International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2024: 7.101

Psychological Distress in Temporomandibular Disorders: A Dass-21 Based Cross-Sectional Study

Dr. Vijay K Asrani[1], Dr Jigna S Shah[2]

[1]PhD Student Oral Medicine and Radiology, Govt. Dental College and Hospital, Gujarat University
Corresponding Author Email: *drvijayasrani[at]gmail.com*

[2]PhD Guide, Professor & Head of Department Oral Medicine and Radiology, Govt. Dental College and Hospital, Gujarat University
Email: *jignasathya[at]gmail.com*

Abstract: ***Temporomandibular disorders (TMDs) are common musculoskeletal conditions often associated with psychological comorbidities. This cross-sectional study assessed psychological distress using the Depression, Anxiety, and Stress Scale (DASS-21) in 311 TMD patients. Females reported significantly higher distress across all domains ($\chi^2 = 13.42$, $p = 0.0012$). Symptom duration influenced outcomes: acute cases were predominantly stress-driven, while chronic cases showed depression and anxiety dominance ($\chi^2 = 132.37$, $p < 0.001$). Age also shaped outcomes ($\chi^2 = 54.35$, $p < 0.001$), with younger groups reporting stress and anxiety, and older groups showing depression predominance. Diagnostic subtypes did not demonstrate significant associations ($\chi^2 = 2.84$, $p = 0.58$). Findings confirm sex, age, and chronicity as key determinants of psychological burden in TMD. Incorporating DASS-21 screening into routine care may improve early detection, intervention, and patient outcomes.***

Keywords: Temporomandibular Disorders, DASS-21, Psychological Distress, Depression

1. Introduction

Temporomandibular disorders (TMDs) are musculoskeletal conditions affecting the temporomandibular joint, masticatory muscles, and associated structures. They are a leading cause of non-dental orofacial pain with global prevalence estimates ranging from 5% to 12%. Etiology is multifactorial, with mechanical, neuromuscular, and psychological factors playing key roles. Psychosocial dimensions, particularly stress, anxiety, and depression, are strongly linked to symptoms of onset, persistence, and treatment outcomes. Such factors can intensify bruxism, amplify pain perception, and facilitate progression to chronicity. Females are consistently reported to have higher prevalence and greater psychological distress, possibly due to biological, hormonal, and psychosocial influences [2,3,5]. Chronic cases tend to show depression and anxiety dominance, while acute cases are often stress-driven. Evidence from South Asian populations remains limited, where cultural and healthcare dynamics may shape outcomes. This study evaluates the distribution of DASS-21 domains among TMD patients, examining associations with sex, age, chronicity, and diagnostic subtypes [6,7].

2. Materials and Methods

Study design and setting

This cross-sectional study was conducted at the Department of Oral Medicine and Radiology, Government Dental College and Hospital, Ahmedabad, over a period of four years (January 2018 – January 2022). The institution functions as a tertiary referral center, receiving patients from both urban and rural regions. Ethical clearance was obtained from the Institutional Review Board before commencement of the study. Written informed consent was secured from all participants, and assent with parental consent was obtained for patients under 18 years of age.

Inclusion and Exclusion criteria

Patients between 10 and 70 years who reported with orofacial pain and clinical features of TMD were included. Exclusion criteria were dental pain, headaches related to trauma, ongoing psychiatric illness or use of antipsychotic medication, and cases meeting Okeson Axis II criteria.

Sample size determination

The following formula was used for sample size calculation :
$N = 4pq / L^2$
where N = sample size, p = expected prevalence (50%), q = 100 − p = 50, and L = permissible error (5.77%). Thus:

$N = (4 \times 50 \times 50) /(5.77\%)2 = 300$

Hence, the minimum required sample size for the study was calculated to be 300 participants.

To account for potential non-response or incomplete data, an additional 4% was added, resulting in an adjusted sample size of 312 and following criteria application, a total of 311 patients were included in the final analysis.

Assessment protocol

Following consent, a structured case history and examination were completed. DASS-21 was administered to all patients to screen their psychological status. Relevant investigations were advised where indicated (IOPA/OPG, USG, CT/CBCT, MRI) to clarify etiology. Diagnosis was categorized according to the recommendations of DC/TMD and AAOP guidance [1,4]. Each diagnosis was validated by two experienced clinicians to ensure reliability.

For the present analysis we retained only operational variables required for service reporting: Gender (Male/Female); Age code (1=10–20, 2=21–30, 3=31–40, 4=41–50, 5=50+); duration (Acute=1, Chronic=2); diagnosis code (1=Myofascial Spasm, 2=Disc Disorders, 3=Joint

Disorders); and DASS-21 domain (1=Stress, 2=Anxiety, 3=Depression)[5].

Statistical analysis

Data were analyzed using SPSS software (IBM Corp., Armonk, NY). Descriptive statistics were generated, and chi-square tests with Cramér's V were applied to assess associations. A p-value <0.05 was considered significant.

3. Results

Of the 311 patients included in the study, 219 were female (70.4%) and 92 were male (29.6%). Acute cases accounted for 84 patients (27.0%), while chronic cases comprised 227 patients (73.0%).

The association between sex and psychological distress was highly significant ($\chi^2 = 13.42$, df = 2, p = 0.0012). Females consistently reported higher levels of depression, anxiety, and stress compared to males. The distribution of these findings is shown in Table 1.

Table 1: DASS-21 Distribution by Sex

Category	Depression	Anxiety	Stress
Female	105	37	77
Male	29	10	53

Duration of symptoms demonstrated a very highly significant association with psychological distress ($\chi^2 = 132.37$, df = 2, p < 0.001). Acute cases were predominantly stress-driven, whereas chronic cases were depression-dominant. The sensitivity of psychological distress to symptom duration is shown in Table 2.

Table 2: DASS-21 Distribution by Duration

Category	Depression	Anxiety	Stress
Acute	5	5	84
Chronic	134	47	46

Age also showed a statistically significant association with distress ($\chi^2 = 54.35$, df = 8, p < 0.001). Patients aged 10–20 years exhibited mainly stress responses, with some anxiety and minimal depression. The 21–30-year group showed higher stress and anxiety, while the 31–40 group was markedly prone to depression. Among the 41–50 and 50+ groups, stress and anxiety were reduced, but depression predominated. The age-wise distribution is presented in Table 3.

Table 3: DASS-21 Distribution by Age

Category	Depression	Anxiety	Stress
10-20	2	5	10
21-30	23	35	49
31-40	51	40	44
41-50	23	2	7
50+	17	1	2

Diagnostic categories did not show a statistically significant association with psychological distress ($\chi^2 = 2.84$, df = 4, p = 0.58). However, descriptive trends were observed. Myofascial spasm cases demonstrated stronger associations with stress and anxiety, especially in the 31–40 age group. Disc displacement was predominantly stress-related and more common among younger adults, particularly in the 21–30 age group and in acute cases. Joint disorders were largely depression-driven and were observed more frequently in older age groups (>40 years). The distribution of psychological distress across diagnostic categories is shown in Table 4.

Table 4: DASS-21 Distribution by Diagnosis

Category	Depression	Anxiety	Stress
1 - Myofascial spasm	51	51	78
2 - Disc displacement	38	37	42
3 - Joint disorders	6	4	4

4. Discussion

The present study highlights key psychosocial patterns in temporomandibular disorders (TMDs). Females reported greater distress across depression, anxiety, and stress, consistent with earlier findings by Yap et al.[8] and Antoniades et al.[9], who observed higher psychosocial burden in women with TMD. Fillingim et al.[11] also suggested that hormonal fluctuations and sociocultural factors contribute to heightened vulnerability among females. Our results, therefore, support the conclusion that sex plays a critical role in shaping the psychological experience of TMD.

The transition from stress-dominant acute cases to depression- and anxiety-dominant chronic cases reflects the temporal progression described in prior literature. Slade et al.[6] reported that chronic TMD is associated with substantial psychological comorbidity, while Durham et al.[7] emphasized the role of psychosocial variables in perpetuating pain. Velly et al.[13] further confirmed that catastrophizing and depression are important predictors of chronicity. In line with these studies, our findings demonstrate that early stress responses may be adaptive, but with chronicity, maladaptive emotional states emerge, reinforcing the biopsychosocial cycle of pain and distress.

Age-related variations were also evident in this study. Younger patients predominantly exhibited stress and anxiety, a finding that aligns with Reissmann et al.[10], who reported greater functional impact and psychosocial strain in younger TMD cohorts. Gatchel et al.[12] similarly suggested that the persistence of symptoms with age leads to emotional exhaustion and depression. These results indicate that the psychological profile of TMD patients is dynamic, shifting from stress in early life to depression in older age groups.

Although diagnostic subtypes were not statistically significant predictors of distress, descriptive patterns were noteworthy. De Leeuw and Klasser[4] suggested that myofascial pain often correlates with psychosocial distress, and our findings confirm a strong association between myofascial spasm and stress/anxiety. Disc displacement was largely stress-related in younger, acute cases, while joint disorders such as osteoarthritis and subluxation were linked with depression in older patients, consistent with the degenerative nature of these conditions. Similar conclusions were drawn by List and Jensen[14], who noted that diagnostic subtypes may shape psychosocial trajectories even in the absence of statistical significance.

The importance of structured psychological assessment is underscored using the DASS-21 tool in this study. Originally developed by Lovibond and Lovibond[2], the instrument has been validated for TMD populations by Xiong et al.[5]. Its inclusion strengthens the reliability of our findings and supports the integration of psychosocial screening into routine clinical care. Schiffman et al.[1], Okeson[3], and De Leeuw[4] have also highlighted the need for standardized diagnostic criteria, which were adopted in this study to ensure consistency and comparability.

Despite its strengths, including a large sample size, standardized diagnostic frameworks, and validated instruments, certain limitations must be acknowledged. The cross-sectional design precludes causal inference, and the use of self-reported data may have introduced bias. These limitations mirror those emphasized by List and Jensen[14], who advocated for longitudinal research to clarify the complex etiology of TMD. Future prospective studies should further explore the biological and psychosocial mechanisms underlying these associations. Incorporating validated psychosocial screening, such as the DASS-21, into clinical practice can enable early identification of at-risk patients, inform tailored management strategies, and promote multidisciplinary approaches.

5. Conclusion

This study confirms that psychological distress in TMD is strongly influenced by sex and chronicity. Females are disproportionately affected across all domains, while acute cases are dominated by stress and chronic cases by depression. The results underscore the need for incorporating DASS-21 screening into routine care. Early recognition and management of psychosocial distress may prevent chronicity, enhance treatment outcomes, and improve patient quality of life. Clinicians should adopt a multidisciplinary approach, integrating dental, psychological, and behavioral strategies for comprehensive TMD care.

References

[1] Schiffman E, Ohrbach R, Truelove E, et al. (2014), “Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) for Clinical and Research Applications.” Journal of Oral & Facial Pain and Headache, 28(1), 6-27.
[2] Lovibond SH, Lovibond PF. (1995), Manual for the Depression Anxiety Stress Scales (DASS), 2nd ed. Sydney: Psychology Foundation.
[3] Okeson JP. (2020), Management of Temporomandibular Disorders and Occlusion, 8th ed. St. Louis: Elsevier.
[4] De Leeuw R, Klasser GD (eds). (2018), Orofacial Pain: Guidelines for Assessment, Diagnosis, and Management, 6th ed. Chicago: Quintessence.
[5] Xiong Y, Yap AU, Marpaung C, Wong MCM. (2025), “Depression, Anxiety, Stress Scales-21: PCA and evaluation of abbreviated versions in young adults with TMDs.” PLoS ONE, 20(1), e0316703.
[6] Slade GD, Ohrbach R, Greenspan JD, Fillingim RB, Bair E, Sanders AE, et al. (2016), “Painful Temporomandibular Disorder: Decade of Discovery from OPPERA Studies.” Journal of Dental Research, 95(10), 1084-1092.
[7] Durham J, Raphael KG, Benoliel R, Ceusters W, Michelotti A, Ohrbach R. (2015), “Perspectives on next steps in classification of oro-facial pain – part 2: role of psychosocial factors.” Journal of Oral Rehabilitation, 42(12), 942-955.
[8] Yap AU, Dworkin SF, Chua EK, List T, Tan KB, Tan HH. (2003), “Prevalence of temporomandibular disorder subtypes, psychologic distress, and psychosocial dysfunction in Asian patients.” Journal of Orofacial Pain, 17(1), 21-28.
[9] Antoniades C, Hadjipavlou M, Antoniades V, Hadjistavrou C. (2011), “Temporomandibular dysfunction and depression in university students.” Journal of Oral Rehabilitation, 38(8), 576-582.
[10] Reissmann DR, John MT, Schierz O, Wassell RW. (2007), “Functional and psychosocial impact related to specific temporomandibular disorder diagnoses.” Journal of Dentistry, 35(8), 643-650.
[11] Fillingim RB, King CD, Ribeiro-Dasilva MC, Rahim-Williams B, Riley JL. (2009), “Sex, gender, and pain: a review of recent clinical and experimental findings.” Journal of Pain, 10(5), 447-485.
[12] Gatchel RJ, Peng YB, Peters ML, Fuchs PN, Turk DC. (2007), “The biopsychosocial approach to chronic pain: scientific advances and future directions.” Psychological Bulletin, 133(4), 581-624.
[13] Velly AM, Look JO, Carlson C, Lenton PA, Kang W, Holcroft CA, et al. (2011), “The effect of catastrophizing and depression on chronic pain—A prospective cohort study of TMD patients.” Pain, 152(10), 2377-2383.
[14] List T, Jensen RH. (2017), “Temporomandibular disorders: Old ideas and new concepts.” Cephalalgia, 37(7), 692-704.