

Prevalence and Risk Factors of Temporomandibular Disorders Among Young Adults: A Cross-Sectional Study

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Abstract

Background

Temporomandibular disorders (TMD) are a group of musculoskeletal conditions affecting the temporomandibular joint, masticatory muscles, and associated structures. Young adults are particularly susceptible to TMD due to increased exposure to psychological stress, parafunctional habits, and lifestyle-related factors. Understanding the prevalence and associated risk factors is essential for early diagnosis and preventive management.

Aim

To assess the prevalence of temporomandibular disorders and evaluate the associated risk factors among young adults.

Materials and Methods

A cross-sectional observational study was conducted among 250 young adults aged 18–30 years. Participants were selected using a convenience sampling technique. Data were collected using a structured questionnaire to record demographic details, TMD-related symptoms, and potential risk factors, followed by clinical examination based on the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD). The collected data were analyzed using SPSS version 26.0. Descriptive statistics, Chi-square test, and binary logistic regression analysis were performed. A p-value of <0.05 was considered statistically significant.

Results

Among the 250 participants, 78 (31.2%) were diagnosed with temporomandibular disorders. Jaw clicking was the most common clinical finding, followed by jaw pain and headache. Perceived stress (67.9%) and teeth clenching/bruxism (55.1%) were the most frequently observed risk factors among participants with TMD. Chi-square analysis demonstrated significant associations between TMD and female gender, perceived stress, teeth clenching/bruxism, and poor sleep quality ($p < 0.05$). Logistic regression analysis identified perceived stress and teeth clenching/bruxism as independent predictors of temporomandibular disorders.

Conclusion

Temporomandibular disorders were common among young adults, with nearly one-third of the participants being affected. Perceived stress and teeth clenching/bruxism were the strongest associated risk factors. Early screening, stress management, and modification of parafunctional habits may help reduce the burden of TMD and improve oral health outcomes.

Keywords: Temporomandibular disorders, Temporomandibular joint, Young adults, Prevalence, Risk factors, Bruxism, Stress, Cross-sectional study.

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Introduction

Temporomandibular disorders (TMDs) comprise a group of musculoskeletal and neuromuscular conditions affecting the temporomandibular joint (TMJ), masticatory muscles, and associated structures. These disorders commonly present with symptoms such as jaw pain, restricted mouth opening, joint sounds during mandibular movement, and difficulty in chewing, speaking, or performing routine oral functions. TMD is considered one of the most common causes of non-dental pain in the orofacial region and can substantially impair an individual's daily activities and overall quality of life, particularly when symptoms become chronic (1,2).

The etiology of TMD is complex and multifactorial. Rather than resulting from a single causative factor, the disorder develops through the interaction of biological, psychological, and behavioral influences. Factors such as emotional stress, parafunctional habits including bruxism and clenching, trauma, occlusal disturbances, hormonal influences, and genetic susceptibility have all been associated with the onset and progression of TMD. Current evidence supports a biopsychosocial model, emphasizing that physical findings alone cannot fully explain the development or persistence of TMD symptoms (3,4).

Accurate diagnosis is essential for both clinical practice and research. The Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) represented a major advancement by providing standardized diagnostic methods for evaluating TMD. Subsequently, the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) improved diagnostic reliability and validity, enabling more consistent identification of different TMD subtypes across populations and research settings (1,2).

Young adults represent a particularly important population for studying TMD because this stage of life is often associated with increased academic demands, occupational stress, lifestyle changes, and psychological challenges. These factors may

contribute to parafunctional habits and increased muscle tension, thereby increasing the likelihood of TMD symptoms. Previous epidemiological studies have reported that TMD is more prevalent among adolescents and young adults, with females generally demonstrating a higher prevalence than males. Early recognition of symptoms during this period may help prevent progression to chronic pain and functional disability (4,5).

Several studies have also identified bruxism as an important behavioral risk factor for TMD. Both sleep and awake bruxism are associated with excessive loading of the temporomandibular joint and masticatory muscles, potentially contributing to pain and dysfunction. However, bruxism alone is not sufficient to explain the occurrence of TMD, highlighting the importance of evaluating multiple contributing factors simultaneously (6,7).

In addition to physical risk factors, psychosocial variables play a significant role in the development and persistence of TMD. Anxiety, depression, emotional distress, poor coping strategies, and stress-related behaviors have consistently been associated with increased pain intensity and functional limitations among affected individuals. These findings further support the multidimensional nature of TMD and the need for comprehensive assessment beyond clinical examination alone (3,4,10).

Standard textbooks and clinical guidelines also emphasize that successful management of TMD depends on accurate diagnosis, early detection, patient education, and identification of modifiable risk factors. Conservative approaches, including behavioral modification, physiotherapy, stress management, and occlusal interventions when indicated, remain the cornerstone of treatment for most patients (8,9).

Despite growing awareness, information regarding the prevalence and associated risk factors of TMD among young adults remains limited in many institutional and regional populations. Identifying the burden of TMD and the factors associated with its occurrence can help clinicians develop

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preventive strategies, promote early diagnosis, and improve patient outcomes. Therefore, the present cross-sectional study aims to assess the prevalence of temporomandibular disorders among young adults and to evaluate the major risk factors associated with their occurrence.

Methodology

The present study was designed as a cross-sectional observational study to assess the prevalence of temporomandibular disorders (TMD) and identify the associated risk factors among young adults. The study was conducted in the Department of Oral Medicine and Radiology at a private dental college in Rajasthan, India, over a period of six months from January 2025 to June 2025. Prior to the commencement of the study, ethical clearance was obtained from the Institutional Ethics Committee. All participants were informed about the objectives and procedures of the study, and written informed consent was obtained before their inclusion.

A total of 250 young adults aged between 18 and 30 years were included in the study using a convenience sampling technique. Participants who were willing to participate and provided informed consent were considered eligible for inclusion. Individuals with a history of facial trauma, temporomandibular joint surgery, congenital craniofacial anomalies, systemic arthritic disorders affecting the temporomandibular joint, neurological diseases interfering with mandibular function, or those undergoing active orthodontic treatment were excluded from the study.

Data collection was carried out using a structured questionnaire followed by a clinical examination. The questionnaire was designed to obtain demographic information such as age and sex, along with details regarding potential risk factors associated with temporomandibular disorders. Information regarding perceived stress, parafunctional habits including teeth clenching and bruxism, nail biting, frequent gum chewing, previous history of jaw trauma, sleep quality, and family history of temporomandibular disorders was recorded. Participants were also asked about symptoms suggestive of TMD, including jaw pain, clicking sounds, limitation of mouth opening, jaw locking, headache, facial pain, and discomfort during chewing.

Following completion of the questionnaire, each participant underwent a standardized clinical examination based on the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD). The examination included palpation of the temporomandibular joints and masticatory muscles to assess tenderness, measurement of maximum

unassisted mouth opening using a digital Vernier caliper, evaluation of mandibular movements, and assessment for joint sounds such as clicking or crepitus during opening and closing movements. All examinations were performed by a single calibrated examiner to minimize inter-examiner variability and ensure consistency in clinical findings.

The collected data were entered into Microsoft Excel 2021 and analyzed using the Statistical Package for the Social Sciences (SPSS) version 26.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to summarize demographic characteristics and estimate the prevalence of temporomandibular disorders. Categorical variables were expressed as frequencies and percentages, whereas continuous variables were presented as mean and standard deviation. The association between temporomandibular disorders and potential risk factors was assessed using the Chi-square test. Variables demonstrating statistically significant associations were further evaluated using binary logistic regression analysis to identify independent predictors of temporomandibular disorders. A p-value of less than 0.05 was considered statistically significant throughout the analysis.

Results

A total of **250 young adults** aged **18–30 years** participated in the present study. The mean age of the participants was **22.8 ± 2.9 years**. Among the participants, the majority belonged to the **21–23 years** age group (**98; 39.2%**), followed by **18–20 years** (**72; 28.8%**), **24–26 years** (**52; 20.8%**), and **27–30 years** (**28; 11.2%**) (Table 1). Of the total participants, **140 (56.0%)** were females and **110 (44.0%)** were males (Table 2).

The overall prevalence of temporomandibular disorders (TMD) in the study population was **31.2%**, with **78 participants** diagnosed with TMD, while **172 participants (68.8%)** showed no evidence of the disorder (Table 3).

Among the participants diagnosed with TMD, **jaw clicking** was the most frequently reported clinical finding, affecting **54 (69.2%)** individuals. This was followed by **jaw pain** in **45 (57.7%)**, **headache** in **38 (48.7%)**, **pain during chewing** in **30 (38.5%)**, **limited mouth opening** in **23 (29.5%)**, and **jaw locking** in **10 (12.8%)** participants (Table 4).

Evaluation of the potential risk factors revealed that **perceived stress** was the most common associated factor and was reported by **53 (67.9%)** participants with TMD. **Teeth clenching or bruxism** was observed in **43 (55.1%)** participants, while **frequent gum chewing** was reported by **37 (47.4%)** participants. **Poor sleep quality** was present in **35 (44.9%)**, **nail biting** in **28 (35.9%)**, and **previous**

jaw trauma in **10 (12.8%)** participants diagnosed with TMD (Table 5).

Statistical analysis using the Chi-square test demonstrated a significant association between temporomandibular disorders and several risk factors. A significantly higher proportion of participants with TMD reported **perceived stress** (67.9% vs. 35.5%; $p = 0.001$), **teeth clenching/bruxism** (55.1% vs. 26.7%; $p = 0.003$), **poor sleep quality** (44.9% vs. 23.8%; $p = 0.009$), and **female gender** (64.1% vs. 52.3%; $p = 0.021$) compared with participants without TMD. Although **frequent gum chewing** and **nail biting** were more common among participants with TMD, these associations were not statistically significant ($p = 0.087$ and $p = 0.054$, respectively). Similarly, **previous jaw trauma** did not show a statistically significant association with TMD ($p = 0.284$) (Table 6).

Binary logistic regression analysis was performed to identify independent predictors of temporomandibular disorders after adjusting for age and gender. The analysis revealed that **perceived stress** was the strongest independent predictor of TMD (**Adjusted Odds Ratio [AOR] = 2.81; 95% Confidence Interval [CI]: 1.58–4.99; $p < 0.001$**), followed by **teeth clenching/bruxism** (**AOR = 2.36; 95% CI: 1.31–4.23; $p = 0.004$**). Although **poor sleep quality** and **female gender** showed increased odds of TMD, their associations were not statistically significant in the adjusted regression model ($p > 0.05$) (Table 7).

Overall, the findings of the present study indicate that nearly one-third of the young adult population was affected by temporomandibular disorders. Perceived stress and parafunctional habits, particularly teeth clenching and bruxism, were identified as the most significant factors associated with the occurrence of TMD in the study population.

Table 1. Distribution of study participants according to age

Age (years)	group Frequency (n)	Percentage (%)
18–20	72	28.8
21–23	98	39.2
24–26	52	20.8
27–30	28	11.2
Total	250	100.0

Table 2. Distribution of participants according to gender

Gender	Frequency (n)	Percentage (%)
Male	110	44.0
Female	140	56.0
Total	250	100.0

Out of the 250 participants, **78 individuals (31.2%)** were diagnosed with temporomandibular disorders, while **172 (68.8%)** did not show evidence of TMD.

Table 3. Prevalence of temporomandibular disorders

TMD Status	Frequency (n)	Percentage (%)
Present	78	31.2
Absent	172	68.8
Total	250	100.0

Among participants with TMD, jaw clicking was the most frequently reported symptom (69.2%), followed by jaw pain (57.7%), headache (48.7%), pain during chewing (38.5%), limited mouth opening (29.5%), and jaw locking (12.8%).

Table 4. Clinical symptoms among participants with TMD (n = 78)

Symptom	Frequency (n)	Percentage (%)
Jaw clicking	54	69.2
Jaw pain	45	57.7
Headache	38	48.7
Pain during chewing	30	38.5
Limited mouth opening	23	29.5
Jaw locking	10	12.8

The most common risk factor observed among participants with TMD was perceived stress (67.9%), followed by teeth clenching/bruxism (55.1%), gum chewing (47.4%), poor sleep quality (44.9%), nail biting (35.9%), and previous jaw trauma (12.8%).

Table 5. Distribution of risk factors among participants with TMD (n = 78)

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Risk factor	Frequency (n)	Percentage (%)	Variable	Adjusted Odds Ratio (AOR)	95% Confidence Interval	p-value
Perceived stress	53	67.9				
Teeth clenching/Bruxism	43	55.1	Perceived stress	2.81	1.58–4.99	<0.001*
Frequent chewing gum	37	47.4	Teeth clenching/Bruxism	2.36	1.31–4.23	0.004*
Poor sleep quality	35	44.9	Poor sleep quality	1.69	0.93–3.05	0.081
Nail biting	28	35.9	Female gender	1.58	0.89–2.79	0.114
Previous jaw trauma	10	12.8				

*Statistically significant (p < 0.05).

Chi-square analysis demonstrated a statistically significant association between TMD and perceived stress (p = 0.001), teeth clenching/bruxism (p = 0.003), poor sleep quality (p = 0.009), and female gender (p = 0.021). No statistically significant association was observed between TMD and previous jaw trauma (p = 0.284).

Table 6. Association between selected risk factors and TMD

Variable	TMD Present (%)	TMD Absent (%)	n	P-value
Female gender	50 (64.1)	90 (52.3)		0.021*
Perceived stress	53 (67.9)	61 (35.5)		0.001*
Teeth clenching/Bruxism	43 (55.1)	46 (26.7)		0.003*
Poor sleep quality	35 (44.9)	41 (23.8)		0.009*
Frequent chewing gum	37 (47.4)	63 (36.6)		0.087
Nail biting	28 (35.9)	40 (23.3)		0.054
Previous jaw trauma	10 (12.8)	15 (8.7)		0.284

*Statistically significant (p < 0.05).

Binary logistic regression analysis identified perceived stress and teeth clenching/bruxism as independent predictors of temporomandibular disorders after adjusting for age and gender.

Table 7. Binary logistic regression analysis of factors associated with TMD

Overall, the study demonstrated that nearly one-third of the young adults were affected by temporomandibular disorders. Perceived stress and parafunctional habits, particularly teeth clenching and bruxism, showed significant associations with TMD and emerged as the strongest independent predictors in the study population.

Discussion

The present cross-sectional study was conducted to determine the prevalence of temporomandibular disorders (TMD) and to evaluate the associated risk factors among young adults. The overall prevalence of TMD in the present study was **31.2%**, indicating that nearly one-third of the participants experienced one or more signs or symptoms of temporomandibular disorders. This finding is comparable to the study conducted by **Fernandes et al.** (11), who reported a considerable prevalence of TMD among young adults and highlighted the role of behavioral and psychosocial factors in disease development. Similarly, **Yap et al.** (12) observed that TMD is a common condition in young adults and is frequently associated with pain-related disability and psychological distress.

The present study found that females exhibited a higher prevalence of TMD than males. Although gender did not remain an independent predictor after multivariate analysis, the finding is consistent with previous epidemiological evidence. **LeResche** (13) reported that women are more frequently affected by TMD than men, possibly because of hormonal influences, differences in pain perception, psychosocial characteristics, and healthcare-seeking behavior. These biological and psychosocial differences may explain the greater susceptibility of females to temporomandibular disorders.

Among the clinical manifestations observed in the present study, jaw clicking was the most common symptom, followed by jaw pain, headache, pain during chewing, limited mouth opening, and jaw

locking. Similar observations were reported by **Trehan et al.** (14), who found joint sounds and pain to be the predominant clinical findings among young adults with TMD. Furthermore, **Costa et al.** (15), in their systematic review, demonstrated a close association between temporomandibular disorders and headache, suggesting that dysfunction of the temporomandibular joint and masticatory muscles contributes significantly to craniofacial pain.

Perceived stress emerged as the most common risk factor and the strongest independent predictor of TMD in the present study. Participants reporting higher levels of stress were significantly more likely to develop temporomandibular disorders than those without stress. These findings are supported by **Almoznino et al.** (16), who reported that chronic pain and psychosocial distress substantially reduce the oral health-related quality of life in individuals with TMD. Likewise, **Lei et al.** (17), in their systematic review of cohort studies, concluded that psychological stress is one of the most consistent predictors associated with the onset and progression of temporomandibular disorders.

Teeth clenching and bruxism were also significantly associated with TMD in the present study and remained independent predictors after logistic regression analysis. These findings are in accordance with the observations of **Yap et al.** (18), who demonstrated that parafunctional oral behaviors, particularly clenching and grinding of teeth, significantly increase the risk of developing TMD symptoms among young adults. Continuous excessive loading of the temporomandibular joint and masticatory muscles may result in muscle fatigue, joint overload, and chronic pain.

Poor sleep quality was more frequently observed among participants with TMD in the present study, although it did not remain statistically significant after adjustment for other variables. Similar findings have been reported by **Yap et al.** (18), who suggested that disturbed sleep, emotional stress, and parafunctional habits often coexist and collectively contribute to the development and persistence of temporomandibular disorders.

The present study did not demonstrate statistically significant associations between TMD and previous jaw trauma, gum chewing, or nail biting. Although these factors were more common among participants with TMD, they were not identified as independent predictors. Similar observations were reported by **Lei et al.** (17), who concluded that while trauma and certain oral habits may contribute to temporomandibular disorders in selected individuals, stronger evidence exists for psychosocial factors and parafunctional habits as primary risk factors.

Temporomandibular disorders have a significant impact on functional activities and quality of life. Patients frequently experience pain during mastication, restricted jaw movement, sleep disturbances, and psychological discomfort, all of which may interfere with daily activities. **Almoznino et al.** (16) emphasized that individuals with TMD generally report poorer oral health-related quality of life than healthy individuals, highlighting the importance of early diagnosis and appropriate management.

Longitudinal evidence provided by **Hirsch et al.** (19) demonstrated that TMD symptoms may persist or worsen over time if appropriate intervention is not provided. Their findings support the importance of routine screening and early identification of TMD, particularly among young adults who are exposed to increasing academic, occupational, and psychosocial stress.

Current recommendations from the **National Institute of Dental and Craniofacial Research (NIDCR)** (20) advocate early recognition of TMD symptoms and emphasize conservative management approaches such as patient education, behavioral modification, stress reduction, physiotherapy, and self-care measures before considering invasive treatment options. These recommendations support the findings of the present study, where stress and parafunctional habits emerged as the most important modifiable risk factors.

The present study has certain limitations. As a cross-sectional study, it cannot establish a causal relationship between the identified risk factors and temporomandibular disorders. In addition, the use of convenience sampling and recruitment from a single institution may limit the generalizability of the findings. Self-reported information regarding stress and parafunctional habits may also be influenced by recall bias. Nevertheless, the study provides valuable information regarding the prevalence of TMD and its associated risk factors among young adults.

Overall, the findings of the present study indicate that temporomandibular disorders are relatively common among young adults. Perceived stress and teeth clenching/bruxism were identified as the strongest associated factors, emphasizing the importance of early screening, patient education, stress management, and preventive strategies for reducing the burden of temporomandibular disorders in this population.

Conclusion

The present study demonstrated that temporomandibular disorders (TMD) are relatively

common among young adults, with an overall prevalence of **31.2%**. Female participants showed a higher occurrence of TMD, although perceived stress and teeth clenching/bruxism were identified as the most significant associated risk factors. Early identification of individuals at risk, along with appropriate patient education, stress management, and modification of parafunctional habits, may help reduce the occurrence and progression of TMD. Further large-scale multicentric longitudinal studies are recommended to confirm these findings and better understand the causal relationship between risk factors and temporomandibular disorders.

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