

## Research Article

## Association of Temporomandibular Disorders Symptoms with Anxiety and Depression in Tunisian Patients

Aymen Ben Hadj Khalifa<sup>1,2,3\*</sup>, Ghada Ayari<sup>1,4</sup>, Monia Elhadj Khalifa<sup>5</sup>, Walid Ghorbel<sup>6,7</sup>, Chiraz Baccouche<sup>1,2,9</sup>, Soumaya Touzi<sup>2</sup>, Faten Ben Amor<sup>7,8</sup>, Hichem Ghedira<sup>1,3</sup>

<sup>1</sup>Biological and Clinical Dento-Facial Approach Laboratory (ABCDF) LR12ES10, Faculty of Dental Medicine, University of Monastir, Monastir, Tunisia

<sup>2</sup>Department of Dental Anatomy, Faculty of Dental Medicine, University of Monastir, Monastir, Tunisia

<sup>3</sup>Department of Pediatric Dentistry, Faculty of Dental Medicine, University of Monastir, Monastir, Tunisia

<sup>4</sup>Department of Restorative Dentistry-Endodontics, Faculty of Dental Medicine, University of Monastir, Tunisia

<sup>5</sup>Psychiatrist practicing in Paris hospitals, Ancient Assistant, Department of Psychiatry, University Hospital of Monastir, Tunisia

<sup>6</sup>Department of Stomatology, Hedi Chaker University Hospital, Sfax, Tunisia

<sup>7</sup>Department of Anatomy, Faculty of Dental Medicine, University of Monastir, Monastir, Tunisia

<sup>8</sup>Outpatient Department, University Dental Clinic, Faculty of Dental Medicine, University of Monastir, Monastir, Tunisia

<sup>9</sup>Department of Stomatology, Taher Sfar University Hospital, Mahdia, Tunisia

### Article History

Received: 04.02.2021

Accepted: 17.02.2021

Published: 03.03.2021

### Journal homepage:

<https://www.easpublisher.com>

### Quick Response Code



**Abstract:** *Aim:* The aim of this study was to assess the prevalence of temporomandibular disorders (TMD) and their association with anxiety and depression in Tunisian patients. *Methods:* Two hundred patients were enrolled in the study and completed a socio-demographic survey. Then, TMD and psychological distress were assessed. Descriptive statistics and logistic regression analysis were performed with TMD symptoms as the outcome variable. *Results:* The prevalence of patients with at least one TMD symptom was 29%. Almost two-thirds of subjects (64%) experienced a history of psychological stress. Anxiety symptoms were determined in 58% of patients, while depression symptoms were found in 23.5% of patients. Logistic regression analysis showed that gender, anxiety, depression and stress were significantly related to TMD symptoms. *Conclusion:* The prevalence of TMD symptoms in Tunisian patients is not very high. Psychological distress; anxiety, depression and stress are correlated with TMD. Risk factors for patients with confirmed TMD were anxiety, depression, stress and female sex. Thus, further longitudinal research of the causality is warranted.

**Keywords:** Temporomandibular Disorders, Anxiety, Depression, Prevalence, Correlation, Study.

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## INTRODUCTION

Temporomandibular disorders (TMD) is an all-inclusive term referring to a heterogeneous group of neuro-musculoskeletal and/or psycho-physiologic disorders involving temporomandibular joints (TMJ), masticatory muscles, and associated tissues [1–3]. The common characteristics are orofacial pain, essentially, in the temporomandibular joint (TMJ) region, masticatory dysfunction, limitation of mandible movement, and the presence of a clicking sound in the TMJ [3-5].

The etiology of TMD is considered to be multifactorial [3-7]. It is directly related to harmful habits, psychological factors, neuromuscular factors, trauma, dysfunctions of the masticatory musculature and adjacent structures, occlusal interferences,

malpositioning or loss of teeth, postural changes, extrinsic and intrinsic changes of TMJ structure, nonfunctional movements of the mandible (bruxing), tooth clenching habits, or a combination of such factors. However, the relative importance of individual factors is still controversial.

Stress, fatigue, anxiety, depression, sleep disorders, and a fast paced life affect negatively the human psyche [4]. Psychological factors are known to play a role in the etiology and persistence of TMD [5, 8]. As with most pain disorders, a high prevalence of depression and anxiety is associated with TMD [9,10].

This study aimed at determining the prevalence of TMD in Tunisian subjects. It also investigated its-correlation with psychological factors such as anxiety and depression.

## MATERIAL AND METHODS

It was a cross-sectional study carried out in the consultation of the University Dental Clinic of Monastir (Tunisia). The sample was considered of 200 subjects randomly selected. Participation in the study was offered during the consultations in an informed way. The patients were free to accept or to refuse. Subjects voluntarily agreed to answer the form, which did not influence the patient's medical management.

### Inclusion criteria

To be included in the study, patients had to be 16 years or older and be able to complete the forms correctly.

### Non-inclusion criteria

Patients who consult for emergencies. Uneducated patients or unable to self-complete the questionnaire.

## DATA COLLECTION

Data were collected using a questionnaire and an oral examination. The questionnaire included the socio-demographic data of the patients and the scale of the evaluation of anxiety and depression.

The level of anxiety and depression was self-rated by the Hospital Anxiety and Depression Scale (HADS) originated from the study of Zigmond and Snaith [11]. It is composed of a 14-item self-administered rating scale consisting of two subscales: seven items measuring anxiety disorders and seven items measuring depression. The individual items are each rated on a four-point scale (0–3) resulting in maximum subscale scores of 21, with higher scores indicating greater levels of distress. It was decided that a score strictly greater than seven (> 7) present on both subscales indicates a symptomatology of anxious and depressive state. The French and Arabic version of the HADS was used for assessment of anxiety and depression levels.

Examination for TMD was performed according to the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) developed by Dworkin and LeResche in 1992 [10]. An oral examination of teeth and TMJ was made, based on self-report and clinical criteria, each patient who mentions at least a notion of articulo-muscular pain and/or discomfort is retained as a patient with TMD.

## STATISTICAL ANALYSIS

Statistical analyses were performed using SPSS 23.0. T-student test and Chi-square test were used to assess the association between TMD and the different characteristics of the sample. Significance was considered for  $P < 0.05$ .

## RESULTS

The mean age of the included participants was 31.4 years (S.D = 13) with extremes ranging from 16 to 77 years. The most represented age group was 21-30 years old with 47.5% (Table1).

A female predominance was observed 59.5% against 40.5% men, with a sex ratio equal to 0.68. (Table1).

In all, 46.5% were students, 37.5% were in professional activity, 13.5 % were unemployed and 2.5% were retired (Table1).

Among participants, 64 % reported a history of psychological stress in inducing and increasing complaints (Table 3).

The prevalence of anxiety symptoms was determined in 58% of patients, while of the depression symptoms was found in 23.5% of patients. The prevalence of TMD was 29% (58 patient).

An association was found between TMD and sex (Table 2). A statistically significant relationship between the presence of TMD symptoms and all psychological factors was found (Table 3).

**Table-1: Distribution of patients regarding age, gender and occupation**

Variables	Number	%
Age group (years)		
≤20	29	14.5
21 to 30	95	47.5
31 to 40	37	18.5
41 to 50	20	10
51 to 60	9	4.5
>60	10	5
Gender		
Female	119	59.5
Male	81	40.5
Occupation		
Students	93	46.5
In activity	75	37.5
Unemployed	27	13.5
Retirement	5	2.5
Total	200	100

**Table-2: Association between Demographic characteristics (age, gender) and TMD**

		With TMD (58)	Without TMD (142)	P
Sex *	Females (119)	38	81	<b>0.041*</b>
	Males (81)	20	61	
Age	≤ 32 (135)	40	95	0.913
	> 32 (65)	18	47	

\* Relative Risk (RR) = 1.29: Females have a higher risk of developing TMD compared to males.

**Table-3: Association between TMD and anxiety, depression and stress**

		With TMD (58)	Without TMD (142)	P
Anxiety State	Yes (116)	49	67	<b>0.000*</b>
	No (84)	9	75	
Depression State	Yes (47)	22	25	<b>0.022*</b>
	No (153)	36	117	
Stress	Yes (128)	44	84	<b>0.026*</b>
	No (72)	14	58	

## DISCUSSION

The prevalence of anxiety and depression in our study were respectively 58% and 23.5%. Bonjardim *et al.* [4] used the same scale and reported anxiety and depression in 16.58% and 26.71% of Brazilian subjects, respectively. In Chinese adolescents [6], the prevalence of anxiety and depression was higher than those of this study, respectively 65.2% and 34.9%. These results show that there is evidence of psychological disturbances in the general population and specifically in those who consult in dentistry, as verified also by Tiller [12] and Zinke & col. [13]

In this study, 29% of Tunisian subjects presented one or more TMD symptoms. A few of these patients had prior knowledge of TMD. These results were in accordance with those found in the study of Rokaya *et al.* [5] which reported a prevalence of 30.6% among Nepalese subjects. Likewise, Fernandes Azevedo [7] found that TMD was present in 36.2% of subjects who were students. In another study [6], the prevalence of Asian adolescents with at least one TMD symptom was 61.4%. However, other studies reported an even higher prevalence of TMD values up to 77% [2, 8, 14–19], especially among those evaluating students.

These differences in the reported prevalence may be due to the characteristics of the study process, the characteristics of the populations, the biological differences, the psychosocial factors and the time when the questionnaire was administered.

The prevalence of TMD in the general population, based on RDC/TMD [10] showed that females had four times greater risk than males. Earlier studies of various populations [2, 14, 18, 19] found that women had a higher prevalence of TMD than men, as well as the findings in our study ( $p=0.041$ , Relative Risk=1.29). Along the same lines, other studies showed that the most important risk factor for developing TMD is female gender [20–22]. In addition, Auerbach *et al.*

[23] found that female TMD patients were significantly more depressed than males.

The high prevalence of TMD in women might be related to physiological characteristics, particularly hormonal variations and structures in connective tissue and muscle. The greater laxity of these tissues, which is related to estrogen level, may explain why these tissues are less able to support functional pressure, thereby leading to TMD [16]. LeResche *et al.* [24] found that pain intensity varied during the menstrual cycle among women with TMD: pain intensity was greater when estrogen concentration was higher.

This association between TMD and gender was not significant in others studies like the one of Lei [6] among Chinese adolescents and Bonjardim in a group of students [19].

In this study, 64% of subjects presented a psychological stress which is similar to the results reported by other studies [5, 15, 25]. These studies showed an association between TMD and mental anxiety or stress. Also, the findings of Auerbach [23] are consistent with previous research indicating a link between emotional dysfunction and TMD. They are supportive of the conclusion that psychological factors play a more pronounced role when there is pain. List *et al.* [26] verified a higher degree of stress and behavior problems in adolescents with TMD than in healthy individuals.

According to this study, a significant association was found between TMD and anxiety ( $p<0.001$ ), depression ( $p=0.022$ ) and stress levels ( $p = 0.026$ ). These results are accordance with those corroborate [2, 4–6, 9].

In adolescents with TMD, psychosocial factors such as increased stress levels, anxiety, depression, somatic complaints, and emotional problems seem to play a more prominent role than dental factors.

Individuals subject to stress may develop parafunctional habits and muscle tension, which lead to the development of TMD [16]. Thus, parafunctional components, especially those that increase muscle tension, and changes in emotional states are good indicators of jaw pain in people with TMD, which suggests that anxiety and depression are etiological factors in TMD. In his study on Portuguese patients, Minghelli [16] found a high prevalence of TMD, which was significantly associated with anxiety and depression. Vassend *et al.* [27] found a strong correlation between trait anxiety scores and TMD pain. Liao *et al.* [18] found that TMD incidence in individuals with depression was 2.65 times that of those without depression. Counter to the study of Bonjardim [19], TMD was found to have a statistically significant association with anxiety but not with depression.

Anxiety and depression may be an important factor in the perception of pain. This evidence was confirmed by other studies [28-30] which indicated that anxiety and depression are related to increased pain reports in clinical settings. Other researches [22, 23, 31] suggested a strong association between muscular pain and anxiety symptoms, while depressive symptoms may be specific to the development of joint pain.

Otherwise, some studies like the one of Spruijt [32] did not find an association between anxiety, depression and TMD. Also, Azevedo [7] found that joint TMD was not associated with anxiety levels.

Greater academic pressures lead to higher levels of psychological distress generating anxiety and stress, which in turn results in increased TMD symptoms [19]. Ahmed K. Ibrahim [33], through a systematic review, found that university students are most at risk of depression. In this study, despite a large number of young students mainly between 21-30 years, there was no relationship between age and psychiatric diseases. Dıraçoğlu [21] also proves the absence of this relationship.

Studies have shown that TMD patients have higher levels of psychological and affective distress, and validated the important role that psychosocial factors play in predisposing, precipitating, and perpetuating TMD [6, 31].

An advantage of this study is the use of an instrument with very good statistical properties for anxiety and depression HADS [11]. According to its developers, HADS was conceived for use in non-psychiatric hospital departments or in the general population to screen patients for the two most common well-known mental illnesses. It has been shown that its sensitivity, specificity and validity were good [4, 20, 21, 34]. It can be used effectively as an initial screening instrument for the most common manifestations of anxiety and depression [35]. Its purpose is not to

discriminate the various types of depression or anxiety states, nor their secondary or primary nature, but to identify the existence of symptomatology and assess its severity.

In our diagnosis, the possibility of a TMD misdiagnosis cannot be excluded, especially for joint-related pathology. Thus, a more detailed clinical examination of TMD signs and symptoms and imaging tests to confirm the diagnosis would have been useful.

This study did not take into consideration general diseases, alcohol addiction, dental treatments, occlusal factors, bruxism and their relationship with TMD and psychological distress [5, 36, 37]. Therefore, this study may be extended to see the correlations of TMD with the previously mentioned factors. Nevertheless, this work cannot be declared free from patient selection bias. It does not represent the general population but provides a representative figure.

## CONCLUSION

The findings of this study are consistent with previous research indicating a link between psychological factors and TMD. Risk factors for patients with confirmed TMD were anxiety, depression, stress and female sex.

This was a pioneer study; thus, actual TMD prevalence might be higher. A greater understanding of this condition among populations exposed to high levels of emotional stress, such as college students, is of considerable importance in increasing awareness of TMD signs and symptoms and encouraging affected individuals to seek treatment. It is important that TMD be diagnosed early to prevent future complications.

## ACKNOWLEDGEMENTS

Special thanks should be given to Professor Yamina Elelmi from the Faculty of Dental Medicine of Monastir, Tunisia, for her help and assistance in this work.

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**Cite This Article:** Aymen Ben Hadj Khalifa *et al* (2021). Association of Temporomandibular Disorders Symptoms with Anxiety and Depression in Tunisian Patients. *EAS J Dent Oral Med*, 3(2), 25-30.