



(RESEARCH ARTICLE)



## Prevalence of temporomandibular disorders among Palestinian medical students

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### Abstract

Temporomandibular joint disorder (TMD) is a collective term that involves alterations in the temporomandibular joint, muscles of mastication and the occlusion. The TMD disorder is a common health problem which affects about 33% of the population within their lifetime. The aim of this study was to evaluate the prevalence of TMDs among university students in Palestine. The role of various risk factors in the etiology of TMD symptoms was also addressed. This is a cross sectional study based on a self-administered questionnaire. The study sample consisted of 416 dental and medical field students from all cities of Palestine studying at Arab American University of Palestine (with an age range of 18 – 27 years). In this study, 63.5% (n = 264) of the investigated students had at least one TMD symptom; clenching was the most prevalent TMD (35.6%) followed by joint noise (33.4%) while locked jaw was the least prevalent (10.6%) symptom. In the conclusion high prevalence of TMD among Palestinian medical students was reported, females reported more pain on TMJ area than males, age group (23 to 25) years reported more frequency of clenching than the other age groups, and strong correlation was found between stress, headache and TMD.

**Keywords:** Temporomandibular Disorder; Clenching; Stress; Headache

### 1. Introduction

There is no doubt that temporomandibular Disorder (TMD) is a collective term that comprises alterations in the temporomandibular joint (TMJ), muscles of mastication and the occlusion. [1] The TMD disorder is a common health problem which affects about 33% of the population within their lifetime. [2] Epidemiologic studies show that TMD symptoms are most prevalent among patients between fifteen and twenty-five years of age; symptoms then level out as patients approach age thirty five. [3]

The prevalence of TMD varies according to the population; Macfarlane *et al.* (2002) reported a 26% overall prevalence of Oro-Facial Pain disorder among English people, [4]. Pow *et al.* [5] reported jaw pain among 33% of the Chinese people in Hong Kong.

Due to its high prevalence, TMD became an important issue in the medical field. Patients with TMD usually suffer from joint pain, limited jaw movement, joint sounds and frequent headaches. History of facial trauma, bruxism, sleep problems, pain elsewhere in the body, and high levels of psychological distress have been linked with TMD development. [6-8]

Although the orthodontic community has become increasingly interested in TMD, there are no previous studies that were conducted in Palestine in order to evaluate the prevalence of TMD, accordingly this study aimed to evaluate the prevalence of TMD and the associated risk factors among university students.

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## 2. Subjects and methods

This is a cross sectional study based on a self-administered questionnaire. A total of 416 students (122 males and 294 females) from all cities of Pleatine studying at the faculties of dentistry and Allied Medical Sciences/ Arab American University of Palestine (Mean age  $21.2 \pm 1.8$  years with a range of 18 – 27 years) were invited to fill the questionnaire. The students were divided into four main age groups as shown in Table 1.

**Table 1** Age distribution of the study sample

Age	Number (%)	Mean
18 to < 21 years	151 (36.3)	$19.3 \pm 0.7$
21 to < 23 years	168 (40.4)	$21.6 \pm 0.5$
23 to < 25 years	81 (19.5)	$23.2 \pm 0.4$
25 to < 28 years	16 (3.8)	$25.6 \pm 0.7$
Total	416 (100)	$21.2 \pm 1.8$

The used questionnaire was based on the guidelines recommended by the American Dental Association [9]. It consisted of 11 questions (Table 2) with main two components; the first five questions were related to TMD symptoms and the last six questions were related to risk factors that might be associated with TMD.

**Table 2** The questionnaire contents

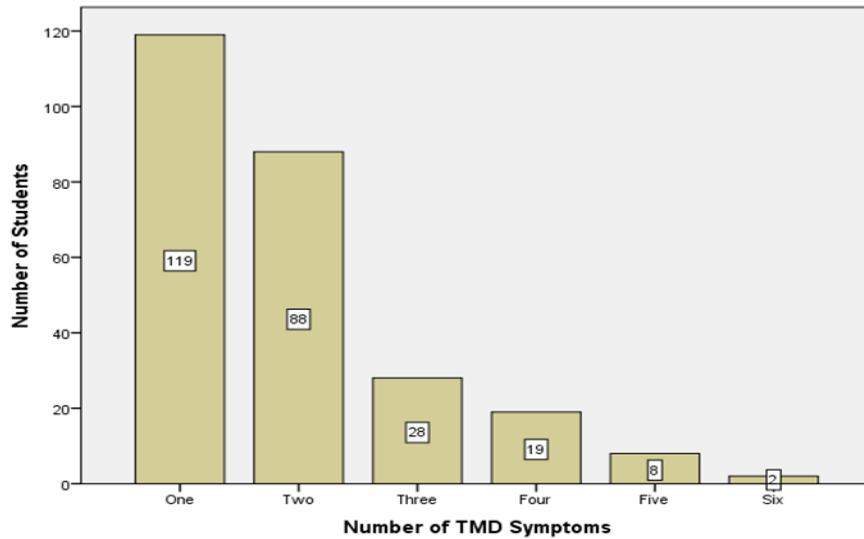
Question	Response	
	Yes	No
Are you aware of noise in the jaw joints?		
Do you have limitation in mouth opening?		
Do you have pain in or about the ears, temples, or cheek area? If yes, which side?		
Has your mouth ever been locked open so you were not able to close it? If yes, how many times?		
Do you have difficulty and / or pain, while chewing or talking?		
Have you ever had trauma to the head and neck area? Where and when?		
Do you have frequent headaches?		
Do you have stress, or being under stressful circumstances?		
Are you aware of clenching of your teeth?		
Do you have pain in other body joints?		
Have you previously been treated for a jaw joint problem? If yes, when?		

## 3. Statistical analysis

Statistical analysis was performed using IBM SPSS (SPSS Version 23, IBM®, Armonk, NY, USA). Frequencies and percentages were calculated. Pearson Chi<sup>2</sup> test was used to study the association between TMD symptoms, gender, age and risk factors. Differences at the 5% level were accepted as being statistically significant.

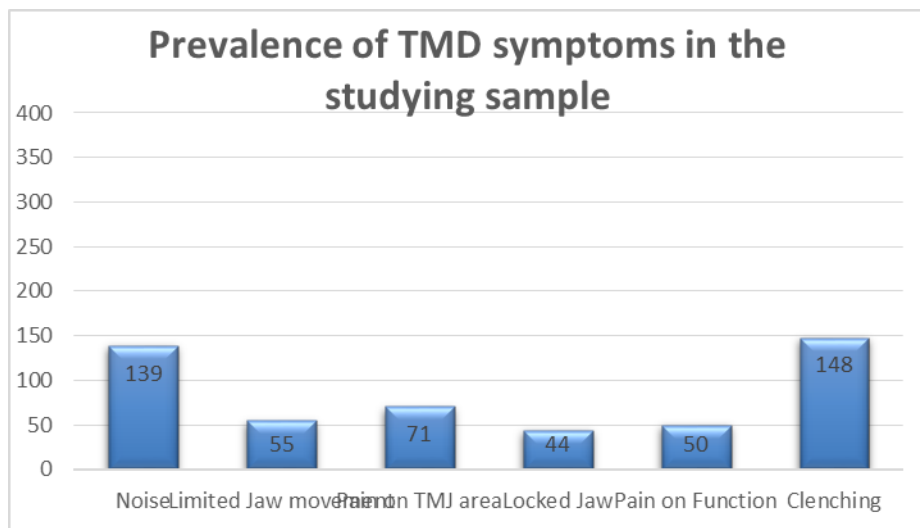
#### 4. Results

TMD symptoms showed a high prevalence among the investigated university students. Sixty-three and half percent (264 students) of the total sample reported at least one TMD symptom; the rest (36.5%, 152/416) did not report any symptom. Only 0.5% (2/416) of the total sample reported all investigated symptoms. The distribution of TMD symptoms in the studied sample is shown in Figure 1.



**Figure 1** The distribution of students according to the number of symptoms they exhibited

The most prevalent TMD symptom reported was clenching (35.6%) followed by TMJ noise (33.4%). Locked jaw was the least reported (10.6%) symptom. The prevalence of each symptom is shown in Figure 2.



**Figure 2** Prevalence of TMD symptoms in the total sample

Almost one quarter of the students (27.3%, n = 72) who reported at least one TMD symptom were males while the rest were females (72.7%, n = 192). There was no significant difference in the reported TMD symptoms between males and females except for pain on TMJ area; more females reported pain on TMJ area (P = 0.012).

Most of the affected subjects were within the first and second age groups. Table 3 shows the prevalence of each symptom according to gender and age groups.

**Table 3** Prevalence of TMD symptoms according to age and gender

Gender	Statistic	Age Group				Total
		Age Grp 1 (151 students)	Age Grp 2 (168 students)	Age Grp 3 (81 students)	Age Grp 4 (16 students)	
Males	Number of male students with TMD symptoms	25	23	20	4	72
	% within Gender	34.7%	31.9%	27.8%	5.6%	100.0%
	% Total sample	9.5%	8.7%	7.6%	1.5%	27.3%
Females	Number of female students with TMD symptoms	67	80	41	4	192
	% within Gender	34.9%	41.7%	21.4%	2.1%	100.0%
	% of Total sample	25.4%	30.3%	15.5%	1.5%	72.7%
	Total	92	103	61	8	264

There was no significant gender difference in the occurrence of TMD symptoms except for the symptom pain on temporomandibular joint area which occurred more among females (as shown in Table 4)

**Table 4** Association between gender and TMD symptoms

Symptom	Gender		P-Value
	Male (122) Number (%)	Female (294) Number (%)	
Noise	38(31.1)	101(34.4)	0.528
Limited jaw movement	14(11.5)	41(13.9)	0.498
Pain on TMJ area	12(9.8)	59(20.1)	0.012
Locked jaw	16(13.1)	28(9.5)	0.278
Pain on function	17(13.9)	33(11.2)	0.439
Clenching	40 (32.8)	108 (36.7)	0.444

When comparing the prevalence of each symptom within the different age groups, apart from clenching, the results showed no significant difference between the different age groups and all TMD symptoms (Noise, limited jaw movement, pain on TMJ area, locked jaw and pain on function). Students in the third age group had the highest prevalence (p value of 0.000) of clenching compared with the other age groups. The age-wise prevalence distribution is shown in Table 5.

**Table 5** Age groups associated with Prevalence of TMD symptoms in the studying sample

Symptom	Age group				P-Value
	Group 1 Number (%)	Group 2 Number (%)	Group 3 Number (%)	Group 4 Number (%)	
Noise	42(27.8)	56(33.3)	36(44.4)	5(31.3)	0.086
Limited jaw movement	24(15.9)	23(13.7)	8(9.9)	0(0)	0.241
Pain on TMJ area	23(15.2)	30(17.9)	17(21)	1(6.3)	0.451
Locked jaw	12(7.9)	20(11.9)	10(12.3)	2(12.5)	0.626
Pain on function	20(13.2)	17(10.1)	11(13.6)	2(12.5)	0.806
Clenching	38(25.2)	64(38.1)	43(53.1)	3(18.8)	0.000

Regarding causative effect of TMD risk factors on the development of TMD symptoms, the results revealed that previous trauma was significantly associated with increased risk of limited joint movement (p = 0.013). Both headache and stress were statistically associated with all TMD symptoms except joint noise.

Arthralgia did significantly increase the risk of pain on temporo-mandibular joint area and clenching. Previous joint treatment was significantly associated with increased pain levels on temporo-mandibular joint area and the development of a locked jaw situation. The associations between TMD symptoms and the associated risk factors are shown in Table 6.

**Table 6** Risk factors for TMD development

Risk factors		Symptoms							
		Noise			Limited movement jaw			Pain on TMJ area	
		Number (%)		P	Number (%)		P	Number (%)	P
Previous trauma	Yes	15(30.6)		0.658	12(24.5)		0.013	13(26.5)	0.061
	No	124(33.8)			43(11.7)			58(15.8)	
Headache	Yes	65(34.9)		0.551	35(18.8)		0.002	54(29)	0.000
	No	74(32.2)			20(8.7)			17(7.4)	
Stress	Yes	91(35.7)		0.216	45(17.6)		0.001	58(22.7)	0.000
	No	48(29.8)			10(6.2)			13(8.1)	
Arthralgia	Yes	32(36.8)		0.454	15(17.2)		0.212	21(24.1)	0.049
	No	107(32.5)			40(12.2)			50(15.2)	
Previous treatment	Yes	11(50)		0.090	5(22.7)		0.176	10(45.5)	0.000
	No	128(32.5)			50(12.7)			61(15.5)	
Risk factors		Symptoms							
		Locked jaw			Pain on function			Clenching	
		Number (%)		P	Number (%)		P	Number (%)	P
Previous trauma	Yes	7(14.3)		0.369	7(14.3)		0.603	19(38.8)	0.619
	No	37(10.1)			43(11.7)			129(35.1)	
Headache	Yes	33(17.7)		0.000	33(17.7)		0.001	85(45.7)	0.000
	No	11(4.8)			17(7.4)			63(27.4)	
Stress	Yes	39(15.3)		0.000	42(16.5)		0.000	119(46.7)	0.000
	No	5(3.1)			8(5)			29(18)	
Arthralgia	Yes	11(12.6)		0.481	15(17.2)		0.092	39(44.8)	0.043
	No	33(10)			35(10.6)			109(33.1)	
Previous treatment	Yes	6(27.3)		0.009	9(40.9)		0.000	9(40.9)	0.591
	No	38(9.6)			41(10.4)			139(35.3)	

## 5. Discussion

Although TMD is a prevalent disease affecting young adults (*Magnusson et al 2000*), there is lack in the literature about its prevalence in the Palestinian population. Accordingly, the aim of this study was to study the prevalence of TMD symptoms among a group of university students.

In this study, students from the dental and medical fields were chosen to answer the questionnaire because they have more knowledge about the temporomandibular joint problems compared to students from other faculties in the university.

The results of this study revealed a high prevalence (63.5%) of TMD symptoms among the investigated students. This result was close to what was found by some other studies. [10,11]

Among the investigated TMD symptoms, clenching was the most prevalent among the investigated students with a prevalence of about 35.6% (148/416 students). This result was in agreement with other studies which proved the strong relationship between clenching and the development of TMD. [12] Joint Noises were the second most reported symptom with a prevalence of about 33.4% (139/416 students).

Apart from clenching, no significant correlation between different **age** groups and the reported TMD symptoms (Noise, limited jaw movement, pain on TMJ area, locked jaw and pain on function). Other studies reported similar results. [13] [14]

In Most of the studies, females reported higher prevalence of TMD symptoms than males. Contrary to most studies reported in the literature, in this study there was no significant gender difference in the occurrence of TMD symptoms except for the symptom pain on temporomandibular joint area which occurred more among females. [10-11, 16-20]

Students in the third age group had the highest prevalence of clenching symptom compared to other groups. This could be explained by the fact that students in the graduation years may suffer high levels of anxiety, stress and headache that may trigger the development of TMD symptoms. This goes in hand with what was found by Gerke *et al.* (1990) who proved the intimate relationship between psychological and emotional factors and the development of TMD. [15]

This study revealed that stress and headache are closely related to the development of TMDs. Headache was the risk factor mostly associated with the TMD development followed by stress. This finding goes in part with what was found by Young (1999) who considered headache as being the most common risk factor associated with TMD development. [21-23]

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## 6. Conclusion

Based on the findings of our study, a high prevalence of TMD among Palestinian medical students with female students reporting more pain on TMJ than males. Age group (23 to 25) years reported more frequency of clenching than the other age groups and a strong correlation was found between stress, headache and TMD.

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## Compliance with ethical standards

### *Disclosure of conflict of interest*

There is no conflict of interest exist among all authors.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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