

## Relationship between temporomandibular joint dysfunction and psychological distress among students of Babol University of Medical Sciences and Technology, Iran

Abdolhamid Al-Havaz DDS, MD<sup>1</sup>, Sina Safari DDS, MD<sup>2</sup>,  
Neda Mohammadpour DDS, MD<sup>3</sup>, Farzan Kheirkhah DDS, MD<sup>4</sup>,  
Mina Motalleb-Nezhad DDS, MD<sup>5</sup>, Majid Arian DDS<sup>6</sup>

### Original Article

#### Abstract

**BACKGROUND AND AIM:** Temporomandibular joint (TMJ) dysfunction is a condition which affects the TMJ and muscles of mastication in the stomatognathic system and the associated structures. Several studies have indicated that approximately 60-70% of people suffer from at least one of the symptoms of temporomandibular disorder (TMD) in their life while only 5% need treatment. Some of evidence have suggested that myofascial pain, functional somatic syndromes are critical conditions of muscle pain which may be resulted from the psychosocial factors. The purpose of this epidemiological study was to evaluate the prevalence of relationship between TMDs, and psychological distress among university students at Babol University of Medical Sciences and Babol University of Technology, Iran.

**METHODS:** This study conducted due to diversity in prevalence reports and to follow the standardized diagnostic method of research in this field. In this cross-sectional descriptive-analytical (wrong term) research, 592 students at different universities in Babol were selected using stratified sampling method. Information about the signs and symptoms of TMD was collected by dental students and through completing the research diagnostic criteria (RDC) for TMD questionnaire. The data were analyzed using  $\chi^2$ , t-test, and Student's test.

**RESULTS:** Between the subjects (28.9%) had at least one type of TMD and the difference between two sex groups was statistically significant. About 5.7% of subjects had moderate to severe symptoms of depression and the difference between two sex groups was statistically significant. In this study, the relationship between depression symptoms and non-specific physical symptoms (NPS) (either with or without pain) with TMD was not statistically significant.

**CONCLUSION:** In this study, no significant relationship was observed between depression symptoms, as well as NPS (with or without pain) and TMD ( $P = 0.682$ ).

**KEYWORDS:** Temporomandibular Joint Disorder, Depression, Prevalence, Psychological Distresses

**Citation:** Al-Havaz A, Safari S, Mohammadpour N, Kheirkhah F, Motalleb-Nezhad M, Arian M. **Relationship between temporomandibular joint dysfunction and psychological distress among students of Babol University of Medical Sciences and Technology, Iran.** J Oral Health Oral Epidemiol 2015; 4(2): 94-101.

**T**emporomandibular joint (TMJ) dysfunction is a condition which affects the TMJ and muscles of mastication in the stomatognathic system and the associated structures.<sup>1</sup>

Temporomandibular disorder (TMD) can affect people at any age; however, its prevalence is higher among women and individuals within the age range of 20-45 years. Several studies have indicated that

1- Assistant Professor, Department of Prosthodontics, School of Dentistry, Babol University of Medical Sciences, Babol, Iran  
2- Assistant Professor, Department of Prosthodontics, School of Dentistry, Kerman University of Medical Sciences, Kerman, Iran  
3- Assistant Professor, Department of Oral Medicine, School of Dentistry, Ardabil University of Medical Sciences, Ardabil, Iran  
4- Associate Professor, Department of Psychiatry, School of Medicine, Babol University of Medical Sciences, Babol, Iran  
5- Professor, Department of Oral Medicine, School of Dentistry, Babol University of Medical Sciences, Babol, Iran  
6- Prosthodontist, Department of Prosthodontics, School of Dentistry, Ardabil University of Medical Sciences, Ardabil, Iran  
Correspondence to: Majid Arian, DDS  
Email: dr.arian\_majid@yahoo.com

approximately 60-70% of people suffer from at least one of the symptoms of TMD in their life while only 5% need treatment.<sup>2,3</sup>

TMD has multi-factorial causes and its symptoms include pain in the TMJ and in the areas around the ear, cervical spinal cord, head, face, fatigue in muscles of mastication and facial-cervical-cranial ones, and limited range of motion in mandible with the presence of joint sounds.<sup>2</sup> Spasm of masticatory muscles is a painful symptom in TMD which is due to tension, contraction, fatigue, or the presence of parafunctional habits such as bruxism and nail biting.<sup>2-4</sup> Various studies on different population have indicated that these habits are initiated or intensified by emotional stresses. Patients with TMD have lower pain thresholds and greater sensitivity to experimental pain when compared with age- and gender-matched pain-free controls. Numerous explanations such as central sensitization, neuroendocrine, and autonomic dysregulation have been offered to explain these differences, but more psychological explanations have received less attention.<sup>2-10</sup>

Pieces of evidence have suggested that myofascial pain, functional somatic syndromes, fibromyalgia, and chronic fatigue syndrome are critical conditions of muscle pain which may be resulted from the psychosocial factors.<sup>11</sup> Myofascial pain and discomfort coincide with the occurrence of tension and stress and cause excessive muscle activity. Such tension ultimately might lead to parafunctional habits. Therefore, psychosocial factors such as anxiety, stress, and depression can play an important role in TMD pathogenesis.<sup>11</sup>

The purpose of this epidemiological study was to evaluate the prevalence of TMDs and psychological distress among university students at Babol University of Medical Sciences and Babol University of Technology, Iran.

## Methods

This study was a cross-sectional descriptive-

analytical research (this is true term: Teacher Sorting and the Plight of Urban Schools: A Descriptive Analysis. Educational Evaluation and Policy Analysis 2002 24: 37-62) with ethical code no 5169. A number of 592 students at different universities in Babol (65 student majoring in medical sciences, 90 in dentistry, 110 in paramedical sciences, 57 in nursing, and 270 in industrial engineering) were selected using stratified sampling method. Sample size calculation formula:

$$N = z^2 \cdot P(1-P)/d^2 = (1.96)^2 \times 0.05 \times 0.95 / (0.02)^2 = 456$$

After completing the demographic information form, collecting the written consent form, and providing medical and dental records from the subjects, the signs and symptoms of TMD were examined in all the subjects.

Information about the signs and symptoms of TMD, which were calibrated through clinical examination by the prosthodontist and psychologist, was collected by dental students and through completing the research diagnostic criteria (RDC)/TMD questionnaire which has a high degree of validity and reliability. A new system known as the RDC for TMD is the standardized criteria for research, based on the available knowledge on TMJ pathology. The diagnostic criteria are proposed for both clinical research and for epidemiological work.

The objective of the authors was to maximize the reliability and minimize the variability of the examination methods and clinical judgment. The system comprises two classification axes. The first axis (clinical aspects of TMDs) contemplates three groups: Group 1. muscle diagnosis; Group 2- disc displacement; and Group 3- arthralgia, arthritis, and arthrosis. The second axis in turn contemplates disabilities related to pain and the psychological condition of the patient. The classification criteria include: Intensity of pain and degree of disability (according to

the severity of chronic pain grading scale). Depression [according to the symptom checklist-90-revised (SCL-90R); depression and vegetative symptoms scale] and limitations related to mandibular function and RDC/TMD explanation.<sup>9</sup>

Finally, the obtained data were scored using RDC/TMD booklet. The extremely early stages of intra-articular disorders, which cannot be diagnosed by conventional clinical examinations, were not recorded.

The part related to the evaluation of mental health condition was a questionnaire with 32 questions, among which 20 questions were related to symptoms of depression and 12 were related to non-specific physical symptoms (NPS). Finally, after calculating the scores, they were classified as normal for scores less than 2, moderate for scores between 2 and 3, and severe for scores more than 3.

The data were analyzed using SPSS software (version 18, SPSS Inc., Chicago, IL, USA) and  $\chi^2$  and t-test, Student's test by a statistician and the level of significances set at 0.05.

## Results

In this study, 592 students were randomly selected (215 male and 377 female) (Table 1).

Out of the total studied population, 171 subjects (28.9%) were suffering from at least one type of TMD, among whom 98 subjects (57.3%) were female and 73 (42.7%) were male. The difference between the two sex groups was statistically significant ( $P = 0.040$ ).

The most common symptom between the population of TMD was a click (31.6%) while the most common TMD subgroup found in this study was group 2 disorders (disc dislocation) (23.3%) (Table 2).

**Table 1.** Frequency of age groups in the study

Age group (year)	Age (year)	n (%)
	Mean $\pm$ SD	
Under 19 (group 1)	1.44 $\pm$ 0.517	335 subjects (56.6)
20-29 (group 2)	1.44 $\pm$ 0.517	251 subjects (42.4)
Above 30 (group 3)	1.44 $\pm$ 0.517	6 subjects (1.0)

SD: Standard deviation

**Table 2.** Frequency of temporomandibular disorder subtypes based on research diagnostic criteria/Temporomandibular disorder (RDC/TMD)

Clinical TMD	n (%)
Group 1	
Myofascial disorders	3 (0.5)
Myofascial disorders with limited maximum opening	1 (0.2)
Group 2 (right joint)	
Disk displacement with reduction	106 (17.9)
Disk displacement without reduction, with limited maximum opening	0 (0.0)
Disk displacement without reduction, without limited maximum opening	0 (0.0)
Group 2 (left joint)	
Disk displacement with reduction	109 (18.4)
Disk displacement without reduction, with limited maximum opening	0 (0.0)
Disk displacement without reduction, without limited maximum opening	0 (0.0)
Group 3 (right joint)	
Arthralgia	3 (0.5)
Osteoarthritis	9 (1.5)
Osteoarthrosis	23 (3.9)
Group 3 (left joint)	
Arthralgia	2 (0.3)
Osteoarthritis	7 (1.2)
Osteoarthrosis	23 (3.9)

TMD: Temporomandibular disorder

Among population, 5.7% of the subjects had moderate to severe symptoms of depression. In this study, 8.5% of women and 0.9% of men had signs and symptoms of clinical depression, which were statistically significant ( $P < 0.010$ ). The degree of depression symptoms among subjects was within 3.7-5, while this value was 0-3.30 for NPS with pain and 0-2.80 for NPS without pain.

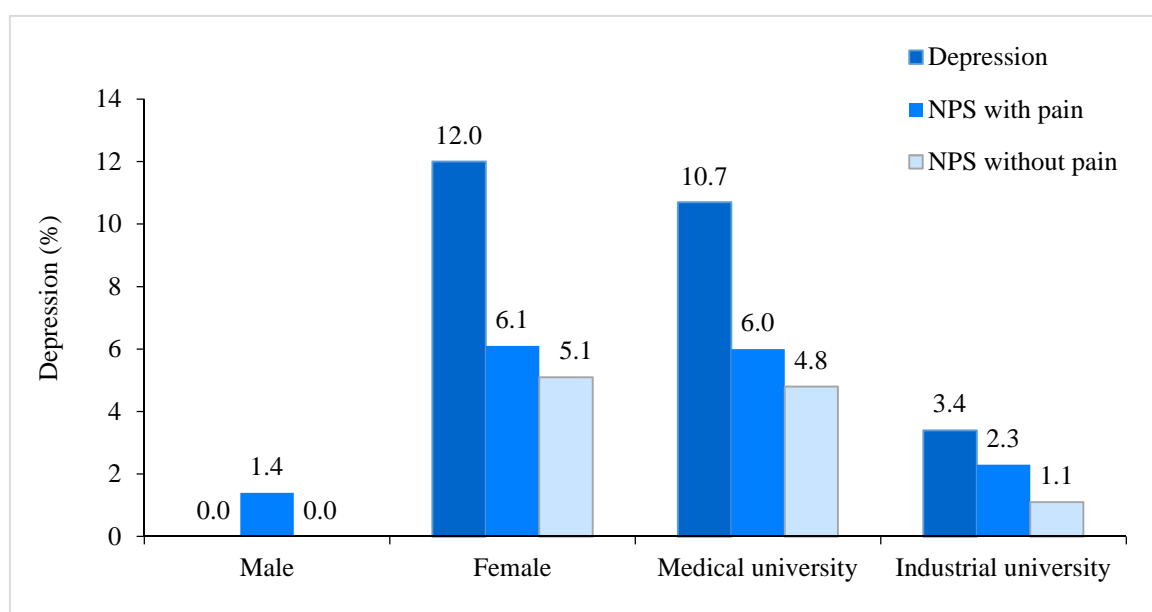
Among 171 TMD patients, 7.0% were suffering from some degrees of depression symptoms (moderate to severe). Among these 171 subjects, 4.1% had moderate to severe NPS (with pain). In this study, the relationship between depression symptoms and NPS (either with or without pain) with TMD was not statistically significant, whereas a significant relationship was observed between the symptoms of depression and NPS ( $P < 0.010$ ).

Among TMD patients, 10.3% of dentistry students, 14.3% of nursing students, 20.0% of paramedical sciences students, and 3.4% of students in different departments of Babol University of Technology indicated moderate to severe depression symptoms, while these symptoms were not observed among students at School of Medical Sciences. The

observed difference between the mentioned schools was statistically significant ( $P = 0.039$ ) (Figure 1).

Moreover, 3.4% of dentistry students, 15.0% of paramedical students, 7.1% of nursing students, and 2.3% of students in different departments of Babol University of Technology were suffering from TMD and also experiencing moderate to severe degrees of NPS (with pain); however, these symptoms were not observed among students at School of Medical Sciences. The observed difference between the above-mentioned schools was not statistically significant.

Among the TMD patients, 15.0% of paramedical students, 7.1% of nursing students, and 1.1% of students at different departments of Babol University of Technology experienced moderate to severe NPS (without pain), while these symptoms were not observed among the students of other schools of Babol University of Medical Sciences. The observed difference between Babol University of Technology and Babol University of Medical Sciences was statistically significant ( $P < 0.001$ ).



**Figure 1.** The relationship between depression as well as non-specific physical symptoms (with or without pain) and other variables

$P < 0.050$  between male and female subjects

## Discussion

Results of this study suggested the 28.9% prevalence of TMD among university students at Babol Universities of Medical Sciences and Babol University of Technology.

Otuyemi et al.<sup>12</sup> reported the prevalence of TMD among 308 students of medical and dental sciences as 42.0%. Nomura et al.<sup>13</sup> also reported the prevalence of TMD among the students at University of Sao Paulo, Brazil, as 53.2%. The great difference in the reported prevalence of TMD may be due to the difference in assessment techniques, also lack of the same definition for TMD and clinical criteria, and specific background in the studies, details of the studied course, the time at which the questionnaire was given to the volunteers, and different racial and environmental conditions.

In the present study, women showed a higher prevalence of TMD than men, which was in agreement with other studies.<sup>12,13</sup> The higher prevalence of TMD in women may be due to physiological characteristics, especially hormonal and structural changes in connective tissue and muscles. The higher laxity in these tissues which is related to estrogen level could explain the fact that these tissues have less ability to provide support against the functional pressures that lead to TMD.<sup>4</sup> The most common TMD subgroup founded in this study was group 2 disorder (disc dislocation), while in the study by Manfredini et al.,<sup>14</sup> group 3 disorders were more common among the TMD patients seeking treatment.

In another study by Yap,<sup>15</sup> group 1 disorders had the highest prevalence in the population of patients seeking TMD treatment. In two above-mentioned studies, people seeking treatment were examined, however, in our investigation all of the subjects were examined, which could have no TMD sign and symptoms and not seeking treatment, this could explain the differences in the findings of these studies.

Among investigated subjects (5.7%) had symptoms of clinical depression. In the

present study, the relative frequency of depression symptoms was generally higher among TMD patients than the population without the TMD. In this study, 8.5% of women and 0.9% of men had symptoms of clinical depression. Unlike the present study Minghelli et al.<sup>16</sup> showed that 30.5% of the studied students had anxiety or depression. Most of the present participants with depression were women, as was the case in other studies. As compared with men, women are more likely to report depressive symptoms and have a higher rate of psychosomatic illnesses.

In the present study, the relationship between signs and symptoms of depression and NPS (with or without pain) with TMD was not statistically significant. Wahlund et al.<sup>17</sup> conducted a study on two groups of adolescents (a group with TMD and a group of healthy individuals), and the results indicated no significant difference between the control group and the one suffering from TMD in terms of emotional dissatisfaction. It was also suggested that chronic TMD pain in adults was not merely followed by an emotional condition. Ferrando et al.<sup>18</sup> studied coping and distress along with TMJ properties in 114 patients who had TMD and the results demonstrated that the patients who had muscle disorder showed higher levels of psychological distress. Yap et al.<sup>15</sup> reported that 39.0% of TMD patients seeking treatment were clinically suffering from depression, and 55.0% had moderate to severe somatization. Unlike the present study, the population in the above study consisted of the patients seeking treatment; this point along with different racial and environment issues can explain the difference between the results of the mentioned and the present study.

Osterberg and Carlsson<sup>19</sup> performed a study on a group of 70-year-old patients and reported that TMD was significantly related to public health, bruxism, and psychosomatic problems. Castrillon et al.<sup>20</sup> reported a



significant relationship between pain intensity in TMD and somatization degree. Sherman and Turk<sup>21</sup> suggested that, because of the relationship between TMD and biopsychosocial issues, the studied patients were not only affected by biomedical aspects but also sought treatment for this reason.

The difference in there ported results about the prevalence of clinical depression and NPS at different ages among TMD patients and the relationship between signs and symptoms of depression and NPS (with or without pain) with TMD could be resulted from the difference in assessment techniques (data collection method and variables types) as well as the difference in the sampling technique (random or non-random, similarity of the studied age groups, sample size, unhealthy or healthy subjects, and gender distribution).<sup>22</sup>

It was observed in this study that there was a significant relationship between depression signs and symptoms and NPS. This finding was in agreement with the results reported by Yap's et al. study,<sup>23</sup> which indicated a significant relationship between depression and NPS.

In this study, the difference between sex groups in signs and symptoms of depression and the NPS level (without pain) in the patient with TMD, was statistically significant, whereas the difference in the NPS level (with pain) between the two sex groups with TMD patients was not statistically significant.

Phillips et al.<sup>24</sup> found that the two sex groups were not similar to each other in terms of biopsychosocial variables. Yap et al.<sup>23</sup> also found that the prevalence of depression and NPS among Asian patients was comparable within the two sex groups.

In the study by In the study by Kuttilla et al. it was concluded that TMD and depression were higher in women than in men.<sup>25</sup> In general, the higher prevalence of depression signs and symptoms and NPS (without pain) among women may be due to

their emotionality, paying more attention to physical and hormonal changes, menstruation, and social and emotional status.

In this study, a significant relationship was observed between depression signs and symptoms and NPS level (without pain) such that these quantities were more significant among paramedical students than others while the NPS level (with pain) did not significantly correlated to the students' field of study.

A study was conducted by Minghelli et al.<sup>16</sup> in which the relationship between TMD symptoms and anxiety as well as depression was examined in three student groups majoring at health, education, management, and engineering schools. The results demonstrated no statistically significant relationship between the students of different schools.

The higher prevalence of depression signs and symptoms and the NPS level (without pain) among the paramedical students participating in this study was observed in women than men. According to various studies and also the present work, the prevalence of signs and symptoms of depression and NPS level (without pain) is more common in women; therefore, signs and symptoms of depression and NPS (without pain) are more prevalent among students of paramedical sciences than other fields.

Finally, we suggest the investigating conducted to assessment of psychosocial distresses in TMD patients.

## Conclusion

In this study, no significant relationship was observed between depression symptoms as well as NPS (with or without pain) and TMD. In the studied patients with TMD, no relationship was observed between age and depression signs and symptoms, as well as NPS. Among women with TMD, the prevalence of depression symptoms and NPS (without pain) was more than men. Furthermore, students of paramedical sciences

had more signs and symptoms of depression and NPS (without pain) than other students.

### Conflict of Interests

Authors have no conflict of interest.

### Acknowledgments

The authors thank Dr. Kazemi H, Dr. Aslani P, Dr. Yoosefi and Department of Prosthodontics of Babol Dental School.

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