

Prevalence of Risk Factors & Etiology of Temporomandibular Joint Disorder Symptoms among Dental Students: A Survey - Based Study.

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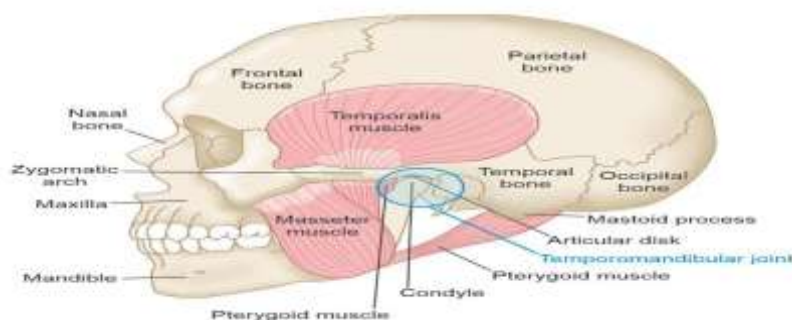
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ABSTRACT

- **Objective:** The aim of this study is to examine the relevance and evaluate the prevalence between TMD signs and symptoms, its correlation with gender, parafunctional habits, stress and its impact on oral health related quality of life among dental undergraduates along with assessing the level of awareness and self recognition of TMD symptoms.
- **Methods:** A survey based study was conducted among dental undergraduates. The study included around 310 students . The mean age group was 18 to 25.
- **Results:** The findings from this study showed males exhibiting higher prevalence of risk factors such as malocclusion, parafunctional habits, stress and trauma while females reported more symptomatic complaints.
- **Conclusion:** Overall, the study highlights the interplay of behavioural, psychological and mechanical factors in the development of TMDs. While females exhibited higher absolute prevalence of symptoms, males demonstrated higher risk for certain etiological factors, particularly stress, trauma and parafunctional habits. These findings underline the importance of adopting a gender sensitive approach in screening and preventive strategies for TMDs in dental students

INTRODUCTION

The **Temporomandibular joint (TMJ)** is a critical anatomical structure that connects the mandible (lower jaw) to the temporal bone of the skull, enabling essential functions such as speaking, chewing and facial expressions.



Temporomandibular joint disorder (TMD) is defined as “a collective term embracing a number of clinical problems involving TMJ, masticatory muscles or both” in the criteria of the American Academy of Orofacial Pain (AAOP). Temporomandibular Disorder (TMD) is the primary reason of pain of non-dental origin in the oro-facial region involving head and neck and facial structures. Common symptoms include joint clicking, limited mouth opening, facial pain, jaw discomfort and deviation or asymmetry during jaw movement. Dental students due to their unique academic environment and occupational stressors, maybe particularly susceptible to the development of TMD symptoms. This survey based study seeks to evaluate the prevalence of such symptoms in this population and examine various risk factors that may contribute to their manifestation.

Several dimensions are explored in the research:

- Association between parafunctional habits and TMJ symptoms – Habits such as bruxism, nail biting, lip/cheek biting are known to place excessive strain on the TMJ. This study investigates whether such behaviours are statistically correlated with TMJ symptoms.
- Gender based analysis – Gender based differences in symptoms have been explored among dental undergraduates. Females may report TMD symptoms more frequently due to hormonal, anatomical and psychological factors.
- Association between psychological stress and TMD symptoms – Academic pressure, prolonged postural strain, and mental health challenges are common among students. This section examines link between self-reported stress and TMD symptoms.
- Awareness among future dental professionals – Despite their clinical knowledge, dental students may overlook or normalize TMJ symptoms leading to delaying intervention.
- Family history and traumatic events as predictors – Genetic predisposition and past trauma to the head or neck region may increase the risk of developing TMD. By evaluating participants’ family history and history of trauma, the study aims to differentiate between congenital and environmentally acquired risk factors.

This comprehensive study aims not only to identify the prevalence of TMD symptoms among dental students but also digs deep into their etiological factors, offering insights into the clinical implications for the next generation of dental professionals.

METHODOLOGY

Study design - This was a descriptive, survey-based study conducted at Goenka research institute of dental sciences among approximately 310 dental students across all academic years including dental interns. The study was conducted over a period of 2 months i.e from 1st June 2025 to 5th August 2025. Through a series of univariate and multivariate analysis, the influencing factors of TMD among dental undergraduates was determined.

Study population – The target population included undergraduate dental students from First to Final year including interns of the Bachelor of Dental Surgery program (age between 18 – 25)

Data collection tool – A structured, self administered questionnaire was used based on Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD). It was divided into the following sections:

1. Demographic data – Age, Gender, Academic year.
2. Symptoms of TMD – Jaw pain, clicking sounds, difficulty in mouth opening, restricted or deviated jaw movement , facial asymmetry.
3. Etiological factors – History of trauma, parafunctional habits (bruxism, nail biting), dental malocclusion.
4. Psychological – Self reported stress
5. Lifestyle habits – Sleep pattern, posture

The following questions were asked in the survey:

1. Do you feel difficulty in opening your mouth?
2. Do you feel your teeth do not articulate or occlude well?
3. Does your temporomandibular joint click while opening or closing your mouth?
4. Is it difficult or painful to move your mandible side to side?
5. Do you notice any kind of facial asymmetry?
6. Do you have any parafunctional habits?
7. Do you feel ear pain/ temporomandibular joint pain while chewing food?
8. Have you met with an accident that led to traumatic injury to your head and neck region in the past?
9. Do you feel any kind of stress
10. Does anyone in your family suffer from pain/ difficulty/ asymmetry of face which is similar to your condition
11. Do you feel restricted mouth opening while yawning or laughing?
12. Have you or anyone in your family experienced an episode of lock jaw in the past?

RESULTS

A total of 310 respondents from various academic years participated in the study. The following findings were recorded based on participants' responses regarding subjective signs and symptoms associated with TMD:

Demographic distribution –This distribution allows for the examination of academic stress, exposure to clinical workload, ergonomic strain as potential contributing factors across all stages of dental training.

SURVEY QUESTIONS	MALE		FEMALE	
	YES	NO	YES	NO
1. Difficulty in mouth opening	6	70	10	221
2. Teeth malocclusion	20	56	28	203
3. TMJ clicking	26	50	73	158
4. Difficult or painful side to side movement of mandible	7	69	25	206
5. Facial Asymmetry	6	70	15	216
6. Habits like Bruxism/ nail/cheek/lip biting	26	50	51	180
7. Ear/TMJ pain while chewing food	14	62	22	209
8. Traumatic injury to head and neck region	8	68	8	223
9. Any kind of stress	23	53	48	183
10. Family history of pain/asymmetry of face/ difficulty in mouth opening	5	71	12	219
11. Restricted mouth opening while yawning or laughing	8	68	13	218
12. Experience of lock jaw by you or your family	5	71	11	220

Each row corresponds to:

- A demographic or clinical question
- Responses categorized as **Yes/No** or **multiple options**
- Group-wise frequency (absolute and percentage)
- **Chi-square (χ^2)** value and **p-value**, testing statistical significance across groups

The table likely compares **five groups of population**.

Key to Interpretation:

- **χ^2 Value:** Tests if there's a statistically significant difference between the groups.
- **p-value:**
 - **< 0.05** = statistically significant difference
 - **< 0.01 or < 0.001** = highly significant
 - **≥ 0.05** = no statistically significant difference

Summary of Significant Findings

Question	p-value	Significance	Comments
Do you feel difficulty in opening your mouth?	0.050	☑ Borderline significant	Group differences just at the threshold.
Does TMJ click while opening/closing?	<0.001	☑☑☑ Highly significant	Strong group difference.
Is it difficult/painful to move mandible side to side?	0.003	☑☑ Significant	Indicates variation across groups.
Do you notice any facial asymmetry?	0.012	☑ Significant	Suggests group differences.
Do you have oral habits?	0.008	☑ Significant	Certain habits more prevalent in specific groups.
Ear pain/TMJ pain while chewing?	0.001	☑☑ Significant	Strong group variation.
Do you feel any kind of stress?	<0.001	☑☑☑ Highly significant	Stress levels vary across groups.
Restricted mouth opening while yawning/laughing?	0.001	☑☑ Significant	Another strong group difference.

Non-Significant Findings ($p \geq 0.05$)

Question	p-value	Comments
Gender distribution	0.447	Groups have similar gender ratios.
Occlusion problem?	0.264	No significant variation.
History of traumatic injury?	0.073	Not quite significant.
Family history of facial pain/asymmetry?	0.339	No meaningful difference.
Lock jaw history (self/family)?	0.235	No significant group difference.

Observations

- **Stress** and **TMJ clicking** are strongly associated with group differences — potentially indicating relevance in TMD diagnosis/severity.
- Functional limitations (like **jaw movement**, **chewing pain**, **mouth opening**) also significantly differ across groups, supporting their diagnostic utility.
- **Gender**, **trauma history**, and **family history** do **not** show statistically significant differences across the groups, at least in this data set.

The present data provides insights into various self-reported symptoms and risk factors associated with temporomandibular joint disorders (TMD), analyzed across multiple groups. The statistical analysis using the chi-square test reveals several clinically and statistically significant associations.

1. Gender Distribution

The analysis did not reveal a statistically significant difference in gender distribution across the groups ($p = 0.447$). While more females were present in the sample overall, the lack of significant difference suggests that gender may not

be a determining factor in the categorization or severity of TMD in this cohort. This contrasts with some literature that identifies females as more susceptible to TMD, possibly due to hormonal, behavioral, or psychosocial differences.

2. TMJ Clicking and Jaw Movement

A highly significant association was found with TMJ clicking during mouth opening or closing ($p < 0.001$), with certain groups showing much higher prevalence. Similarly, difficulty or pain in moving the mandible side to side was also significantly associated with specific groups ($p = 0.003$). These findings align with classic signs of internal derangement or functional disorders of the temporomandibular joint, indicating that joint noise and restricted mandibular movement are key clinical markers.

3. Pain During Mastication

There was a significant association between temporomandibular or ear pain during chewing and group categorization ($p = 0.001$). The presence of both types of pain, or TMJ pain alone, was more prevalent in groups likely representing moderate to severe TMD cases. This reinforces the role of joint pain as a diagnostic criterion and its impact on quality of life.

4. Psychological Stress

One of the most notable findings was the strong association between perceived stress and group categorization ($p < 0.001$). A higher proportion of participants in specific groups (likely those with more severe symptoms) reported experiencing stress. This supports existing evidence that psychological factors, including stress and anxiety, contribute to TMD pathophysiology—possibly through parafunctional habits such as bruxism or increased muscle tension.

5. Oral Parafunctional Habits

Oral habits, particularly nail/lip/cheek biting and bruxism, were significantly different across groups ($p = 0.008$). These behaviors are known contributors to TMD due to repetitive strain on the masticatory muscles and joint structures. Interestingly, the group with the highest reported parafunctional habits also reported higher levels of stress and TMJ symptoms, suggesting a potential interrelationship.

6. Facial Asymmetry and Restricted Mouth Opening

Facial asymmetry ($p = 0.012$) and restricted mouth opening while yawning or laughing ($p = 0.001$) were both significantly associated with group categorization. These symptoms often reflect structural or functional impairments of the TMJ, highlighting the need for detailed clinical evaluation when such signs are reported.

7. Non-Significant Findings

No significant associations were found between groups and the following variables:

- Perception of occlusal issues ($p = 0.264$)
- History of traumatic injury to head/neck ($p = 0.073$)
- Family history of TMJ-related symptoms ($p = 0.339$)
- Experience of lock jaw ($p = 0.235$)

While trauma and family history are established risk factors in some populations, their lack of significance here may be due to underreporting, recall bias, or sample homogeneity.

In summary, significant year-wise differences were observed in difficulty in mouth opening, TMJ clicking, mandibular side movements, facial asymmetry, oral habits, ear/TMJ pain while chewing, stress, and restricted mouth opening, with interns consistently showing higher prevalence of symptoms and habits compared to the lower years.

DISCUSSION

Temporomandibular joint disorders (TMDs) are a group of conditions affecting the temporomandibular joint, masticatory muscles and associated structures. They are multifactorial in etiology, often presenting a combination of structural, functional, psychological and behavioural factors. The present study investigated the prevalence of several key factors and indicators of TMD among dental students.

This study highlights several significant clinical and behavioral features associated with temporomandibular joint disorders (TMD). TMJ clicking during mouth movements ($p < 0.001$), difficulty in lateral mandibular motion ($p = 0.003$), and pain during mastication ($p = 0.001$) were significantly more prevalent in affected groups, suggesting mechanical dysfunction within the temporomandibular joint. These findings align with previous research identifying these symptoms as hallmark signs of internal derangement and joint pathology.

Implications and Clinical Relevance:

The data underscores the multifactorial nature of TMD, involving biomechanical, psychological, and behavioral components. The statistically significant variables—such as TMJ clicking, stress, pain during chewing, and parafunctional habits—should be considered key focus areas in both diagnosis and management. The strong association between stress and TMD highlights the importance of incorporating psychological screening and interventions in treatment protocols. Stress management programs, counselling services and education on avoiding parafunctional habits may play a preventive role in reducing the burden of TMDs in this population.

LIMITATIONS OF THE STUDY

- The data relies on **self-reported symptoms**, which may introduce **subjective bias**.
- Lack of clarity on **group definitions** as the study does not have control and affected group, which makes specific interpretations limited.
- A **cross-sectional** design restricts causal inference.

CONCLUSION

This analysis reinforces the importance of evaluating both physical and psychological parameters in patients presenting with temporomandibular symptoms. The significant associations between TMJ dysfunction, parafunctional habits, stress, and joint pain suggest an integrated biopsychosocial model is essential for effective management of TMD Disorders.

Temporomandibular joint disorders (TMD) hold considerable significance among dental students, given their heightened vulnerability due to academic stress, sustained occlusal and postural strain, and parafunctional habits often acquired during training. The prevalence of TMD in this population underscores the need for early identification, preventive strategies, and targeted interventions to safeguard both their immediate health and their long-term professional efficiency as future dental practitioners.

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