

Original Article

Frequency of Myofascial Pain and Dysfunction Syndrome in Dental Students and its Association with Stress

Maria Naz Shaheen ¹, Abdur Rasheed ², Syed Moosa Raza ³, Sabhagi Kumari ⁴
Asma Shahid ⁵, Sharjeel Bashir ⁶

^{1,3,4} Jinnah Sindh Medical University, Karachi, Pakistan

² Dow University of Health Sciences, Karachi, Pakistan

⁵ Liaquat College of medicine and dentistry, Karachi, Pakistan

⁶ Combined Military Hospital (CMH), Karachi, Pakistan

Keywords: Musculoskeletal Pain ; Chronic Pain ; Bruxism ;
Mastication ; Mandibular Condyle

Article History

Received: May 01, 2026

Revision: May 24, 2026

Accepted: June 05, 2026

Published: July 10, 2026

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Corresponding Author: Maria Naz Shaheen

Email: maria.naz@jsmu.edu.pk

DOI:10.69837/pjammr.v4i2.136

How to Cite: Shaheen MN, Rasheed A, Raza SM, Kumari S, Shahid A,

Bashir S. Frequency of Myofascial Pain and Dysfunction Syndrome in

Dental Students and its Association with Stress: Original Article. Pak J Adv

Med Med Res.2026;4(2):127-130.

ABSTRACT

Objective: To determine the prevalence of Temporomandibular Pain Dysfunction Syndrome among dental students and assess its association with perceived stress, while evaluating differences according to age and gender.

Methods: This cross-sectional study was conducted at Jinnah Sindh Medical University, Karachi, over 3 months. We recruited 196 dental students from all academic years using non-probability convenience sampling. We collected data through a validated, self-administered questionnaire that included sociodemographic details, the Perceived Stress Questionnaire (PSQ), and clinical examination findings. We categorized stress severity as low, moderate, or high. TMPDS diagnosis required positive responses to >50% of self-assessment items plus at least two clinical signs. We performed statistical analyses in IBM SPSS Version 26 using chi-square tests, with $p \leq 0.05$ considered significant.

Results: Among 196 participants, 29 (14.8%) had TMPDS, with higher prevalence in females (85.2%) and students aged 21–24 years. TMPDS was significantly associated with gender ($p = 0.015$), age group ($p = 0.002$), and stress level ($p = 0.031$). Stress distribution was 44.9% low, 43.9% moderate, and 11.2% high, with TMPDS prevalence highest in the moderate stress group.

Conclusion: TMPDS is prevalent among dental students and significantly associated with stress, gender, and age. Early screening and stress management interventions may help reduce TMPDS risk in this population.

INTRODUCTION

Temporomandibular disorders (TMDs) are common musculoskeletal conditions that represent a significant public health concern due to their high prevalence and negative impact on daily functioning. Individuals with TMD may present with symptoms such as jaw pain, difficulty in mastication, joint sounds, facial pain, headaches, and restricted mandibular movement. Epidemiological evidence indicates that TMDs are more prevalent in women than men, with female-to-male ratios ranging from 2:1 to 8:1 (1-6). TMDs most frequently affect young and middle-aged adults, particularly those between 20 and 40 years of age. Although nearly one-third of the population reports at least one TMD-related symptom, only a small proportion (3.6–7%) seek professional care (7- 10). Clinically significant TMD is estimated to affect 5–12% of the population, while up to 25–30% experience mild or intermittent symptoms (11- 12). These figures underscore the importance of early recognition, especially in younger populations who may be at risk of developing chronic symptoms. Advancements in diagnostic approaches have improved standardized TMD assessment. The Diagnostic Criteria for Temporomandibular Disorders (DC/TMD), derived from the validated RDC/TMD instruments, offers a reliable framework for diagnosing common pain-related TMDs and demonstrates high sensitivity and specificity, along with strong inter-examiner reliability. However, despite improved diagnostic accuracy, understanding of etiological factors, particularly psychosocial contributors, remains incomplete. Traditionally regarded as a disorder affecting adults, TMD is increasingly reported among adolescents and young adults, a trend that has been attributed to heightened psychosocial stress and demanding academic environments (13–16). Stress is an important risk factor for TMD, influencing muscle activity, pain perception, and parafunctional habits. Dental students, in particular, are a vulnerable group because of the intense cognitive, psychomotor, and emotional demands of dental education. Although an association between stress and TMD has been documented, the precise mechanisms underlying this relationship remain unclear. Moreover, there is limited empirical evidence examining the frequency of myofascial pain dysfunction syndrome (MPDS), which is a common pain-related subtype of TMD among dental students, and its association with perceived stress. Addressing this gap is essential for early identification, prevention, and targeted interventions in this high-risk population.

Material and Methods

We conducted a cross-sectional study over three months, from May 2023 to July 2023, at the Sindh Institute of Oral Health Sciences, Jinnah Sindh Medical University (JSMU) (Ethical Approval: IRB of JSMU

(JSMU/IRB/2022/693), Karachi). Using the Open Epi calculator (version 3.01), the sample size was determined based on a 53.2% prevalence of TMD, with a 7% margin of error and a 95% confidence interval, yielding a required sample of 196 participants. We used a non-probability convenience sampling technique (17). Researchers approached dental students from all four years of the BDS program during clinical rotations and classroom sessions. We included only students who provided written informed consent and completed the full questionnaire. We excluded incomplete forms and non-consenting individuals. The sociodemographic section included biodata, age, gender, dental school year, residence, marital status, physical disability, self-evaluating questions, and clinical examination (17-19). The self-evaluating questions consisted of 12 questions to assess the frequency of myofascial pain (e.g., clicking sounds during mastication and mouth opening/closing), betel nut chewing, pain on opening and closing the mouth or at night, stress, etc. Answers were recorded as yes or no for present or absent, respectively. Students with 50% 'yes' were classified as diseased patients. The clinical examination consisted of 08 questions to assess abnormalities in the function of the muscles of mastication and mouth opening (e.g., tender pterygoid muscles, tender masseter, tender temporalis, clicking on opening and closure, etc.), designed in consultation with two Oral and maxillofacial surgeons. Mouth opening was assessed by BOLEY's gauge with a measurement (0- 40 mm) in which (0- 14 mm = (Nil), 15-29 = (Limited), 30- 40 mm = (Normal)), respectively. Lateral excursion restriction of the mandible was assessed as "yes" or "no" (present or absent). The second part included a 30-item PSQ score, developed to assess stressful life events and circumstances that tend to trigger or exacerbate disease symptoms. Stress significantly affects the quality and consistency of the sleep cycle. The PSQ, developed by Levenstein and colleagues, has been validated in populations of inpatients, outpatients, students, and health care workers, with a mean age of 31.8 ± 13.9 . The scale is recommended for clinical settings but has also been used in research studies; a psychometric evaluation found internal consistency ranging from 0.90 to 0.92 and test-retest reliability of 0.82 (17-19). Participants completed a self-evaluating questionnaire, and Cronbach's alpha was 0.6. Clinical examination was done with the help of oral surgeons, and the muscles of mastication were evaluated. Stress levels were categorized as low, moderate, and high based on cutoff values: 0-0.44 as low stress, 0.45-0.59 as moderate stress, and 0.60-1 as high stress (19-20).

Data analysis

Data were analyzed using IBM SPSS Version 26. We calculated frequencies and percentages for categorical variables. We assessed associations between TMPDS and sociodemographic variables or stress levels using the chi-square test. We considered $p \leq 0.05$ statistically significant.

Results

A total of 196 dental students participated in the study. The majority were females (167, 85.2%), while 29 (14.8%) were males. Regarding age, 103 (52.6%) participants were aged 21–24 years and 93 (47.4%) were aged 17–20 years. The distribution across academic years was relatively balanced, with 49 (25.0%) students from the first year, 44 (22.4%) from the second year, 50 (25.5%) from the third year, and 53 (27.0%) from the fourth year. Most participants belonged to the middle socioeconomic group (157, 80.1%), followed by the low (23, 11.7%) and upper (16, 8.2%) socioeconomic groups (Table 1).

Table 1. Frequency of sociodemographic characteristics of participants

Sociodemographic variable	Category	Frequency (n)	Percentage (%)
Gender	Male	29	14.8
	Female	167	85.2
Age (years)	17–20	93	47.4
	21–24	103	52.6
Dental school year	1st	49	25.0
	2nd	44	22.4
	3rd	50	25.5
	4th	53	27.0
Socioeconomic status	Low	23	11.7
	Middle	157	80.1
	Upper	16	8.2

Sociodemographic characteristics of dental students included in the study, including gender, age group, academic year, and socioeconomic status. Data are presented as frequencies and percentages.

Table 2. Association between stress level and TMPDS

Stress level	TMPDS No, n (%)	TMPDS Yes, n (%)	p-value
Low	79 (89.8)	9 (10.2)	0.031*
Moderate	67 (77.9)	19 (22.1)	
High	21 (95.5)	1 (4.5)	

Association between stress level and Temporomandibular Pain Dysfunction Syndrome (TMPDS) among dental students. Data are presented as frequencies and percentages. The association was assessed using the chi-square test; $p \leq 0.05$ was considered statistically significant.

Table 3. Association of TMPDS with sociodemographic variables

Sociodemographic variable	Category	TMPDS No, n (%)	TMPDS Yes, n (%)	p-value
Gender	Male	29 (100.0)	0 (0.0)	0.015*
	Female	138 (82.6)	29 (17.4)	
Age (years)	17–20	87 (93.5)	6 (6.5)	0.002*
	21–24	80 (77.7)	23 (22.3)	
Dental school year	1st	42 (85.7)	7 (14.3)	0.527
	2nd	40 (90.9)	4 (9.1)	

	3rd	40 (80.0)	10 (20.0)	
	4th	45 (84.9)	8 (15.1)	
Socioeconomic status	Low	19 (82.6)	4 (17.4)	0.428
	Middle	136 (86.6)	21 (13.4)	
	Upper	12 (75.0)	4 (25.0)	

Association between Temporomandibular Pain Dysfunction Syndrome (TMPDS) and sociodemographic characteristics of dental students, including gender, age group, academic year, and socioeconomic status. Data are presented as frequencies and percentages. The chi-square test was used; $p \leq 0.05$ was considered statistically significant.

Discussion

This study assessed the frequency of myofascial pain and dysfunction syndrome (TMPDS) and its association with perceived stress among dental students using the Perceived Stress Questionnaire (PSQ) and clinical examination. Temporomandibular disorders are increasingly recognized as a public health concern due to their high prevalence and multifactorial etiology (21-23). Although TMPDS has traditionally been considered an adult condition, emerging evidence indicates that adolescents and young adults are also significantly affected, likely due to increasing psychosocial stressors (24-25). In the present study, 196 participants, 29 (14.8%) had TMPDS, consistent with previous reports among student populations (25-27). Students with higher perceived stress were more likely to exhibit TMPDS, supporting stress as an important contributing factor. From a public health perspective, this association is particularly relevant for dental students, who routinely face academic, clinical, and performance-related stressors. TMPDS was significantly associated with age and gender ($p < 0.05$). The higher occurrence among younger students highlights early adulthood as a vulnerable period, coinciding with academic pressure and career-related stress (28). While many studies report a higher prevalence and severity of TMPDS in females, the present findings showed a higher frequency among males, possibly reflecting cultural, behavioral, or reporting differences (21-23, 29-30). Nevertheless, hormonal and neurobiological mechanisms, particularly estrogen-mediated modulation of pain perception, remain plausible explanations for the female predominance reported elsewhere (21). We found no significant associations between TMPDS and socioeconomic status, academic year, or place of residence, suggesting that psychosocial stressors may play a greater role than demographic variables in this population. Parafunctional habits such as bruxism, which are often stress-related, have been shown to contribute to microtrauma of the temporomandibular joint and may mediate this relationship (32). The limited concordance between self-reported symptoms and clinical findings indicates that neither approach alone is sufficient for diagnosis. Clinical examination appears to be more reliable, while self-report tools may be useful for initial screening rather than definitive diagnosis (33). This finding has translational relevance, emphasizing the need for standardized clinical screening protocols within student health services. Psychological factors such as anxiety and depression may exacerbate pain perception and increase vulnerability to stigma, further complicating TMPDS management (32). Notably, a proportion of students with low perceived stress still exhibited TMPDS, highlighting the limitations of self-reported stress measures and the multifactorial nature of the disorder. Future research incorporating objective stress biomarkers may provide more robust insights (33). The findings underscore the importance of integrating stress-management strategies and early screening for TMPDS within dental education programs. From a public health standpoint, preventive interventions targeting stress reduction may help mitigate TMPDS burden and improve students' well-being and academic performance. This study is limited by its

single-center design, relatively small and gender-imbalanced sample, and reliance on self-reported stress measures. Confounders such as anxiety and bruxism were not fully controlled. Larger, multicenter longitudinal studies are needed to clarify causal pathways and inform evidence-based preventive strategies for TMPDS among dental students.

Conclusion

This study demonstrates a significant association between TMPDS and stress levels among dental students, as well as age and gender. Clinical evaluation should be emphasized alongside self-reporting tools to ensure accurate diagnosis. Preventive and therapeutic interventions for stress may help manage TMPDS.

Ethical Approval

Ethical approval was obtained from the Institutional Review Board of Jinnah Sindh

Medical University, Karachi (Approval No. JSMU/IRB/2022/693).

Disclaimer: None.

Conflict of Interest: None.

Funding: None.

Authors' Contributions

Concept and Design of the Study: Dr. Maria Naz Shaheen¹, Dr. Abdur Rasheed².

Drafting of the Manuscript: Dr. Maria Naz Shaheen¹, Dr. Abdur Rasheed², Dr. Syed Moosa Raza³.

Data Collection: Dr. Sabhagi Kumari⁴, Dr. Asma Shahid⁵, Dr. Sharjeel Bashir⁶.

Critical Review and Supervision: Dr. Abdur Rasheed².

Final Approval of the Version to be Published: All authors approved the final version of the manuscript.

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