Original Article

The study of relationship between reported temporomandibular symptoms and clinical dysfunction index among university students in Shiraz

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ABSTRACT

Background: This study was designed to evaluate the correlation between subjective data obtained from a questionnaire and clinical examination among students in Shiraz university of medical sciences. **Materials and Methods:** In this cross-sectional prospective study, the samples consisted of 200 subjects, with 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 clinical dysfunction (Di) and anamnestic (Ai) indices. Data were evaluated by the Chi-square test between gender and clinical dysfunction index (Di) and correlation coefficient between Di and Ai (the level of significance was set at $P<0.05$). **Results:** Among the total study population, 30% reported mild symptoms (Ai I) while 2% had severe (Ai II). In the clinical examination, 71% showed some degree of dysfunction. These degrees were as follows: 50% were classified as mild (Di I), 13% moderate (Di II) and 8% severe signs and symptoms (Di III).

With respect to gender, women (80%) were more affected than men (62%). A significant relationship was found between gender and the occurrence of temporomandibular disorder (TMD) ($P<0.05$). The correlation coefficient (r) between the reported symptoms (Ai) and recorded signs (Di) was 0.53. There were positive correlation coefficient between Di and Ai. They were statistically significant ($P<0.001$). **Conclusions:** A high prevalence of signs and symptoms of TMD among students in Shiraz University of Medical Sciences was seen, which was greater in women. Despite suffering from TMD, students were not aware of their disorders.

Key Words: Anamnestic dysfunction index, clinical dysfunction index, temporomandibular dysfunction

INTRODUCTION

Temporomandibular joint (TMJ) function has been the subject of considerable study for over a century, and despite voluminous literature, the multifactorial etiology of TM dysfunction is even today a cryptic

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issue.[1] Reports have shown that signs and symptoms of temporomandibular disorder (TMD) increase with age;[2] however, other studies have shown a decrease in symptoms with increasing age.[3] Over a 20 years period, investigations on TMD have revealed predominately mild signs and symptoms already present in childhood. An increase in symptoms occurs until young adulthood, after which they level out.[4] The concept of TMD may be attributable to specific genes that are inheritable.[5] In epidemiological studies of TMD, Helkimo found that prevalence between 12 and 57% for anamnestic symptoms and between 28 and 88% for clinical signs.[6] However, some studies have been conducted in other parts of

the world, for example in the African continent, Abdel-Hakim[7] reported in an Egyptian sample that more than 24% had anamnestic symptoms and that more than 39% had clinical signs. Mazengo[8] found in randomly selected adult Tanzanians, a prevalence of 26% reported symptoms and 40% clinical signs. In Asia, Shiau[9] reported that 43% of Taiwanese university students had a prevalence of one or more signs of TMD. Jagger[10] found that more than 19% had anamnestic symptoms and that over 36% showed clinical sign in university students. The lack of standardized criteria in the evaluation of TMD, however, makes comparison between different studies difficult. This problem was addressed by Helkimo[11] in 1974 and was the basis for the development of his anamnestic (reported) and clinical dysfunction index which probably still remains the most widely applied system in epidemiological studies of TMD. Prevalence and severity of TMD studies should provide a health care need in the population studied. It is therefore important and valuable to have epidemiological data to estimate the proportion and distribution of these disorders in the population. The aim of this study was to evaluate the prevalence of temporomandibular dysfunction in university students of both sexes through the analysis of the subjective and objective data obtained from a questionnaire and clinical examination, and correlation between anamnestic and clinical dysfunction index.

MATERIALS AND METHODS

This cross-sectional, prospective clinical survey was conducted through a questionnaire and clinical examination. Written consent form was taken and the subjects participated for this study voluntarily. The samples comprised of 200 university students, with equal gender distribution who attended 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 anamnestic and clinical examinations according to Helkimo.[11] The anamnestic examination was based on the reported symptoms by the students and classified according to anamnestic dysfunction index (Ai) as 0, I, II. A summary is given in Table 1.

Clinical examination was preformed twice by one examiner previously trained and calibrated in the use of the index.

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. The anamnestic examination was based on reported symptoms by the students and classified according to anamnestic dysfunction index (Ai) as I, II. Chi-square test was used to compare sex

Table 1: Evaluation of clinical and anamnestic dysfunction according to Helkimo index

Clinical dysfunction index, Di	Anamnestic dysfunction index, Ai
Di0 denotes absence of the clinical symptoms on which the index is built up.	Ai0 denotes complete absence of subjective symptoms of dysfunction.
Di I denotes mild symptoms of dysfunction.1-4 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 1-3 palpation sites, tenderness to palpation laterally over the TMJ, pain in association with 1 movement of the mandible, maximum mouth opening 30-39 mm, horizontal movements 4-6 mm.	Ai I denotes mild symptoms such as temporo-mandibular joint (TMJ) sounds (clicking and crepitation), feeling of stiffness or fatigue of the jaws.
Di II denotes moderate symptoms of dysfunction and at least one severe symptom. Combined with 0-4 mild symptoms or 5 mild symptoms only. The severe symptoms may be any of the following: locking/ luxation of TMJ, tenderness to palpation in 4 sites or more of the masticatory musculature, tenderness to palpation posteriorly of the TMJ, pain in 2 or more movements of the jaw, maximal mouth opening <30 mm, one or more horizontal movement <4 mm.	Ai II denotes severe symptoms of dysfunction. One or more of the following symptoms were reported in the anamnesis: Difficulty in opening the mouth wide, locking, luxations, pain on movement, facial and jaw pain.
Di III denotes 2-5 of the severe symptoms possibly combined with any of the mild symptoms.	

TMJ: Temporomandibular joint

differences and clinical dysfunction index. Correlation coefficient was calculated between the anamnestic and clinical dysfunction index. (Ai, Di). *P* value less than 0.05 was considered statistically significant, and a correlation coefficient more than 0.4 was considered acceptable based on the results of previous studies.[12]

RESULTS

According to anamnestic dysfunction index, 68% reported no symptoms (Ai0), 30% had mild symptoms (Ai I), and 2% suffered from severe symptoms (Ai II). In clinical dysfunction index, 29% of subjects showed no signs of dysfunction (Di0), whereas 71% were positive for some degrees of dysfunction (Di): 50% had mild (Di I), 13% exhibited moderate dysfunction (Di II), while 8% suffered severe dysfunction (Di III). Feeling of fatigue (14.5%) and TMJ sounds (10.5%) were the most common anamnestic symptoms reported [Table 2]. Overall clinical examinations reveal that the prevalence of TMD exceeds the reported issues.

In the clinical examination, impaired range of mandibular movement (52%) and impaired TMJ function (50%) were most frequently observed in students compared to other signs and symptoms [Table 3].

Chi-square test was used to compare sex differences and clinical dysfunction. Regarding gender versus dysfunction, 62% of male and 80% of female showed signs and symptom TMD (*P*<0.05), which indicate a significant difference between gender and dysfunction [Table 4]. The correlation coefficient (r) between the reported symptoms (Ai) and recorded signs (Di) was 0.53. This indicates that there was a positive linear correlation coefficient between Di and Ai and also indicates that they were statistically significant (*P*<0.001). Comparison of percentage distribution of the Helkimo anamnestic (Ai) and clinical dysfunction index (Di) in 200 Iranian university students is shown in Figure 1.

DISCUSSION

The aim of this study was to evaluate the prevalence of signs and symptoms of TMD in university students in Shiraz University of Medical Sciences through the distribution of frequency of data obtained from a questionnaire and physical examination. According to clinical examination among the 200 students studied, a total of 71%
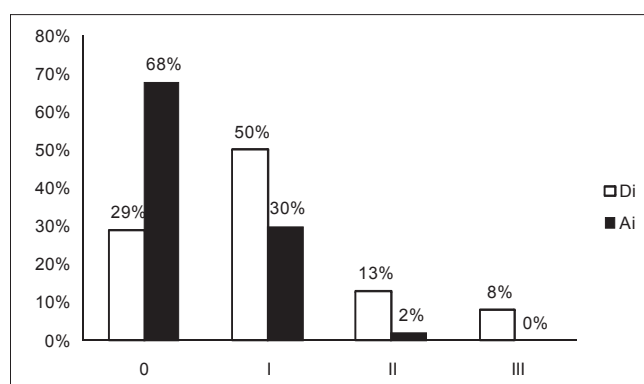

Figure 1: Comparison of percentage distribution of the Helkimo anamnestic (Ai) and clinical dysfunction index (Di) in 200 Iranian university students

Table 2: Distribution of Helkimo anamnestic (Ai) symptoms in 200 university students

Reported symptoms	No.	%
Sound	21	10.5
Feeling of stiffness of the jaws	8	4
Feeling of fatigue of the jaws	29	14.5
Sound and feeling or tenderness	2	1
Difficulty in opening the mouth wide	2	1
Locking, luxation	0	0
Pain on mandibular movement	1	0.5
Facial and jaw pain	1	0.5

Table 3: Distribution of Helkimo dysfunction index (Di) in 200 university students

Clinical signs	No.	%
Muscle pain on palpation	46	23
TMJ pain on palpation	46	23
Impaired TMJ function	100	50
Pain on mandibular movement	32	16
Impaired range of mandibular movement	104	52

TMJ: Temporomandibular joint

Table 4: Percent and number of students with regard to dysfunction (Di) and gender (*P*=0.005)

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

showed some degree of TMD as follows: Mild (50%), moderate (13%) and severe (8%) clinically.

The anamnestic index showed that 68% had no symptoms.

In this study, the prevalence of TMD in women (80%) was higher than men (62%). The prevalence of clinical dysfunction reported by Nourallah and Johansson[12] according to the Helkimo clinical dysfunction index was: Di 0 = 63%, Di I = 33%, Di II = 3% and Di III = 1% and anamnestic dysfunction index: Ai0 = 64%, AiI = 30%, Ai II = 6%. In their study, subjects were comprised of 105 dental students whose mean age was 23 years. Our results were dissimilar since this discrepancy may also be due to different racial, cultural and economic environments. Among TMD prevalence studies, Schiffman *et al.*[13] have performed a thorough TMD prevalence study of nursing students, with the use of a comprehensive questionnaire and clinical examination. In their study, 69% of subjects had positive TMD findings, which included muscle (23%) and joint disorders (19%). However, only 6% exhibited severe signs and symptoms and 34% of students would have been reported (anamnestic) with symptoms. In another study performed by Solberg *et al.*,[14] 65% of college students had one or more signs and symptoms of TMD. In our clinical study, 71% of all samples showed some degree of dysfunction (Di); 34% reported positive symptoms (Ai), 23% had joint pain and 23% muscle pain on palpation, which approximated the reports of Schiffman and Solberg.[13,14] In a study conducted by Nassif *et al.*[15] on university students with a mean age of 22.4 years, the overall results showed that 75% of subjects had TMD signs and symptoms of which 6.9% were mild, 51.4% moderate and 16.7% severe. In our study, 71% had some degree of dysfunction. Therefore, a comparison of the present results with the previous report which also involved university students has shown a similar prevalence of TMD. Studies have shown wide variations in the prevalence of clinical signs of TMD. Otuyemi[16] performed a study on university students with a mean age of 23 years which has shown mild, moderate and severe signs and symptoms of 46%, 16.5% and 0.3%, respectively, 26.3% of subject reported mild (Ai I) and 2.9% reported severe temporomandibular dysfunction (Ai II). No significant relationships were found between sex and dysfunction. The results of the present study indicated that a discrepancy exists between the two studies. In the study of Pedroni,[17] 68% of the subjects exhibited some degree of TMD. Their study was performed on 50 dental students, whose ages ranged from 19 to 25 years. In their study, women were more affected than men, which was in agreement with our findings.

In the study performed on university students (average age: 20 years) that has been reported by Nomura,[18] 53.21% of the students showed some degree of TMD: 35.78% mild, 11.93% moderate and 5.5% severe. Women were most affected, with 63.11% showing some degree of TMD when compared with 40.62% of men. The prevalence of moderate and severe TMD in our study closely approximated the result by Nomura. The high prevalence of women classified with some degree of TMD may be related to physiological differences of the female, such as hormonal variations, muscular structure and different characteristics of connective tissue.[17,18] Results of our study indicate that prevalence of TMD among Iranian university students were remarkable. Also there were significant differences between clinical and anamnestic dysfunction index. This means that most students did not know whether they had the disorder and what the prognosis were. This can be due to various reasons such as emotional and psychological stress during their educational lifetime, particularly the stress they encounter during university entrance exam. Further epidemiological studies must be done on prevalence of TMD in Iranian university students. Proper diagnosis and plan management strategies should be proposed for prevention and treatment. Because of high prevalence of signs and symptoms of TMD among university students, some therapeutic centers should be organized to screen, cure and train the students.

Due to the wide distribution of TMD among different populations, this concept requires additional investigation within different cultural, economic and educational environments.

In conclusion, the results from this study showed that among university students, 71% of all subjects revealed some degree of dysfunction (Di) by clinical examination while only 32% of students reported positive symptoms (Ai). There were a positive correlation between Di and Ai which means that with increase in Ai, Di increases. Women (80%) were more affected than men (62%).

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