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The Relationship between Depression and Anxiety with Temporomandibular Disorder Symptoms in Dental Students

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ABSTRACT

Objective: *It can be said that approximately 60-70% of the general population would probably experience at least one symptom of temporomandibular disorder (TMD) in their lives, but only about 5% of these people seek treatment. On the other hand, depression and anxiety are now recognized as a serious public health problem among adults. Anxiety disorder is a chronic, high-risk disease that may lead to dysfunction and reduce quality of life. The aim of this study was to assess the association between depression and anxiety with TMD in dentistry students of Zanjan Dental School in 2020-2021.*

Methods: *The population of this study consisted of students with TMD, and the control population was selected from students of the same faculty. To collect the data, volunteers first answered questions about the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD). Then the Depression, Anxiety and Stress Scale (DASS-21) questionnaire was completed by students in both groups. The collected data were then entered into stata software version 14.*

Results: *According to the results of univariate analysis of logistic regression, gender, tuition, residential status, stress, anxiety and depression have a significant effect on TMD (P <0.2). After examining the*

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simultaneous effect of variables and eliminating possible confounding variables with multiple logistic regression models, stress was identified as the most effective factor in TMD (significance level in this model is less than 0.05).

Conclusion: *Based on findings, while there was a significant relationship between stress, depression and anxiety with symptoms of TMD, stress alone was identified as the most effective factor in developing TMD.*

Keywords: temporomandibular disorders, depression, anxiety, stress.

INTRODUCTION

Temporomandibular disorder has been described with pain in the preauricular, temporomandibular joint (TMJ) or masticatory muscles; moreover, restriction or deviation of motion and clicking sound in TMJ during mandibular function would be among its other symptoms (1). Temporomandibular disorder is the most common non-infectious orofacial pain (2), which can be caused by several factors, including malocclusion, trauma, emotional stress, and jaw parafunctional movements (3). Temporomandibular disorders are usually diagnosed by general dentists, while there is a pain in the TMJ area and the oral area of the face (4). Patients with TMD often suffer from chronic pain, but severe pain may lead to a reduced quality of life (5). According to the studies, about 60-70% of the general population have possibly experienced at least one symptom of such a disorder at some stage of life; however, only about 5% of them seek treatment (2).

On the other hand, patients' poor psychological status is one of the concerns related to TMDs, and it includes recurrent symptoms of depression, bad general mood, decreased activity, sleep disorders, and general pessimism (6). Spasm, in fact, may result from increased muscle activity due to psychological stress and muscle fatigue (7). Depression and anxiety are now recognized as a serious problem in adults' general health (4), and the direct relationship between anxiety and depression and the subsequent symptoms of TMD is a highly debated topic. However, TMD-related symptoms are often overlooked or confused with headache, odontogenic pain or sinus pain, so people are unaware of TMD and its symptoms (4).

The present research aims to assess the relationship between depression and anxiety with TMD in dental students of Zanjan University of Medical Sciences, Iran. ❑

MATERIAL AND METHODS

The current case-control study was designed and conducted to assess the relationship between depression and anxiety with TMDs in dental students of Zanjan University of Medical Sciences, Iran, in 2020-2021, and it was approved by the ethics committee of the university (IR.ZUMS.REC.1399.252).

In this study, a total of 120 people participated in the study and control groups. The case group, which was diagnosed with TMD (albeit mild), consisted of students who voluntarily answered questions about the RDC/TMD, and the control group was composed of asymptomatic students according to this criterion. Trauma to the jawbone, infection, history of inherited diseases, prostheses, maxillofacial surgery, history of inflammatory and autoimmune diseases such as rheumatoid arthritis, fibromyalgia, neurological disorders or recent oral surgery were the exclusion criteria. To collect data, participants first answered questions about the RDC/TMD, which was developed by Schiffman in 1992 as an appropriate protocol to diagnose the possibility of patients suffering from simple to complex TMD.

In this study, participants received parts of Axis I, a simple, acceptable, and valid self-report tool used with a sensitivity and specificity of 0.95 to assess the presence of any type of TMD symptoms (8). Then students completed a depression, anxiety, and stress questionnaire (DASS-21). This questionnaire is a valid scale consisting of 21 questions and three subscales, which measures the cognitive and emotional dimensions of psychological distress. While each of the subscales of depression, anxiety, and stress consists of seven questions, the final score of each is gi-

ven by the sum of the scores of related questions.

Data were analyzed using Stata version 14 (Stata Corp, College Station, TX, USA). For descriptive analyses, the mean, standard deviation (SD), and number (%) were calculated. Then univariate and multivariate logistic regression model was used to determine the relationship between depression and anxiety with TMDs, and crude and adjusted odds ratio (OR) with 95% confidence interval (CI) were estimated. P values<0.05 were considered to indicate statistical significance. ❑

RESULTS

In the present study, 60 students with TMDs were included in the case group and an equal number of students in the control group. Table 1 illustrates the descriptive information of 60 affected students (case group).

According to data summarized in Table 1, the most common TMD problem was myalgia with headache attributed to TMD (35%), followed by arthralgia (25%), myalgia (20%), all three problems – myalgia, arthralgia, and headache – attributed to TMD (10%), and finally, students with both arthralgia and myalgia (2%), respectively.

The distribution of characteristics (demographic features, stress, anxiety, and depression) of students in both case and control groups is summarized in Table 2, which shows that 68.33% of students with TMD (cases) are female.

Univariate logistic regression analysis was performed to identify the most important factors affecting TMD, and in order not to ignore any important variables, a significance level of $\alpha = 0.2$ was initially considered. According to the results, gender, tuition, residential status, stress, anxiety, and depression had a significant effect on TMD ($P < 0.2$) (Table 3).

Then to evaluate the simultaneous effect of the variables, variables with a significance level of less than 0.2 were simultaneously entered into a multiple logistic regression model, and confounders variables were eliminated ($p > 0.2$) (Table 4).

After removing the effect of confounding variables, only stress was identified as the most effective factor in TMD (significance level in this model is less than 0.05). By adjusting the confounders, the adjusted chance of developing

TABLE 1. Characteristics of students with TMD problems

Variable	Amount (%)
Myalgia	12 (20)
Arthralgia	15 (25)
Myalgia, arthralgia	2 (3.33)
Myalgia, headache attributed to TMD	21 (35)
Myalgia, arthralgia, headache attributed to TMD	10 (16.67)

TABLE 2. Distribution of characteristics of students in case and control groups

Variables	Case group (%)	Control group (%)
Gender		
Female	41 (68.33)	24 (40)
Male	19 (31.67)	36 (60)
Marital status		
Single	57 (95)	54 (90)
Married	3 (5)	6 (10)
Tuition		
Daily	49 (81.67)	35 (58.33)
International Campus	11 (18.33)	25 (41.67)
Residential status		
Native	14 (23.33)	7 (11.67)
Non-native	46 (76.67)	53 (81.33)
Father's education		
Academic	56 (93.33)	55 (91.67)
Non-academic	4 (6.67)	5 (8.33)
Mother's education		
Academic	45 (75)	48 (80)
Non-academic	15 (25)	12 (20)
Family income		
Low	0 (0)	0 (0)
Medium	60 (100)	54 (90)
Much	0 (0)	6 (10)
Entrance		
2014	2 (3.33)	1 (1.67)
2015	24 (40)	23 (38.33)
2016	25 (41.67)	19 (31.67)
2017	9 (15)	17 (28.33)
Stress		
Normal	4 (6.67)	43 (71.67)
Mild	5 (8.33)	6 (10)
Medium	18 (30)	6 (10)
Intense	27 (43.33)	5 (8.33)
Very intense	7 (11.67)	0 (0)
Anxiety		
Normal	9 (15)	42 (70)
Mild	7 (11.67)	7 (11.67)
Medium	22 (36.67)	10 (16.67)
Intense	15 (25)	1 (1.67)
Very intense	7 (11.67)	0 (0)
Depression		
Normal	14 (23.33)	46 (76.67)
Mild	9 (15)	6 (10)
Medium	15 (25)	8 (13.33)
Intense	12 (20)	0 (0)
Very intense	10 (16.67)	0 (0)

TABLE 3. Factors affecting TMD using a univariate logistic regression model

Variable	Odds ratio (OR)	(95% CI)	P-value
Gender	0.30	0.65-0.14	0.002
Tuition	0.31	0.72-0.13	0.006
Residential status	0.43	1.16-0.16	0.098
Stress	4.07	6.31-2.63	0.001≥
Anxiety	3.59	5.54-2.32	0.001≥
Depression	3.32	5.16-2.14	0.001≥
Father's education	1.27	4.99-0.32	0.72
Mother's education	0.75	1.77-0.31	0.51
Entrance	0.75	1.18-0.48	0.21
Marital status	0.47	1.98-0.11	0.3

TABLE 4. TMD risk factors using multiple logistic regression model

Variable	Odds ratio (OR)	(95% CI)	P-value
Gender	0.72	2.29-0.22	0.583
Tuition	0.31	1.09-0.09	0.070
Residential status	0.29	1.36-0.06	0.119
Stress	2.45	4.30-1.40	0.002
Anxiety	1.71	3.20-0.91	0.092
Depression	1.48	2.78-0.78	0.221

TMD in people with high stress was 2.45 (95% CI 4.30-1.40) compared to those without stress. ❑

DISCUSSION

The study aims to assess the association between depression and anxiety with TMDs in students of Zanjan Dental School, Iran, in 2020-2021. According to the results, myalgia along with headache attributed to TMD was the most common type of TMD among students. Other studies using RDC/TMD found a link between TMD and headache; moreover, similar symptoms have been also observed for TMD and headache (9).

The results of the present study indicate that female students are more prone to TMDs than males. The incidence of TMD pain in women has been extensively studied in other studies. For instance, Velly *et al* conducted a study on 83 patients and found that women were almost three times more likely to develop myofascial pain than men (10). In addition, Bagis *et al* showed that TMD symptoms were higher in women than men (11), but Vojdani *et al* believed that it was a mistake to think that women were suffering more from TMD than men. Although extensive epidemiological studies showed that the proportion of TMD signs and symptoms was equal for both male and female subjects, women were more likely to seek treatment and more receptive to pain than men, so most patients, especially in dental cases, were women. Therefore, it seems that a combination of these factors has led to such a relationship between the two sexes (12).

In the present study, a significant association between students with TMD symptoms and high scores in DASS surveys was found, meaning that a significant association between stress, depression, anxiety with TMD symptoms could be seen. In this study, stress alone was identified as the most effective cause of TMD. Stress, anxiety and depression are well-known psychological issues that a person may experience at some point in life. Although the disease is often transient, anxiety and depression may also be a chronic mental illness and its health consequences have been extensively studied. University students often experience a lot of stress, especially during exams. So, knowing the awareness of the association between anxiety and depression with TMD, extensive research has been conducted to investigate this relationship in the student population (4]). Kanehira *et al* recognized the important role of psychological factors such as stress in TMD, which suggested that not only these factors but also controlled studies should be considered in the treatment of TMD (13). The residential status shows a significant relationship with TMD, but most students at Zanjan Dental School are non-native, so it cannot be safely extended to other populations.

According to Weitzman *et al*, university is an important place to study young people's mental health (14). Read *et al* believe that college students would probably experience being away from home and family for the first time, living with other students, and reducing adult supervision (15). So, these changes may increase the risk of depression and subsequent TMD problems (2). Besides, the tuition also showed a remarkable association with TMD, but most students of Zanjan Dental School, Iran, were state-funded, so these relationship could not be generalized to other populations. The cause of TMD is one of the most controversial issues in clinical dentistry. Several authors emphasize the influence of local factors on its developments while others focus on systemic factors (16). Currently, TMD is not a single problem but a group of several different diseases (2). ❑

CONCLUSIONS

While stress, depression, and anxiety are significantly associated with TMD symptoms, stress alone was identified as the most effective factor in developing TMD. Female students are more prone to TMD than males. Moreover, no significant relationship was found between students' age and TMD. ❑

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References

1. **Ahuja V, Ranjan V, Passi D, Jaiswal R.** Study of stress-induced temporomandibular disorders among dental students: An institutional study. *National Journal of Maxillofacial Surgery* 2018;9:147.
2. **Pesqueira AA, Zuim PR, Monteiro DR, et al.** Relationship between psychological factors and symptoms of TMD in university undergraduate students. *Acta Odontologica Latinoamericana* 2010;23:182-187.
3. **Okeson JP.** Management of temporomandibular disorders and occlusion-E-book. Elsevier Health Sciences, 2019.
4. **Akhter R, Murray A, Hassan N, Wickham J.** Temporomandibular Disorder Symptoms and their Association with Anxiety and Depression Among University Students. *Advances in Dentistry & Oral Health* 2019;10:1-5.
5. **FernandesAzevedo AB, Câmara-Souza MB, DantasIdS, et al.** Relationship between anxiety and temporomandibular disorders in dental students. *CRANIO®* 2018;36:300-303.
6. **Maślak-Bereś M, Loster JE, Wieczorek A, Loster BW.** Evaluation of the psychoemotional status of young adults with symptoms of temporomandibular disorders. *Brain and Behavior* 2019;9:e01443.
7. **Pournasrollah A, Eslami H, Fakhrzadeh V, et al.** The Relationship between Eccentric Occlusion with Temporomandibular Disorders (TMD) and Para-functional Habits among Dentistry Students of Tabriz University of Medical Sciences in 2017. *Advances in Bioscience and Clinical Medicine* 2018;6:11-15.
8. **Schiffman E, Ohrbach R, Truelove E, et al.** Diagnostic criteria for temporomandibular disorders (DC/TMD) for clinical and research applications: recommendations of the International RDC/TMD Consortium Network and Orofacial Pain Special Interest Group. *Journal of Oral & Facial Pain and Headache* 2014;28:6.
9. **Gonçalves MC, Florencio LL, Chaves TC, et al.** Do women with migraine have higher prevalence of temporomandibular disorders? *Brazilian Journal of Physical Therapy* 2013;17:64-68.
10. **Velly AM, Gornitsky M, Philippe P.** Contributing factors to chronic myofascial pain: a case–control study. *Pain* 2003;104:491-499.
11. **Bagis B, Ayaz EA, Turgut S, et al.** Gender difference in prevalence of signs and symptoms of temporomandibular joint disorders: a retrospective study on 243 consecutive patients. *International Journal of Medical Sciences* 2012;9:539.
12. **Vojdani M, Dehbozorgi G, Mohammadzadeh S, AkbariJahromi A.** Comparison of anxiety and depression in patients with temporomandibular disorders and healthy individuals. *The Journal of Islamic Dental Association of IRAN (JIDA)* 2007;19:90-96.
13. **Kanehira H, Agariguchi A, Kato H, et al.** Association between stress and temporomandibular disorder. *Nihon HotetsuShikaGakkaiZasshi* 2008;52:375-380.
14. **Weitzman ER.** Poor mental health, depression, and associations with alcohol consumption, harm, and abuse in a national sample of young adults in college. *The Journal of Nervous and Mental Disease* 2004;192:269-277.
15. **Read JP, Wood MD, Davidoff OJ, et al.** Making the transition from high school to college: The role of alcohol-related social influence factors in students' drinking. *Substance Abuse* 2002;23:53-65.
16. **Wieckiewicz M, Grychowska N, Wojciechowski K, et al.** Prevalence and correlation between TMD based on RDC/TMD diagnoses, oral parafunctions and psychoemotional stress in Polish university students. *BioMed Research International* 2014;2014:472346.