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EVALUATION OF PREVALENCE AND SEVERITY OF TMJ DISORDER IN ADULTS WITH RHEUMATOID ARTHRITIS IN LAHORE, PAKISTAN-A CROSS SECTIONAL STUDY

Original Research

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ABSTRACT

Background: The temporomandibular joint (TMJ) plays an essential role in mastication, speech, and facial movement, and is frequently affected by systemic inflammatory conditions such as rheumatoid arthritis (RA). Chronic inflammation in RA can lead to temporomandibular disorders (TMD), causing pain, restricted movement, and reduced quality of life. Despite its clinical significance, limited data exist regarding TMJ involvement among RA patients in Pakistan.

Objective: To determine the prevalence and severity of temporomandibular joint disorders among patients with rheumatoid arthritis using the Fonseca Anamnestic Index and Visual Analogue Scale.

Methods: A descriptive cross-sectional study was conducted among 156 clinically diagnosed RA patients aged 25–45 years from multiple hospitals in Lahore, Pakistan. Both male and female participants were included. Data were collected using the Fonseca Anamnestic Index (FAI) and Visual Analogue Scale (VAS) to assess the presence and intensity of TMJ dysfunction. Ethical approval was obtained prior to data collection, and informed consent was secured from each participant. Descriptive analysis was performed using SPSS version 25, and results were expressed in frequencies and percentages.

Results: Among the 156 participants, 128 (82.1%) were female and 28 (17.9%) were male, with a mean age of 37.67 ± 7.14 years. Based on the FAI scoring, 21.8% had no TMD, 43.6% had mild TMD, 24.4% had moderate TMD, and 10.3% had severe TMD. Pain severity measured by VAS showed that 21.8% had no pain, 43.6% had mild pain, 24.4% moderate, 4.5% severe, and 5.8% reported the worst pain.

Conclusion: The study demonstrated a high prevalence of temporomandibular disorders among rheumatoid arthritis patients, predominantly mild in severity, with females being more frequently affected than males. These findings highlight the need for early TMJ assessment and multidisciplinary management in RA patients to prevent chronic dysfunction.

Keywords: Arthritis, Rheumatoid; Fonseca Anamnestic Index; Jaw Diseases; Pain Measurement; Prevalence; Temporomandibular Joint; Temporomandibular Joint Disorders.

INTRODUCTION

The temporomandibular joint (TMJ) is a highly specialized synovial joint formed by the articulation of the mandible and the temporal bone, playing a pivotal role in essential functions such as mastication, facial expression, and dental occlusion (1,2). Given its complex biomechanical and anatomical structure, even minor pathological changes can significantly impair oral and facial functionality. Temporomandibular disorders (TMDs) encompass a spectrum of conditions that affect the TMJ and associated musculature, resulting in orofacial pain, joint sounds, and limitations in mandibular movement (3–5). The etiology of TMDs is multifactorial, with contributing factors including hereditary predisposition, aging, parafunctional habits, environmental stressors, and systemic inflammatory diseases such as rheumatoid arthritis (RA) (6,7). Rheumatoid arthritis, a chronic systemic autoimmune disorder, is characterized by synovial inflammation and progressive joint destruction, which can extend to the TMJ, leading to pain, stiffness, crepitus, and restricted mandibular movement (8,9). Studies report that TMJ involvement occurs in up to 80% of patients with RA, with a notably higher prevalence among females (10,11). Such involvement not only exacerbates the overall disease burden but also impairs essential daily functions like chewing and speech. TMJ damage in RA is often associated with long-standing disease and increased disease severity (12,13).

Despite the significant impact of TMJ involvement in RA, clinical detection and reporting remain inadequate. Many patients attribute TMJ pain to dental issues, delaying appropriate rheumatologic or dental evaluation (14). The underreporting of TMDs in rheumatology clinics further complicates early diagnosis and management, underscoring the need for interdisciplinary collaboration between dentists, rheumatologists, and radiologists (15). Advanced imaging modalities such as magnetic resonance imaging (MRI) and cone-beam computed tomography (CBCT) have improved diagnostic accuracy, allowing detailed visualization of soft and hard tissue changes associated with TMJ pathology (16). The pathophysiology of TMD in RA involves both mechanical and biochemical mechanisms. Chronic inflammation promotes synovial proliferation, joint effusion, and erosion of the articular surfaces, while mechanical overloading induces localized hypoxia, oxidative stress, and free radical formation, further aggravating tissue damage (17,18). Given these interrelated mechanisms, the TMJ serves as a sensitive indicator of systemic inflammatory activity in RA. However, in many developing regions, including Pakistan, there remains a paucity of epidemiological data addressing TMJ involvement in RA. This gap limits the development of region-specific diagnostic and management strategies. Therefore, understanding the extent and characteristics of TMJ disorders among patients with RA is crucial for improving patient outcomes and quality of life (19). The objective of the present study is to determine the frequency and clinical manifestations of temporomandibular disorders in patients with rheumatoid arthritis, thereby emphasizing the importance of early recognition and multidisciplinary management of TMJ involvement in this population.

METHODS

This study was designed as a descriptive cross-sectional investigation conducted across multiple hospitals in Lahore, Pakistan. The research was completed over a period of six months following formal approval of the study synopsis by the institutional ethical review committee). Ethical principles outlined in the Declaration of Helsinki were strictly adhered to, and written informed consent was obtained from all participants prior to data collection to ensure voluntary participation and confidentiality. The target population included patients clinically diagnosed with rheumatoid arthritis (RA) by a rheumatologist. A total of 156 participants were recruited through a non-probability convenient sampling technique. The sample size was determined using the Ausvet.epitool calculator, assuming a 95% confidence level, a population proportion of 0.727, and a margin of error of 0.07. Eligible participants were both male and female, aged between 25 and 45 years, representing the typical adult age range in which TMJ manifestations are commonly reported among RA patients. Exclusion criteria included patients with other rheumatologic conditions, ongoing orthodontic treatment, a history of migraine, seizures, or psychological disorders, as well as those suffering from trigeminal neuralgia, traumatic facial injury, or stroke. These exclusion parameters were established to eliminate potential confounding variables that could influence TMJ symptoms.

Data collection was carried out using the **Fonseca Anamnestic Index (FAI)**, a validated and widely used self-reported questionnaire designed to assess temporomandibular joint dysfunction through evaluation of pain, joint sounds, jaw movement, and functional limitations. Each participant completed the questionnaire under supervision after providing informed consent, ensuring comprehension

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and accuracy in responses. In addition to the questionnaire, a detailed medical file review was performed for all included patients to record demographic details, disease duration, medication history, and TMJ-related symptoms such as pain, stiffness, and clicking. Following data collection, responses were coded and entered into the Statistical Package for the Social Sciences (SPSS) version 25 for analysis. Descriptive statistical methods, including frequency distributions, percentages, and mean ± standard deviation, were used to determine the prevalence and severity of temporomandibular joint disorders among rheumatoid arthritis patients. The findings were summarized to highlight the magnitude and pattern of TMJ involvement within the study population.

RESULTS

A total of 156 individuals diagnosed with rheumatoid arthritis were included in the study, comprising 128 females (82.1%) and 28 males (17.9%), with an overall mean age of 37.67 ± 7.14 years (range 25–45 years). The findings demonstrated a high prevalence of temporomandibular joint disorders among the study population, with varying degrees of severity as evaluated using the Fonseca Anamnestic Index. The overall distribution of temporomandibular joint disorders indicated that 43.6% of participants exhibited mild TMD, 24.4% had moderate TMD, and 10.3% presented with severe TMD, while 21.8% showed no evidence of TMD. Gender analysis revealed a markedly higher prevalence among females, with 62.2% demonstrating TMD symptoms compared to 16% of males, indicating a female predominance in disease manifestation. Pain-related symptoms were also assessed in detail. Approximately 23.7% of participants reported pain while opening the mouth, 12.2% experienced it occasionally, and 64.1% had no such pain. Similarly, 21.8% experienced pain during lateral mandibular movement, while 13.5% reported occasional discomfort and 64.7% denied any pain. Muscular pain while chewing was present in 27.6% of patients, with 19.2% reporting intermittent pain and 53.2% reporting none.

Headache frequency was notably high, as 46.2% experienced frequent headaches, 26.3% occasionally, and 27.6% none. Pain localized to the nape of the neck was reported by 56.4% of respondents, with 21.2% experiencing it intermittently and 22.4% reporting none. Earache or pain in the craniomandibular region was reported by 17.3% of participants, with 19.2% experiencing it occasionally and 63.5% denying such symptoms. TMJ clicking sounds during chewing were reported by 24.4% of participants, occasionally noticed by 13.5%, and absent in 62.2%. Additionally, teeth clenching or grinding was observed in 22.4% of participants, intermittently in 12.2%, and absent in 65.4%. Pain intensity measured by the Visual Analog Scale (VAS) showed that 43.6% of the participants experienced mild pain, 24.4% had moderate pain, 4.5% reported severe pain, and 5.8% rated their pain as the worst possible intensity. In contrast, 21.8% reported no pain at all. These findings collectively highlight the substantial symptom burden associated with temporomandibular joint involvement among rheumatoid arthritis patients.

Table 1: Descriptive Statistics of Age (N=156)

Statistic	Value
Mean Age	37.67
Std. Deviation	7.14
Minimum Age	25
Maximum Age	45

Table 2: Descriptive Statistics of Gender (N=156)

Gender	Frequency	Percent
Female	128	82.1%
Male	28	17.9%
Total	156	100%

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Table 3: Prevalence of TMD (N=156)

TMD Severity	Frequency	Percent
No TMD	34	21.8%
Mild TMD	68	43.6%
Moderate TMD	38	24.4%
Severe TMD	16	10.3%
Total	156	100%

Table 4: Descriptive Statistics of Pain Severity (VAS) (N=156)

Pain Severity	Frequency	Percent
No pain (0)	34	21.8%
Mild pain (1-3)	68	43.6%
Moderate pain (4-6)	38	24.4%
Severe pain (7-9)	7	4.5%
Worst pain (10)	9	5.8%
Total	156	100%

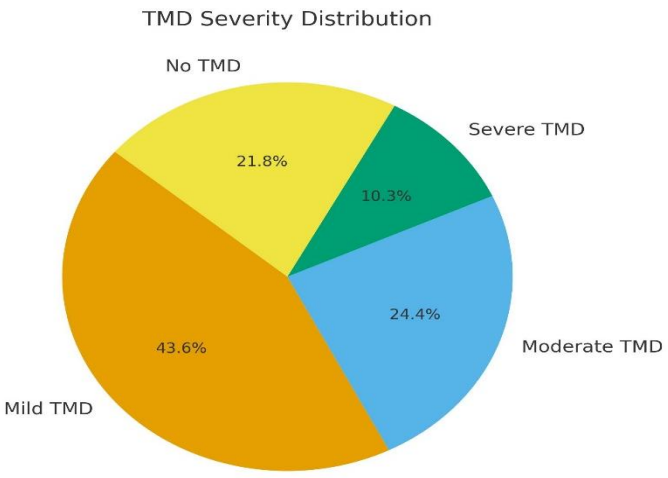

Figure 2 TMD Severity Distribution

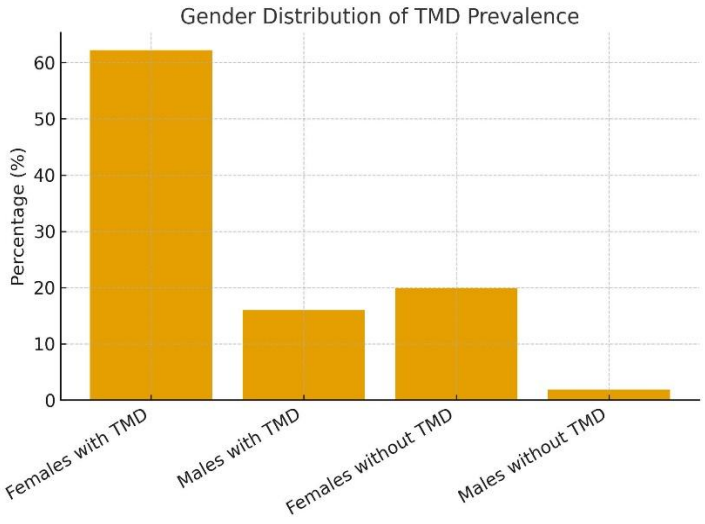

Figure 2 Gender Distribution of TMD Prevalence

DISCUSSION

The present study investigated the prevalence and severity of temporomandibular joint (TMJ) disorders among patients with rheumatoid arthritis (RA) in Lahore, Pakistan, using the Fonseca Anamnestic Index. The findings revealed that a significant proportion of RA patients (78%) exhibited varying degrees of temporomandibular dysfunction, with the majority classified as having mild TMD (43.6%), followed by moderate (24.4%) and severe forms (10.3%). These results indicate that TMJ involvement is a common comorbidity in

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rheumatoid arthritis and highlight the need for early recognition and management to prevent functional disability. The results of this study are consistent with several previous reports that have identified a high prevalence of TMJ disorders among patients with RA. A comparable cross-sectional study conducted in Saudi Arabia reported a 70% prevalence of TMD among RA patients, with mild cases being the most common (18,19). Similarly, investigations conducted in Taiwan and Japan reported prevalence rates ranging from 56% to 67%, indicating that RA significantly increases the risk of TMJ involvement. Another large-scale study demonstrated that RA patients have approximately a 2.5-fold higher risk of developing TMD compared with healthy individuals (20). The similarities across these studies underscore the global relevance of TMJ involvement in rheumatoid arthritis, though variations in prevalence may be attributed to differences in diagnostic criteria, sample size, and population demographics.

In the current study, TMD was notably more prevalent among females (62.2%) than males (16%), reaffirming the consistent gender disparity reported in the literature. Hormonal factors, particularly estrogen, have been implicated in modulating inflammatory processes and influencing pain perception, which may explain the higher susceptibility among women. Additionally, behavioral and psychosocial factors such as stress and parafunctional habits like teeth clenching may further exacerbate TMJ symptoms in females. The age range of the participants (25–45 years) corresponds to the most active and productive period of life, during which chronic inflammatory diseases such as RA can have significant physical and psychosocial consequences (21-23). Pain-related findings from the present study, including the presence of jaw pain, mandibular movement difficulty, and muscle pain during chewing, align with previously published data, which reported similar patterns of orofacial discomfort among RA patients. The frequent occurrence of headaches and neck pain observed in this study suggests that temporomandibular dysfunction in RA may extend beyond localized joint pathology, potentially involving muscular and postural components (24). Such multisystemic involvement highlights the importance of multidisciplinary care, integrating rheumatology, dentistry, and physiotherapy in disease management. A major strength of this study lies in its use of the Fonseca Anamnestic Index, a validated, cost-effective, and non-invasive screening tool that allows for easy assessment of TMJ dysfunction. The inclusion of both genders and a moderately sized sample also adds to the representativeness of the findings. Furthermore, conducting the study in a clinical population of confirmed RA patients enhances the validity of the observed association between rheumatoid arthritis and TMJ disorders.

However, certain limitations must be acknowledged. The cross-sectional design restricts causal inferences regarding the relationship between RA severity and TMJ dysfunction. The use of a self-reported questionnaire, while practical, introduces subjective bias and may over- or underestimate symptom severity. The absence of imaging modalities such as MRI or CBCT limits the ability to objectively confirm TMJ pathology. Additionally, the use of convenient sampling may have introduced selection bias, potentially affecting the generalizability of the results. Future studies should adopt longitudinal designs, include control groups of non-RA individuals, and utilize multimodal diagnostic approaches combining clinical, radiographic, and biochemical assessments to provide a more comprehensive understanding of TMJ involvement in rheumatoid arthritis. The implications of these findings are clinically significant. The high prevalence of TMJ disorders among RA patients emphasizes the necessity of incorporating routine TMJ screening into rheumatologic assessments. Early identification of TMJ dysfunction could facilitate timely interventions, including pharmacologic management of inflammation, physical therapy, and patient education to prevent chronic pain and joint deformity. Collaborative efforts between dental and rheumatology professionals can contribute to improved functional outcomes and quality of life for affected individuals. In conclusion, the current study reinforces the strong association between rheumatoid arthritis and temporomandibular joint disorders, particularly among female patients. Despite methodological limitations, the findings contribute valuable regional data to an underexplored area of rheumatologic research and support the integration of TMJ evaluation in standard care protocols for patients with rheumatoid arthritis.

CONCLUSION

This study concluded that temporomandibular joint disorders are a common comorbidity among individuals with rheumatoid arthritis, with a considerable proportion of patients exhibiting varying degrees of dysfunction. The findings highlighted that, female patients were more frequently affected than males, emphasizing a potential gender-related predisposition. Overall, the study underscores the importance of early recognition and multidisciplinary management of temporomandibular involvement in rheumatoid arthritis to prevent functional impairment, enhance quality of life, and promote timely therapeutic intervention in clinical practice.

AUTHOR CONTRIBUTION

Author	Contribution
Umme Abiha*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Amina Bibi	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Hafiza Sana Qayyum	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Iqra Tariq	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published

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