ORIGINAL RESEARCH

Comparison of Temporomandibular Disorders in Iranian Dental and Nondental Students

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ABSTRACT

Aim: The aim of this study was to define the prevalence and severity of temporomandibular disorders (TMD) among Iranian dental and nondental students who attended Shiraz University of Medical Sciences.

Materials and methods: The samples consisted of 200 subjects, 100 dental and 100 nondental students (equal distribution between males and females). Subjects ages ranged from 18 to 30 years (24.07 ± 2.93). A functional evaluation was performed using the Helkimo dysfunction index (Di). Data were evaluated by the Chi-square test.

Results: Among the total study population, 71% showed some degree of dysfunction. Prevalence ratio in dental students was 80%, while in nondental students was 62% (p < 0.05, odds ratio = 0.679). With respect to gender, women (80%) were more affected than men (62%). A significant relationship was found between gender and the occurrence of TMD (p < 0.05).

Conclusion: A high prevalence of signs of TMD in Iranian university students was seen which was greater in dental students and women.

Clinical significance: The results of this study showed that the prevalence of TMD among dental students and women was significantly higher than nondental students and men. These findings might be due to poor postural style or emotional stress during dental practice.

Keywords: Temporomandibular dysfunction, University student, Helkimo index, Prevalence, Epidemiological study, Clinical trial.

INTRODUCTION

Temporomandibular disorder (TMD) is a generic term for a number of clinical signs and symptoms that involve the masticatory muscles, temporomandibular joints (TMJ) and associated structures.[1-3] The etiology of TMD has multifactorial causes related to emotional stress, occlusal interferences, mispositioning or loss of teeth, postural changes, dysfunctions of the masticatory musculature and adjacent structures, extrinsic and intrinsic changes of TMJ structure and/or a combination of such factors.[1-5] Reports have shown that signs and symptoms of TMD increase with age,[4] however other studies have shown a decrease in symptoms with increasing age.[5] Over a 20-year period, investigations on TMD have revealed predominantly mild signs and symptoms already present in childhood. An increase in symptoms occurs until young adulthood, after which they level out.[6] The concept of TMD may be attributable to specific genes that are inheritable.[7]

Cross-sectional nonpatient prevalence studies have reported that approximately 50 to 75% of subjects exhibit one or more signs of TMD and approximately 33% have at least one symptom.[8-10] It is important and valuable to have epidemiological data with which to estimate the proportion and distribution of these disorders in the population.[11-13] The epidemiological importance of TMD concerns the knowledge of several symptomatic complexes and therapeutic approaches which allow for the establishment of prevention and control programs.[14] In a study on college students, Schiffman has reported that 69% of the students had positive signs of TMD.[15] Shiau et al have undertaken a survey on university students which revealed that 42.9% had one or more signs related to TMD.[16] It is critical to know the severity of problems associated with TMD rather than only listing the total signs and symptoms.[17,18] TMD severity studies should provide a health care need to estimate in the population studied.

Many studies have been performed which have lead to the development of several indices and criteria. Although these studies have shown that the prevalence of signs and

symptoms of TMD vary considerably, a simple comparison is difficult because of the lack of uniform criteria.[12,18] One of the most widely used indices has been developed by Helkimo, which examines the clinical dysfunction index (Di).[19]

Most of the epidemiologic studies of TMD, with a few exceptions, performed among Western population groups.[3,5,6,10,11] Moreover, there has not been any published article in regard to comparison of prevalence of TMD among dental and nondental students as yet. So, the aim of this study was to evaluate the prevalence of temporomandibular dysfunction in dental and nondental Iranian university students of both sexes through the analysis of data obtained from a clinical examination and using the Helkimo dysfunction index.[19]

MATERIALS AND METHODS

This cross-sectional survey was conducted through clinical examination according to the criteria of Helkimo. Written consent of the subjects was taken and the subjects participated for this study voluntarily. The samples comprised of 200 university students; 100 dental and 100 nondental students with equal gender distribution. The subjects were randomly selected from dental and nondental students of Shiraz University of Medical Sciences in Iran.

Students whose ages ranged from 18 to 30 years (24.07 ± 2.93) with no history of systemic, musculoskeletal or neurological disorders were enrolled. Subjects were on no medications. Subject selection was based on the following criteria: Good periodontal health and absence of active caries or lesions, the presence of a full complement of permanent teeth with or without the third molar and no history of orthodontic treatment. All individuals were subjected to clinical examinations. According to Helkimo,[19] clinical dysfunction index (Di) are as follows:

- Di 0—it denotes absence of the clinical symptoms, of which the index is built up.
- Di I—it denotes mild symptoms of dysfunction. 1 to 4 of the following symptoms were recorded: Deviations of the mandible in opening and/or closing movement >2 mm from a straight line, TMJ sounds (clicking or crepitation), tenderness to palpation of the masticatory musculature in 1 to 3 palpation sites, tenderness to palpation laterally over the TMJ, pain in association with one movement of the mandible, maximum mouth opening 30 to 39 mm, horizontal movements 4 to 6 mm.
- Di II—it denotes moderate symptoms of dysfunction and at least one severe symptom. Combined with 0 to 4 mild symptoms or 5 mild symptoms only. The severe symptom may be any of the following: Locking/luxation

of TMJ, tenderness to palpation in four sites or more of the masticatory musculature, tenderness to palpation posteriorly of the TMJ, pain in two or more movements of the jaw, maximal mouth opening <30 mm, one or more horizontal movement <4 mm.

- Di III—it denotes 2 to 5 of the severe symptoms possibly combined with any of the mild symptoms.

Clinical examination was preformed twice by one examiner previously trained and calibrated in the use of the index. For mandibular movement evaluation, any deviation or deflection of the mandible upon opening was rated. The TMJ were examined for pain and function on palpation. Clicking and crepitus of the TMJ was assessed by the examiner with the use of a stethoscope. Masticatory muscles (temporalis, masseter, medial and lateral pterygoid) were palpated bilaterally for tenderness. Depending on the clinical dysfunction score (CDS) following clinical examination, each student was classified as having a clinical dysfunction index (Di) of 0 (0 points, no signs and symptoms), Di I (1-4 points, mild TMD), Di II (5-9 points, moderate TMD) and Di III (10-25 points, severe TMD). Examination results were recorded on standardized charts according to Helkimo.[19]

Data were compared between subjects by means of percent and the Chi-square test. The level of significance was set at p < 0.05.

RESULTS

According to the Di, 29% of all subjects showed no signs of dysfunction (Di 0), whereas 71% were positive for some degrees of dysfunction. In dental group, 20% had no TMD and within nondental group 38% revealed absence of any sign and symptoms. Around 80% of dental students and 62% nondental group had positive signs and symptoms. Significant differences in the occurrence of TMD were noted between the two groups of students (p < 0.05). The odds ratio of TMD between dental students compared to nondental students was 0.679. In the dental group, 58% were mild (Di I), 10% moderate (Di II) and a total of 12% had severe (Di III) symptoms. In nondental group, 42% suffered from mild symptoms, 16% moderate and 4% were Di III for TMD (Table 1).

Regarding gender *vs* dysfunction, 62% of male and 80% of female subjects showed signs and symptoms of TMD (p < 0.05) which indicated a significant relationship between gender and dysfunction (Table 2). Impaired range of mandibular movement and TMJ function were most frequently observed in all subjects compared to other signs and symptoms, but were more in the dental group. The distribution of signs and symptoms noted with the TMD examination are found in Table 3.

Table 1: Comparison of degrees of dysfunction (Di) in dental and nondental students (p = 0.004)

Group		Dysfunction (Di)				
		Without (Di 0)	*Mild (Di I)*	*Moderate (Di II)*	*Severe (Di III)*	*Total*
Dental	No	20	58	10	12	100
	%	20	58	10	12	100
Nondental	No	38	42	16	4	100
	%	38	42	16	4	100
Total	No	58	100	26	16	200
	%	29	50	13	8	100

Table 2: Percentage and number of students with regard to dysfunction and gender (p = 0.005)

Gender		Dysfunction		
		Without	*With*	*Total*
Male	No	38	62	100
	%	38	62	100
Female	No	20	80	142
	%	20	80	100
Total	No	58	142	200
	%	29	71	100

Table 3: Distribution of signs and symptoms of dysfunction in 200 dental and nondental students according to Helkimo index

		Group	
		Dental	*Nondental*
TMJ sound	No	11	7
	%	11	7
Muscle pain on palpation	No	30	16
	%	30	16
TMJ pain on palpation	No	30	16
	%	30	16
Impaired TMJ function	No	60	40
	%	60	40
Pain on mandibular movement	No	18	14
	%	18	14
Impaired range of mandibular movement	No	60	44
	%	60	44

DISCUSSION

This study evaluated, using the Helkimo index, the prevalence and severity of TMD in Iranian dental and nondental students. The results of this study showed that the prevalence of TMD among dental students was significantly higher than nondental students and this information is of great importance for the early diagnosis of the dysfunction.

There are considerable variances among the reported TMD epidemiology studies and this may be specially due to unstructured methodology and/or a lack of standardized procedures for measuring symptoms and signs.[12,18,20-24] Many papers point toward the need to have a standardized classification for TMJ disorder's signs and symptoms, and the use of indices an excellent means to allow disease severity to be individually classified in order to examine the incidence of such problem in a specific population, measure the effectiveness of the therapies employed and study etiologic factors.[25,26]

Helkimo was a pioneer in developing indexes to measure the severity of TMJ disorders as well as pain in this system. In an epidemiological study, he developed an index that was further broken down into anamnesis, clinical and occlusal dysfunction. Through this index, he tried to assess, individually and in the general population, the very prevalence and severity of TMJ disorders in mandibular pain and occlusal instability.[27]

The study developed by Fricton and Schiffman[28] aimed at developing a craniomandibular index and test it as to its reliability. Later studies showed that the use of these indices allowed for a safe evaluation of the signs and symptoms of temporomandibular disorders in the patients investigated.[29-30] So, in the current study, we used Helkimo index to measure the prevalence and severity of TMD among students.

Some studies in nonpatient population indicate a high prevalence of TMD in both the general and nonpatient populations.[9,10,20-24] Accordingly, it is relevant and critical to know the severity of the TMD problem rather only listing the total symptoms and signs. Fonseca advocated that subjects classified as having severe or moderate TMD should be referred to a specialized health care center or specialist.[30] However, Kuttila et al point out only 7% of subjects as having severe or moderate TMD should be referred to a specialized health care center or specialist in Sweden.[31]

In the study reported herein, among 200 students studied, a total of 71% showed some degree of TMD as follows: Mild (50%), moderate (13%) and severe (8%). The results of our study are similar to the finding of De Oliveria et al who found 68% of the subjects had some TMD, when evaluating the prevalence and severity of TMD in Brazilian students. In their study, 50.3% showed mild dysfunction, 13.9% demonstrated moderate dysfunction symptom, while 4.3% suffered severe dysfunction symptom.[9] Therefore, it is estimated that a significant proportion of population have TMD signs and that most of them do not know they have disorder or if treatment is possible and what is prognosis. However, there is no published study regarding the comparison

of TMD in dental and nondental students. The results of our study demonstrated high frequency prevalence of TMD in dental students, when compared with nondental students (p < 0.05). The higher prevalence of dental students classified with some degree of TMD may be related to more emotional stress and poor body posture among this group.

Mental distress has been reported to be a risk factor or initiating factor for TMD. Solberg et al suggested that masticatory muscle pain is a stress-induced symptom built up through parafunction and other self-destructive behaviors.[10] In an epidemiological study of TMD in university students of Taiwan, Shiau et al reported that scores on stress, general anxiety, emotion and anger were higher in the TMD group.[16]

Several studies have confirmed that the changes in posture interfere with the mandible position.[32,33] In a prevalence study of signs and symptoms of TMD in Brazilian university students, it was demonstrated that the prevalence of pain on palpation of masticatory musculature, inadequate head, neck and shoulder postures and presence of sensitive points to palpation of the head, scapular girdle and cervical region were proportionally higher according to the severity of TMD.[9] However, further studies for comparison of emotional stress and changes in body posture in dental and nondental TMD groups are recommended in future.

With regards to sex, our results agree with the findings of Pedroni et al, Nomura et al and Solberg et al.[23,24,10] They reported higher prevalence of signs and symptoms associated with TMD among women. The higher prevalence of women with some degree of TMD may be related to typical physiologic differences of feminine sex, such as regular hormonal variations, muscular structure and different characteristic of the conjunctive tissue.[10,23,24] These matters need to be investigated fully.

CLINICAL SIGNIFICANCE

The results of this study showed that the prevalence of TMD among dental students and women was significantly higher than nondental students and men. These findings might be due to poor postural style or emotional stress during dental practice.

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