Prevalence of signs and symptoms of temporomandibular disorders (TMD) in a sample of medical students in Erbil city

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Objectives: The aim of the present study was to find the prevalence of temporomandibular disorder by Helkimo anamnesis and clinical dysfunction index and to determine the degree of associations present between temporomandibular disorder and each of age, gender and anxiety.

Methods: 230 students were randomly selected with the age group of 18-25 years, from all colleges of Hawler medical university, from March 2019 to June 2019. Data was collected through Helkimo anamnesis dysfunction index[1], Helkimo clinical dysfunction index[1] and generalized anxiety disorder 7-item scale[2]. The data were statistically analyzed by Descriptive statistics and chi square test.

Results: The most encountered symptoms reported by the students were joint sounds (27.4%) and joint fatigue (27.4%). (50%) of the students had some grade of temporomandibular disorder according to Helkimo anamnesis questionnaire (subjective temporomandibular disorder symptoms) and (57.4%) had some grade of temporomandibular disorder According to Helkimo clinical dysfunction index (objective temporomandibular disorder symptoms). The associations between temporomandibular disorder and each of age (P-value= 0.900), Gender (P -value= 0.221), and anxiety (P-value= 0.288) were statistically not significant by using Helkimo anamnesis questionnaire. Significant association was found between temporomandibular disorder and each of gender (P-value <0.001) and anxiety (P-value <0.001) by using Helkimo clinical dysfunction index.

Conclusion: In conclusion, the prevalence of temporomandibular disorder was high. The most common symptom reported by students were joint sounds and joint fatigue. According to Helkimo clinical dysfunction index temporomandibular disorder was more prevalent among females and those who had a degree of anxiety.

Keywords: College students, anxiety, Helkimo index

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Introduction

Temporomandibular disorders (TMD) are a number of conditions that interfere with the normal function of the temporomandibular joint and related structures[3], causing signs and symptoms like pain, limitation of mouth opening and temporomandibular joint sounds.[4] Usually, the patient seek treatment when the significant symptoms arise however in many cases TMD can exist with sub clinical symptoms.[5] A number of factors are associated with TMD and those factors are either dental, medical or mental, some of these factors include parafunctional habits, trauma, muscle pathophysiology and emotional stress. Age and gender are two other factors that has been studied but it has not proved whether they are causative factors or just concurrent factors.[4] There are some factors that put college students under the risk of developing TMD among them are study associated stress[6], study associated parafunction[7] and unfavorable body position while studying or lab working[8].

According to Liu and Steinkeler[9] college

students are at higher risk of TMD because of their age since the peak age of starting TMD symptoms is 20 years.

The prevalence of TMD was estimated by a population based study done by Isong et al to be between 8% to 15% for females and 3% to 10% for males.[10] TMD prevalence differs from male to female, different age groups, races and socioeconomic status.[10,11] For the purpose of measuring TMD there is an absolute need of dependable and relatively simple indices. Among those commonly used indices were anamnestic index and clinical dysfunction index proposed by Helkimo in 1974.[1] There are several studies published concerning the prevalence of TMD in other countries abroad.[12-23] According to the researchers knowledge there is no study done in Erbil city about TMD prevalence, therefore the objective of the present study is to determine the prevalence of TMD in Hawler medical university and to find out the associations between TMD and each of age, gender and anxiety.

Methods

A total number of 230 students were randomly selected with the age group of 18-25 years, from all colleges of Hawler medical university, namely, college of medicine, college of dentistry, college of pharmacy, college of nursing, and college of health sciences, from March 2019 to June 2019. Data was collected through Helkimo anamnesis dysfunction index[1], Helkimo clinical dysfunction index[1] and generalized anxiety disorder 7-item scale (GAD-7)[2]. Patients with all permanent dentition were included in the study. Patients with clinically diagnosed TMD with treatment were excluded from the study.

The Helkimo anamnesis dysfunction questionnaire is composed of 8 questions with yes and no answers, proposed by Marti Helkimo for evaluation of TMD. The criteria and scoring were all described in detail by Helkimo.[1] The anamnestic questionnaire was translated in to Kurdish language and questions were asked in Kurdish to accomplish repeatability and consistency in asking by the researcher. The Helkimo clinical dysfunction index was proposed by Marti Helkimo to know the severity of TMD by examining the subjects for 5 symptoms and each symptom had three grades using 0, 1 or 5 points. The five symptoms were: impaired range of movement of the mandible, impaired function of the temporomandibular joint, pain on movement of the mandible, muscle pain and temporomandibular joint pain, their criteria and scoring were all described in detail by Helkimo.[1] The level of anxiety was measured by Generalized Anxiety Disorder 7-item (GAD-7) scale. The scale is composed of 7 signs and symptoms felt by the patient in the past 2 weeks, [2] including the repetition of the signs in the days of the week. The scoring were all described in detail by Spitzer et al.

Statistical analysis. The data was submitted to chi square test to show the strength of association between the prevalence of temporomandibular joint disorder, age, gender, and anxiety disorder, using SPSS software package (Version 23). The level of significance was set at $p < 0.05$.

Results

The response rate was 92% because 8% of the students either did not proceed with the interview or they refused to be examined by the researcher, so were not included in the study. Descriptive analysis showed that the mean ± standard deviation of the age of the students who participated was (20.2870± 1.79648). (Figure 1) shows that most of the students who participated in the study were females (63%). According to (Figure 2), the students were composed mostly of 19-21 age group (63%).

It's evident from (Table 1) that the most encountered symptoms reported by the students were joint sounds (27.4%) and joint fatigue (27.4%). (Table 2) shows that (50%) of the students had some grade of TMD and nearly one fourth of them had severe symptoms according to Helkimo anamnesis questionnaire (subjective TMD symptoms). The sample included 98 students (42.6%) free from TMD symptoms while the rest (57.4%) had TMD symptoms and they were either mild, moderate or

severe symptoms According to Helkimo clinical dysfunction index (objective TMD symptoms) as its shown in (Table 3).
The associations between TMD and each of age (P-value= 0.900), Gender (P-value= 0.221), and GAD (P-value= 0.288) were statistically not significant by using Helkimo anamnesis questionnaire as seen in each of (Table 4), (Table 5) and (Table 6) respectively. Similarly the association between TMD and age by using Helkimo clinical dysfunction index (P-value= 0.357) was not significant either (Table 7). On contrary there was a highly significant association between TMD and genderusing Helkimo clinical dysfunction index (P-value <0.001) as it's evident
in (Table 8) that moderate (20%) and severe (2.2%) TMD in females was significantly higher than moderate (3.5%) and severe (0.4%) TMD in males. Another highly significant association (P-value <0.001) was present between TMD and GAD using Helkimo clinical dysfunction index. It's clearly evident from (Table 9) that symptom free TMD was higher among those with minimal GAD (26.5%) and lower among mild (13%), moderate (2.6%) and severe GAD (0.4%).

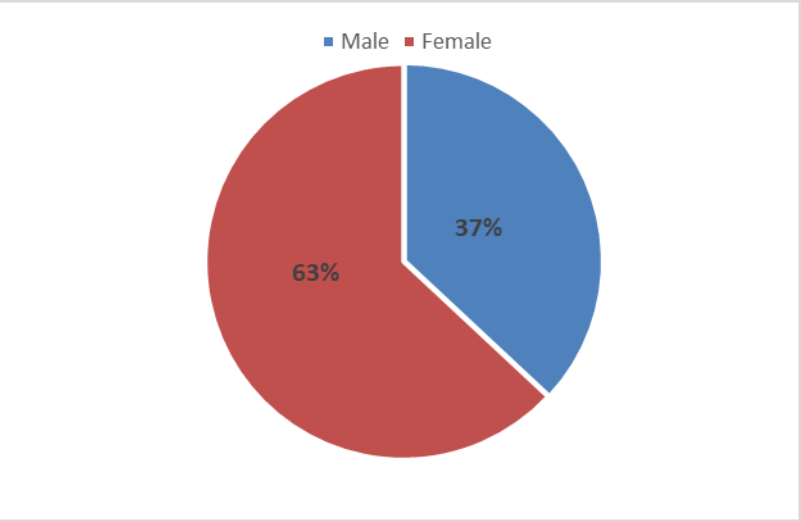

Figure 1: A-Pie chart of gender distribution of the sample.gender distribution of the sample.

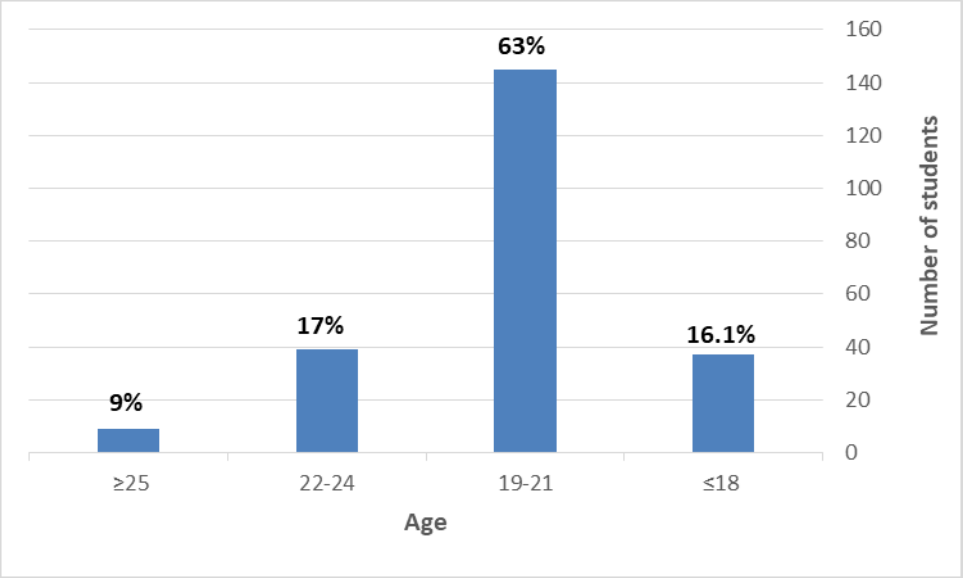

Figure 2: Bar-chart of age Distribution of the sample.

Table 1: Frequency of TMD symptoms according to .Helkimo anamnesis questionnaire.

	Frequency of Symptoms according to Helkimo anamnesis questionnaire	No.	Percentage%
1	**Sound in the TMJ area**	63	27.4%
2	**Jaw rigidity**	34	14.8%
3	**Fatigue in the jaw area**	63	27.4%
4	**Difficulty when opening the mouth**	19	8.3%
5	**Locked mandible**	22	9.6%
6	**Pain in the TMJ or in the area of masticatory muscles**	35	15.2%
7	**Pain during mandible movement**	14	6.1%
8	**Luxation of the mandible**	14	6.1%

Table 2: prevalence of TMD levels by using Helkimo anamnesis Helkimo anamnesis questionnaire index.

Severity of TMD according to Helkimo anamnesis index	No.	Percentage %
Symptom free (Ai-0)	115	50%
Mild (Ai-I)	55	23.9%
Severe (Ai-II)	60	26.1%
Total	230	100%

Table 3: Prevalence of TMD levels by using Helkimo clinical dysfunction index

Severity of TMD according to Helkimo clinical dysfunction index	No.	Percentage %
Symptomfree (Di-0)	98	42.6%
Mild (Di-I)	72	31.3%
Moderate (Di-II)	54	23.5%
Severe (Di-III)	6	2.6%
Total	230	100%

Table 4: Association between Age and TMD by using Helkimo anamnesis questionnaire index.

Age	TMD severity according to Helkimo anamnesis index								P-value
	symptom free		Mild		Severe		Total		
	No.	%	No.	%	No.	%	No.	%	
≤18	17	7.4%	12	5.2%	8	3.5%	37	16.1%	0.900
19-21	73	31.7%	33	14.3%	39	17%	145	63%	
22-24	21	9.1%	8	3.5%	10	4.3%	39	17%	
≥25	4	1.7%	2	0.9%	3	1.3%	9	3.9%	
Total	115	50%	55	23.9%	60	26.1%	230	100%	

Table 5: Association between Gender and TMD by using Helkimo anamnesis questionnaire index.

Gender	TMD severity according to Helkimo anamnesis index								P-value
	symptom free		Mild		Severe		Total		
	No.	%	No.	%	No.	%	No.	%	
Male	47	20.4%	15	6.5%	23	105%	85	37%	0.221
Female	68	29.6%	40	17.4%	37	16.1%	145	63%	
Total	115	50%	55	23.9%	60	26.1%	230	100%	

Table 6: Association between anxiety and TMD by using Helkimo anamnesis questionnaire index and GAD

Severity of anxiety according to GAD 7-item scale index	TMD severity according to Helkimo anamnesis index								P-value
	symptom free		Mild		Severe		Total		
	No.	%	No.	%	No.	%	No.	%	
Minimal	54	23.5%	21	9.1%	25	10.9%	100	43.5%	0.288
Mild	32	13.9%	19	8.3%	11	4.8%	62	27%	
Moderate	18	7.8%	8	3.5%	16	7%	42	18.3%	
Severe	11	4.8%	7	3%	8	3.5%	26	11.3%	
Total	115	50%	55	23.9%	60	26.1%	230	100%	

Table 7: Association between Age and TMD by using Helkimo clinical dysfunction index.

Age	TMD severity according to Helkimo clinical dysfunction index										P-value
	Symptom free		Mild		Moderate		Severe		Total		
	No.	%	No.	%	No.	%	No.	%	No.	%	
≤18	20	8.7%	7	3%	10	4.3%	0	0%	37	16.1%	0.357
19-21	59	25.7%	48	20.9%	32	13.9%	6	2.6%	145	63%	
22-24	16	7%	12	5.2%	11	4.8%	0	0%	39	17%	
≥25	3	1.3%	5	2.2%	1	0.4%	0	0%	9	3.9%	
Total	98	42.6%	72	31.3%	54	23.5%	6	2.6%	230	100%	

Table 8: Association between Gender and TMD by using Helkimo clinical dysfunction index.

Gender	TMD severity according to Helkimo clinical dysfunction index										P-value
	symptomfree		Mild		Moderate		Severe		Total		
	No.	%	No.	%	No.	%	No.	%	No.	%	
Male	47	20.4%	29	12.6%	8	3.5%	1	0.4%	85	37%	<0.001
Female	51	22.2%	43	18.7%	46	20%	5	2.2%	145	63%	
Total	98	42.6%	72	31.3%	54	23.5%	6	2.6%	230	100	

Table 9: Association between anxiety and TMD by using Helkimo clinical dysfunction index and GAD 7-item scale.

Severity of anxiety according to GAD 7-item scale index	TMD severity according to Helkimo clinical dysfunction index										P-value
	symptomfree		Mild		Moderate		Severe		Total		
	No.	%	No.	%	No.	%	No.	%	No.	%	
Minimal	61	26.5%	32	13.9%	5	2.2%	2	0.9%	100	43.5%	<0.001
Mild	30	13%	26	11.3%	5	2.2%	1	0.4%	62	27%	
Moderate	6	2.6%	7	3%	27	11.7%	2	0.9%	42	18.3%	
Severe	1	0.4%	7	3%	17	7.4%	1	0.4%	26	11.3%	
Total	98	42.6%	72	31.3%	54	23.5%	6	2.6%	230	100%	

Discussion

The present study has provided information about the students at Hawler Medical University in Erbil, Iraq on the prevalence of TMD and its relation with age, gender and anxiety by using anamnestic questionnaire of Helkimo and Helkimo clinical dysfunction index[1]. The decision to use the Helkimo anamnesis and dysfunction index together in this study, was based on the possibility of subjectively and objectively measuring the severity of TMD, because according to Helkimo the anamnesis questionnaire only takes the subjects' symptoms while the clinical dysfunction index measures the degree of TMD present by taking in to account the severity of the TMD signs examined by the researcher and both indices has their own scoring. There were difference between subjective and objective TMD prevalence in this study and that's probably because there is no significant association between these two indices as concluded by Ajanovic and Bejtovic[24].In this study the prevalence of subjective TMD (50%) was less than the objective one (57.4%) since TMD can occur with no subjective symptoms.[5]

The effect of anxiety on pain threshold on muscles of mastication has been found and mentioned by both Nomura et al[25] and Okeson[26], And it has also been found that the level of anxiety and stress among college students during college years are relatively high and this is due to the importance of these years for their future professions.[27] so choosing young college students as subjects in this study has been decided because they are considered as risk groups for anxiety and stress.The most encountered symptoms reported by the students were joint sounds and joint fatigue which was in accordance with many studies that found clicking to be the most encountered symptom.[28,29] however in a study done by Bagis et al[21] 92% of the participants had temporal muscle pain as the most frequent symptom. Other studies found that poor articulation of teeth[30], mandibular deviation[23] and Headache[14] were the most occurring symptom

In this study the prevalence of subjective TMD (measured by using Helkimo anamnesis questionnaire) were 50% which was in exact accordance to a study by Bonjardim et al[31], however the results of Aldridge and Fenlon[32], and Al-Hayek et al[16], showed lower prevalence rate and a study done in Brazil by Bezerra et al[33] along with another study by Aldhalai et al[30] in saudi arabia had found higher prevalence rate. The prevalence of objective TMD (measured by using Helkimo clinical dysfunction index) was 57.4% which was nearly the same as a study by Boscato et al[34] and less than what was found by(Al-Hayek et al[16], Alhussini et al[14], and Ahmed and Abuaffan[28], and lower results had been found by Calderón et al[23] and Al-khotani et al[35]. Lower prevalence of objective TMD in this study was probably because the presence of all permanent tooth was an inclusion criteria and according to Gesch et al[36] the number of teeth in occlusion is a protective factor for TMD This study's results revealed that age, gender or anxiety had no significant association with subjective TMD, the same findings were reported about age and gender by Akhter et al[37] a study done among 1930 university students by using interview questionnaires in japan. Current study's results disagreed with a study done by Bezerra et al[33] that showed significant association between gender and subjective TMD in which females were predominant, and the same study[33] found that subjective TMD and stress were significantly associated. Aldhalai et al[30] had studied subjective TMD among 318 participants in Saudi Arabia using Fonesca questionnaire concluding that there was no difference between genders, while the severity of subjective TMD increases with increasing age. Opposed to this study's results Bonjardim et al[31] had found a significant association between subjective TMD and anxiety. Females had more severe objective TMD than males in this study, the same findings had been reported by Adèrn et al[38], Bagis et al[21] , Boscato et al[34], Aldridge and Fenlon[32], and Al-Hayek et al[16]. On the other hand other studies[14,23,29,] showed no significant difference between both genders.

The reason that TMD is more prevalent in females than males is probably because of physiological differences between females and males such as: hormonal variations,

lower pain threshold.[39] And this fact clarifies that why the peak prevalence of TMD in females is during reproductive years and women using estrogen as supplement or oral contraceptives tend to seek TMD treatment more.[40] It was found that there was no significant association between age and objective TMD in this study which was in agreement with Boscato et al[34] and Alhussini et al[14]. And that is probably because of minimum differences between the age groups of our sample. Students with GAD in the present study showed more objective TMD compared with those who don't have GAD, which is in accordance with what was found by Boscato et al[34] with (P-value= 0.001). It's important to mention that the time of this study was concurrent with students exam time and that affected their level of stress and anxiety. In a study[41] in Mexico by using both questionnaire and clinical examination 46.1% of the participants had some grade of TMD and it was concluded that gender, stress and anxiety to be the most significant associated factors. In general there was a huge diversity of TMD prevalence among studies done worldwide. The reasons were: the sample's age group, the diagnostic methods used and the type of the population studied.[42]

Conclusion

Based on the result of this study, the prevalence of TMD measured by both Helkimo questionnaire and Helkimo clinical dysfunction index were high. However the severe TMD cases by using both indices were relatively low. The most common symptom reported by students were joint sounds and joint fatigue. Additionally no statistically significant association were found between TMD and each of age, gender and anxiety by using Helkimo anamnesis questionnaire, however the association between TMD and each of gender and anxiety were very significant by using helkimo clinical dysfunction index.

Conflict of interest

The authors reported no conflict of interests.

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