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ORIGINAL ARTICLE

Frequency of Temporomandibular Joint Disorder among Medical Students in Balochistan

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ABSTRACT

Background: Temporomandibular disorders (TMDs) are a serious health issue among university students, especially in challenging study programs. Nonetheless, there is limited information regarding the prevalence of TMDs among dental and medical students in Balochistan.

Methodology: The cross-sectional study evaluated 376 dental and medical students with Fonseca's Anamnestic Index. Data collection was conducted via a validated two-part questionnaire delivered via Google Forms. The first section examined possible risk factors such as age, gender, department of study, year of study, number of study hours per day and sleeping hours. The second section included Fonseca's Anamnestic Index, a 10-item test with known reliability (Cronbach's α=0.82) for screening TMD, which categorizes cases as no TMD (0-15 points), mild (20-40 points), moderate (45-65 points), or severe (70-100 points). SPSS version 21 was used to analyze statistical significance.

Results: The prevalence of TMD was found to be 57.98% overall, with 26.86% mild, 20.48% moderate, and 10.64% severe. The most frequent symptoms were jaw mobility problems (22.6%), bruxism (22.9%), and headache (22.1%). Severe TMD cases had significantly longer study times (5.18±1.4 vs 3.89±1.2 hours/day, p<0.001) and shorter sleep time (7.55±1.4 vs 10.61±1.8 hours/night, p<0.001). Prevalence rose with academic year, being highest in fourth-year students (38.5%, p<0.001), with no significant gender (p=0.098) or field-of-study differences (p=0.212).

Conclusion: The very high prevalence of TMD among Balochistan's medical and dental students indicates strong associations with academic workload and sleep deprivation. These results emphasize the necessity for institutional interventions in stress management and sleep hygiene in health professions education.

Keywords: Temporomandibular disorders, academic stress, bruxism, medical students, dental students

INTRODUCTION

Temporomandibular joint disorders (TMDs) are a heterogeneous group of musculoskeletal disorders involving the reciprocal articulating surface of the jaw joint and the masticatory muscles of the jaws and face.[1,2] It is often characterized by facial and jaw pain, limited movement, and noise in the joint.[3] These conditions are especially common in young adults living through high-pressure situations like their first versus clinical medical years.[4,5] Prolonged hours spent studying dental and medical curricula, alongside with clinical responsibilities and sleep-deprivation, can lead to the development of parafunctional habits such as bruxism, a recognised risk factor to the development of TMDs.[6,7] In Balochistan, healthcare education transpires in an under-resourced context wherein academic rigor is substantial, thus, knowledge about the prevalence of TMD becomes instrumental to the formulation of focused interventions premised on the protection of both student health as well as academic achievement.

Current literature reveals high concern regarding TMD prevalence among student groups. Kumar et al. (2022) identified 34.8% of Indian dental students presented with TMD symptoms, and they were highly correlated with anxiety and depression (p<0.01).[8] Larkin et al. also reported 41.2% prevalence among U.S. dental students and instructors, observing clinical students reported significantly higher percentages compared to pre-clinical colleagues (p=0.003).[9] Notably, Minervini et al.'s (2025) systematic review confirmed even greater TMD prevalence (52.7%) among patients with multiple sclerosis, with neurological elements potentially amplifying TMD pathophysiology.[10] Although these studies confirm that TMD is an international health problem within educational environments, they mostly focus on either dental populations or specific populations, with medical students remaining under researched. Moreover, no research has explored this problem in Balochistan's specific academic climate.

In spite of increasing awareness of TMD as a scholarly health issue, substantial gaps exist in its prevalence among combined medical and dental student groups in resource-poor areas. Balochistan's unique educational issues - such as limited mental health resources and large student-faculty ratios - may uniquely affect TMD development. This research will establish TMD prevalence among Balochistan's medical and dental students and assess related factors such as academic tension levels, sleeping habits, and parafunctions. Baseline information for institution-specific wellness programs will be provided, and future studies on TMD prevention in similar educational environments will be informed.

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METHODOLOGY

This cross-sectional study was conducted in Balochistan Medical College (BMC), Quetta during November 2022-February 2023 and the ethical approval was obtained from the ethical review board (ERB) of BMC, Quetta.

Inclusion criteria: 18–30 years old, currently registered as a medical or dental student in a recognized institution in Balochistan, providing willingness to participate and signed informed consent with no history of TMJ surgery, fractures, or major dental procedures in the past 6 months.

Exclusion criteria: Medical or dental students with any systemic conditions, psychiatric disorders, or those who did not provide informed consent were excluded from the study.

The sample size for this study was calculated using the standard formula for prevalence studies, considering a 95% confidence level and a 5% margin of error. The estimated prevalence of temporomandibular joint disorder (TMD) among students in Pakistan was taken as 60%, based on a previous study conducted by Khan et al., which reported a TMD prevalence of 60% among university students in Pakistan. Using the formula:

$$x = \frac{Z^2 \text{ x } p \text{ x } (1 - p)}{d^2}$$

where Z=1.96 for 95% confidence, p=0.60 (prevalence), and d=0.05, the calculated sample size was 369 participants. Thus, a

minimum of 369 medical students were required to be included in the study to ensure adequate power and precision of results.

An 88-item self-administered questionnaire was completed by all agreeing participants. Prior to commencing the study, all participants were informed in detail about the purpose of the study, and assured that the data collected would be kept confidential and the research participants would remain anonymous. Informed consent was obtained from all participants. A total of 387 dental school students participated in this study from the first to the get of academics. The questionnaires were distributed electronically via email to all students both in medical and dental fields within the medical and dental colleges. The questionnaire included two essential parts: First part consisted of demographic details including age, gender, field of study, year of study, study hours per day and sleep hours.

The second part included the Fonseca questionnaire, consisting of 10 questions, dealing with the occurrence of tenderness/pain at the level of the temporomandibular joint (TMJ), back, head and mastication, parafunctional habits, limiting/hindering movement of the jaw, joint crepitation, perception of malocclusion and emotional stress. The participants were asked to respond to these 10 questions with “yes,” “no” or “sometimes,” opting for only one of the options as their answer. Answers were valued 10, 5 and 0 for the responses “yes”, “sometimes” and “no” respectively. The values of all 10 answers were grouped sum and evaluated against the ranking- taking in to consider the criteria from the table.

All the data recorded was analyzed by using Statistical Package for Social Sciences (SPSS) version 21 by IBM. Descriptive statistics including mean, standard deviations, frequencies and percentages were calculated and normality of the data was assessed using Shapiro-Wilk test. Chi-square statistic was calculated for categorical variables and Kruskal-Wallis test for quantitative variables. P value at 0.05 was considered statistically significant.

Total Score	TMD Class
Total between 0 and 15	No
Total between 20 and 40	Mild
Total between 45 and 65	Moderate
Total between 70 and 100	Severe

RESULTS

A total of 376 completed questionnaires from medical and dental students were included in the study. The mean age of the participants was 24.44 ± 2.4 and included 211 (56.12%) males and 165 (43.88%) females. 187 (49.73%) belonged to medical field and 189 (50.27%) belonged to dental field. 48 (12.77%) students were in their first year, 103 (27.39%) were in second year, 119 (31.65%) were in their third year, 78 (20.74%) were in their fourth year and 28 (7.45%) were in their fifth year of study program. The mean study hours were 4.29 ± 1.4 and the mean sleep hours were 9.75 ± 1.9 hours. Table I highlights the responses of the students to the Fonseca’s questionnaire. Table II. Age, study time, and sleep time distribution across TMD severity levels with significant association with study time ($p<0.001$) and sleep loss ($p < 0.001$) but not with age ($p = 0.319$). Table III. Demographic features related to TMD status, indicating significant association with year at university ($p<0.001$) but no significant association with gender ($p = 0.098$) or field of study ($p=0.212$).

Table I. Responses of participants to the Fonseca’s questionnaire.

Questions	Yes	Sometimes	No
	N (%)	N (%)	N (%)
1. Is it hard for you to open your mouth?	85 (22.61)	53 (14.10)	238 (63.29)
2. Is it hard for you to move your mandible to different sides?	71 (18.88)	93 (24.73)	212 (56.38)
3. Do you experience muscular pain while chewing?	42 (11.17)	68 (18.09)	266 (70.74)
4. Do you experience headaches frequently?	83 (22.07)	74 (19.68)	219 (58.24)
5. Do you have stiff neck or pain on the nape?	45 (11.97)	83 (22.07)	248 (65.96)
6. Do you have pain in craniomandibular joints or earaches?	60 (15.96)	141 (37.5)	175 (46.54)
7. When opening your mouth or while chewing, do you feel any TMJ clicking?	40 (10.64)	68 (18.09)	68 (18.09)
8. Do you grind or clench your teeth?	86 (22.87)	132 (35.11)	158 (42.02)
9. Do you think your teeth do not articulate well?	70 (18.62)	212 (56.38)	94 (25)
10. Do you get nervous quite often?	77 (20.48)	26 (6.91)	273 (72.61)

Figure 1. TMD prevalence among the participants

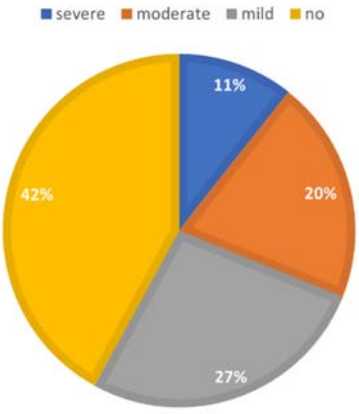

Table II. Association of TMD status with age, study hours and sleep hours among the studied student population (N = 376).

Variables	TMD status				p – value*
	No Mean ± SD	Mild Mean ± SD	Moderate Mean ± SD	Severe Mean ± SD	
Age	24.56 ± 2.4	24.29 ± 2.3	24.31 ± 2.4	24.6 ± 2.6	.319
Study hours	3.89 ± 1.2	4.15 ± 1.3	4.87 ± 1.4	5.18 ± 1.4	< .001
Sleep hours	10.61 ± 1.8	10.24 ± 1.8	8.49 ± 1.1	7.55 ± 1.4	< .001

* Kruskal-Wallis test

Table III. Association of TMD status with gender, field of study and year of study among the studied student population (N = 376).

Variables	TMD status				p – value*
	No n (%)	Mild n (%)	Moderate n (%)	Severe n (%)	
Gender					
Male	97 (25.79%)	57 (15.16%)	34 (9.04%)	23 (6.12%)	.098
Female	61 (16.22%)	44 (11.70%)	43 (11.44%)	17 (4.52%)	
Field of study					
Medical	78 (20.74%)	48 (12.77%)	35 (9.31%)	26 (6.92%)	.212
Dental	80 (21.28%)	53 (14.09%)	42 (11.17%)	14 (3.72%)	
Year of study					
1st year	28 (7.45%)	13 (3.46%)	4 (1.06%)	3 (0.79%)	< .001
2nd year	51 (13.56%)	40 (10.64%)	9 (2.39%)	3 (0.79%)	
3rd year	59 (15.69%)	27 (7.18%)	29 (7.71%)	4 (1.06%)	
4th year	14 (3.72%)	13 (3.46%)	31 (8.24%)	20 (5.32%)	
5th year	6 (1.59%)	8 (2.13%)	4 (1.06%)	10 (2.66%)	

* Chi-square test statistic

DISCUSSION

The current research evaluated the prevalence of temporomandibular disorders (TMD) among dental and medical students and found that a considerable percentage presented with TMD-related symptoms such as jaw pain (22.61%), headache (22.07%), and bruxism (22.87%). Increased study hours and less sleep time were highly correlated with greater severity of TMD, and academic year advancement also had a significant correlation with TMD prevalence.

The results concur with current literature, which emphasizes the increasing prevalence of TMD in students in high-stress learning environments. A higher rate of TMD symptoms was reported in our study in comparison with Alharbi et al., who found an overall TMD prevalence of 18.7% among the participants.[11] This disparity could be explained by differences in evaluation instruments (Fonseca's questionnaire versus RDC/TMD criteria) or by differences between regions in stress levels of academia. In both studies, there were no statistically significant gender differences in the prevalence of TMD (p=0.098 in our study versus p=0.213 in Alharbi et al.), refuting the prevalent notion of female dominance in TMD. Bruxism is present in ~40% of TMD cases and is strongly linked to stress and sleep disorders.[12] Prevalence of major TMD symptoms found in this study is in accordance with various other studies, with the strongest concordance in headaches (22.1% in this study vs. 19.8% in Wu et al.) and restriction in jaw mobility (22.6% vs. 18.9%),[13] implying these are the universal manifestations of TMD for health professions students. Our results indicated a 22.9% prevalence of bruxism and 22.1% frequency of headache, which are in line with Emodi-Perlman et al. (2020), who noted a 32% rise in TMD symptoms and a 40% increase in bruxism in Poland and Israel.[14] Srivastava et al. found higher prevalence according to DC/TMD criteria, i.e., 34.5% for disorders of the muscles, 12.4% for disc displacement, 7.8% for joint pain.[15] Lack of gender-associated significant differences as found in the present study is also at odds with the observed female predominance (79% female patients) and significant gender differences in presentation of TMD (p<0.001) reported in Bagis et al.'s (2012) clinical trial. [16]

As for academic variables, our results strongly support the findings of Nazir et al. of augmented TMD frequency with academic advancement. Our study identified statistically significant increases in severity of TMD with advancing study years (p<0.001), similar to that reported by Nazir of 42.1% TMD prevalence in final-year students compared with 31.2% for first-years.[17]

Our study's comparison of TMD prevalence between medical (49.7%) and dental (50.3%) students showed no statistically significant difference in TMD occurrence between the two groups (p=0.212). This result is contrary to the general trends observed in Alrizqi and Aleissa's (2023) systematic review of 27 studies published between 2015 and 2021, who reported that dental students had higher TMD prevalence (range: 28-47%) than medical students (range: 15-32%) in international studies.[18]

Subsequent studies should investigate longitudinal trends in prevalence of TMD among students, using objective assessments such as polysomnography for assessing sleep and clinical examinations to confirm self-reported symptoms. Intervential studies comparing stress-reduction programs or ergonomic modifications in study settings might also yield practical recommendations. This research adds to the literature by measuring the effect of academic stressors on TMD in a student population, identifying modifiable risk factors like sleep deprivation and extended study hours. Through these associations, our findings support targeted health promotion interventions in schools to enhance students' musculoskeletal and general well-being.

CONCLUSION

In conclusion, this research demonstrates a high rate of TMD symptoms in medical and dental students, associated significantly with longer study hours, less sleep, and higher academic years. These results reiterate the necessity for academic institutions to institute interventions that enhance balanced study schedules and sufficient sleep to help reduce TMD risk. Future studies should emphasize intervention measures to reduce such stress-related conditions in student populations.

REFERENCES

1. Al Hayek SO, Al-Thunayan MF, AlGhaihab AM, AlReshaid RM, Omair A. Assessing stress associated with temporomandibular joint disorder through Fonseca's anamnestic index among the Saudi physicians. Clin Exp Dent Res. 2018 Dec;5(1):52-8. DOI: 10.1002/cre2.157. PubMed PMID: 30847233; PubMed Central PMCID: PMC6392863.
2. De La Torre Canales G, Câmara-Souza MB, Muñoz Lora VRM, Guarda-Nardini L, Conti PCR, Rodrigues Garcia RM, et al. Prevalence of psychosocial impairment in temporomandibular disorder patients: A systematic review. J Oral Rehabil. 2018 Nov;45(11):881-889. doi: 10.1111/joor.12685. Epub 2018 Jul 17. PMID: 29972707.
3. Al Moaleem MM, Okshah AS, Al-Shahrani AA, Alshadidi AA, Shaabi FI, Mobark AH, Mattoo KA. Prevalence and severity of temporomandibular disorders among undergraduate medical students in association with khat chewing. J Contemp Dent Pract. 2017 Jan;18(1):23-8. DOI: 10.5005/jp-journals-10024-1982. PubMed PMID: 28050980.
4. Alfawzan AA. An assessment of the prevalence and severity of temporomandibular disorders among undergraduate dental students at Qassim University. World J Dent. 2020 Apr;11(2):134-8. DOI: 10.5005/jp-journals-10015-1715.
5. Zheng H, Liu Z, Wang H. Research progress in effect of chewing-side preference on temporomandibular joint and its relationship with temporomandibular disorders. Zhejiang Da Xue Xue Bao Yi Xue Ban. 2023 Jun;52(3):386-97. Chinese, English. DOI: 10.3724/zdxbyxb-2023-0066. PubMed PMID: 37476950; PubMed Central PMCID: PMC10409910.
6. 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 Face Med. 2020 Sep;16(1):19. DOI: 10.1186/s13005-020-00234-2. PubMed PMID: 32887633; PubMed Central PMCID: PMC7650519.
7. Gotler M, Oren L, Spierer S, Yarom N, Ashkenazi M. The impact of COVID-19 lockdown on maintenance of children's dental health: A questionnaire-based survey. J Am Dent Assoc. 2022 May;153(5):440-9. DOI: 10.1016/j.adaj.2021.10.004. PubMed PMID: 35221097; PubMed Central PMCID: PMC8523489.
8. Kumar LS, Naik Z, Panwar A, Sridhar M, Bagewadi A. Prevalence of temporomandibular disorders and their correlation with gender, anxiety, and depression in dental students: A cross-sectional study. J Indian Acad Oral Med Radiol. 2022 Jul-Sep;34(3):281-5. DOI: 10.4103/jiaomr.jiaomr_65_22.
9. 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 Odontol Scand. 2018 Aug;76(6):387-393. doi: 10.1080/00016357.2018.1440322.
10. Carvalho LSC, Nascimento OJM, Rodrigues LLFR, Matta APDC. Relationship between Expanded Disability Status Scale scores and the presence of temporomandibular disorders in patients with multiple sclerosis. Eur J Dent. 2018 Jan-Mar;12(1):144-148. doi: 10.4103/ejd.ejd_91_17.
11. Rani S, Pawah S, Gola S, Bakshi M. Analysis of Helkimo index for temporomandibular disorder diagnosis in the dental students of Faridabad city: A cross-sectional study. J Indian Prosthodont Soc. 2017 Jan-Mar;17(1):48-52. doi: 10.4103/0972-4052.194941.
12. Häggman-Henrikson B, Ali DA, Mustafa, Chrcanovic BR. Bruxism and dental implants: a systematic review and meta-analysis. J Oral Rehabil. 2023 [Epub ahead of print]. DOI: 10.1111/joor.13567.
13. Wu J, Huang Z, Chen Y, Chen Y, Pan Z, Gu Y. Temporomandibular disorders among medical students in China: prevalence, biological and psychological risk factors. BMC Oral Health. 2021;21(1):549. DOI: 10.1186/s12903-021-01916-2.
14. Emodi-Perlman A, Eli I, Smardz J, Uziel N, Wieckiewicz G, Gilon E, et al. Temporomandibular disorders and bruxism outbreak as a possible factor of orofacial pain worsening during the COVID-19 pandemic-concomitant research in two countries. J Clin Med. 2020 Oct;9(10):3250. DOI: 10.3390/jcm9103250.
15. Srivastava KC, Shrivastava D, Khan ZA, Nagarajappa AK, Mousa MA, Hamza MO, et al. Evaluation of temporomandibular disorders among dental students of Saudi Arabia using Diagnostic Criteria for Temporomandibular Disorders (DC/TMD): a cross-sectional study. BMC Oral Health. 2021 Apr;21(1):211. DOI: 10.1186/s12903-021-01578-0. PubMed PMID: 33902543; PubMed Central PMCID: PMC8077893.
16. Bagis B, Ayaz EA, Turgut S, Durkan R, Özcan M. Gender difference in prevalence of signs and symptoms of temporomandibular joint disorders: a retrospective study on 243 consecutive patients. Int J Med Sci. 2012;9(7):539-44. DOI: 10.7150/ijms.4474. PubMed PMID: 22991492; PubMed Central PMCID: PMC3444974.
17. Nazir MA, Izhar F, Hassan S, Tanvir M, Nemat F, Ashraf MW, et al. Temporomandibular disorders among dental students in Pakistan: assessment of prevalence, severity, and associated factors based on questionnaire. Scientifica (Cairo). 2023 Jul;2023:8895544. DOI: 10.1155/2023/8895544. PubMed PMID: 37497127; PubMed Central PMCID: PMC10368500.
18. Alrizqi AH, Aleissa BM. Prevalence of temporomandibular disorders between 2015-2021: a literature review. Cureus. 2023 Apr;15(4):e37028. DOI: 10.7759/cureus.37028. PubMed PMID: 37143640; PubMed Central PMCID: PMC10152905.

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