Prevalence of Temporomandibular Disorders among Undergraduate Dental Students Using Fonseca Questionnaire

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ABSTRACT

Background: The term "temporomandibular joint diseases" refers to a group of linked conditions that affect the TMJ and its accompanying muscles, teeth as well as ligaments, and Occlusion. Dental undergraduates are more prone to temporomandibular joint disorders because of study stress and clinical workload.

Objective: The objective of the study was to evaluate the frequency and severity of temporomandibular joint disorders and their associated sign and symptoms in undergraduate dental students using Fonseca's Questionnaire a cross-sectional study conducted in Karachi.

Methods: This cross-sectional survey was conducted among dental students of two public sector dental colleges in Karachi, from June 2019 to December 2019. The inclusion criteria were dental students aged 18 or above, from first to final year BDS. Exclusion criteria were dental students with a history of systemic, musculoskeletal, or neurological disorders, under current temporomandibular joint treatment, and with orofacial pain. The sample size of 375 was calculated and recruited through convenience sampling. Fonseca's questionnaire was used to assess Temporomandibular Disorders. The questionnaire includes bibliographic details along with an assessment of joint disorder according to Fonseca criteria. The data was analyzed on SPSS version 26.0.

Results: The total number of participants enrolled in the study was 375, with a mean age of 20.61 + 1.16 years. Female participants account for the majority of TMDS *i.e.* 57.3% (n=215). Almost equal responses were received from all undergraduate BDS students. Findings showed that 58.4% (n=219) participants had no TMD followed by 36.3% (n=136) who suffered from mild TMD according to Fonseca's score. Only 4.8% (n=18) participants reported moderate and 0.5% (n=2) reported severe TMD. The evaluation of different signs and symptoms associated with TMD revealed that difficulty to move the mandible, opening the mouth, and pain while chewing were statistically significant symptoms related to gender

Conclusion: A concise anamnestic index makes it possible to recognize a TMD patient and, at the same time, categorize the patient based on the severity of the illness. The study concluded that temporomandibular disorders were seen frequently in undergraduate dental students. Fonseca's index could effectively screen TMDs among undergraduate dental students which may lead to early diagnosis and effective treatment planning by the clinicians

Keywords: Temporomandibular joint, questionnaire, population, students, dentistry, epidemiology.

INTRODUCTION

Temporomandibular disorders (TMD) are a subject of attention for numerous decades as it has varied etiological causes and management options [1]. Temporomandibular disorders (TMD) are a complex collection of medical issues affecting the muscles of mastication, the temporomandibular joint, nearby bone and soft tissue structures, and the combination of these injuries. Temporomandibular joint (TMJ) pain, along with joint noise during function, widespread myofascial tenderness, and a useful restriction or divergence of the jaw aperture are all symptoms of TMD. They also include decreased mandibular range of motion, aches and tenderness in the muscles of mastication, and joint pain [2].

TMD is projected to affect more than 5% of the population as a whole [3]. Patients with TMD warning signs involve wide age series; though, the present is a crest incidence flanked by 20 and 40 years of age [4]. TMD is identified by linked indications and symptoms because of the elevated incidence and changes in dietary and lifestyle [5]. A study involving Brazilian undergraduates evaluated about 200 participants and found that 83.60% had mild, 13.93% had moderate, and 2.45% had severe TMD [6].

TMD warning signals are more prevalent in girls than in males. Women tend to develop TMD during their premenopausal years, in contrast to the known increased health risk in postmenopausal women for illnesses including heart disease and stroke [7]. Although the causes of the sexual imbalance in TMD prevalence are not fully understood, some have proposed a hormonal factor. Patients with TMD have been observed to have higher estrogen levels [8].

TMD has been linked to mental stress, particularly in college students. According to a study, patients who are

under mental stress had a 2.65 times higher incidence of getting TMD than people who are not under stress [9]. The TMD is caused by a variety of reasons, such as occlusal misalignment, masticatory muscle exhaustion, oral habits, mental stress, early tooth loss, and dysfunction of structures close to the TMJ. Because TMD is a degenerative disease that deteriorates with time, early diagnosis and therapy are crucial. The prognosis is favorable if it is treated at an early stage. Due to TMJ injury, it becomes irreparable in its later stages, which may necessitate extensive medical interventions and surgery [10]. Additionally, there is a greater demand for TMDs treatment due to the growing public desire for complete oral health care; as a result, epidemiological data on the prevalence, distribution, and origin of TMDs in the community is important.

TMD prevalence can be determined using a variety of approaches; however, the Fonseca questionnaire is the simplest way to do it. This questionnaire, which Fonseca introduced in 1992, is frequently used to categorize TMD severity since it is effective at gathering pertinent information [11]. This questionnaire covers a wide range of topics and gives a realistic picture of TMD. There are ten components to it, which include examining the temporomandibular joint, head, and back for pain during chewing, functional habits, movement restrictions, joint clicking, sense of malocclusion, and emotional stress experience. The Fonseca Anamnestic Indicator (FAI) is a self-administered index. A survey that has been presented as a cheap, simple applied substitute TMD, an assessment tool for the general public. Many studies have been conducted to weigh up the strength and consistency of the Fonseca Anamnesis Index (IAF) which is commonly used to measure the severity of temporomandibular disorders [12]. Since the technical staff can acquire the anamnestic index quickly, cheaply, and with a large population coverage, public health and screening agencies should implement the questionnaire.

Due to the ongoing assessments throughout the year, undergraduate dental students are constantly under pressure. Their stress from interpersonal and personal relationships may prevent students from achieving their goals during the academic year. Students were shown to have a higher prevalence of temporomandibular problems [13-15].

Therefore, this study was planned to evaluate, using Fonseca's questionnaire, the frequency, and severity of TMD in undiagnosed Pakistani dental undergraduates. The characterization of volunteers with undiagnosed TMD would help in understanding its frequency in Pakistani undergraduate dental students. The objective of the study was to identify the frequency and severity of Temporomandibular joint disorders and their associated sign and symptoms in undergraduate dental students using Fonseca's Questionnaire a cross-sectional study conducted in Karachi.

METHODS

The cross-sectional survey was conducted among dental students of Liaquat College of Medicine and Dentistry (LCMD) and Karachi Medical and Dental College (KM&DC) from June 2019- December 2019. After meeting the inclusion and exclusion criteria listed below, dental students enrolled in the first, second, third, and fourth years of their BDS programs at Liaquat College of Medicine and Dentistry (LCMD) and Karachi Medical and Dental College (KMDC) were invited to participate in the study. The inclusion criteria were dental students enrolled either in first, second, third, or fourth year BDS, willing to give informed verbal consent to participate in this study, and age greater than 18 years. Dental students having a history of neurological, musculoskeletal, or systemic problems, as well as those who are currently receiving treatment for TMD or who have orofacial pain, were excluded from the program. The study participants were recruited through non-probability convenience sampling. The minimum calculated sample size was 332, calculated by the Raosoft Sample size calculator; the margin of error was 5%, and 95% confidence interval and response distribution of 50%. Although the response was received from 375 participants so the sample size of the study was 375. All study participants received a thorough explanation of the study's goals, the procedures involved in gathering data, and any potential dangers or upsides. The responses of study participants were kept anonymous and confidential during the whole research process.

The researcher physically face-to-face, interviewed the study participants about TMJ disorders by using the predesigned questionnaire. The given questionnaire investigates demographic details, past medical history, and signs and symptoms associated with TMJ disorders. Study participants were briefed about the questionnaire which was answered with a "three-point Likert scale". For a detailed analysis of TMD severity, the answers "yes", "no" and "sometimes" from each question were summed up and the total was multiplied by the value attributed

Table 1: Classification of TMD according to Fonseca's questionnaire.

| S. No.	Category of TMJ Disorder	Clinical Index Score
1.	No Temporomandibular disorders	The score of 0 and 15 points on the Fonseca Questionnaire will represent no temporomandibular disorders.
2.	Mild Temporomandibular disorders	A score of 20 and 40 points on the Fonseca Questionnaire will represent mild temporomandibular disorders.
3.	Moderate Temporomandibular disorders	A score of 45 and 65 points on the Fonseca Questionnaire will represent moderate temporomandibular disorders.
4.	Severe Temporomandibular disorders	A score of 70 and 100 points on the Fonseca Questionnaire will represent severe temporomandibular disorders.
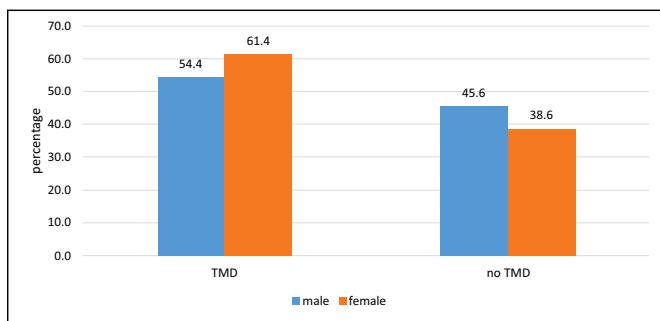
Fig. (1): Gender distribution and Frequency of TMD among participants.

to each answer: *i.e.* ten for yes, five for sometimes, and zero for no, respectively (**Table 1**).

The data were entered into the statistical analysis software SPSS version 26.0. The I frequency, percentage and mean ± SD were calculated for qualitative and quantitative variables. The Chi-square test was used to check the statistical association among the variables. The p-value < 0.05 was considered significant.

RESULTS

The total number of participants enrolled in the study was 375, with a mean age of 20.61 + 1.16 years. Female participants account for the majority of TMDS *i.e.* 215(57.3%). A total of 96(25.6%), 95(25.3%), 91(24.3), and 93(24.8) from the first year, second year, third year, and final year BDS students were enrolled in the study respectively.

156 (41.6%) had suffered from TMDs. Among the suffered participants 136 (36.3%) suffered from mild, 18(4.8 %) participants reported moderate and 2 (0.5%) reported severe TMD according to Fonseca's score. Out of 156 TMDs study subjects, 73 (46.8%) were males and 83 (53.2%) were females (**Fig. 1**).

The association of different signs and symptoms with TMD revealed that difficult to move the mandible (p-value = 0.000), opening the mouth (p-value = 0.011), and pain while chewing (p-value = 0.000) as statistically significant symptoms related to gender. The majority of positive symptoms were reported by female participants (**Table 2**).

DISCUSSION

TMD has multiple etiology and is a complicated illness. Pain in the orofacial region with a non-odontogenic etiology is the main clinical manifestation of these illnesses [16].

Numerous investigations carried out in various regions of Saudi Arabia either employed simply the TMD pain screener questionnaire in the general population [17] or self-constructed questionnaires with university students [18]. Additional researchers classified TMD using the Fonseca anamnestic index (FAI) in conjunction with different other questionnaires, or they utilized RDC/TMD to determine the prevalence of TMD [19].

The mean age of 20.61 + 1.16 years in this study. A similar age range was reported by other researchers like Habib SR [20].

The majority of TMD victims are female patients, which comprise the sample. This is congruent with a study that was published in 2022 and found that 71.9% of the sample had TMD, with females being more likely to have it [21]. Although a study by Zafar MS and colleagues at Taibah University in 2017 found that there were more male participants (57%) than female participants, TMD was more common among the female participants despite the study's findings being statistically insignificant [22]. A 2018 study in Karachi, Pakistan, found that among 372 participants, 65.8% (245) of the participants were female students from Pakistan [23].

A total of 96 (25.6%), 95 (25.3%), 91 (24.3), and 93 (24.8) BDS students from the first, second, third, and final years, respectively, were registered for the study. Even though other research found varying numbers of dental students [24].

According to the study's findings, the majority of individuals [136(36.3%)] did not have TMD, whereas the next largest group [136(36.3%)] had mild TMD. 2. (0.5%) of the individuals had severe TMD, while 4.8% of the participants had moderate TMD. The study's findings that TMD is quite common in the study population are consistent with those of a study conducted in Pakistan

Table 2: Response of participants for different signs and Symptoms associated with TMD to gender.

Signs and Symptoms	Female			Male			p-value
	Yes n(%)	No n(%)	Sometimes n(%)	Yes n(%)	No n(%)	Sometimes n(%)	
Hard to open mouth	4(1.9)	190(88.4)	21(9.8)	1(0.6)	155(96.9)	4(2.5)	0.011*
Hard to move the mandible	6(2.8)	192(89.3)	17(7.9)	0(0)	159(99.4)	1(0.6)	<0.001*
Pain while chewing	12(5.6)	132(61.4)	71(33)	3(1.9)	135(84.4)	22(13.8)	<0.001*
Frequent headaches	10(4.7)	94(43.7)	111(51.6)	11(6.9)	67(41.9)	82(51.3)	0.642
Pain on the nape or stiff neck	17(7.9)	125(58.1)	73(34)	14(8.8)	95(59.4)	51(31.9)	0.895
Earaches or pain in joints	32(14.9)	161(74.9)	22(10.2)	27(16.9)	117(73.1)	16(10)	0.872
Tmj clicking	21(9.8)	134(62.3)	60(27.9)	14(8.8)	96(60)	50(31.3)	0.766
Clench or grind teeth	43(20)	152(70.7)	20(9.3)	31(19.4)	112(70)	17(10.6)	0.911
Teeth don't articulate well	20(9.3)	123(57.2)	72(33.5)	12(7.5)	94(58.8)	54(33.8)	0.832
Nervous person	39(18.1)	122(56.7)	54(25.1)	24(15)	90(56.3)	46(28.8)	0.608

*Significant at p<0.05

that was published in 2014 and included 137 students. In that study, 7.9% of the students were found to have no TMD, 44.3% to have mild or moderate TMD, and 3.6% to have severe TMD [25]. Another study carried out in Khyber Pakhtunkhwa in 2020 indicated that 41.2% of individuals, or the majority, had mild TMD [26].

To ascertain how frequently dental students suffered TMD symptoms, a study was conducted on a university campus in Bengaluru using Fonseca's questionnaire consisting of 300 adult students. It reported that 33.3% of participants suffered from varying degrees of TMDs. The Fonseca questionnaire is effective in screening a large population [11].

In this study, undergraduate dental students have suffered from TMD of variable severities. A study conducted by Karthik R in 2017 reported that among 402 students 23% suffered from TMD majority of them were females [27].

With the help of Fonseca's condensed questionnaire, it is feasible to identify TMD patients and, at the same time, classify them according to the severity of their ailment. Following a study by Kumar MP, Harshitha C. in 2018 conducted research and concluded that dental students at Saveetha Dentistry College had a mild-to-moderate prevalence of TMD [28].

TMD symptoms can appear singly, in groups, or combination. These could result in multiple tooth extractions and difficult surgical procedures [29]. The results of our study's cross-tabulation revealed that there was a relationship between the symptoms of TMJ and gender and that 16.22% of females experienced frequent headaches and 13.56% identified as having an anxious disposition. Contrarily, 2.65% of men reported having these issues. According to a 2018 study, TMD affected the majority of female pupils. Women had an odds ratio of 1.9 (95% confidence range) compared to men [30].

In 2020, Abdulwahab Al-Dailami and colleagues released a study on the clinical assessment of TMD in dentistry students in their undergrad stage. 81.7% of the study participants had normal mouth openings, and 18.3% had limited mouth openings, per the findings of the clinical examination. From 13.1% to 86.9% of participants felt soreness during palpation. 45.3% of participants had auscultation, and 54.7% of patients were negative (clicking). They claimed that a sizable percentage of individuals had clicked on palpation and suffered from TMD [31].

The cross-sectional design and small sample size of this study are its main limitations.

It is recommended that more longitudinal, multicenter studies with a substantial sample size be conducted to ensure that the findings are more broadly applicable and representative of the population. In light of the study, it is also advised that all efforts be made to obtain an early diagnosis of TMD and its associated etiological causes. Doing so will assist parents and patients in accepting, comprehending, and selecting better treatment alternatives. To reduce the pathogenesis of the disease, people should be informed about the ongoing negative effects of causal factors such as malocclusion, stress, *etc.* and given counseling.

CONCLUSION

A concise anamnestic index makes it possible to recognize a TMD patient and, at the same time, categorize the patient based on the severity of the illness. The study concluded that temporomandibular disorders were seen frequently in undergraduate dental students. Fonseca's index could effectively screen TMDs among undergraduate dental students which may lead to early diagnosis and effective treatment planning by clinicians.

ETHICS APPROVAL

The study was approved by the ethical review committee of KMDC, Karachi Pakistan. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/ or national research committee and with the Helsinki declaration.

CONSENT FOR PUBLICATION

Written informed consent was taken from the participants.

AVAILABILITY OF DATA

The data set may be acquired from the corresponding author upon a reasonable request.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHORS' CONTRIBUTION

All authors comply with ICMJE guidelines of author contribution.

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