The Prevalence of Symptoms and Signs of Temporomandibular Disorders among a Group of Young Adult Jordanian Population

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ABSTRACT

Objective: The aim of this study is to determine the prevalence of signs and symptoms of temporomandibular joint in 18 years old Jordanian population and to establish a baseline data for comparison with other studies.

Methods: A group of young adult Jordanians presented to Officer Election Committee for Mu'tah Military University in 2004 were included in this study. A questionnaire was designed to assess the anamnestic and clinical dysfunction indices according to Helkimo. The anamnestic examination was based on the reported symptoms. While the clinical examination was based on maximum mandibular opening, protrusive and lateral movements, auscultation of temporomandibular joint and palpation of joint and muscles of mastication. Data were collected, tabulated, and analysed using Chi-square test and Correlation coefficients tests.

Results: A total of 5,312 Jordanians (3,871 males, 1,441 females) were examined. There were no significant differences between males and females either in reported symptoms or clinical signs. Whilst about 63% reported no symptoms (Ai 0), 21.5% reported mild, and severe symptoms (Ai I) and (Ai II). Similarly, 31.2% showed no signs of dysfunction (Di 0); 47.9% had mild signs (Di I); 17.1% showed moderate signs (Di II); and 3.8% showed severe signs of dysfunction (Di III). There were low but significant correlations between Anamnestic index score (Ai) and the recorded signs (Di) as well as the clinical dysfunction score.

Conclusion: The data obtained from the physical examination and questionnaire identified a high prevalence of signs and symptoms of temporomandibular disorders in 18-year-old Jordanians. Further studies are required to evaluate the prevalence of signs and symptoms of temporomandibular disorders in older age groups among Jordanian population.

Key words: Helkimo index, Prevalence, Signs, Symptoms, Temporomandibular Joint Disorders

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Introduction

The term 'temporomandibular disorders' (TMD) is used to describe a number of clinical problems that involve the temporomandibular joints (TMJ) or masticatory muscles or combinations of both.[1] Most patients with this

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diagnosis suffer from muscle and/or joint pain on palpation and/or mandibular movements. Additionally, joint sounds may occur and the mandibular range of motion may be limited.

The prevalence of TMD has been extensively reported in the literature and several indices and criteria have been developed.[2] The literature reports great variability in the prevalence of clinical symptoms (6-93%) and signs (0-93%), probably as a result of the different clinical criteria used.[3] A simple comparison is difficult because of the lack of uniform criteria. One of the most widely used indices is that developed by Helkimo (1974) which combined anamnestic and clinical dysfunction indices.[4]

Many studies reported prevalence with different age groups in many countries. Thilander *et al.* reported that one or more clinical signs were reported in 25% in 5-17 year olds,[5] while more recent studies carried out in Saudi Arabia reported the prevalence of TMJ signs around 20% and symptoms 24-33% in 12-16 year old children.[6,7] A high prevalence of 68% was reported in a Brazilian study among university students,[8] while a Japanese study, reported a 74% prevalence in the same age group.[9] One geriatric study reported that objective signs and symptoms are more often reported than younger subjects.[10]

The aetiology of TMD remains a subject of controversy and is generally viewed as multifactorial. Nevertheless, a number of studies have implicated occlusal interferences and psychological factors as more important than other variables in providing explanation for TMD.[11-14] Choi *et al*. reported that the Prior experience of a dislocated disc was found to be the most risky factor in TMD. Stress was related to limitations of mouth opening, and the experience of trauma in the TMJ was found to be related to pain in the joint region. Subjects with high sleep bruxism activity tend to feel more stressed at work and in their daily life, which in turn might influence their physical state. These subjects also seem to deal with stress in a negative way.[15] Bruxism may not be a direct risk factor in TMD, and the clenching habit found to be more harmful than bruxism.[16] The relationship between bruxism and temporomandibular disorders, if it exists, seems to be controversial and unclear.[17] Pergamalian *et al*. reported that tooth wear factor did not differentiate patients with bruxism from those without and the amount of bruxism activity was not associated with more severe muscle pain and was associated with less pain in the TMJ on palpation.[18] Other investigators have looked at the correlation between TMD and orthodontic treatment. However, these correlations have not been clearly established.[19- 22]

While the literature abounds TMD in developed and some developing countries, very little has been reported in Arab countries. To the best of our knowledge, there are no such reports in Jordan. The purpose of this study is therefore to determine the prevalence of signs and symptoms of TMD among young adults Jordanians.

Methods

A group of young adult Jordanians were presented to Officers Election Committee for Mu'tah Military University, from different provinces of Jordan. All the subjects had just finished their high school examination which is considered a university entrance examination. Their ages were 18± 6 months.

A questionnaire was designed to assess the anamnestic and clinical dysfunction indices according to Helkimo.[4] The anamnestic examination was based on the reported symptoms by the subjects and classified according to the anamnestic dysfunction index (Ai) as 0, I, or II. While Ai0 comprised individuals with subjectively symptom-free TMD, AiI and AiII represent those presented with mild and severe symptoms, respectively.

The clinical examination was based on maximum mandibular opening, and maximum eccentric mandibular movements during protrusive and lateral movements, these movements were measured in millimetres. Those measurements were obtained by using a digital calliper with a sensitivity of 0.01mm. Each movement was repeated three times in order to obtain an average of the values.

The temporomandibular joint was examined for sounds and pain. Auscultation of articular sounds was carried out with the aid of a stethoscope

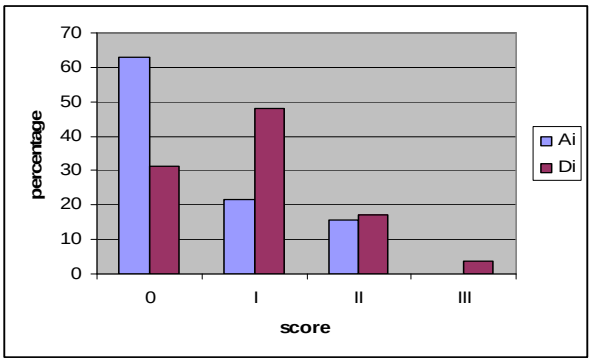

Fig 1: The percentages and distributions of Helkimo anamnestic (Ai) and clinical (Di) dysfunction index

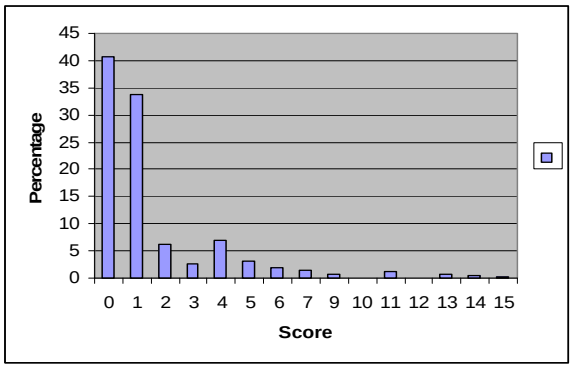

Fig 2: The distribution of clinical index score (CID)

positioned on the TMJ lateral region, while the volunteer was performing mouth opening and closing movements, consecutively and uninterruptedly three times, in order to observe the presence of articular sounds. TMJ pain was assessed by palpating the TMJ on rest and during movement and was reported as present or not.

The muscles of mastication (masseter, temporalis, and medial pterygoid) were palpated for tenderness. In addition, the lateral pterygoid was examined against forced contraction. Depending on the clinical dysfunction score (CDS) following clinical examination, each subject was classified as having a clinical dysfunction index (Di0) of (0 points) for individuals with clinically symptom-free TMD, DiI (1-4 points) for those with mild symptoms, Di II (5-9 points), and Di III (10-25 points) for individuals with moderate and severe TMD symptoms, respectively. No reference was made to the occlusal component in this study.

All the examinations were performed by one examiner who was trained and calibrated in the use of the index. The use of one examiner would insure the continuity of interpretation of the answers provided by the subjects. To confirm intra-examiner reliability 48 subjects were randomly selected and re-examined in the same day to reduce the risk of symptom fluctuation.[23] Dahlberg's formula was used to calculate the standard error of the method, and Houston coefficient of reliability[24] was calculated. The maximum mandibular opening error was 0.34mm, for the maximum right lateral movement was 0.39mm, for the maximum left lateral movement was 0.37mm, and for the maximum protrusive movement was 0.31mm. The Houston's coefficient of reliability was above 92% for all the above measured variables.

Data were collected, tabulated, and statistical analyses were performed using Statistical Package for Social Sciences (SPSS for Windows, SPSS, Chicago, III). Chi-square test was used to compare sex differences in both anamnestic and clinical dysfunction index scores. Correlation coefficients between both scores were calculated.

Results

A total of 5,426 Jordanians 3,916 males (77.9%), and 1,510 females were presented to Officers Election Committee for Mu'uta Military University, from different provinces of Jordan. (27.1%) of them 114 subjects (69 females, 45 males) having history of orthodontic treatment were excluded from this study. The remaining 5,312 subjects 3,871 (72.9%) males, 1,441 (27%) females were included.

The data were pooled in the present investigation. As there were no statistically significant differences between genders regarding reported symptoms (P=0.31) or clinical signs (P=0.27). Whilst about 63% (n=3274) reported no symptoms (Ai 0), 1118 subjects (21.5%) reported mild symptoms (Ai I) and 806 subjects (15.5%) had severe symptoms (Ai II). Similarly, 1,622 subjects (31.2%) showed no signs of dysfunction (Di 0); 2,489 subjects (47.9%) had mild signs (Di I); 889 subjects (17.1%) showed moderate signs (Di II); and 198 subjects (3.8%) showed severe signs of dysfunction (Di III; Fig. 1).

Table I: Relative frequency table showing the number and percentage of participant's maximum mandibular opening, and maximum eccentric mandibular movements during protrusive and lateral movements measured in millimetres

Maximum Vertical Opening	**N**	**%**
≥ 40 mm	4844	91.2
30-40 mm	366	6.9
< 30mm	102	1.9
Maximum Left Lateral Movement	**N**	**%**
≥ 7 mm	3925	73.9
4-6 mm	1339	25.2
0-3 mm	48	0.9
Maximum Right Lateral Movement	**N**	**%**
≥ 7 mm	4005	75.4
4-6 mm	1238	23.3
0-3 mm	69	1.3
Maximum Protrusion	**N**	**%**
≥ 7 mm	3309	62.3
4-6 mm	1811	34.1
0-3 mm	192	3.6

Table II: Relative frequency table showing the number and percentages of different temporomandibular signs and symptoms

TMJ signs and symptoms	**N**	**%**
TMJ Sounds	2560	48.2
Impaired range of mandibular movement	818	15.4
Masticatory pain on palpation	113	2.1
TMJ Pain on Palpation	73	1.4
TMJ Pain on Movement	89	1.7

The majority (91.2%) of the subjects' demonstrated maximal opening capacity (40mm or more) while 8.8% demonstrated restricted vertical movement. Similarly, about one fourth (24.6% right; 26.1% left) demonstrated restricted lateral mandibular movement, while 37.7% showed restricted protrusive mandibular movement as shown in Table I.

An analysis of the signs of the TMD showed that joint sounds was the most frequently recorded sign (48.2%) among Jordanians followed by impaired range of movement (15.4) as shown in Table II. Furthermore, the clinical dysfunction scores showed that 59.2% of the sample presented with one or more clinical signs of dysfunction. The highest recorded score was 15 points (Fig. 2). The linear correlation coefficient (r) between the reported symptoms (Ai) and the recorded signs (Di) was 0.32, and between the reported symptoms (Ai) and the clinical dysfunction score (CDS) was 0.37. Although these values were low, they were statistically significant (p=0.021).

Discussion

The population group was chosen for this study for two reasons. First, almost all of them were borne in the same year (1987) having the same age (18 years±6 months) making it nearly an ideal sample regarding the sample size and the age group. Second, they belong to different provinces in Jordan making the sample very close to be representative to Jordanian population at this specific age group.

The number of 18 years old Jordanian population were about 98.000 in the year when this study was conducted, they were distributed almost equally between both genders.[25] The sample size included in this study represented about 5.5% of the population of that particular age group.

The lack of differences in the reported symptoms and clinical signs as revealed in this study tends to agree with other investigators.[26,27]

Although other studies found a higher incidence of TMD in females.[28-30] This may be attributed to the different criteria and different age group than those used in this study.[28,31]

Perceived symptoms of the TMD (anamnestic index) in the present study conform with the generally reported values[31,32] despite the 57% and 12% values reported by Helkimo (1979)[4] and Abdel-Hakim (1983),[33] respectively. The fact that joint sounds were the commonest specific symptom in this study was in agreement with other studies reported in the literature,[14,34] although other criteria were used to evaluate joint sounds than those used in this study.

Regarding the prevalence of clinical signs of TMD, wide variations were reported in literature. While Mazengo and Kirveskari reported 40% and 37%, respectively,[35] Helkimo and Carlson reported higher values of 61% and 73%, respectively.[4,36] The relatively high value reported in this study (59.2%) may be largely attributed to the fact that about half (48.2%) of the subjects appeared to have joint sounds. In addition, about one forth of the sample demonstrated restricted lateral movement and more than one third (37.7%) demonstrated restricted protrusive mandibular movement. Although there is no obvious reason to explain these results, but they should be interpreted with caution simply because considerable proportion of the subjects are not accustomed to making such movement.

Pain is known as an important feature of TMD because it is the most important reason for seeking treatment for TMD Greene *et al*.[37] Between 3-7% of the population seeks treatment for pain and dysfunction.[3] Isong *et al*. reported the TMD type of pain differ significantly by race, age, and gender after adjusting for socioeconomic status.[38]

In contrast to other studies, the results of this investigation revealed that only about 13% of the subjects suffered from pain. This may have been due to subjects hiding their actual complaint of pain because they might think it may negatively impact the committee's decision to accept them as officers. Hence, may not reflect the actual distribution of pain among this particular sample.

Low correlation coefficients between reported symptoms and recorded signs as well as the clinical dysfunction score do not necessarily indicate that significant proportion of the sample have TMD. As these results can be interpreted in a different way. For example the considerable proportion of the sample demonstrated restricted protrusive and lateral movements may not reflect an actual problem as there are no studies known to determine the normal range of lateral and protrusive movement in Jordanian population.

Although the Helkimo index has been widely used, it suffers from some limitations. Most importantly is the issue of validity, making its general applicability difficult. It would appear that a rather arbitrary cut-off points and values for different classes within the subscale have been selected, yet not weighted accordingly. In addition, the issue of unidimensionality within the index should be resolved. Van Der Weele and Dibbet[39] stated that even though the index may be acceptable as a valuable instrument in assessing the TMD, much is still needed to improve the existing scale.

Conclusions

There were no statistically significant differences between both sexes regarding reported symptoms or clinical signs.

In general the prevalence of clinical signs and reported symptoms were comparable to other West European studies. TMJ sounds was the most prevalent sign in contrast to the West European studies that showed pain as the most frequently reported sign.

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