Research Article

PREVALENCE AND SEVERITY OF TEMPROMANDIBULAR DISORDERS AMONG MALE UNIVERSITY STUDENTS IN RIYADH

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ABSTRACT

Objective: The aim of this study was to evaluate the prevalence and severity of temporomandibular disorders (TMD) among male university students in Riyadh, Saudi Arabia. The role of medical and dental history of concern, related to the Temporomandibular disorders among the participants was also addressed. **Methods:** The required information was collected through a questionnaire. The first part of the questionnaire was used to collect the medical and dental history of the participants and the second part was composed of 10 questions regarding common TMD symptoms. Fonseca's Anamnestic index (FAI) was used to classify the volunteers according to TMD severity degree as no, light, moderate and severe dysfunction. **Results:** Six hundred questionnaires were distributed out of which four hundred were completed at a response rate of 66.6%. The mean age of the participants was 21.94±1.81 years. 30.5% of the participants had a history of psychological stress. The past dental treatment received by the participants was common with 77% having history of direct restorations. 48.5% of the participants were classified as without, 38.8 % as light, 11.8 % as moderate and only 1 % with severe dysfunction according to the FAI. **Conclusion:** There is a mild to moderate prevalence of TMDs among the male university students in Riyadh. Use of anamnestic index is helpful and the information collected is of great importance for the early diagnosis of the dysfunction, preventing future complications.

Key Words: Temporomandibular disorders; TMDs; Prevalence of TMDs; Fonseca's Questionnaire.

1. INTRODUCTION

Temporomandibular disorders (TMDs) is a collective term that defines a subgroup of painful orofacial disorders, involving complaints of pain on the temporomandibular joint (TMJ) region and fatigue of the craniocervicofacial muscles, especially masticatory muscles, limitation of mandible movement and presence of articular clicking. The etiology of TMDs has multifactorial causes related to traumatic injury, immune mediated systemic disease, neoplastic growths, emotional stress, occlusal interferences, malpositioning or loss of teeth, postural changes, dysfunctions of the masticatory musculature and adjacent structures, extrinsic and intrinsic changes on TMJ structure, non-functional movements of the mandible (bruxing) and tooth clenching habits and/or a combination of such factors (de Santis et al., 2014, Manfredini and Lobbezoo, 2010, Bonjardim et al., 2005).

Prosthodontic rehabilitation, orthodontic treatment, orthognathic surgery and mandibular fractures have been associated with TMJ changes and worsening of the existing TMDs (Goldstein, 1999). Morphologic changes occur in the TMJ because of the loading, altered jaw position and stress due to the above mentioned treatments due to inherent adaptive capacity of the TMJ (Arnett et al., 1996).

The prevalence of TMDs range from 20% to 50% and may be due to racial differences, differences in sample, criteria and methods used for collecting information (Lee et al., 2013, Modi et al., 2012, Ebrahimi et al., 2011, Vojdani et al., 2012, Nomura et al., 2007, deOliveira et al., 2006, Fateih, 2006, Farsi, 2003). The screening for TMDs in the population is always a concern and challenge for the researchers. Different assessment methods have been used for the assessment of TMDs, including self-administered questionnaires, patient history indices, physical examination in the clinics, diagnosis with validated instruments or tools and behavioral or psychological assessment (Goldstein, 1999, Schiffman et al., 2014, Manfredini et al., 2011).

The most common and important tool to assess TMDs is the Research Diagnostic Criteria for TMDs (Dworkin and LeResche, 1992). This has been used in several clinical and epidemiological studies but it requires the physical presence of the patient for evaluation. With this in mind, other instruments have been developed for evaluating TMDs. Fonseca's Anamnestic Index (FAI) has been proposed as a low cost and easy to apply alternative and has been used in screening for TMDs in a non-patient population (Da Fonseca et al., 1994). This makes the survey fast with a short time of application, feasible, cost effective and would provide a severity index with less influence from

the examiner and less variability in the measures (Nomura et al., 2007, deOliveira et al., 2006). The Fonseca's questionnaire follows the characteristics of a multi-dimensional evaluation. It is composed of 10 questions, which include checking for the presence of pain in tempormandibular joint, head, back, while chewing, para functional habits, movement limitations, joint clicking, perception of malocclusion and sensation of emotional stress.

The aim of this study was to use a cross sectional epidemiological survey to investigate the prevalence and severity of TMDs in male Saudi university students using Fonseca's questionnaire. The role of medical and dental history of concern, related to the TMDs among the participants was also investigated. The characterization of volunteers would help understanding its prevalence, early diagnosis and management in university students of Saudi Arabia.

2. METHODS

This descriptive cross sectional research project was approved by the ethical committee of the College of Dentistry Research Center, King Saud University, Riyadh (Registration Id # IR0058). The study was carried out between September 2013 and March 2014.

The required information was collected through an anonymous questionnaire. The questionnaire was adopted from previous studies (Modi et al., 2012, Ebrahimi et al., 2011, Vojdani et al., 2012, Nomura et al., 2007, deOliveira et al., 2006, Fateih, 2006, Farsi, 2003) and modified to suit the requirements of the present study. The questionnaire was also translated in Arabic for the students who could not read English. The questionnaires along with a cover letter stating the instructions, rationale and purpose of the survey were distributed by hand to a conveniently selected sample of 600 male university students from colleges of medicine, dentistry, pharmacy, applied medical sciences and engineering of King Saud University, Riyadh, Saudi Arabia. The students who were willing to participate in the study filled the questionnaire by hand and returned it.

The questionnaire comprised of two main parts; first part collected the demographic information, medical, dental, TMJ and trauma to the face history. The second part contained Fonseca's 10 questions (Da Fonseca et al., 1994) concerning the pain in TMJ, head and back, while chewing, para functional habits, movement limitations, joint clicking, perception of malocclusion and sensation of emotional stress. The participants were requested to select one answer as yes, no or sometimes. The answer with 'yes' was given a value of 10, 'sometimes' with 5 and 'no' with 0. The sum of the values for each question would give us a final value which was then used to classify the volunteer as shown in Table 1.

[Table 1]

There was no time limit for completion of the questionnaire. Participants with a history of trauma to TMJ, under treatment of TMDs or orthodontic treatment, suffering from any immuno compromised disease were excluded from the study (Hiz Ozcan, et al., 2012).

Descriptive statistics and frequency analysis of the collected data was done using Statistical Package for Social Sciences (SPSS) version #17 (SPSS, Chicago, Illinios, USA). Chi square test was applied to generate the significance for each question with significance set at <0.05.

3. RESULTS

Six hundred questionnaires were distributed of which four hundred were completed and received giving a response rate of 66.6%. The respondents included 220 (55%) from college of dentistry, 55 (14%) from college of medicine, 25 (6%) from college of pharmacy, 70 (17.5%) from college of engineering and 30 (7.5%) from college of applied medical sciences. The mean age of the participants was 21.94 SD $\pm$ 1.81.

The medical, dental and TMJ history of concern are presented in Table 2. 30.5% of the participants had a history of psychological stress. Almost three-fourth (77%) of the participants gave history of past dental treatment, mostly dental fillings

[Table 2]

The number and percentage of participants with different level of TMJ dysfunction based on the Fonseca's questionnaire are presented in Table 3 & Figure 1. Almost half of the participants (48.5%) were classified as without dysfunction and only 1 % with severe dysfunction.

[Table 3]

[Figure 1]

Table 4 describes the participants at different levels of dysfunction with medical and dental history of concern. Almost all the participants falling in the moderate to severe dysfunction category had a strong history of psychological stress and various dental treatments.

[Table 4]

Response of the participants to the Fonseca's 10 questions are presented in the Table 5. All the responses for each question showed a statistically significant difference ($p<.05$) by chi square test. Articulation of the teeth was found to be the most common problem with 29.8% of the participants complaining about it and the least percentage of complaints 1.8% by the participants was about mouth opening.

[Table 5]

4. DISCUSSION

The present study has provided information about the prevalence and severity of TMDs based on the Anamnesis Index proposed by Da Fonseca et al (1994) in male university students of Riyadh, Saudi Arabia. The response rate of the questionnaire (66%) was found to be satisfactory.

The screening for TMDs in the population is the concern of researchers and several instruments for the TMD diagnosis have been presented in the literature, but there is no universal diagnostic criteria. Dworkin and Leresche (1992) proposed the Research Diagnostic Criteria for TMDs (RDC/TMDs) due to the need to use an instrument which is universally accepted. This has been used in several clinical and epidemiological studies. Most recently Shiffman and colleagues (2014) proposed a new comprehensive version of RDC/TMDs as diagnostic criteria for Temporomandibular disorders (DC/TMD). The researchers claim that DC/TMD includes a valid and reliable screening questionnaire as well as diagnostic algorithms for the most common pain related TMD. Despite its advantages, the RDC/TMD and DC/TMD are quite an extensive instruments which requires the presence of individual for the TMDs diagnosis and the difficulty to be employed on large samples. The use of Anamnestic Index by Da Fonseca (1994) for detecting TMDs signs and symptoms has the advantage of being easily used either by general practitioner or epidemiologists. Thus, the Anamnestic Index would act as a preliminary TMDs tracing tool and after the affected population is identified a more thorough investigation can be conducted with complete clinical examination and use of diagnostic instruments to confirm the diagnosis. In a literature review about the reliability of using questionnaire for diagnosing the severity of TMDs, Campos and colleagues (2009) recommended the use of Anamnestic Index because of its simplicity, speed, and cost effectiveness.

Prevalence of TMDs based on the FAI varies in different reported studies. In our study, a little more than half (51.5%) of the participants reported from light and moderate to severe TMDs. In published literature the prevalence of TMDs range from 42 to 68%. Modi and colleagues (2012) found the prevalence in 46%, Conti and colleagues (1996) found it in 42%, Nomura and colleagues (2007) found it in 53.2%, Shiau and Chang (1992) found in 42.9% and de Oliveira and colleagues (2006) found it in 68%. This variation may be because of the differences in ethnic background, gender distribution and sample size. According to some studies (de Oliveira and colleagues, 2006, Nomura and colleagues, 2007) there is a greater probability of TMDs in females as compared to

males. In the current study only male students were included and it may have affected the results of the study.

Anxiety and depression are the most frequent clinical disorders in the general population and are also significantly present among university students. Literature reports on academic stress and its repercussion on the health of university students. The university is a critical context for studying the mental health of youth. The university students are often undergoing role transitions such as moving away from the family home for the first time, residing with other students and experiencing reduced adult supervision. These changes may increase the risk of depression (Bonjardin et al., 2009, Pesqueira et al., 2010). It is well accepted that psychological factors play a role in the etiology and maintenance of TMDs. In particular a high incidence of exposure to stressful life events and elevated levels of anxiety and stress related symptoms have been reported in TMDs patients (Pesqueira et al., 2010, Pallegama et al., 2005). In our study, 30.5% (n=122) of the participants gave history of psychological stress and out of these 65.6% were classified for some degree of TMDs dysfunction ranging from light to severe. These outcomes are in agreement with Pesqueira and colleagues (2010) and Bonjardim and colleagues (2009) who asserted that stress and anxiety plays an important role in TMDs, acting as predisposing or aggravating factor. However, it is difficult to measure a variable as stress or anxiety and although an effort has been made to find the prevalence of stress among the TMDs patients but there is a need for long term studies about the topic in the local population.

Historically, there has been a belief among the dental professionals that occlusion has as strong relationship to the TMDs. This was supported with little scientific data and the literature review by Higdon and Badel and colleagues (2012) suggests that occlusion has not been determined as the dominant cause of TMDs. Nevertheless, occlusion is a basic component of the dental restorative procedures which changes or supplements the compromised or lost occlusal relations. Any error in the occlusion because of the dental treatment results in increased muscle tension and pain, which causes mild unloading of TMJ leading sometimes to TMDs depending on the degree of occlusal error. An interesting finding in the current study was that history of past dental treatment was very common among the participants. Almost one fourth of the participants who were classified to have moderate to severe dysfunction gave a strong history of past dental treatment. However, the interpretation of such association should be done carefully because of the limitations of the study such as, use of a brief questionnaire, conveniently selected sample, sample

population comprising of male students and distribution of the questionnaire among all levels of undergraduate and graduate students.

Although the current study provided some information regarding the prevalence and severity of TMDs in young male Saudis, there is a need for conducting long term clinical studies in this region. Early diagnosis and prevention of future complications associated with TMDs is the key for successful TMDs treatment.

5. CONCLUSION:

Based on the limitations of the study we can conclude that:

- There is a mild to moderate prevalence of TMDs among the male Saudi university students.
- Use of Anamnestic Index is helpful and this information can be of great importance for the early diagnosis of the dysfunction, preventing future complications.
- History of past dental treatment and psychological stress were found in students having mild, moderate and severe TMDs.
- Longitudinal studies in the current population are recommended to follow the prevalence and health care needs for TMDs.

CONFLICT OF INTEREST:

Authors declare no conflict of interest associated with this publication.

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Table 1. TMDs severity classification based on Fonseca's Anamnestic Index	
Without dysfunction	Score b/w 0-15
With light dysfunction	Score b/w 20-40
With moderate dysfunction	Score b/w 45-65
With severe dysfunction	Score b/w 70-100

Table 2. Medical, Dental and TMJ history of the participants.					
Medical history of concern					
Psychological Stress	**Arthritis**	**Musculoskeletal disorder**		**Neurological disorders**	
122(30.5%)	4(1%)	11(2.8%)		7(1.8%)	
Dental history of concern					
Orthodontic Treatment	**Crowns and Bridges**	**Dentures**	**Teeth Extraction**	**Fillings**	**Root Canal Treatment**
117(29.3%)	45(11.3%)	4(1%)	145(36.3%)	308(77%)	100(25%)
TMJ history of concern					
Presence of TMD		**Treatment received for TMD**		**History of trauma to the face**	
67 (16.8%)		2 (.5%)		17 (4.2%)	

Table 3. Classification of severity of Temporomandibular Disorders based on Fonseca's Anamnestic Index.

Fonseca's Classification	N (%)	Mean Age ±SD	95% Confidence Interval for Mean		Minimum	Maximum
			Lower Bound	Upper Bound		
Without dysfunction	194 (48.5)	21.83±1.81	21.55	22.12	19.00	27.00
With light dysfunction	155 (38.8)	21.90±1.84	21.58	22.22	19.00	26.00
With moderate dysfunction	47 (11.8)	22.37±1.68	21.81	22.94	20.00	25.00
With severe dysfunction	4 (1)	23.66±.57	22.23	25.10	23.00	24.00
Total	400	21.94±1.81	21.74	22.13	19.00	27.00

Table 4. Level of TMJ dysfunction in patients with medical and dental history of concern.					
Medical or Dental Complaint	**Without Dysfunction**	**Light Dysfunction**	**Moderate Dysfunction**	**Severe Dysfunction**	**p value**
Psychological Stress N=122(%)	42 (21.6)	60 (38.7)	19 (40.4)	1 (25)	.002
Root Canal Treatment N=100(%)	38 (19.5)	37 (23.8)	24 (51)	1 (25)	.000
Fillings N=308(%)	136 (70.1)	126 (81.2)	43 (91.4)	3 (75)	.006
Teeth Extraction N=145(%)	51 (26.2)	66 (42.5)	25 (53.1)	3 (75)	.000
Dentures N=4	0 (0)	2 (1.2)	1 (2.1)	1 (25)	.000
Crowns and Bridges N=45(%)	16 (35.6)	16 (10.3)	11 (23.4)	0 (0)	.026
Orthodontic Treatment N=117(%)	40 (8.2)	57 (36.7)	19 (40.4)	1 (25)	.003

Table 5. Response of the participants to Fonseca's 10 questions (n=400)					
S. No.	**Questions**	**Yes N (%)**	**Sometimes N (%)**	**No N (%)**	**Chi square p value**
1.	**Is it hard for you to open your mouth?**	7 (1.8)	52 (13)	341 (85.2)	.000
2.	**Is it hard for you to move your mandible from side to side?**	13 (3.2)	40 (10)	344 (86)	.000
3.	**Do you get tired /muscular pain while chewing?**	55 (13.8)	97 (24.2)	245 (61.2)	.000
4.	**Do you have frequent headaches?**	55 (13.8)	80 (20)	265 (66.2)	.000
5.	**Do you have pain on the nape or stiff neck?**	34 (8.5)	84 (21)	281 (70.2)	.000
6.	**Do you have earaches or pain in cranio mandibular joints?**	11 (2.8)	34 (8.5)	354 (88.5)	.000
7.	**Have you noticed any TMJ clicking while chewing or when you open your mouth?**	62 (15.5)	93 (23.2)	242 (60.5)	.000
8.	**Do you clench or grind your teeth?**	65 (16.2)	43 (10.8)	290 (72.5)	.000
9.	**Do you feel your teeth do not articulate well?**	119 (29.8)	42 (10.5)	238 (59.5)	.000
10.	**Do you consider yourself a tense (nervous) person?**	83 (20.8)	102 (25.5)	214 (53.5)	.000