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Evaluation of Temporomandibular Joint Disorder in Dental Undergraduates Using the Fonseca Questionnaire

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ABSTRACT

A basic component of general well-being and health is oral health. One common problem influencing populations worldwide is temporomandibular dysfunction (TMD). **Objectives:** To determine the occurrence of temporomandibular disorders in dental undergraduates using the Fonseca index. **Methods:** A cross-sectional analytical study was carried out with undergraduate dental students enrolled at Watim Medical and Dental College, Rawalpindi, Pakistan. The sample size was determined using the WHO sample size calculator, and participants were selected through non-probability judgmental sampling. Assessment of temporomandibular disorders was performed using the validated Fonseca Anamnestic Questionnaire. Data management and statistical analysis were conducted with SPSS version 26. **Results:** A total of 186 participants were included, with 149 females (80.10%) and 37 males (19.90%). Using the Fonseca Clinical Index, TMD classification revealed that 104 participants had present TMD (55.90%), while 82 had absent TMD (44.10%). Severity levels ranged from no TMD (44.09%) to mild TMD (43.01%), moderate TMD (9.68%), and severe TMD (3. 23%). Gender and TMD were statistically significantly associated (p=0.004), indicating that gender may contribute to TMD occurrence, with females being more affected. Additionally, there was a correlation between gender and TMD severity (p=0.038), suggesting that severity may vary based on an individual's gender. However, no correlation was found between age and TMD (p=0.397). **Conclusions:** TMD was prevalent among dental undergraduates, with a statistically significant association with gender, particularly affecting females.

INTRODUCTION

TMD refers to a range of disorders that impact the muscles of mastication, the temporomandibular joint, and related tissues [1, 2]. Temporomandibular disorders (TMDs) are now widely acknowledged as the primary source of chronic orofacial pain of non-dental origin, occupying the third position among dental conditions responsible for pain and functional impairment [3]. Myofascial disorders represent the most frequently encountered subtype of TMD, primarily characterized by muscle-related pain, whereas internal derangements, including disc displacement and TMJ arthralgia, are reported less often [4]. The approximate prevalence of TMD in adults is around 31-38%, and 11% in children [5-7]. Epidemiological studies indicate that TMDs disproportionately affect women, occurring about five times more frequently than in men, with the highest prevalence reported in younger individuals [6, 8]. Nevertheless, signs of TMDs appear to increase with advancing age. Among healthcare professionals,

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particularly dental undergraduates, awareness and understanding of TMD are crucial due to their role in diagnosing and managing these disorders in future practice. Dental undergraduates represent a particularly significant population for assessing temporomandibular disorders due to their dual role as both potential sufferers and future frontline professionals in diagnosing and managing TMD. Research indicates that dental students may be especially vulnerable to TMD symptoms due to high academic stress, prolonged postural strain during clinical training, and increased awareness of orofacial symptoms, which may lead to self-reporting bias or early identification [6, 7]. This makes them an ideal group for studying the interplay between psychosocial and physiological contributors to TMD. The Fonseca Anamnestic Index (FAI), or Fonseca Questionnaire, is a well-established, validated tool widely used in epidemiological studies to assess TMD symptoms and severity across diverse populations [9]. Its simplicity, cost-effectiveness, and ability to categorize TMD into mild, moderate, and severe forms make it particularly suitable for large-scale screenings in academic settings. By applying this tool to dental undergraduates, this study not only aims to quantify the prevalence and types of TMD within a high-risk, knowledgeable cohort but also seeks to inform curriculum enhancements and stress management interventions targeted at mitigating TMD onset during professional training. Psychosocial, environmental, biological, and neurophysiological factors play significant roles in the development of TMD symptoms. These factors include emotional stress (such as anxiety and depression), bruxism, occlusal discrepancies, orthodontic interventions, issues with chewing function, and postural irregularities, all contributing to an increased susceptibility to TMDs [6, 8]. The Fonseca Questionnaire, developed by Dr. Luciano Fonseca, serves as a valuable tool in screening and assessing TMD symptoms [9]. This questionnaire comprises a set of structured questions designed to evaluate various aspects of TMJ dysfunction, including pain, joint noises, and functional limitations. Its utility lies in providing a systematic approach to gathering clinical data, aiding in both early detection and comprehensive evaluation of TMD among dental professionals. Although considerable research has been conducted on temporomandibular disorders (TMDs), there is a lack of evidence focusing on the prevalence and awareness of TMD symptoms among dental undergraduates, particularly through the use of standardized screening instruments such as the Fonseca Questionnaire. There is also limited data assessing how well dental undergraduates recognize, self-report, and interpret TMD-related symptoms, despite being future providers expected to manage such disorders. This study addresses this gap by evaluating the prevalence and characteristics of temporomandibular disorder (TMD) symptoms among dental undergraduates using the Fonseca Questionnaire. In addition, it seeks to assess students' awareness and knowledge of TMD, thereby providing insights that may support early detection, management, and the integration of targeted educational and wellness strategies within dental institutions.

Temporomandibular disorders (TMD) represent a significant source of orofacial pain and functional limitation worldwide, yet their early identification in high-risk student populations remains insufficiently explored. Although several international studies report variable prevalence rates among university students, there is limited region-specific evidence assessing TMD among dental undergraduates in Pakistan using standardized and validated screening tools such as the Fonseca Anamnestic Index. Furthermore, few studies have evaluated the association between demographic variables and TMD severity within this cohort. Addressing this gap is essential to inform preventive, educational, and stress-management strategies in dental institutions. This study aims to determine the occurrence of temporomandibular disorders in dental undergraduates using the Fonseca index.

METHODS

This analytical cross-sectional study was carried out among undergraduate dental students at Watim Medical and Dental College, Rawalpindi, Pakistan, to investigate temporomandibular disorders (TMD). Data collection took place over six months, from May to October 2022. Ethical clearance was obtained from the Institutional Ethical Review Board of Watim Medical and Dental College (Ref. No. 06 ERB/April/2022). Written informed consent was secured from all participants in accordance with the Helsinki Declaration. The sample size was estimated using the WHO calculator, considering a student population of about 350, a 95% confidence interval, 5% margin of error, and an expected prevalence of 63% based on prior literature. An additional 10% was added to account for possible non-response, yielding a total of 186 participants. Students from all four professional years were included to ensure representation across different stages of the program. Sampling was performed using a non-probability purposive strategy. Temporomandibular disorders were assessed with the Fonseca Anamnestic Index (FAI), a validated and frequently used screening tool. The instrument evaluates symptoms such as restricted mouth opening, difficulty in jaw movement, fatigue or discomfort during mastication, headaches, neck or ear pain, joint sounds, bruxism, difficulty biting, and psychological stress. Each of the ten questions is scored as 10 points for "Yes," 5

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points for "Sometimes," and 0 points for "No," producing a total score ranging from 0–100. Scores are interpreted as: 0–15 (no TMD), 20–40 (mild), 45–65 (moderate), and 70–100 (severe). To reduce confounding, students with systemic illnesses (e.g., autoimmune disease, rheumatoid arthritis, neurological disorders) or those receiving any TMD treatment (pharmacological, surgical, or physiotherapy) were excluded. Data were collected through the FAI, a brief sociodemographic questionnaire (age, gender), and relevant medical/dental history. The psychometric properties of the FAI are well established, with reported high reliability (Cronbach's alpha = 0.849; ICC = 0.837), good concurrent validity against DC/TMD, and acceptable sensitivity (≈78%) and specificity, with an AUC of 0.852. Statistical analyses were performed using IBM SPSS version 26.0. Normality of continuous data was examined with the Shapiro–Wilk test. Group differences in mean FAI scores across age categories were assessed using independent samples t-test, while associations between gender and TMD severity were evaluated with the chi-square test.

RESULTS

This study assessed temporomandibular disorder (TMD) prevalence and severity among 186 students (mean age 21.60 ± 1.65 years), with a significant female majority (80.1%). Over half (55.9%) of the participants exhibited TMD symptoms, with 43% classified as mild, 9.7% as moderate, and 3.2% as severe based on the Fonseca clinical index. Common symptoms included frequent headaches (34.9%), neck pain (23.7%), and jaw fatigue during chewing (16.7%). Statistical analysis revealed a significant association between gender and both TMD presence (p=0.004) and severity (p=0.038), while age showed no significant correlation with TMD (p=0.397). These findings suggest a notable gender disparity in TMD prevalence and highlight the importance of early screening in young adult populations. Table 1 presents students' demographic and Temporomandibular Disorder (TMD) statistics. Of the 186 participants, 149 are female (80.10%) and 37 are male (19.90%). Based on the Fonseca Clinical Index, 104 participants (55.90%) were found to have TMD, while 82 participants (44.10%) did not show signs of the disorder. The severity of TMD among the participants was distributed as follows: 44.09% had no TMD, 43.01% had mild TMD, 9.68% had moderate TMD, and 3.23% had severe TMD (Table 1).

Table 1: Demographic Characteristics and Temporomandibular Disorder Classification

Variables	n (%)
Students	186 (100)
Gender	
Male	37 (19.90)
Female	149 (80.10)
Temporomandibular Disorder (TMD)	
Present	104 (55.90)
Absent	82 (44.10)
Classification of Temporomandibular disorder using Fonseca's clinical index	
NO TMD	82 (44.09)
Mild TMD	80 (43.01)
Moderate TMD	18 (9.68)
Severe TMD	06 (3.23)

Various symptoms related to Temporomandibular Disorder (TMD) were observed in the study population. These symptoms include difficulty opening the mouth wide, jaw movement issues, fatigue or muscle pain during chewing, headaches, neck pain, earaches, joint noises, teeth clenching or grinding habits, and perceived tension (Table 2).

Table 2: Fonseca Questionnaire for Temporomandibular Disorder

Variables	Yes N (%)	No N (%)	Sometimes N (%)
Is it hard for you to open your mouth?	5 (2.7)	168 (90.30)	13 (7)
Is it hard for you to move your mandible from side to side?	7 (3.0)	169 (90.9)	10 (5.4)
Do you get tired /muscular pain while chewing?	31 (16.7)	112 (60.2)	43 (23.1)
Do you have frequent headaches?	65 (34.9)	81 (43.5)	40 (21.5)
Do you have pain in the nape or a stiff neck?	44 (23.7)	98 (52.7)	44 (23.7)
Do you have earaches or pain in the craniomandibular joints?	8 (4.3)	160 (86)	18 (9.7)
Have you noticed any TMJ clicking while chewing or when you open your mouth?	36 (19.4)	120 (64.5)	30 (16.1)
Do you clench or grind?	29 (15.6)	129 (69.4)	28 (15.1)
Do you feel your teeth do not articulate well?	14 (7.5)	165 (88.7)	7 (3.8)
Do you consider yourself a tense (nervous) person?	58 (31.2)	78 (41.9)	50 (26.9)

Information on the variables associated with Temporomandibular Disorder (TMD). Gender and TMD are statistically significantly associated (p=0.004), indicating that gender may contribute to the occurrence of TMD, and females are more affected. Moreover, there is a correlation between gender and the severity of TMD, as evidenced by a p-value of 0.038. This suggests that the severity of TMD may vary depending on an individual's gender. There is no meaningful correlation between age and TMD (p-value = 0.397). Age is not the sole predictor of TMD incidence (Table 3).

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Table 3: Associations Between Gender, Age, TMD, and TMD Severity

Variables	χ^2 / t-value	DF	p-Value
Gender and TMD	8.09	1	0.004*
Gender and TMD severity	8.44	3	0.038*
Age and TMD (t-test)	-0.85	184	0.397

*Statistically significant at p≤0.050

DISCUSSION

This study examined temporomandibular disorders (TMD) in dental students using demographic data and the Fonseca Clinical Index. Among the 186 participants, 55.9% were diagnosed with TMD, classified into mild (43.01%), moderate (9.68%), and severe (3.23%) levels. Common symptoms included difficulty in mouth opening (2.7%), jaw movement limitations (3%), chewing fatigue (16.7%), headaches (34.9%), neck pain (23.7%), earaches (4.3%), and teeth clenching or grinding (15.6%). These findings confirm that TMD is relatively frequent among dental students and may affect daily functioning. When compared with previous research, our results were largely consistent. Nazir *et al.* reported a prevalence of 66.9% among dental students [9], while other studies using the same questionnaire documented rates of 62% and 53.21%, respectively [10, 12]. One study reported that within its 53.21% TMD-positive population, 35.78% had mild, 11.93% moderate, and 5.5% severe TMD, which closely aligns with our classification. Research conducted in Saudi Arabia also demonstrated that 45% of dental students experienced TMD, with 62.8% of females exhibiting mild to severe forms [13, 14]. These comparative findings underscore that dental students across diverse settings consistently exhibit a high burden of TMD. A systematic review and meta-analysis of 21 studies further demonstrated the broader impact of TMD, showing that 19.1% of affected individuals experience disc displacement and 9.8% suffer from degenerative joint disease [8, 15]. Such evidence suggests that dental students with TMD may be at risk of progressive functional limitations and oral parafunctions. Additionally, studies indicate that TMD prevalence is significantly higher among dental students (80%) compared to peers in non-dental fields (62%) [16–18], highlighting the need for preventive measures tailored to this group. Stress emerged as a key associated factor, with 31.2% of our study population identifying it as a perceived root cause of TMD. This aligns with previous findings reporting psychological stress in 29.6% of dental students with TMD. However, a Pakistani study found a much lower rate (12.3%), which may reflect differences in population characteristics, stress assessment tools, or cultural factors influencing reporting. Given the demanding academic, clinical, and patient care responsibilities faced by dental students, chronic stress likely plays a significant role in TMD development, with potential negative consequences for academic performance, health, and quality of life [19, 20]. The analysis demonstrated a statistically significant relationship between gender and temporomandibular disorders, both in terms of occurrence (p=0.004) and severity (p=0.038), with higher susceptibility observed among female students. In contrast, age showed no meaningful association with TMD (p=0.397). These results align with earlier studies that implicate hormonal influences in the greater prevalence of TMD among women. Jedynak *et al.* proposed that persistent endocrine disruptions may contribute to this gender disparity [21]. Meta-analytical evidence further reinforces that TMDs are more prevalent among women, possibly influenced by hormonal mechanisms. Taken together, our results and prior evidence highlight that TMD is common among dental students, with stress and female gender being significant associated factors. Preventive and interventional strategies, particularly stress management and early screening, should be prioritized to reduce the burden of TMD in this high-risk population.

This study was limited by its single-center design and non-probability sampling technique, which may restrict generalizability to other dental institutions. The reliance on self-reported questionnaire data may also introduce response bias and over- or under-estimation of symptoms. Additionally, clinical examination based on DC/TMD criteria was not performed to confirm diagnoses. Future multicenter studies incorporating clinical assessments, longitudinal follow-up, and evaluation of psychosocial and hormonal factors are recommended to better understand TMD progression and to design targeted preventive interventions for dental students.

CONCLUSIONS

The study concluded a significant prevalence of Temporomandibular Disorder (TMD) among dental students, with symptoms ranging from jaw dysfunction to psychological stress. Gender was found to significantly influence TMD presence and severity, favoring females. Age, however, did not show a significant association with TMD incidence. These findings underscore the need for targeted preventive measures and further research into the complex interplay of gender, age, and hormonal factors in TMD development among student populations.

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Authors' Contribution

Conceptualization: AK
Methodology: SA[1], AS
Formal analysis: SA[1], AS
Writing and Drafting: ABK
Review and Editing: AK, SA[1], AS, ABK, DA, SA[2]

All authors approved the final manuscript and take responsibility for the integrity of the work

Conflicts of Interest

All the authors declare no conflict of interest.

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REFERENCES

[1] Chaurasia A, Ishrat S, Chaudhary PK, Dhingra K, Nagar A. Temporomandibular Disorders in North Indian Population Visiting a Tertiary Care Dental Hospital. National Journal of Maxillofacial Surgery. 2020 Jan; 11(1): 106–9. doi: 10.4103/njms.NJMS_73_17.

[2] Qvintus V, Sipilä K, Le Bell Y, Suominen AL. Prevalence of Clinical Signs and Pain Symptoms of Temporomandibular Disorders and Associated Factors in Adult Finns. Acta Odontologica Scandinavica. 2020 Oct; 78(7): 515–21. doi: 10.1080/00016357.2020.1746395.

[3] Iodice G, Cimino R, Vollaro S, Lobbezoo F, Michelotti A. Prevalence of Temporomandibular Disorder Pain, Jaw Noises and Oral Behaviours in an Adult Italian Population Sample. Journal of Oral Rehabilitation. 2019 Aug; 46(8): 691–8. doi: 10.1111/joor.12803.

[4] Kmeid E, Nacouzi M, Hallit S, Rohayem Z. Prevalence of Temporomandibular Joint Disorder in the Lebanese Population, and Its Association With Depression, Anxiety, and Stress. Head and Face Medicine. 2020 Sep; 16(1): 19. doi: 10.1186/s13005-020-00234-2.

[5] Valesan LF, Da-Cas CD, Réus JC, Denardin AC, Garanhani RR, Bonotto D, Januzzi E, de Souza BD. Prevalence of Temporomandibular Joint Disorders: A Systematic Review and Meta-Analysis. Clinical Oral Investigations. 2021 Feb; 25(2): 441–53. doi: 10.1007/s00784-020-03710-w.

[6] Ângelo DF, Mota B, João RS, Sanz D, Cardoso HJ. Prevalence of Clinical Signs and Symptoms of Temporomandibular Joint Disorders Registered in the EUROTMJ Database: A Prospective Study in a Portuguese Center. Journal of Clinical Medicine. 2023 May; 12(10): 3553. doi: 10.3390/jcm12103553.

[7] Zieliński G, Pająk-Zielińska B, Ginszt M. A Meta-Analysis of the Global Prevalence of Temporomandibular Disorders. Journal of Clinical Medicine. 2024 Feb; 13(5): 1365. doi: 10.3390/jcm13051365.

[8] Yekkalam N, Novo M, Tyrberg MJ, Sipilä K. Risk Factors Associated With Symptoms of Temporomandibular Disorders Among Women With Hypermobile Ehlers-Danlos Syndrome: Questionnaire-Based Study in Finland and Sweden. Journal of Oral Rehabilitation. 2024 Aug; 51(8): 1390–400. doi: 10.1111/joor.13706.

[9] Shivamurthy PG, Kumari N, Sadaf A, Meghana MB, Azhar H, Sabrish S. Use of Fonseca's Questionnaire to Assess the Prevalence and Severity of Temporomandibular Disorders Among University Students – A Cross-Sectional Study. Dentistry. 2022 Feb; 3000(1): a001. doi: 10.5195/d3000.2022.178.

[10] Khan MW, Zaigham AM. Prevalence and Severity of Temporomandibular Disorders in Medical/Dental Undergraduate Students. Journal of the Pakistan Dental Association. 2021 Apr; 30(2). doi: 10.25301/JPDA.302.94.

[11] Sánchez-Torrelo CM, Zagalaz-Anula N, Alonso-Royo R, Ibáñez-Vera AJ, López Collantes J, Rodríguez-Almagro D, Obrero-Gaitán E, Lomas-Vega R. Transcultural Adaptation and Validation of the Fonseca Anamnestic Index in a Spanish Population With Temporomandibular Disorders. Journal of Clinical Medicine. 2020 Oct; 9(10): 3230. doi: 10.3390/jcm9103230.

[12] Nazir MA, Izhar F, Hassan S, Tanvir M, Nemat F, Ashraf MW, Alamri A. Temporomandibular Disorders Among Dental Students in Pakistan: Assessment of Prevalence, Severity, and Associated Factors Based on Questionnaire. Scientifica. 2023; 2023(1): 8895544. doi: 10.1155/2023/8895544.

[13] Alfawzan AA. An Assessment of the Prevalence and Severity of Temporomandibular Disorders Among Undergraduate Dental Students at Qassim University. World Journal of Dentistry. 2020 Sep; 11(2): 134–8. doi: 10.5005/jp-journals-10015-1715.

[14] Alharbi AA, Shukr BS, Algethami MA, Alhumaidi FY, Mohaymidan NM, Alharbi A, Algethami M, Alhumaidi FA. The Prevalence of Temporomandibular Disorders Among Dental and Medical Students in Taif, Saudi Arabia: A Cross-Sectional Study. Cureus. 2024 Jul; 16(7). doi: 10.7759/cureus.65827.

[15] Lövgren A, Österlund C, Ilgunas A, Lampa E, Hellström F. A High Prevalence of TMD is Related to Somatic Awareness and Pain Intensity Among Healthy Dental Students. Acta Odontologica Scandinavica. 2018 Aug; 76(6): 387–93. doi: 10.1080/00016357.2018.1440322.

DOI: https://doi.org/10.54393/pjhs.v6i8.2995

[16] Xiong X, Xiao C, Zhou X, Li X, Wang J, Yi Y. Knowledge and Attitudes Regarding Temporomandibular Disorders Among Postgraduate Dental Students and Practicing Dentists in Western China: A Questionnaire-Based Observational Investigation. Pain Research and Management. 2023; 2023(1): 7886248. doi: 10.1155/2023/7886248.

[17] Ram H, Shah D. Prevalence of Sign and Symptoms of TMD Among the Patients Attending Siddhpur Dental College and Hospital of Gujarat. International Journal of Applied Dental Sciences. 2020; 6: 671–5. doi: 10.22271/oral.2020.v6.i3j.1023.

[18] de Melo Rocha CO, Peixoto RF, de Resende CM, de Medeiros Alves AC, da Costa Oliveira ÂG, Seabra Barbosa GA. Psychosocial Aspects and Temporomandibular Disorders in Dental Students. Quintessence International. 2017 Mar; 48(3).

[19] Lugassy D, Ben-Izhack G, Zissu S, Shitrit Lahav R, Rosner O, Elzami R, Shely A, Naishlos S. Anxiety, Stress, and Depression Levels Among Dental Students: Gender, Age, and Stage of Dental Education Related. Psychology, Health and Medicine. 2025 Apr; 1–5. doi: 10.1080/13548506.2025.2476085.

[20] Ramachandran S, Soheilipour S, Ford NL, Brondani MA. Exploring Stressors and Coping Strategies Among Dental Students During COVID-19 Pandemic in British Columbia. Journal of Dental Education. 2023 Oct; 87(10): 1427–36. doi: 10.1002/jdd.13312.

[21] Jedynak B, Jaworska-Zaremba M, Grzechocińska B, Chmurska M, Janicka J, Kostrzewa-Janicka J, *et al.* TMD in Females With Menstrual Disorders. International Journal of Environmental Research and Public Health. 2021 Jul; 18(14): 7263. doi: 10.3390/ijerph18147263.