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Prevalence of Temporomandibular Disorders and Their Association with Stress Among Healthcare Students at Taibah University

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Aim: This study aimed to assess the prevalence of TMDs and the degree of stress experienced by these students.
Materials and Methods: A cross-sectional analytical study was conducted on 281 health college students at Taibah University. Data were collected using Google Forms questionnaires to assess students' stress levels, stressors, and the prevalence and severity of TMDs. Statistical analysis was performed using SPSS.
Results: The highest prevalence of mild TMDs was among first-year students (58.3%), decreasing. Severe TMD were rare, with the highest occurrence in the sixth year (2.5%). Pharmacy students had the highest prevalence of mild TMDs (46.2%), while dental students had the highest prevalence of moderate TMDs (15.5%). Females were significantly more affected by mild to moderate TMDs than males (P=0.002). The association between stress levels and TMD severity across study variables was insignificant (P≥0.05).
Conclusion: Although there was no significant association between stress levels and the severity of TMD symptoms across the research variables including college type, and college level; however students studying dentistry are most likely to experience moderate TMDs (15.5%), which may be related to the ergonomic and physical demands of dental school. Although severe TMDs are uncommon, nursing students have the greatest rate of severe TMDs (4.3%).

Keywords: TMD, stress, Medical health care, Students, Dental.

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Introduction

Temporomandibular disorders (TMDs) is a condition encompassing various issues within the joint, temple, and masticatory system. Its impact goes beyond physical symptoms, such as limitation or restricted mouth movement, clicking heard during function, as many individuals with TMDs also experience headaches and stress[1,2] At some point in their lives, 60–70% of the general population exhibits at least one symptom of this condition, yet only 5% of them diligently look for therapy.[3] There is a strong correlations between TMDs and characteristics including gender, poor sleep, anxiety, depression, oral parafunction, somatization, and physical characteristics. Those factors supporting the biopsychosocial theory of the disorder. [4]

Understanding the association between stress and TMDs is crucial to addressing the psychosocial factors contributing to this condition. Wiackiewicz et al. grant screening tests using the Patient Health Questionnaire-9, Perceived Stress Scale-10, and Generalized Anxiety Disorder-7, claiming that Polish patients with TMDs had elevated levels of anxiety, sadness, perceived stress, and pain intensity. [5]

The intricate relationship between stress, burnout, headaches, and temporomandibular disorders (TMDs) or periodontitis is particularly relevant in health college settings, where students often experience elevated stress levels due to academic pressures and other factors. Early identification of potential etiological factors for TMDs is crucial to prevent a decline in patient outcomes, including increased pain, psychological distress, limited jaw movement, and physical impairment. Medical health field students', in particular, are highly susceptible to stress due to the rigorous demands of their academic programs. [6,7]

An investigation was carried out at a dental school in Riyadh, Saudi Arabia, to determine the prevalence and possible risk factors of TMDs among dental students of various academic levels conclude that 62.8% of female students were suffering from TMDs.[8] Moreover, in 2021, Srivastava et al. was found that dental students were more likely to acquire TMDs, particularly those enrolled in clinical programs. The study also highlighted the relationship between TMDs and demographic, psychological, and academic characteristics, emphasizing the part anxiety and parafunctional behaviors play in TMD development. The findings highlight the need for strategies like academic counseling and objective evaluation with rubrics to alter the training, curriculum, and assessment practices given to dentistry students. [9]

Furthermore, TMDs' complex nature implies that they are not just a medical condition but are also closely related to psychological health. This emphasizes the need of integrated approaches that consider the psychological as well as the physical aspects of TMDs, particularly in educational environments where stress levels are high.[10] Overall, the data in these sources illustrates the significance of identifying and treating the high incidence of temporomandibular disorders among college students, especially those enrolled in dental programs, and the necessity of entire strategies that take into account the interactions among TMD, stress, and psychological health.

Our study assess the prevalence of TMDs among the students of health colleges at Taibah University in 2022-2023 and focus on the association between the TMD and stress.

Further researches are required to look at the particular challenges faced by these students and develop problem solving

strategies that can reduce their risk of TMDs and improve their overall health. By shedding light on the intricate interaction between TMDs, stress, and psychological well-being among Health Colleges' students in their clinical years, this study will contribute to the body of existing research.

Material and Methods

Study design and sample

The present study type was cross-sectional survey designed to assess the prevalence of stress association TMDs among study population which included sample of enrolled undergraduate students' of health care colleges at Taibah university during the academic years of 2023-2024. The study was approved by Taibah University's ethical committee with approval number (TUCDREC/020323/YAyed), and all participants provided an informed consent before enrolling in the study. A stratified random sample size were applied to ensure representation across different academic years from all health care colleges at Taibah University main campus.

Inclusion and exclusion criteria

Inclusion criteria involved student's age range from 18-30 years. Students who have been part of the undergraduate curriculum from preclinical and clinical years. All participants signed an informed consent before participation to the study. Exclusion criteria involved students who have been diagnosed with other psychological disorders. Students from non-health colleges at Taibah University. Students with TMDs due to trauma or accidents.

Study tools and data collection

The questionnaires were sent out and distributed via google forms to the students. Consisting of 3 parts: demographical data, Fonseca Anamnestic index (FAI) and Perceived Stress Scale (PSS). The validated FAI was used to evaluate TMDs consists of 10 yes/no questions who addresses common TMDs related symptoms were used in English and Arabic translation to ensure the understanding of the participants.[11,12] Scores divide participants into four categories related to the severity: mild TMDs (20–45), moderate TMDs (50–65), severe TMDs (70–100), and no TMDs (0–15). A standardized validated stress scale PSS with 10 questions version was used in English and Arabic version to assess stress levels. [13, 14]

Data Analysis

Data collected were analyzed through Excel sheet and SPSS (the statistical package for social sciences software (SPSS)). Descriptive data summarized the participant's demographics data and prevalence of stress and TMDs symptoms. Chi-square was used for analysis of any correlation between categorical TMDs severity degree and stress level. Statistical significance was defined as a p-value of less than 0.05.

Results

After distributing the questionnaire to students in colleges of medicine, dentistry, pharmacy and nursing ranging from first to sixth academic years, a total of 281 participations have been filled the forms. Out of the 281 participants in the study, 150 (53.38%) were male and 131 (46.62%) were female (Fig. 1).

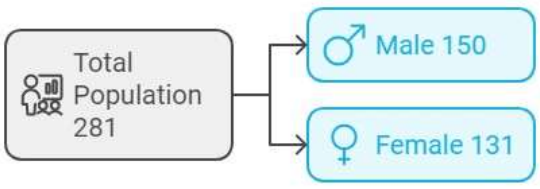

Figure 1: Gender distribution of the study population.

Females were significantly more affected by mild and moderate TMDs than males (P=0.002). Males were more likely to have no TMDs than females (Table 1).

Table 1: Different TMDs distribution statistics among different gender

TMDs groups	frequency	Gender		Total	P value
	%	Female	Male		
No TMD	frequency	53	93	146	0.002*
	%	18.9%	33.1%	52.0%	
Mild TMD	frequency	64	51	115	
	%	22.8%	18.1%	40.9%	
Moderate TMD	frequency	12	4	16	
	%	4.3%	1.4%	5.7%	
Sever TMD	frequency	2	2	4	
	%	.7%	.7%	1.4%	

* Statistical significance at p-value <0.05.

The majority of students who report no TMDs (146 out of 281, or 51.96%) have the lowest stress levels. Severe TMDs is rare, as evidenced by the fact that only 1.42% of students have severe TMDs, compared to 35.94% with mild TMDs and 10.68% with moderate TMDs.

The highest mean stress levels (21.76) are found in students with mild TMD, indicating that stress may play a role in the development of TMDs. Although they are marginally lower than those with mild TMDs, the mean stress levels for moderate (21.27) and severe TMDs (21.50) are similarly higher than those without TMDs. Although the relationship is not linear, there is a positive correlation between the prevalence of TMDs and greater stress levels. While students with severe TMDs exhibit somewhat lower mean stress, maybe as a result of adaptive mechanisms or a smaller sample size (there are only four students in the severe group), students with mild TMDs report the highest levels of stress (Fig. 2).

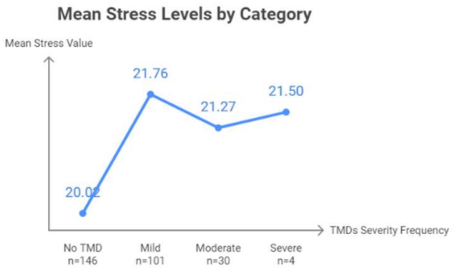

Figure 2: The relationship between stress levels (measured as "Mean Stress") and the severity of temporomandibular disorders TMDs.

The frequency and severity of temporomandibular disorders (TMDs) among students across several academic years are displayed in Table 2. The prevalence of mild TMDs is highest in the first year (58.3%), then decreases in the fourth year (27.9%). Moderate TMDs is rather stable, however it peaks in the second year (18%) and drops significantly in the fifth year (3.7%). Severe cases are uncommon, with the highest occurrence in the sixth year (2.5%).

Table 2: The frequency and severity of temporomandibular disorders (TMDs) among students across several academic years.

Academic year	No TMD	Mild	Moderate	Severe	Total	P-Value
1st Year	33.3%	58.3%	16.6%	0%	21 Students	0.201*
2nd Year	48%	32%	18%	2%	50 Students	
3rd Year	45.16%	45.16%	9.6%	0%	31 Students	
4th Year	59.3%	27.9%	11.6%	1.1%	86 Students	
5th Year	54.7%	39.6%	3.7%	1.8%	53 Students	
6th Year	52.5%	35%	10%	2.5%	40 Students	

* Statistical significance at p-value <0.05.

Table 3 showed the prevalence and severity of TMDs among students across various healthcare disciplines. Pharmacy students (46.2%) are the most likely to have mild TMDs, followed by students studying medicine (36.3%), dentistry (33.7%), and nursing (28.98%). Students studying dentistry are most likely to

experience moderate TMDs (15.5%), which may be related to the ergonomic and physical demands of dental school. Students studying pharmacy exhibit the least amount of moderate TMDs (5.97%).

Table 3: The prevalence and severity of TMDs among students across various healthcare disciplines.

Health care disciplines	No TMD	Mild	Moderate	Severe	Total	p- Value
Dentistry	49.3%	33.7%	15.5%	1.29%	77 Students	0.601*
Medicine	53%	36.3%	10.6%	0%	66 Students	
Nursing	56.5%	28.98%	10.14%	4.3%	69 Students	
Pharmacy	47.76%	46.2%	5.97%	0%	67 Students	
Medical Rehabilitation	100%	0	0	0	2 Students	

* Statistical significance at p-value <0.05.

Although it is uncommon, nursing students have the greatest rate of severe TMDs (4.3%), most likely as a result of lengthy shifts and physically taxing job. There have been no reports of severe cases among students studying medicine or pharmacy.

There was no significant association between stress levels and the severity of TMD symptoms across the research variables including college type, and college level as P-value was > 0.05 (Table 4).

Table 4: the association between stress levels and the severity of TMD symptoms across the research variables

TMD groups	Frequency %	Stress Score 1	2	3	Total	P-Value
No TMD	Frequency	1	143	2	146	0.655*
	%	.4%	50.9%	.7%	52.0%	
Mild TMD	Frequency	0	112	3	115	
	%	.0%	39.9%	1.1%	40.9%	
Moderate TMD	Frequency	0	16	0	16	
	%	.0%	5.7%	.0%	5.7%	
Sever TMD	Frequency	0	4	0	4	
	%	.0%	1.4%	.0%	1.4%	
Total	Frequency	1	275	5	281	
	%	.4%	97.9%	1.8%	100.0%	

* Statistical significance at p-value <0.05.

Discussion

This study provides valuable insights into the prevalence, severity, and potential contributors to temporomandibular disorders (TMDs) among healthcare students from various disciplines.

In Al-Madinah population, 61% are suffering from TMD with varying severity as mentioned in the previous study.[15] Our study was exploring the relation between stress and TMDs among health college's students at Taibah University those are clustered from Al-Madinah population as the stress is the one of the psychological factors that initiate the TMD.

The correlation between stress and TMD is insignificant in our study which concise with a study done on dental students only.[16] Students with mild TMDs exhibit the highest mean stress levels (21.76), suggesting a strong link between mild TMD development and stress. Interestingly, severe TMDs are associated with slightly lower stress levels (21.50), which may be attributed to adaptive mechanisms or the small sample size in this group (n = 4). On the other hand, McNeil et al. and Aranha et al. concluded that a significant correlation between TMD and stress. [17,18] While the relationship

between stress and TMDs is not strictly linear, the positive correlation highlights the need for stress management interventions.

Although the overall TMD index did not significantly differ by gender, females were notably more affected by mild and moderate TMDs than males (p = 0.002) which coincide with result of studies done by Tsai et al. and Helmy et al. those conclude that females have high prevalence of TMD than males.[19,20] This is due to the hormonal and emotional changes that occur periodically. Thus, a precise psychological intervention program must be considered. The sever cases of the TMD is rarely present in our cases. Similar result in the study done in Riyadh however, this study is done on male only. [21]

The modification of PSS-14 to PSS-10's simplify the survey and allow inclusion of other measures, which is not always possible with long tests. Therefore, the decision to choose this survey is due to its applicability. In addition, presence and validity of Arabic version of PSS to allow the students with English language difficulty to understand the survey. [14,22]

Pharmacy college students have high prevalence of mild TMD as they often faced rigorous academic workloads which increase the stress that induce the TMD. [23] In comparison to nursing students who have the lowest prevalence of mild TMD referred to engagement in more practical training and physical activity, which could act as a buffer against stress-induced conditions like TMDs. Severe TMDs, though rare, were reported predominantly by nursing students as well (4.3%), possibly reflecting the physical and emotional toll of clinical rotations and long shifts.

The variation in TMD prevalence across academic years reveals interesting trends. Mild TMDs are most prevalent among first-year students (58.3%) and decrease in later years, possibly due to initial stress during the transition to professional education. Moderate TMDs, on the other hand, peak in the second year (18%) before declining significantly in the fifth year (3.7%). The rarity of severe TMDs, with the highest occurrence in the sixth year (2.5%), suggests that cumulative academic demands and prolonged physical strain could contribute to these cases. This require enhance awareness of the teacher and the education staff to clarify this issue and reduce its occurrence.[24] Moreover, the presence of health specialties as physician, dentist and psychologist helps in early diagnosing this problem and immediate integration to manage it.

Limitation

The number of students participating is still low that may affect the result of the study. In addition, clinical and radiological examination must be provided to ensure the result in self-reporting survey. Moreover, laboratory investigation for the stress marker will play a role to ensure the correlation of the result. [25]

Conclusion

This study highlights the multifactorial nature of temporomandibular disorders (TMDs) among healthcare students, emphasizing the roles of academic stress, gender, and professional demands. While mild TMDs are the most common, severe cases remain rare. Females are more likely to experience mild and moderate TMDs than males, and stress levels are positively correlated with TMD prevalence, particularly in students with mild symptoms. College-specific differences suggest that the unique challenges faced by students in various disciplines, such as the physical demands of dentistry or the high

stress levels in pharmacy, contribute to these trends.

The findings underscore the importance of stress management programs, ergonomic training, and mental health support within academic institutions. Addressing these factors proactively can reduce the prevalence and impact of TMDs, enhancing the overall well-being and academic success of healthcare students. Future research should explore additional factors contributing to TMDs and implement longitudinal studies to assess long-term outcomes.

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Data availability

The data of this study is available from the corresponding author upon request.

Ethics approval and consent to participate

The study was approved by Taibah University's ethical committee with approval number (TUCDREC/020323/YAyed), and all participants provided an informed consent before enrolling in the study.

Competing interests

The author declares that there no conflict of interest and the article was not funded or supported by any research grant.

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