ORIGINAL ARTICLE

Age-Related Prevalence and Severity of Temporomandibular Disorder among Patients Attending Dental and Maxillofacial Surgery OPD at a Tertiary Care Hospital

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Abstract

Background: Temporomandibular disorders encompass conditions affecting the temporomandibular joint (TMJ) and its associated muscles, often resulting in pain, restricted mandibular movement, and clicking sounds.

Objective: To assess the age-specific prevalence and severity of temporomandibular disorders among patients attending the Dental and Maxillofacial Surgery outpatient clinics at a tertiary care hospital.

Methods: A cross-sectional study conducted over six months, from August 2024 to January 2025, at Liaquat National Hospital's Dental and Maxillofacial Surgery OPD included 200 patients. The data was collected using Fonseca's 10-item questionnaire to evaluate Temporomandibular Joint (TMJ) dysfunction severity.

Results: In terms of age distribution, approximately 26.9% of participants were aged 18 to 29 years, 28.4% were aged 30 to 39 years, 34.8% were aged 40 to 49 years, and 9.5% were aged 50 and older. Out of 200 participants, Temporomandibular Disorders (TMD) were seen in 79%. The majority had mild TMD (39%), followed by moderate TMD (27%) and severe TMD (27%). Across all age groups, mild TMD was the most prevalent condition. Nearly 30% of participants in the following two age groups reported having moderate TMD: 30-39 (29.8%) and 40-49 (30.0%). The frequency of severe TMD was higher in the 40-49 years age group (15.7%), followed by the 30-39 years (12.3%), 18-29 years (11.1%), and 50 years and above (10.5%).

Conclusion: These age-related findings support the implementation of early diagnostic and preventive measures for younger populations and tailored long-term management strategies for older patients.

Keywords: *Dental outpatient department, prevalence, tertiary care hospital, temporomandibular joint, temporomandibular disorder.*

INTRODUCTION

The temporomandibular joints (TMJs), comprising the jawbone, masticatory muscles (temporalis, masseter, medial and lateral pterygoids), and ligaments (temporomandibular, stylomandibular, sphenomandibular), facilitate vital functions such as chewing, speaking, and swallowing [1]. Temporomandibular disorders (TMDs) encompass conditions affecting these structures and present with symptoms such as joint clicking, limited jaw movement, and TMJ pain [2].

TMD stands as the second most prevalent musculoskeletal source of pain and disability, surpassed only by low back pain [3]. Its etiology is multifaceted, encompassing structural, physiologic, genetic, hormonal, psychological, and social determinants [4].

The Research Diagnostic Criteria for TMD (RDC/TMD, 1992**)** introduced a dual-axis model: Axis I targets physical and structural diagnosis, including muscular and joint disorders, bruxism, trauma, genetic predisposition, and hormonal effects [5]. It relies on clinical examination protocols and structured diagnostic rules [6]. Axis II captures psychosocial dimensions of pain severity, functional impairment, psychological distress, and behavioural patterns *via* validated questionnaires [6].

In 2014, the Diagnostic Criteria for TMD (DC/TMD) refined both axes: Axis I diagnostic accuracy now boasts sensitivity ≥ 0.86, specificity ≥ 0.98, and inter-examiner reliability (κ)≥ 0.85 in detecting common pain-related TMDs, including intra-articular conditions such as disc displacement [7]. Axis II includes streamlined screening and comprehensive self-report instruments addressing psychosocial status and jaw function [8].

A 2024 meta-analysis confirmed no significant diagnostic disparity between Axis I and II results (RR 1.17; 95% CI: 0.80-1.71; P = 0.41), highlighting the synergistic diagnostic value of integrating both axes [9].

Emerging evidence, grounded in the biopsychosocial model, reveals that TMD often coexists with psychological distress, mediated through interlinked neurobiological pathways. Specific personality traits, extraversion, agreeableness, neuroticism, and female

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sex have been linked to worsened Axis II outcomes, such as increased pain intensity, disability, and psychological distress scores in TMD patients (PHQ-4, GAD-7) [10, 11].

Incorporating both Axis I and II within a biopsychosocial framework enhances understanding of TMD pathophysiology and supports the development of personalized diagnostic and therapeutic approaches.

Temporomandibular disorder symptoms, which are mostly common, include chronic pain, associated distress, and reduced economic income due to the extensive need for medical services. Consequently, continuous pain negatively impacts quality of life [12, 13]. Timely diagnosis and treatment of temporomandibular joint conditions can significantly reduce the risk of further complications. Therefore, examining the prevalence and severity of TMD among patients attending the Dental and Maxillofacial Surgery OPD at a tertiary care hospital is essential. Moreover, previous studies have consistently shown that TMDs are more prevalent in women and tend to affect individuals within specific age brackets. For example, an adult Italian population sample reported a higher prevalence in women aged approximately 20-40 years [14, 15]. Systematic reviews and meta-analyses have also corroborated higher TMD prevalence among females and younger to middle-aged adults [9, 16]. Including these epidemiological patterns will strengthen the contextualization of our study findings.

METHODOLOGY

A cross-sectional study was conducted at the Dental and Maxillofacial Surgery Outpatient Department of Liaquat National Hospital, Karachi (tertiary care), over six months (August 2024 to January 2025). Ethical approval was obtained from the hospital's Ethical Review Committee (Ref: App. #R.C.-LNH-Dental-10/2022/118). Written informed consent was secured from all participants.

Patients attending the OPD during the study period who provided consent and completed the questionnaire were included. Individuals with a history of facial trauma, prior orthodontic treatment, or immune-compromised conditions were excluded.

Although convenience sampling, a non-probability method in which participants are selected based on availability, was employed [17, 18], we included a sample size calculation to ensure methodological transparency and reference precision. Assuming a 95% confidence level, an estimated prevalence (p=0.26), and 7% margin of error, the required sample size was 151. We enrolled 200 participants, balancing statistical guidance with practical feasibility while acknowledging the limitations in generalizability inherent to this sampling approach [18].

Data collection was performed using a structured questionnaire, comprising two parts: (1) demographic and medical/dental history, including prior TMJ issues or facial trauma; (2) the Short-Form Fonseca Anamnestic Index (SFAI), a validated TMD screening tool consisting of 10 items such as TMJ pain, headaches, masticatory discomfort, parafunctional habits, joint noises, movement restrictions, and emotional stress. Responses are scored: Yes (10), Sometimes (5), No (0), yielding a total score (0-100) categorized as: 0-15 (no TMD), 20-40 (mild), 45-65 (moderate), 70-100 (severe). The SFAI was chosen for its practicality in outpatient settings and strong diagnostic accuracy, demonstrating high area under the curve (AUC) values (0.97), sensitivity (90.7-97.5%), and specificity (93.0-96.5%) relative to the DC/TMD standard [19, 20].

All data were collected by trained personnel under supervision. While the gold-standard DC/TMD clinical examination, which requires formal examiner training and calibration, was not implemented, our staff were explicitly trained in consistent SFAI administration. Future studies will incorporate complete DC/TMD diagnostic protocols with calibrated examiners to enhance diagnostic reliability [21].

Descriptive statistics were used: frequencies and percentages for categorical variables; means ± standard deviations for continuous variables. Data analysis was conducted using SPSS version 19.0. The observed frequencies of responses across age groups were analyzed using Pearson's Chi-Square Test of Independence, which assesses whether categorical variables (response category and age group) were associated. Where applicable, Fisher's Exact Test was considered if expected cell counts fell below acceptable thresholds. A p-value less than or equal to 0.05 is considered statistically significant [22].

RESULTS

A total of 200 participants were included in the study, with a mean age of approximately 37 years. The age distribution was as follows: 34.8% were aged 40-49 years, 28.4% were aged 30-39 years**,** 26.9% were aged 18-29 years, and 9.5% were aged 50 years and above. In terms of gender**,** 53.2% (n = 107) were female, and 46.3% (n=93) were male. Examining professional roles, the participants include faculty members (22.9%), students (24.4%), housewives (22.9%), and shopkeepers (8%), while 21.4% fall into the "Others" category (**Table 1**).

Table 1: Demographic details of studied participants.

Variable	Frequency	Percentage
AGE (Years)		
18-29	54	26.9
30-39	57	28.4
40-49	70	34.8
50 above	19	9.5
GENDER		
Male	93	46.3
Female	107	53.2
Designation		
Faculty	50	25
Student	50	25
Housewife	52	26
Others	48	24
Qualification		
Graduate	85	42.5
Postgraduate	21	10.5
Undergraduate	59	29.5
None	35	17.5
Comorbid		
Diabetes	12	6
Hypertension	16	8
Osteoporosis	18	9
Hyperlipidemia	15	7.5
Asthma	16	8
None	123	61.2

A total of 200 patients were evaluated; more than three-quarters (79%) of the study participants experienced TMD-related symptoms, with mild severity being the most prevalent. The majority (39%) had mild TMD, followed by those with moderate TMD (27%) **(Table 2**).

Table 2: Based on the fonseca anamnestic index categories, the severity distribution among the patients.

Severity Level	Score Range	Frequency	Percentage
No TMD	0-15	42	21.0
Mild TMD	20-40	78	39.0
Moderate TMD	45-65	54	27.0
Severe TMD	70-100	26	13.0

Across all age groups, mild TMD was the most prevalent condition. Nearly 30% of participants in the following two age groups reported having moderate TMD: 30-39 (29.8%) and 40-49 (30.0%). According to the findings, middle-aged adults are most likely to experience moderate symptoms. The most severe symptoms tend to appear near the end of the middle-aged group because the 40-49 age group reported the highest percentage of severe TMD (15.70%). Moderate and severe were less common in the 18-29 and 50+ age groups. The 50+ age group had the highest percentage of symptomatic patients without TMD, but cases of severe TMD were noted when TMD was present. Among participants aged 18-29, no symptomatic participants reported moderate or severe TMD symptoms (**Table 3**).

Table 3: Age-wise estimated severity breakdown.

Age Group (Years)	No TMD n(%)	Mild TMD n(%)	Moderate TMD n(%)	Severe TMD n(%)
18-29	14(25.9)	21(38.9)	13(24.1)	6(11.1)
30-39	9(15.8)	24(42.1)	17(29.8)	7(12.3)
40-49	13(18.6)	25(35.7)	21(30.0)	11(15.7)
50+	6(31.6)	8(42.1)	3(15.8)	2(10.5)

The findings revealed that temporomandibular joint (TMJ) clicking was the most commonly reported symptom, with consistent prevalence across all age groups and no significant variation in frequency or severity. Despite its widespread occurrence, this symptom did not exhibit age-specific patterns. In contrast, specific symptoms varied significantly between age groups. Difficulty opening the mouth was most frequently reported by individuals aged 40-49 (25%), followed by those aged 30-39 (15%) and 18-29 (14%). Difficulty in lateral movement of the mandible was more prominent in the 50 and above age group (45%) compared to younger participants. Other symptoms, including muscular pain during mastication, frequent headaches, neck pain, and joint pain, did not show significant age-related differences. Teeth clenching showed some variability, with the highest prevalence (19%) observed in the 30-39 age group (**Table 4**).

DISCUSSION

The severity of TMJ symptoms varied across participants, with consistent reports of clicking sounds and teeth clenching. This mirrors findings from Khatoon *et al*. (2020) [17] and Bertoli *et al*. (2020) [15], who reported common symptoms including neck pain, muscular fatigue, and masticatory pain. The 30-39 age group reported the highest incidence of teeth clenching, a pattern also observed in similar studies. These findings suggest that TMJ severity is often linked to socio-economic factors and stress, which may influence the intensity of symptoms. Tailored treatment

Table 4: Assessment of pain among patients attending dental and maxillofacial surgery OPD at tertiary care hospital.

Question	Groups	Age categories (in years)				p-value
		18-29 n(%)	30-39 n(%)	40-49 n(%)	50+ n(%)	
Is there difficulty in opening your mouth?	Yes	14 (18.9)	34 (45.9)	31 (41.9)	5 (6.8)	0.012
	Sometimes	15 (28.8)	6 (11.5)	14 (26.9)	4 (7.7)	
	No	25 (37.9)	17 (25.8)	25 (37.9)	10 (15.2)	
Is it difficult to move the mandible from side to side?	Yes	4 (5.6)	24 (33.8)	11 (15.5)	2 (2.8)	<0.001
	Sometimes	9 (16.1)	5 (8.9)	14 (25.0)	4 (7.1)	
	No	41 (34.5)	28 (23.5)	45 (37.8)	13 (10.9)	
Does the muscle pain occur during mastication?	Yes	16 (21.9)	21 (28.8)	16 (21.9)	2 (2.7)	0.329
	Sometimes	14 (22.6)	16 (25.8)	24 (38.7)	8 (12.9)	
	No	24 (25.3)	20 (21.1)	30 (31.6)	9 (9.5)	
Do frequent headaches occur?	Yes	11 (18.3)	16 (26.7)	16 (26.7)	1 (1.7)	0.195
	Sometimes	12 (18.8)	11 (17.2)	24 (37.5)	6 (9.4)	
	No	31 (25.8)	30 (25.0)	30 (25.0)	12 (10.0)	
Does neck pain occur?	Yes	6 (10.0)	11 (18.3)	4 (6.7)	3 (5.0)	0.291
	Sometimes	9 (13.6)	12 (18.2)	15 (22.7)	2 (3.0)	
	No	39 (24.1)	34 (21.0)	51 (31.5)	14 (8.6)	
Does the pain occur in the jaw joints?	Yes	7 (9.6)	3 (4.1)	9 (12.3)	3 (4.1)	0.430
	Sometimes	13 (15.3)	18 (21.2)	26 (30.6)	7 (8.2)	
	No	34 (28.8)	36 (30.5)	35 (29.7)	9 (7.6)	
Is any clicking sound heard while opening the mouth or chewing?	Yes	3 (6.5)	9 (19.6)	10 (21.7)	1 (2.2)	0.522
	Sometimes	16 (22.2)	16 (22.2)	15 (20.8)	5 (6.9)	
	No	35 (23.0)	32 (21.1)	45 (29.6)	13 (8.6)	
Does clenching of teeth occur?	Yes	19 (21.6)	25 (28.4)	24 (27.3)	3 (3.4)	0.136
	Sometimes	4 (12.1)	8 (24.2)	14 (42.4)	5 (15.2)	
	No	31 (28.2)	24 (21.8)	32 (29.1)	11 (10.0)	
Do the teeth articulate properly?	Yes	6 (8.8)	6 (8.8)	8 (11.8)	2 (2.9)	0.230
	Sometimes	7 (10.8)	14 (21.5)	24 (36.9)	4 (6.2)	
	No	41 (26.1)	37 (23.6)	38 (24.2)	13 (8.3)	
Does the patient feel nervous?	Yes	15 (18.5)	15 (18.5)	27 (33.3)	8 (9.9)	0.400
	Sometimes	16 (18.8)	24 (28.2)	21 (24.7)	5 (5.9)	
	No	23 (26.7)	18 (20.9)	22 (25.6)	6 (7.0)	

plans are essential for effectively managing these symptoms across diverse populations.

Although the mean age of TMJ patients was not explicitly stated, the age distribution suggests that most participants were in the 30-39 age group, which coincides with the highest incidence of teeth clenching. Jo *et al*. (2021) [13] and other studies like Mazzo *et al*. (2024) [14] also reported that TMJ disorders tend to affect adults in their 30s to 40s, particularly women. The variation in mean age across studies could be attributed to different sample populations, suggesting that TMJ disorders may

emerge or intensify in adulthood due to lifestyle and socio-economic stressors.

In terms of gender distribution, females accounted for a higher percentage of TMJ cases in this study, consistent with other research, including Jo *et al*. (2021) [13], in which women accounted for 75.2% of TMJ patients. This higher prevalence in females may be linked to hormonal, psychosocial, and anatomical factors. The findings in this study emphasize the importance of gender-specific approaches in diagnosing and treating TMJ disorders.

Age-wise, TMJ symptoms such as clicking and teeth clenching were consistent across all age groups, with the most notable variation observed in the 30-39 age group, which reported the highest prevalence of clenching (19%). This aligns with studies such as Khatoon *et al*. (2020) [17] that highlighted higher TMJ symptom prevalence in younger individuals, often linked to stress and socio-economic pressures. The high prevalence among university students, as noted in the study by Gulzar *et al*. (2022) [16], further emphasizes the role of academic and personal stressors in TMJ symptom development. These age-specific findings highlight the need for tailored prevention and treatment strategies to address TMJ disorders effectively across different age groups.

CONCLUSION

This study demonstrates that the prevalence of TMJ disorders peaks in individuals aged 15-35, with the 30-39 age group showing the highest occurrence of symptoms such as jaw discomfort and teeth clenching. While older age groups show more consistent symptom patterns, these nevertheless reflect ongoing chronic manifestations. These age-related findings support the implementation of early diagnostic and preventive measures for younger populations and tailored long-term management strategies for older patients.

ETHICAL APPROVAL

Ethical approval was obtained from the Institutional Review Committee of Liaquat National Hospital and Medical College, Karachi (REF letter No. App.#R.C-LNH-Dental-10/2022/118). All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/ or national research committee and the Helsinki Declaration.

CONSENT FOR PUBLICATION

Written informed consent was taken from the participants.

AVAILABILITY OF DATA

The data set may be acquired from the corresponding author upon a reasonable request.

FUNDING

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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Declared none.

AUTHORS' CONTRIBUTION

A.M. contributed to the study concept, design, data collection, manuscript drafting, and final approval of the submitted version. S.M. contributed to study design, statistical analysis, interpretation of results, and critical revision of the manuscript. T.I. contributed to the overview of the study, including background contextualization and literature review. S.A. contributed to the writing, drafting, and editorial preparation of the manuscript. Y.A.M. contributed to statistical analysis, data interpretation, and critical review of the manuscript.

All authors have read and approved the final version of the manuscript.

GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this work the author(s) limitedly used ChatGPT (GPT-4, OpenAI) to get language suggestions and do minor proofreading in some parts of the manuscript. After using this tool/ service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the published article.

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