Original Article

Stress Related Temporomandibular Joint Disorders - A Comparative Study between Preclinical and Clinical Undergraduate Students of Dentistry

Munazza Sharfuddin[1], Ayshwarya Muralidharan[2], Premalatha Shetty[3], Aditya Nandan[4], Animesh Jain[5]

[1]Intern, [2]Intern, [3]Professor and Associate Dean, Department of Oral and Maxillofacial Surgery, Manipal College of Dental Sciences, Mangalore, Manipal Academy of Higher Education (MAHE), Manipal [4]Post graduate, Department of Oral and Maxillofacial Surgery, Manipal College of Dental Sciences, Mangalore, Manipal Academy of Higher Education (MAHE), Manipal, [5]Professor and Head, Department of Community Medicine, Kasturba Medical College, Mangalore, Manipal Academy of Higher Education (MAHE), Manipal

Abstract

Objective: This cross-sectional study compared the proportion and severity of stress related TMD, gender predilection and influence of parafunctional habits in preclinical and clinical undergraduate students of dentistry.

Method: The data was collected using Fonseca's Anamnestic index and Zung's Self-rating Anxiety Scale. The results were analyzed as proportions and percentage. Chi square test was used. A 'p value' of less than 0.05 was considered as significant.

Results: Mild to moderate anxiety levels were seen in 6.4% females and 3.4% males .According to the FAI, 48.2% females and 67.8% males did not have TMD. Mild, moderate and severe TMD were seen in 41.1%, 9.2% and 1.4% of the females and 27.1%, 5.1% and 0% males respectively.

Conclusion: While the proportion of stress was higher in preclinical students, TMD was higher in clinical students. TMD observed in clinical students could be a manifestation of the stress they experienced in their former years.

Key Words – *Temporomandibular joint, Masticatory Muscles, Stress, Bruxism, Undergraduate, Dentistry, University, Students*

Introduction

Temporomandibular Joint Disorders (TMDs) are a comprehensive term, used to describe numerous related disorders involving the Temporomandibular Joints (TMJ), masticatory muscles, and occlusion. It is characterized by symptoms such as TMJ pain, restricted mouth opening, muscle tenderness and intermittent joint sounds. Secondary symptoms such as muscle fatigue, radiation of pain to the neck and temple, headaches and incoordination of jaw movement may also be present. [1-3]

The etiology of TMD is multifactorial, including biomechanical, neuromuscular and psychosocial factors such as traumatic injuries, occlusal interferences, postural changes, parafunctional habits such as bruxism, dysfunction of masticatory muscles, intrinsic and extrinsic changes of the structure of the TMJ, and emotional stress. [1,4]

Correspondence author:
Dr. Premalatha Shetty (BDS, MDS)
Professor and Associate Dean
Manipal College of Dental Sciences, Mangalore
Manipal Academy of Higher Education, (MAHE)
Manipal, Karnataka, India, Pin code- 575001
Contact number- +91 9448509022
Mail ID – premalatha.shetty@manipal.edu

Emotional stress in individuals may lead to insidious habits such as bruxism. Bruxism is the involuntary grinding or clenching of teeth. It is usually an unconscious activity, whether the individual is awake or asleep; often associated with fatigue, anxiety, emotional stress, or fear, and frequently triggered by occlusal irregularities. Prolonged clenching results in excessive workload on the TMJ and the muscles of mastication, which leads to strain and fatigue of the muscles, causing TMD. [4,5]

Undergraduate students of dentistry are expected to excel in both theoretical and clinical knowledge and obtain a holistic approach to Dentistry. As an attempt to achieve this goal, dental institutions set up a heavy curriculum of lectures, with a composite union of both medical and dental subjects. Furthermore, the preclinical students (1st and 2nd year) experience a sudden change in curriculum, coupled with an unfamiliar living environment and increased academic load. On the contrary, the clinical students (3rd and 4th year) experience a sudden change from model work to clinical practice dentistry and have numerous clinical quotas to complete throughout the course.[6-8]

Innumerable published literature assessed the prevalence of TMD among university students. Most studies focused on the prevalence of signs and symptoms of TMD among students with variables such as age, gender or field of professional education, without marked emphasis on the causes of TMD, particularly, emotional stress.

This study was an effort to establish the relationship between emotional stress and TMD and to estimate and compare the proportion of stress related TMD in preclinical and clinical undergraduate students of dentistry, along with variables such as gender predilection and the influence of parafunctional habits. [9,10]

Materials and Methods

This cross-sectional study was conducted in Manipal College of Dental Sciences, Manipal Academy of Higher Education, Mangalore, Karnataka, India, among undergraduate students of Dentistry aged 17 to 24 from December 2018 to June 2019.

All full-time students willing to give written consent participated in the study. Students with a history of trauma to head and neck and those receiving orthodontic treatment were excluded.

This study was approved by the Institutional Ethics Committee of Manipal college of Dental Sciences, MAHE. An Informed Consent was taken from all students, and confidentiality of the study data was maintained. Out of 180 preclinical students and 200 clinical students 100 each of preclinical and clinical student agreed to take part in the study.

Sample Size:

With 95% confidence level and 92.1% power (d = 10%) with reference to p=50%, sample size comes to be 200, with 100 students each of preclinical and clinical students.

(n = 100×2 = 200)

$$n = [Z_\alpha^2\ p\ q] / d^2$$

Z_α = 1.96 at 50% confidence level

d = 10% relative precision

Sample selection:

The study questionnaires will be distributed among 200 students, 100 each of preclinical and clinical years. Among preclinical students, 50 students each will be selected at random from first and second year. Among clinical students, 50 students each will be selected at random from third and fourth year.

Sampling method: Stratified random sampling

The demographic details, the information sheets and study questionnaires (Fonseca's Anamnestic Index[11,12] and Zung's self-rating anxiety scale[13,14]), were distributed among 200 students, 100 each of preclinical and clinical years by Stratified Random Sampling. Among the preclinical students, 50 students each were selected at random from first and second year. Among the clinical students, 50 students each were selected at random from third and fourth year. The students were briefed about the questionnaires. After obtaining written informed consent, the subjects were asked to complete and submit the questionnaires.

Following the collection of the questionnaires, a short session was conducted by the chief investigators of the study to enlighten the students on the prevalence, causes, the signs and symptoms of TMD, with a special emphasis on the treatment options, and the methods to provide symptomatic relief for the same.

The data was collected and tabulated in Microsoft Excel and analyzed using the SPSS version 17.0. The results were analyzed as proportions and percentage. Chi square test was used to determine the strength of association between the variables. A 'p value' of less than 0.05 was considered as significant.

Ethics Approval number: 17134

Results

Of the 200 students (100 each of preclinical and clinical years) aged 18 to 23, females and males were 70.5% and 20.5% respectively. According to the FAI, 59% of the Preclinical Students and 49% of the Clinical Students did not have TMD. Mild, moderate and severe TMD was seen in 34%, 7% and 0% of the Preclinical Students and 40%, 9% and 2% of the Clinical Students respectively (Chi square test value=3.662, p=0.300). According to the FAI, 48.2% of the female students and 67.8% of the male students did not have TMD. Mild, moderate and severe TMD was seen in 41.1%, 9.2% and 1.4% of the female students and 27.1%, 5.1% and 0% male students respectively (Chi square test value=6.884, p=0.076). According to the Zung's SAS, 92% of the Preclinical Students and 97% of the Clinical Students had normal levels of anxiety. Mild-moderate anxiety levels were seen in 8% of the Preclinical Students and 3% of the Clinical Students. 'Marked to severe' and 'extreme' anxiety levels were not seen in the students (Chi square test value=2.405, p=0.121). According to the Zung's SAS, 93.6% of the female students and 96.6% of the male students had normal levels of anxiety. Mild-moderate anxiety levels were seen in 6.4% of the female students and 3.4% of the male students (Chi square test value=0.717, p=0.397).

Table 1: Group-wise and gender-wise score on Zung's Scale among the study participants

	NORMAL	MILD-MODERATE
Group		
Preclinical	8%	92%
Clinical	3%	97%
Gender		
Female	132 (93.6%)	9 (6.4%)
Male	57 (96.6%)	2 (3.4%)

[p value (Group-wise) = 0.121, p value (Gender-wise) = 0.397]

Discussion

This cross-sectional study investigated the association of emotional stress and TMD. It was observed that the proportion of TMD was higher in the clinical students as compared to the preclinical students. While 'severe TMD' (according to the FAI) was not seen in the Preclinical Students, 2% of clinical students experienced it. The female students had a higher proportion and severity of TMD as compared with male students. While 'severe TMD' was not seen in the male students, 1.4% of the female students experienced it. The proportion of stress was higher in preclinical students as compared with clinical students. Female students had a higher incidence of stress as compared with male students. Both 'marked to severe' and 'extreme' stress levels (According to the Zung's SAS) were not seen in the students.

Wahid et al. [9] performed a similar study on the prevalence and severity of TMD in undergraduate university students using the FAI, which was also used to obtain information on the presence of stress among students. It was a cross-sectional study conducted among four medical disciplines, namely, Dentistry,

Medicine, Pharmacy and Physical therapy. Out of 137 students who enrolled, 7.9% were observed with 'No TMD', 44.3% with 'Mild TMD', 44.3% with 'Moderate TMD' and 3.6% with 'Severe TMD'. It was observed that the MBBS students experienced severe TMD more commonly as compared to the other disciplines. The authors concluded that the mean level of stress and TMD is almost equivalent in the different medical disciplines, with a variation in only its level of severity. [10]

Augusto et al.[12] studied the prevalence of TMD and its association with perceived stress and Common Mental Disorders (CMD) in students. The FAI, perceived stress scale, and the self-reporting questionnaire (SRQ-20) was used for data collection respectively. The prevalence of TMD among the students was 71.9%, distributed as Light TMD dysfunction (50%), moderate TMD dysfunction (16.4%) and severe TMD dysfunction (5.5%), with a higher frequency seen among women (76.4%). It was thus concluded that there is a significant correlation between TMD and variables such as para-functional habits, perceived stress and CMD. [13]

Nomura et al.[10]assessed the prevalence of TMD among 218 dental students using the FAI. The group consisted of 96 men and 122 women, with an average age of 20 years. Of the students, 53.21% were observed with TMD, with 35.78% showing mild TMD, 11.93% moderate TMD and 5.5% severe TMD. While considering severe TMD alone, women were affected approximately 9 times more than men. Amongst the students with TMD, 76.72% students considered themselves tense people; 71.55% reported to clench or grind their teeth; 65.52% reported clicking of the TMJ; 64.66% reported frequent headache and 61.21% reported neck pain. [11]

Habib et al.[3] conducted a questionnaire study on the prevalence and severity of TMD among male university students using the FAI. In addition to this, the role of relevant medical and dental histories in the assessment of TMD was also addressed. It was reported that psychological stress (30.5%) and direct restoration (77%) were the most common entries in the dental and medical histories. [3]

Notable similarities exist between the study conducted and the ones mentioned above, namely, the common use of the FAI for assessing the presence of TMD with no supplemental clinical examination, and the analysis of emotional stress, para-functional habits, occlusal interferences and gender as influencing factors for the prevalence and severity of TMD.

A few distinct characteristics make this study unique. Of the ten questions in the FAI, only one gives information about the presence of emotional stress among the students. While most other studies relied on the FAI to evaluate stress, this study made use of the Zung's SAS for this data. Another salient component of this study was the educational session conducted by the chief investigators to brief the students on the prevalence, causes, signs and symptoms of TMD, with a special emphasis on the treatment options for the same.

Clinical examination to assess the signs of TMD was not performed in this study and may be considered for the next phases of the study. Due to feasibility issues and time constraint, it was not possible to conduct a cohort study, which would be the ideal method to establish causal association.

Conclusions

The proportion of stress was higher in preclinical students, whereas TMD was higher in clinical students. It can be inferred from these results that the increased stress levels in the preclinical students may be a consequence of a sudden change in curriculum, coupled with an unfamiliar living environment and increased academic load. The clinical students, on the other hand, may be more accustomed to the program. The symptoms of stress related TMD manifest over a period of time, as a result of the pathological changes in the structure of the TMJ and masticatory muscles. Thus, TMD experienced in the clinical students could be a manifestation of the increased stress levels that the students experienced in their former years.

Conflict of Interest : None declared

Source of Support : None

References

1. Marklund S, Wänman A. Incidence and prevalence of temporomandibular joint pain and dysfunction. A one-year prospective study of university students. Acta Odontologica Scandinavica. 2007 Jan 1;65(2):119-27.
2. Hegde S, Mahadev R, Ganapathy KS, Sujatha D, Patil BA. Prevalence of signs and symptoms of temporomandibular disorders in dental students. JIAOMR. 2011 Jul 1;23(5):316.

3. Habib SR, Al Rifaiy MQ, Awan KH, Alsaif A, Alshalan A, Altokais Y. Prevalence and severity of temporomandibular disorders among university students in Riyadh. Saudi Dent J. 2015 Jul 1;27(3):125-30.
4. Chisnoiu AM, Picos AM, Popa S, Chisnoiu PD, Lascu L, Picos A, Chisnoiu R. Factors involved in the etiology of temporomandibular disorders-a literature review. Clujul medical. 2015;88(4):473.
5. Baum A. Stress, intrusive imagery, and chronic distress. Health psychology. 1990;9(6):653
6. Saddki N, Sukerman N, Mohamad D. Association between emotional intelligence and perceived stress in undergraduate dental students. Malays J Med. 2017 Feb;24(1):59.
7. Divaris K, Mafla AC, Villa-Torres L, Sánchez-Molina M, Gallego-Gómez CL, Vélez-Jaramillo LF, Tamayo-Cardona JA, Pérez-Cepeda D, Vergara-Mercado ML, Simancas-Pallares MÁ, Polychronopoulou A. Psychological distress and its correlates among dental students: a survey of 17 Colombian dental schools. BMC medical education. 2013 Dec 1;13(1):91.
8. Elani HW, Bedos C, Allison PJ. Sources of stress in Canadian dental students: a prospective mixed methods study. J Dent Educ. 2013 Nov;77(11):1488-97.
9. Wahid A, Mian FI, Razzaq A, HUSSAIN BOKHARI SA, Kaukab T, Iftikhar A, Khan H. PREVALENCE AND SEVERITY OF TEMPOROMANDIBULAR DISORDERS (TMD) IN UNDERGRADUATE MEDICAL STUDENTS USING FONSECA'S QUESTIONNAIRE. Pakistan Oral & Dental Journal. 2014 Jan 1;34(1).
10. Nomura K, Vitti M, Oliveira AS, Chaves TC, Semprini M, Siéssere S, Hallak JE, Regalo SC. Use of the Fonseca's questionnaire to assess the prevalence and severity of temporomandibular disorders in Brazilian dental undergraduates. Braz. Dent. J. 2007;18(2):163-7.
11. Marklund S, Wänman A. Incidence and prevalence of myofascial pain in the jaw–face region. A one-year prospective study on dental students. Acta Odontologica Scandinavica. 2008 Jan 1;66(2):113-21.
12. Augusto VG, Perina KC, Penha DS, Santos DC, Oliveira VA. Temporomandibular dysfunction, stress and common mental disorder in university students. Acta ortopedica brasileira. 2016 Dec;24(6):330-3.
13. Zung WW. A rating instrument for anxiety disorders. Psychosomatics: Journal of Consultation and Liaison Psychiatry.1971 Nov.
14. Zung WW. The measurement of affects: depression and anxiety. In Psychological measurements in psychopharmacology 1974 (Vol. 7, pp. 170-188). Karger Publishers.