhtemel uyku bruksizminin gelişiminde bir risk faktörü müdür? Üniversite öğrencilerinde bir çalışma**

**Amaç:** Bu çalışmanın amacı farklı eğitim disiplinlerinde öğrenim gören üniversite öğrencilerinde, eğitimin sigara alışkanlığı ve muhtemel uyku bruksizmi eğilimine olan etkisini ve varsa sigara ve muhtemel uyku bruksizminin ilişkisini değerlendirmektir.

**Gereç ve Yöntemler:** Çalışma, Cumhuriyet Üniversitesi Diş Hekimliği Fakültesi Ağız, Diş ve Çene Radyolojisi Anabilim Dalı'na 2012- 2014 tarihleri arasında başvuran, 17-34 yaş aralığında 262'si kız (%57) ve 195'i erkek (%43) olmak üzere 457 üniversite öğrencisinin doldurduğu formlar üzerinden retrospektif olarak yürütüldü. Bu formlarda öğrencilerin sorulara verdikleri cevaplar kaydedildi. Bulguların istatistiksel değerlendirilmesi SPSS 20.0 programında ki-kare analizi kullanılarak yapıldı.

**Bulgular:** Sigara alışkanlığı mühendislik bölümü öğrencilerinde ve erkeklerde anlamlı derecede yüksek bulundu ( $p < 0.05$ ). Sigara kullanan öğrencilerde muhtemel uyku bruksizmi görülme sıklığı yüksek olsa da bu fark anlamlı değildi ( $p > 0.05$ ). Cinsiyet ve eğitim disiplinlerinin muhtemel uyku bruksizmiyle arasında anlamlı bir ilişki yoktu ( $p > 0.05$ ).

**Sonuç:** Eğitim disiplinlerinin sigara alışkanlığında etkili bulunurken, muhtemel uyku bruksizmi üzerinde bu etki görülmemiştir.

### ANAHTAR KELİMELER

**Bruksizm, fakülte, sigara alışkanlığı, üniversite öğrencisi**

Bruxism is a repetitive jaw muscle activity characterized by grinding or clenching of the teeth and/or by bracing or thrusting of the mandible. There are two types of bruxism: one that occurs during sleep (sleep bruxism) and one during wakefulness (awake bruxism).<sup>1</sup>

While there is no consensus on the exact cause of sleep bruxism (SB), current literature support the hypothesis

that SB has a multifactorial etiopathogenesis which potentially involves disturbance of the dopaminergic system in the central nervous system, stress, sleep disorders and smoking habit.<sup>2-5</sup> Although the criteria for diagnosis of self-reported bruxism have not been fully established, self-report of the individuals is the easiest and generally accepted diagnostic method

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that has been employed in studies on large samples.<sup>2</sup> However, some authors suggested that a bruxism diagnosis relying on this method should be considered as “possible” bruxism and the definite diagnosis can only be made on the basis of self-report in conjunction with clinical examination and polysomnographic (PSG) recordings.<sup>1</sup>

To date, international studies on university students have often investigated the prevalence of bruxism only in certain disciplines of education<sup>6,7</sup> or among all university students without selecting a specific population.<sup>8,9</sup> The overall prevalence of clenching teeth and grinding teeth was reported at 46.8% and 19.8% respectively in young adults in Turkey in an investigation conducted via telephone interviews.<sup>10</sup>

Dopamine is a neurotransmitter found in the basal ganglia that is involved in the control of jaw movements<sup>11</sup> and nicotine is known to stimulate central dopaminergic activity which may have a role in the development of bruxism.<sup>4</sup> This association was observed in a limited number of studies<sup>12,13</sup> while one study came out with contrasting findings.<sup>8</sup>

Smoking has a deleterious effect on the general health and it is also a risk factor for oral cancers.<sup>14,15</sup> Few international studies exist in the literature on the patterns of smoking in university students from different academic disciplines,<sup>16</sup> which generally focused on the entire university community<sup>17-19</sup> or a single discipline.<sup>20,21</sup>

To our knowledge, no study was performed in Turkey among university students from various education disciplines that investigated the smoking tendency and bruxism as well as the relation between smoking and bruxism. Identification of academic disciplines that may be associated with bruxism and smoking could help targeting specific populations for implementation of effective healthcare strategies.

In light of these data, we aimed to determine whether different disciplines of education have an impact on the prevalence of smoking and parafunctional bruxism among university students and examine the association between smoking and “possible” SB, if any.

## MATERIALS AND METHODS

This study had a retrospective design and used the data on demographics and several parameters recorded on completed questionnaires during a previously published bruxism study conducted by us at the same clinic.<sup>2</sup> Data from questionnaires completed by a total of 457 university students including 195 males (mean age  $21.7 \pm 2.4$  years) and 262 females (mean age  $21.2 \pm 2.1$  years) with an age

range of 17-34 ( $21.41 \pm 2.25$  years) who admitted to the Department of Oral and Maxillofacial Radiology of the Faculty of Dentistry, Cumhuriyet University for dental care between 2012 and 2014 were included in the study. The principles set forth in the Declaration of Helsinki were followed during the conduct of the study and approval was obtained from the Ethics Committee for Clinical Research of Cumhuriyet University Medical Faculty (Protocol No:2016-07/07). In the previous study, subjects were informed about the nature of the research and their written consent was obtained before completion of questionnaires. The exclusion criteria were existing sleep disorders, current or past neurological diseases and use of medications.<sup>2</sup>

On the questionnaire, information on gender, age, name of faculty, smoking habits and teeth clenching habits of the university students as well as their responses to the question about smoking (never smoked, non-smoker, occasional smoker and regular smoker) had been recorded. Occasional smokers and regular smokers were considered as current smokers. Affirmative responses to any of the questions “Have you ever noticed that you grind your teeth or clench your jaws when you are asleep?” and “Have you ever been told by someone that you grind your teeth or clench your jaws when you are asleep?” were utilized to make a diagnosis of “possible” SB.<sup>2</sup>

The study data were analyzed using IBM SPSS Statistics 20.0 software. For statistical analysis of the findings, differences between study groups were assessed by the chi-square test. A sample size of 457 provided 89% power to detect an effect size (W) of 0.1919 using a (6 degrees of freedom) Chi-Square Test with a significance level (alpha) of 0.05.

## RESULTS

This study was conducted using the data from a total of 457 university students including 195 males (representing 43% of the sample) and 262 females (57%) with an age range of 17-34 years ( $21.41 \pm 2.25$  years). The overall prevalence of bruxism was 29.5% with a prevalence of 32% among females and 26% among males.

In the present study, no statistically significant association was found between bruxism and gender or bruxism and smoking (Table 1 and Table 2). Smoking habits in relation to gender was statistically significant ( $p < 0.05$ ) (Table 3). The prevalence of smoking was 10% in female students and 33% in male students ( $p < 0.05$ ). The faculty that the students attended did not have a significant impact on the prevalence of bruxism ( $p > 0.05$ ) (Table 4). Smoking was significantly more common among engineering students in comparison to students from other faculties ( $p < 0.05$ ) (Table 5).

**Table 1.**

**Relationship between gender and possible sleep bruxism**

Possible Sleep Bruxism	Gender			$\chi^2$	P
	Female, n(%)	Male, n(%)	Total, n (%)		
Bruxer, n(%)	85 (32)	50 (26)	135 (29.5)	2.485	0.115
Non-Bruxer, n(%)	177(68)	145 (74)	322 (70.5)		
Total, n(%)	262 (100)	195 (100)	457 (100)		

$\chi^2$ :Chi-square, Statistically significant  $p < 0.05$

**Table 2.**

**Relationship between possible sleep bruxism and smoking**

Possible Sleep Bruxism	Smoking			$\chi^2$	P
	Smoker, n(%)	Non-Smoker, n(%)	Total, n (%)		
Bruxer, n(%)	28 (31.5)	107 (29.1)	135 (29.5)	0.196	0.658
Non-Bruxer, n(%)	61 (68.5)	261 (70.9)	322 (70.5)		
Total, n(%)	89 (100)	368 (100)	457 (100)		

$\chi^2$ :Chi-square, Statistically significant  $p < 0.05$

**Table 3.**

**Relationship between gender and smoking**

Smoking	Gender			$\chi^2$	P
	Female, n(%)	Male, n(%)	Total, n (%)		
Smoker, n(%)	24 (10)	65 (34)	89 (19.5)	2.485	0.001*
Non-Smoker, n(%)	238 (90)	130 (66)	368 (80.5)		
Total, n(%)	262 (100)	195 (100)	457 (100)		

$\chi^2$ :Chi-square, Statistically significant  $p < 0.05$

**Table 4.**

**Relationship between faculty type and possible sleep bruxism**

Faculty type	Possible Sleep Bruxism			$\chi^2$	P
	Bruxer, n(%)	Non-Bruxer, n(%)	Total, n(%)		
Social Sciences	22 (16.3)	48 (14.9)	70 (15.3)	1.819	0.937
Sciences	26 (19.3)	52 (16.1)	78 (17.1)		
Education	23 (17)	52 (16.1)	75 (16.4)		
Engineering	22 (16.3)	57 (17.7)	79 (17.3)		
Health Sciences	23 (17)	57 (17.7)	80 (17.5)		
Vocational High School	14 (10.4)	37 (11.5)	51 (11.2)		
Others	5 (3.7)	19 (5.9)	24 (5.3)		
Total	135 (100)	322 (100)	457 (100)		

$\chi^2$ :Chi-square, Statistically significant  $p < 0.05$

**Table 5.**

**Relationship between faculty type and smoking**

Faculty type	Smoking			$\chi^2$	P
	Smoker, n(%)	Non-Smoker, n(%)	Total, n(%)		
Social Sciences	6 (6.7)	64 (17.4)	70 (15.3)	16.824	0.010
Sciences	14 (15.7)	64(17.4)	78 (17.1)		
Education	11 (12.4)	64 (17.4)	75 (16.4)		
Engineering	26 (29.2)	53 (14.4)	79 (17.3)		
Health Sciences	14 (15.7)	66 (17.9)	80 (17.5)		
Vocational High School	12 (13.5)	39 (10.6)	51 (11.2)		
Others	6 (6.7)	18 (4.9)	24 (5.3)		
Total	89 (100)	368 (100)	457 (100)		

$\chi^2$ :Chi-square, Statistically significant  $p < 0.05$

**DISCUSSION**

Epidemiological studies mostly rely on questionnaires or interviews and using such instruments may pose challenges in determining the true prevalence of bruxism which may lead to the underestimation of exact numbers and bruxism may not be recognized as a behavior by individuals.<sup>12</sup> While several methods are currently used for the diagnosis of sleep bruxism, the diagnosis can only be confirmed by means of polysomnographic recordings in adequately equipped sleep laboratories and it is not feasible to conduct cross-sectional studies in a population using polysomnography due to its high cost.<sup>3</sup> Additionally, interpretation of PSG recordings involves several challenges and confusing details because various movements of masticatory muscle systems (eg. swallowing, tics, cough) are simultaneously recorded.<sup>3</sup> Thus, self-report questionnaires were used for the diagnosis of bruxism in the present study since this is the most convenient and widely accepted method for gathering data in large scale given the inherent limitations of the self-report approach versus other techniques (ie. clinical, PSG), it should be noted that the findings of our study refer to "possible" SB.<sup>1</sup>

Estimation of SB prevalence relies mostly on the reports of teeth grinding by family members or roommates of the individual.<sup>22</sup> In a general review conducted by Kato *et al*<sup>22</sup>, the prevalence of teeth grinding was 14-20% in children, 13% in young people, 5-8% in adults and around 3% among people who are 60 years of age and older.

Variations are observed in the reported SB prevalence in studies that have made interfaculty comparisons or examinations at the university level.

In two studies that focused on the university community as a whole, SB prevalence was reported at 31.6% in Brasil<sup>8</sup> and 31.8% in Italy.<sup>9</sup> In the present study, SB was found in 29.5% of the sample which is consistent with the prevalences cited above.

The prevalence of SB has been particularly investigated in the field of dental medicine.<sup>7,23</sup> Dental practice may be associated with stress factors<sup>6</sup> and a very high SB prevalence was reported in Saudi Arabia at 31.1%.<sup>7</sup> Bruxism prevalence of 33.9% was found in a study conducted with students from a dental faculty in Konya, Turkey.<sup>24</sup> In the current study, dental medicine was categorized as a department of health sciences and although direct comparisons with other studies cannot be made, a relatively lower bruxism prevalence of 17% was found among dental students. Variations in bruxism prevalences between countries or in a single country may stem from differences in diagnostic criteria and indexes used, socioeconomic conditions, cultural and geographic factors and population characteristics.<sup>25</sup> Our study data showed that bruxism was equally common in female and male students. A literature review by Shetty *et al*<sup>26</sup> found that awake bruxism was more common in females as compared to males but sleep bruxism did not show such gender predominance. Our study lends support to these findings.

The prevalence of smoking was reported as 7.2% among university students in the US.<sup>27</sup> Another study that included 3706 students from 7 universities showed frequent smoking in 15.8% and occasional smoking in 12% of the students.<sup>17</sup> A study on 3659 students from 6 universities in Ankara reported regular smoking in 33.4% and occasional smoking in 14.8% of the students.<sup>28</sup> On the other hand, smoking prevalence was 35.9% among 1870 university students in Tokat as reported by Celikel *et al*.<sup>18</sup> In the present study, the prevalence of smoking was 19.5% on average considering all departments of the university. This figure is higher than those reported from the UK and the US and the fact that Turkey has the highest percentage of smokers in the European region and third highest percentage in the world<sup>28</sup> is consistent with this finding. However, this figure is lower than the average prevalence reported in other studies. This may be explained by differences in regional factors or stress-related factors or the time periods covered by the studies.

There are rare studies that compared smoking habit among different academic disciplines. Webb *et al*'s study, conducted in 10 British universities<sup>16</sup>, reported that tobacco use was most prevalent in art, social science and biological science students compared to other departments, among whom 36-39% of males and 33% of females were regular smokers. Engineering department had one of the least smoking prevalences. In an Indian study, smoking habit was significantly less common among medical students in comparison to

non-medical students (18.3% versus 43.3%).<sup>29</sup> Eid *et al*<sup>30</sup> reported a significantly lower prevalence of smoking among veterinary students compared to social science students in Egypt (5.3% and 12.1%, respectively). Studies that found a lower prevalence among medical students have attributed this to the fact that medical students had a heightened awareness on the harms of smoking and that social science students had longer free time at their hands.<sup>17,30</sup> However, no remarkable differences were observed in smoking between medical students and social science students. Differences in cultural, social and racial characteristics and educational policies may account for reported discrepancies in the smoking prevalence between countries.

Certain sociodemographic factors including paternal education status, employment of the student and death of the mother have also been associated with smoking.<sup>30</sup> The visibility of smoking in the campus, the lack of restrictions on smoking, the presence of social imitation and the ease of purchasing cigarettes have also been cited as important factors for smoking.<sup>28</sup> Factors that appear to be protective against smoking were reported as self-esteem, adult and scholastic competence, locus of control and socialization.<sup>31</sup> One study showed that smokers had higher anxiety scores compared to those who never smoked or ceased smoking and were more likely to be type A personality (competitive, workoholic, impatient, aggressive personality).<sup>32,33</sup>

In our study, engineering students had a %33 prevalence of smoking which was significantly higher compared to students in other departments. With respect to this finding, no evidence was found in the relevant literature as to which specific personality traits or sociodemographic characteristics of engineering students might have contributed to a higher prevalence of smoking. Further studies are needed to establish factors that might be related to starting and continuing smoking (such as stress, class attendance requirement or more free time available<sup>16,30,32</sup>) among engineering students.

Because of the social meaning smoking has acquired and because of different trends in male and female initiation rates, it might be suggested that different psychosocial factors predict smoking in females and males. There are some data supporting the hypothesis that female smoking is associated with self-confidence, social experience and rebellion, whereas male smoking is associated with social insecurity.<sup>34</sup> A British study on university students reported a higher prevalence of smoking in males.<sup>17</sup> Also, in one study, male students as a group were reported to exhibit the least favorable attitudes towards no-smoking policies.<sup>35</sup>

Male smoking was more common among university students in Turkey as shown by some nationwide research studies.<sup>18,19,28</sup> In the present study, smoking prevalence was significantly lower among female university students which is consistent with aforementioned studies.

Despite considerable differences between studies with regard to the study design, sample size, definition of smoking and evaluation of bruxism, a limited number of studies have examined the relationship between smoking and bruxism.<sup>12</sup> There are studies which reported that smokers were two times more likely to report frequent bruxism compared with never smokers.<sup>4</sup> While the underlying mechanism between smoking and bruxism is not known, there are several possibilities.<sup>12</sup> Nicotine is known to induce acetylcholine and glutamate synaptic transmission and enhance dopamine release.<sup>35</sup> This may have an impact on the development of bruxism. Additionally, higher levels of smoking, leading to increased levels of nicotine and dopamine release might be strongly related to bruxism. Rintakoski *et al*<sup>12</sup> reported the dose-effect relationship between smoking and sleep bruxism in young adults. Contrastingly, Goes Soares *et al*'s<sup>8</sup> study in Brazilian university students did not find any association between smoking and bruxism. However, in that study sleep bruxism and awake bruxism were not clearly discriminated. In our study, although the prevalence of bruxism among smokers was higher in comparison to nonsmokers, it was not statistically significant. This may be explained by the inclusion of occasional smokers in the group of smokers and the failure to provide specific information on the amount of tobacco use, both of which represent a limitation of the current study.

## CONCLUSION

In conclusion, as a risk factor, different education disciplines might have various contributions to smoking but possible sleep bruxism does not seem to be affected by this difference. Longitudinal studies are needed to perform an assessment on the cause-effect relationship between education disciplines and smoking.

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