

# Frequency of Temporomandibular Joint Dysfunction in Patients Wearing Conventional Complete Dentures

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## Abstract

**Background:** A group of musculoskeletal and neuromuscular conditions known as temporomandibular disorders (TMDs) primarily affects the temporomandibular joint (TMJ), masticatory muscles, and associated structures.

**Objectives:** To assess the frequency of Temporomandibular joint dysfunction (TMD) at three specific intervals of one month, three months, six months following the use of conventional complete dentures.

**Materials and Methods:** The study is Descriptive case series and was conducted at the Department of Prosthodontics, Fatima Memorial Hospital, Lahore over a period of six months, from 22 June 2024 to 22 December 2024. Fifty complete denture wearers were evaluated using a modified Helkimo's dysfunction index (DI) at one, three, and six months. The DI assessed mandibular opening, deviation, pain, and joint sounds. TMD was considered present if the DI score was  $\geq 1$ . The data were analyzed descriptively, and inferential tests (e.g., chi-square) were not performed since TMD was not observed in any participants.

**Result:** The mean age of participants was  $64.34 \pm 4.134$  years. Among them, 27 (54%) were male and 23 (46%) were female. No patient demonstrated clinically significant signs of TMD during the six-month follow-up, irrespective of age, gender, education, socioeconomic status, BMI, and duration of edentulism.

**Conclusion:** During the six-month follow-up, no patients wearing conventional complete dentures showed signs meeting the criteria for temporomandibular joint dysfunction. These observations are based on a limited sample size and follow-up period.

**Keywords:** *Conventional complete dentures, Temporomandibular joint dysfunction*

## Introduction

A group of musculoskeletal and neuromuscular conditions known as temporomandibular disorders (TMDs) primarily affects the temporomandibular joint (TMJ), masticatory muscles, and associated structures. These disorders are typically characterized by localized discomfort in the preauricular and facial regions, limited or deviated mandibular movement, and joint sounds such as clicking or crepitus.<sup>1</sup>

TMDs are multi-factorial in origin, with etiological contributors including emotional stress, occlusal discrepancies, and trauma.<sup>2</sup> The pain associated with TMD is distinct and cannot be classified as neurogenic, psychogenic, visceral, periodontal, dental, or cutaneous in nature.<sup>3</sup> Epidemiological studies estimate that 40–75% of the general population may exhibit at least one clinical sign of TMD, such as joint sounds, while approximately 33% report at least one symptom, including facial or TMJ pain.<sup>4</sup>

Painful TMDs are musculoskeletal in origin and are

recognized as the most prevalent cause of non-odontogenic pain in the orofacial region.<sup>3,5</sup> Muscle tenderness upon palpation, especially in the masticatory muscles, is one of the most commonly reported symptoms.<sup>6,7</sup>

Dental status plays a crucial role in the prevalence and presentation of TMDs. Evidence suggests that individuals with fewer natural teeth may exhibit more signs and symptoms of TMD compared to those with a full dentition. Conversely, some studies report that completely edentulous patients wearing complete dentures demonstrate fewer TMD symptoms than dentate individuals.<sup>5</sup>

Alzarea et al. reported that the prevalence of TMD among complete denture wearers ranged between 15% and 25%,<sup>1</sup> whereas Subawari et al. noted that up to 70% of complete denture wearers presented with signs of TMD.<sup>2</sup> This discrepancy highlights the need for further investigation into the relationship between edentulous status, denture quality, and TMD development.

While wearing dentures has been reported to correlate with TMD, the occurrence of TMD in complete denture patients is uncommon in clinical practice. The aim of our study is to determine the frequency of TMD following the use of conventional complete dentures in our population and to evaluate whether denture wear is genuinely linked to temporomandibular joint dysfunction. The findings of this study will be shared with local healthcare professionals and may guide future research and treatment recommen-

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dations.

To assess the frequency of Temporomandibular joint Dysfunction (TMD) at three specific intervals of one month, three months, six months following the use of conventional complete dentures.

**Material and Methods**

The current study was conducted at the Department of Prosthodontics, Fatima Memorial Hospital, Lahore, from 22 June 2024 to 22 December 2024. The study design was a descriptive case series in which a total of 50 patients were observed. The sample size was estimated using the WHO formula for sample size calculation, keeping a 70% predicted percentage of TMD, a 95% confidence interval, and a 13% margin of error. Furthermore, a non-probability purposive sampling technique was used for sample collection.

Prior approval from the institutional ethical committee was obtained under ethical number **FMH-21/07/2025-IRB-1688**. Patients meeting the inclusion criteria were enrolled in the study through the OPD and Prosthodontics departments at Fatima Memorial Hospital, Lahore. Patients receiving removable complete dentures with correct occlusal vertical dimension and centric relation, and previously healthy individuals with no signs of TMD, were included. Patients with any previous maxillofacial injury, those diagnosed with stomatognathic system impairment, and single complete denture wearers with opposing natural dentition were excluded. Written informed consent was obtained from all patients.

A thorough medical, dental, and clinical assessment for temporomandibular joint problems was conducted. The general history included questions regarding the patient’s age, gender, occupation, socioeconomic status, BMI, and duration of edentulism. This was followed by a detailed complete denture history, including the reason for seeking new complete dentures, duration of complete denture experience, age of the current dentures, number of sets of complete dentures worn previously, denture sleeping habits, and denture discomfort.

A modified version of Helkimo’s dysfunction index (DI) was used to assess clinical dysfunction. Clinical examination included assessment of mandibular opening, deviation during opening, pain in the TMJ, preauricular region, and masticatory muscles, along with palpation for tenderness. Joint sounds were auscultated using a standard stethoscope. TMD was considered present if the Helkimo index score was  $\geq 1$  at one, three, or six months of follow-up.

SPSS version 25 was used for data analysis. Categorical variables such as gender, education level, socioeconomic status, and TMD were expressed as frequencies and percentages, while continuous variables including age, duration of edentulism, pain severity, BMI, and Helkimo score were summarized as mean and standard deviation. Stratification of patient characteristics was performed; however, as no cases of TMD were identified during follow-up, the analysis was limited to de-

scriptive statistics.

**Results**

In our study, which comprised 50 complete denture wearers, the majority of cases (n = 44, 88%) were in the age group of 61–70 years, followed by 6 patients (12%) in the 50–60 years age group, with a mean age of  $64.34 \pm 4.13$  years. Male patients were slightly more frequent than female patients, with 27 (54%) males and 23 (46%) females. Most participants were educated, with 37 patients (74%) having matric-level education or above (Table 1).

**Table-1 Age Distribution (n=50)**

AGE	FREQUENCY	PERCENTAGE
50-60 years	6	12.0%
61-70 years	44	88.0%
Total	50	100%
GENDER	FREQUENCY	PERCENTAGE
Male	27	54.0%
Female	23	46.0%
Total	50	100%
EDUCATION	FREQUENCY	PERCENTAGE
Illiterate	4	8.0%
Primary	4	8.0%
Middle	5	10.0%
Matric and above	37	74.0%
Total	50	100%
SES	FREQUENCY	PERCENTAGE
Low (< 5,000/m)	10	20.0%
Middle (50-100,000/m)	23	46.0%
High(>100,000/m)	17	34.0%
Total	50	100%

Regarding comorbid conditions, 36 patients (72%) had a BMI  $\leq 27$  kg/m<sup>2</sup>, while 14 patients (28%) had a BMI  $> 27$  kg/m<sup>2</sup>. The mean BMI was 27 kg/m<sup>2</sup> with a standard deviation of  $\pm 1.66$ . Fifteen patients (30%) had a duration of edentulism  $\leq 3$  months, while the mean duration of edentulism was  $2.70 \pm 0.46$  months (Table 2).

None of the patients developed temporomandibular joint dysfunction (TMD) following rehabilitation with conventional complete dentures. No significant differences in TMD were observed with respect to age, gender, education level, socioeconomic status, BMI, or duration of edentulism, as no TMD cases were identified. (Tables 3 and 4).

**Discussion**

In the present study of 50 complete denture wearers, the mean age of participants was  $64.34 \pm 4.13$  years, with the majority (88%) belonging to the 61–70 years

**Table– 2 Comorbid Conditions (n=50)**

COMORBID CONDI-TIONS	FREQUENCY	PERCENTAGE
<b>BMI</b>		
≤ 27 Kg/m <sup>2</sup>	36	72.0%
> 27 Kg/m <sup>2</sup>	14	28.0%
<b>Total</b>	50	100%
<b>Duration of edentulism</b>		
≤ 3 month	15	30.0%
>3 month	35	70.0%
<b>Total</b>	50	100%

**Table– 3 Frequency temporomandibular joint dysfunction (n=50)**

TMD	FREQUENCY	PERCENTAGE
TMD (1 month)	0	0(0%)
TMD (3 month)	0	0(0%)
TMD (6 month)	0	0(0%)
<b>Total</b>	50	100%
<b>No patient (100%) demonstrated signs of TMD during follow-up</b>		

age group. Notably, none of the patients demonstrated signs of temporomandibular joint dysfunction (TMD) at one, three, or six months of follow-up. These findings differ from several studies reporting varying prevalence and severity of TMD among edentulous and complete denture-wearing populations.

Almeida et al., Coronatto et al., and Manfredini et al. reported a higher prevalence of TMD in younger to middle-aged adults (20–45 years).<sup>12-14</sup> In contrast, Plesh and Adams found that TMD was more common in older patients compared to younger individuals, suggesting that age may play a contributory role.<sup>15</sup> However, Serman et al. proposed that TMD symptoms tend to fluctuate over time rather than showing a consistent progression with age.<sup>11</sup>

No statistically significant gender-related differences were observed in the present study, with a nearly equal distribution of males (54%) and females (46%) and no TMD symptoms detected in either group. In contrast, Zakir et al. reported a higher prevalence of

TMD in females (54%), with symptoms such as clicking and muscle pain more commonly observed during the 1–5 year edentulous phase.<sup>16</sup> The shorter follow-up duration of six months in the present study may partly explain the absence of TMD signs.

An important strength of this study was the consideration of multiple potential contributing factors, including education level, socioeconomic status, BMI, and duration of edentulism. None of these variables demonstrated a statistically significant association with TMD in our cohort. These findings differ from those of Dallanora et al., who reported a 55.12% prevalence of TMD among complete denture wearers and identified a significant association with duration of denture use ( $p < 0.05$ ).<sup>17</sup> Similarly, Al-Khorasani et al. reported TMD indicators in 82.5% of complete denture wearers.<sup>18</sup>

The absence of TMD in our patients may be attributed to the provision of well-fabricated, properly fitting complete dentures that restored occlusal harmony and vertical dimension, thereby minimizing joint strain. Additionally, the absence of natural teeth may reduce parafunctional habits such as bruxism, which are known contributors to TMD. Balanced occlusal schemes and adequately contoured denture bases may also help distribute masticatory forces evenly and prevent overloading of the temporomandibular joint.

**Limitation**

This study has several limitations, including a relatively small sample size of 50 patients, a short follow-up period of six months, and a single-center design. Future studies with larger sample sizes, longer follow-up durations, and multicenter participation are recommended to obtain findings with wider clinical relevance.

**Conclusion**

This study concluded that no cases of temporomandibular joint dysfunction were identified in complete denture wearers within six months of prosthesis insertion. The absence of TMD was consistent across age, gender, education level, socioeconomic status, BMI, and duration of edentulism. These findings support the potential protective role of well-made and properly maintained complete dentures and emphasize the importance of meticulous prosthodontic care, patient compliance, and regular follow-up.

**CONFLICT OF INTEREST: None**

**FUNDING SOURCES: None**

**Table-4 Stratification Of Temporomandibular Joint Dysfunction With Respect To Co-Morbid Conditions**

AGE	TMD (1 month)		P value	TMD (3 month)		P value	TMD (6 month)		P value
	Yes	No		Yes	No		Yes	No	
50-60 years	0(0%)	6(12%)	0.0000	0(0%)	6(12%)	0.0000	0(0%)	6(12%)	0.0000
61-70 years	0(100%)	44(88%)		0(100%)	44(88%)		0(100%)	44(88%)	
<b>Total</b>	0(00%)	50(100%)		0(00%)	50(100%)		0(00%)	50(100%)	
<b>GENDER</b>									
Male	0(0%)	27(54%)	0.0000	0(0%)	27(54%)	0.0000	0(0%)	27(54%)	0.0000
Female	0(100%)	23(46%)		0(100%)	23(46%)		0(100%)	23(46%)	
<b>Total</b>	0(00%)	50(100%)		0(00%)	50(100%)		0(00%)	50(100%)	
<b>EDUCATION</b>									
Illiterate	0(00%)	4(8%)	0.0000	0(00%)	4(8%)	0.0000	0(00%)	4(8%)	0.0000
Primary	0(00%)	4(8%)		0(00%)	4(8%)		0(00%)	4(8%)	
Middle	0(00%)	5(10%)		0(00%)	5(10%)		0(00%)	5(10%)	
Matric and above	0(00%)	37(74%)		0(00%)	37(74%)		0(00%)	37(74%)	
<b>Total</b>	0(00%)	50(00%)		0(00%)	50(00%)		0(00%)	50(00%)	
<b>SES</b>									
Low	0(00%)	10(20%)	0.0000	00(00%)	00(00%)	0.0000	00(00%)	00(00%)	0.0000
Middle	0(00%)	23(46%)		00(00%)	00(00%)		00(00%)	00(00%)	
High	0(00%)	17(34%)		00(00%)	00(00%)		00(00%)	00(00%)	
<b>Total</b>	0(00%)	50(100%)		00(00%)	00(00%)		00(00%)	00(00%)	
<b>BMI</b>									
≤ 27 Kg/m <sup>2</sup>	0(00%)	36(72%)	0.0000	0(00%)	36(72%)	0.0000	0(00%)	36(72%)	0.0000
> 27 Kg/m <sup>2</sup>	0(00%)	14(28%)		0(00%)	14(28%)		0(00%)	14(28%)	
<b>Total</b>	0(00%)	50(100%)		0(00%)	50(100%)		0(00%)	50(100%)	
<b>Duration of edentulism</b>									
≤ 3 months	0(00%)	15(00%)	0.0000	00(00%)	00(00%)	0.0000	00(00%)	00(00%)	0.0000
>3 months	0(00%)	35(00%)		00(00%)	00(00%)		00(00%)	00(00%)	
<b>Total</b>	0(00%)	50(00%)		00(00%)	00(00%)		00(00%)	00(00%)	

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**Author Contributions**

1. **Sania Liaqat:** Conceptualization of the study, study design, funding, materials, data collection, data analysis and literature review.
2. **Zahid Iqbal:** Study design, data collection, data analysis and supervision .
3. **Sohaib Nawaz :**Conceptualization of the study, Data analysis and critical review.
4. **Shehla Batool:** Data analysis
5. **Khadija Shahid:** Critical revision of the manuscript and final approval of the version to be published.