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Original Article

The prevalence of temporomandibular disorders among medical students

Tıp fakültesi öğrencilerinde temporomandibuler bozuklukların prevalansı

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ABSTRACT

Objective: This study aimed to evaluate the frequency of temporomandibular disorders (TMD) among students at the Abant Izzet Baysal University Medical Faculty in Turkey.
Material and Method: Two hundred eleven medical students aged between 18 and 30 were included in the study. The presence and severity of TMD were evaluated using the Fonseca Anamnestic Index (FAI). Parafunctional habits, bruxism, and orthodontic treatments potentially associated with TMD were investigated.
Results: No TMD was determined in 87 (41.2%) of the participants, mild TMD in 82 (38.9%), moderate TMD in 37 (17.5%), and severe TMD in five (2.4%) in the evaluations performed using the FAI. The frequency of TMD was significantly higher in women compared to men ($p<0.05$). The incidences of parafunctional habits and self-reported bruxism were significantly higher among participants with TMD compared to those with no TMD ($p<0.05$). The severity of TMD also increased significantly in the presence of parafunctional habits and bruxism ($p<0.05$).
Conclusions: The incidence of TMD among medical students was 59% and female gender, parafunctional habits, and bruxism were found to be associated with the disorders.

Keywords: Fonseca's Anamnestic Index, prevalence, temporomandibular joint disorders

ÖZ

Giriş: Bu çalışmanın amacı, Türkiye'de Abant İzzet Baysal Üniversitesi Tıp Fakültesi öğrencileri arasında temporomandibular bozuklukların (TMD) sıklığınının belirlenmesidir.
Yöntem: Bu çalışmaya 18- 30 yaşları arasında 211 tıp fakültesi öğrencisi dahil edildi. TMD'nin varlığı ve şiddeti, Fonseca'nın Anamnestik İndeksi (FAI) kullanılarak değerlendirildi. TMD ile ilişkili olabilecek parafonksiyonel alışkanlıklar, bruksizm ve ortodontik tedaviler sorgulandı.
Bulgular: Fonseca Anamnestik İndeks (FAI) kullanılarak yapılan değerlendirmede katılımcıların 87'sinde (%41,2) TMD yok, 82'sinde (%38,9) hafif, 37'sinde (%17,5) orta, 5'inde (%2,4) şiddetli TMD saptandı. Kadınlarda TMD sıklığı erkeklere oranla istatistiksel olarak anlamlı düzeyde yüksekti ($p<0.05$). Parafonksiyonel alışkanlıklar ve katılımcıların bildirdiği bruksizm sıklığı TMD olanlarda, olmayanlara göre anlamlı derecede yüksekti ($p<0.05$). Parafonksiyonel alışkanlıklar ve bruksizm varlığında TMD şiddeti anlamlı oranda artmıştı ($p<0.05$).
Sonuç: Tıp fakültesi öğrencilerinde FAI ile belirlenen TMD sıklığı %59 olup, kadın cinsiyet, parafonksiyonel alışkanlıklar ve bruksizmin TMD ile ilişkili olduğu saptanmıştır.

Anahtar kelimeler: Fonseca Anamnestik İndeks, prevalans, temporomandibuler eklem bozukluğu

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INTRODUCTION

Temporomandibular disorders (TMD) are a group of musculoskeletal system problems originating from the masticatory muscles and surrounding tissues (1). These are the most common causes of orofacial region pains, after odontogenic pain (2). TMD is a complex entity with a multifactorial etiology including structural, psychological, and functional components. This disorder impacts daily activity and quality of life and affects an average of 6-12% of the population. TMD peaks between the ages of 20 and 40 and is more common in women than in men (3,4). Findings can cause mild pain to a more significant level of pain and discomfort that restricts mandibular functions. Age, female gender, psychosocial factors, occlusal disorders, parafunctional habits, stress, and various systemic diseases are known to play a role in the etiology of TMD (5). Symptoms may include pain localized to the masticatory muscles and joint, a decreased range of motion in and sounds originating from the temporomandibular joint (TMJ), pain radiating to the head, neck and ear, facial pain, tinnitus, and dizziness. TMD findings are largely mild and left-limiting but may result in chronic pain and functional impairment in small numbers of patients (6). A multidisciplinary approach such as patient education, behavior modification, psychosocial approaches, physical therapy, exercise, medical therapies, and occlusal splints increases the success of treatment. Surgical interventions should be considered in patients who do not respond to conventional treatment (7).

Due to its long working hours and clinical training, medical education is physically and mentally exhausting. An increased risk of developing musculoskeletal pain has been reported in medical students, particularly due to mental stress and prolonged computer use (8). However, very few studies have investigated the prevalence of TMD in medical students (9-11). Determining the epidemiology of TMD in medical students is very important in terms of achieving a better understanding of the etiological factors involved, the development of individualized therapeutic methods, and creating awareness of the condition and preventive programs.

The purpose of this cross-sectional study was to determine the prevalence of TMD among medical students who had not previously diagnosed with the condition. Medical students at the Abant Izzet Baysal University Medical Faculty were therefore assessed using examination and survey evaluations.

MATERIAL AND METHOD

This cross-sectional study was planned prospectively. The research was conducted in strict accordance with the principles of the Helsinki Declaration, and approval was granted by the Abant Izzet Baysal University Medical Faculty Clinical Research Ethical Committee (2019/256).

The participants invited to take part were informed verbally and in writing about the purpose and duration of the study through a “Volunteer Information Form” prepared beforehand and based on the study protocol. Written consent was obtained from all individuals consenting to take part by signing the “Volunteer Information Form”.

Participants

Two hundred eleven students at the Abant Izzet Baysal University Medical Faculty between February and July 2021 were included in the study. Inclusion criteria were being at the age of 18-30, being a student at the medical faculty, and consenting to take part. Students refusing to take part or those with recent tooth pain and histories of trauma to the head and neck region were excluded.

Demographic characteristics such as age, gender, parafunctional habits, presence of bruxism, fillings, crown restoration, missing teeth, and history of orthodontic treatment were investigated for all participants.

Power analysis on PASS 11 software, performed to determine the sample size at 0.95 power with a 47% prevalence value and 15% deviation at a 39.5%-54.5% interval, revealed a minimum requirement of 181 individuals (12).

Evaluation Methods

TMD findings: The Symptom Questionnaire of the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) developed in 2014 was used to standardize the evaluation of TMD findings (13). DC/TMD criteria are evaluated using a two-axis system. The first axis involves the physical dimension of the dysfunction, and the second axis covers the psychosocial dimension, including behavioral and psychological factors. A standard has been established for the evaluation and examination of the TMJ and surrounding tissues in Axis 1. In contrast, Axis 2 involves the evaluation of pain severity and localization, jaw functional limitation, parafunctional habits, physical function, and symptoms.

DC/TMD Axis 1: The participants were asked 14 questions under the headings of pain, headache, TMJ sounds, and locking in the TMJ, and the answers were recorded. A positive response to any of these symptoms is regarded as indicating the presence of TMD. The presence of at least one TMD symptom was used to determine the prevalence in the current study population.

DC/TMD Axis 2: The Oral Habits Checklist section of the DC/TMD was employed in the evaluation of parafunctional habits.

Fonseca Anamnestic Index (FAI): This questionnaire was developed by Fonseca in 1994 to detect the presence and severity of TMD in the population. It consists of 10 questions. There are three responses for each question: "yes" (score 10), "sometimes" (score 5), and "no" (score 0). The questionnaire is scored out of 100 points; scores between 0-15 indicate no TMD, 20-40 mild TMD, 45-65 moderate TMD, and 70-100 severe TMD (14). The FAI was used to detect the presence and severity of TMD in all participants.

Statistical Analysis

The data were analyzed using SPSS (Statistical Package for the Social Sciences, Chicago, IL, USA) version 21.0 software. Descriptive values are shown in tables as numbers and frequencies (%). Age was expressed as mean values and standard deviation. Categorical variables were compared using Chi-square tests. The Shapiro-Wilk test was applied to determine the normality distribution of numerical variables. Two independent t-tests were used to compare means between groups for normally distributed data. The results were evaluated at a 95% confidence interval, and p values <0.05 were considered statistically significant.

RESULTS

Three hundred seventeen medical students were invited to take part in the study between February and July 2021, of whom 211 consented to participate. The mean age of the participants was 22.9+1.2 years, 59.7% were female, and 40.3% were male.

Symptom investigation showed that parafunctional habits were present in 39.8% of the participants and self-reported bruxism in 34.1%. In addition, 29.9% of the participants reported pain in the TMJ and associated structures. The mean VAS value of the participants reporting pain was 2.4±1.5. Sounds during movement of the TMJ was present in 23.2%. No participant reported locking in the jaw.

Missing teeth were observed in 50 participants (23.7%) and filled teeth and crown restorations in 94 (44.5%), while 26 participants (12.3%) had a history of orthodontic treatment.

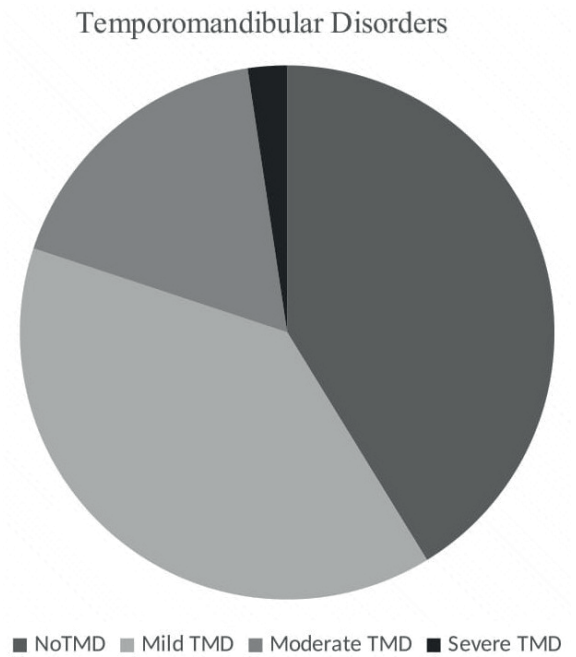

Figure 1. Temporomandibular Disorders.

Analyses performed using the FAI revealed no TMD in 87 (41.2%) of the participants, mild TMD in 82 (38.9%), moderate TMD in 37 (17.5%), and severe TMD in five (2.4%) (Figure 1).

The participants with and without TMD were then compared in terms of age, gender, presence of bruxism, orthodontic treatments, parafunctional habits, and academic years. The results revealed a significantly higher prevalence in women compared to men ($p<0.05$). The prevalence of parafunctional habits and self-reported bruxism was also significantly higher in the TMD group than in the non-TMD group ($p<0.05$). No significant difference was determined between the two groups in terms of age, orthodontic treatments, or years of education (>3 or <3 years) ($p>0.05$) (Table 1).

The patients were also divided into mild and moderate-severe TMD groups using the FAI. These subgroups were then compared in terms of age, gender, presence of bruxism, orthodontic treatments, parafunctional habits, and academic years. The results revealed a significantly higher prevalence of parafunctional habits and self-reported bruxism in the participants with moderate-severe TMD compared to the mild TMD group ($p<0.05$). No difference was found between the two groups in terms of age, gender, orthodontic treatments, or years of education ($p>0.05$) (Table 2).

Table 1. Descriptive statistics for variables and comparisons between students with and without TMD.

	Non-TMD (n: 87)	TMD (n: 124)	p
Gender n (%)			
Female	44 (51%)	82 (61%)	**0.023**
Male	43 (49%)	42 (34%)	
Age (Mean±SD)	22.8±1.3	23.0±1.2	0.439
Orthodontic treatment n (%)			
Yes	11 (13%)	15 (12%)	0.905
No	76 (87%)	109 (88%)	
Years of medical education			
More than 3 years	49 (56%)	76 (61%)	0.470
Less than 3 years	38 (44%)	48 (39%)	
Parafunctional habits n (%)			
Yes	24 (28%)	60 (48%)	**0.002**
No	63 (72%)	64 (52%)	
Bruxism n (%)			
Yes	18 (%21)	54 (%43)	**0.001**
No	69 (%79)	70 (%57)	

TMD: Temporomandibular disorders, SD: standard deviation, p<0.05

DISCUSSION

TMD is a common problem that can affect the quality of life and psychosocial functions (3). The prevalence of TMD in different studies ranges between 5% and 12%, and some have reported a higher prevalence among university students compared to the general population (11,15).

The purpose of this study was to compare the prevalence of TMD using the FAI among students at the Abant Izzet Baysal University Medical Faculty in Turkey. It was found that 41.2% of the participants had no TMD, while 58.8% had TMD (38.9% mild, 17.5% moderate, and 2.4% severe).

Psychosocial and occupational factors play an important role in the development of TMD. A demanding educational life, prolonged study periods, acquiring the necessary knowledge during clinical training, paying constant

Table 2. Descriptive statistics for variables and comparisons in students with mild and moderate-severe TMD.

	Mild TMD (n: 82)	Moderate-Severe TMD		p
		Moderate (n: 37)	Severe (n: 5)	
Gender n (%)				
Female	53 (65%)	26 (70%)	3 (60%)	0.623
Male	29 (35%)	11 (30%)	2 (40%)	
Age (Mean±SD)	23.0±1.2	23.0±1.1	22.4±0.8	0.439
Orthodontic treatment n (%)				
Yes	10 (%12)	4 (%11)	1 (%20)	0.963
No	72 (%88)	33 (%89)	4 (%80)	
Years of medical education				
More than 3 years	48 (59%)	25 (68%)	3 (60%)	0.379
Less than 3 years	34 (41%)	12 (32%)	2 (40%)	
Parafunctional habits n (%)				
Yes	30 (37%)	26 (70%)	4 (80%)	**<0.001**
No	52 (63%)	11 (30%)	1 (20%)	
Bruxism n (%)				
Yes	25 (30%)	25 (68%)	4 (80%)	**<0.001**
No	57 (70%)	12 (32%)	1 (20%)	

TMD: Temporomandibular disorders, SD: standard deviation, p<0.05

attention, and struggling to concentrate can cause chronic stress and lead the development of musculoskeletal pain and TMD among medical students (8,16,17).

The prevalence of TMD among university students evaluated using the FAI were reported at 60% by Özdinç et al. [16], 66% by Kaynak et al. [18], and approximately 55% by Bicaj et al.[19] Similar to our results, these studies reported a higher rate of mild TMD than of moderate-severe TMD. The prevalence of TMD in the our research (58.8%) is very close to those in the previous literature. However, other studies have reported rates of 47% (12), 45% (20), and 42% (21). The variations between studies may be due to differences in population sizes and students' gender distributions, as well as individual, psychosocial, and social differences, and studying in different academic fields. For example, one study reported higher prevalence of TMD among students in the fields of science and health compared to humanities students (22). Bahrani et al.[23] reported a higher frequency of TMD among dental students (80%) than non-dental students (62%). Wahid et al.[11] applied the FAI and reported a prevalence of TMD of approximately 92% among medical students. Strenuous medical programs may entail a heavy workload that can cause stress among students in health sciences and medical students, and be physically and mentally challenging due to long working and training hours in clinics.

A higher prevalence of TMD was reported in female participants than in males (16,18,24). The prevalence of TMD was also significantly higher among women than men in this study. The higher prevalence of TMD in women has been potentially associated with female reproductive hormones affecting pain modulation and physical structures (25). Factors such as women's roles in society and their responsibilities in the home and workplace may also lay the foundation for the development of TMD (26). One review study reported that female dental students exhibited higher stress levels than males (27). In addition, women are reported to have a greater tendency than men to signs and symptoms of TMD. One study also reported a higher level of pain and muscle tenderness in women with TMD compared to men (28).

TMD develops more frequently in the female gender, although several studies have determined no association between gender and severity of TMD (12,19,29). Consistent with the previous studies, no association between gender and the

severity of TMD was observed in this research. This suggests that variables such as psychosocial factors, marital status, and financial status may be more effective in TMD development than the gender factor. A review study also reported lower stress levels among college students studying at their first-choice department (27).

In this study, parafunctional habits and bruxism were significantly higher among the participants with TMD compared to those with no TMD. The presence of parafunctional habits and bruxism was also linked to the severity of TMD. Acharya et al.[10] reported that increased parafunctional habits were associated with TMD. Bruxism can be triggered by high stress causing increased activity in the masticatory muscles and leading to ischemia and related muscular pains. In addition, it is thought that occlusal problems that develop after excessive mechanical loading of the TMJ and wear on the teeth and temporomandibular discs due to bruxism predispose to the development of TMD in particular (9).

One limitation of this study is that the population consisted only of medical students. The inclusion of students from different departments or participants who were not undergoing academic education might have been useful in terms of identifying the etiological factors involved. Another limitation is that evaluation was performed using the FAI. DC/TMD criteria examination forms could be used for an objective evaluation. However, Berni et al.[30] compared the FAI and Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) in myogenous TMD and concluded that FAI can be employed with a high degree of diagnostic accuracy. Another limitation of this study is that participants' physiological, psychological, social status, and academic performance were not evaluated.

In conclusion, the prevalence of TMD among medical students participated in this study was 59%, and female gender, parafunctional habits, and bruxism were found to be associated with the disorder. Further extensive studies with larger numbers of participants, including medical faculties in different regions, are needed.

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Ethics Committee Approval: The study protocol was approved by the Abant Izzet Baysal University Medical Faculty Clinical Research Ethical Committee (07.01.2020 / 2019/256).

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