International Journal of Dentistry Research

Research Article

ISSN: 2581-3218
IJDR 2024; 9(3): 78-82
Received: 06-09-2024
Accepted: 10-11-2024

www.dentistryscience.com
doi: 10.31254/dentistry.2024.9303

Association of oral over use behaviours and stress with Temporomandibular Disorders among adolescent's in Vikarabad- A cross sectional study

Niharika Dara[1], Sheetal. A[2], Abhinav TN[2], P. Parthasarathi[3], Monica. M[4], Koppula Yadav Rao[3]

[1] Postgraduate, Department of Public Health Dentistry, Sri Sai College of Dental Surgery, Vikarabad, Telangana, India

[2] Associate Professor, Department of Public Health Dentistry, Sri Sai College of Dental Surgery, Vikarabad, Telangana, India

[3] Professor, Department of Public Health Dentistry, Sri Sai College of Dental Surgery, Vikarabad, Telangana, India

[4] Professor & HOD, Department of Public Health Dentistry, Sri Sai College of Dental Surgery, Vikarabad, Telangana, India

Abstract

Introduction: Oral overuse behaviors, which include activities beyond essential functions like chewing, swallowing, and talking, present differently across age groups. Objectives: To determine the association between Oral Overuse Behaviors with the Temporomandibular disorders (TMD's). To determine the association between Stress with the TMD's. Materials and Methods: In this cross-sectional study, 725 students from Vikarabad Pre-University colleges were surveyed using a Personal History Questionnaire, the Oral Behavior Checklist, the Perceived Stress Questionnaire, and the Fonseca Questionnaire. Exclusions included students undergoing orthodontic treatment or recent oral or orthognathic surgeries, those absent on the day of data collection, and those unwilling to participate. Data analysis involved descriptive statistics, Pearson correlation, and linear regression using SPSS version 25. Results: Of the 725 participants, 372 (51.3%) were male, and 353 (48.7%) were female. The stress levels were as follows: 54.1% had moderate stress, 32% had low stress, and 13.9% had high stress. Regarding TMD, 34.6% had no TMD, while 5% had severe TMD. There was a significant correlation between TMD severity, oral overuse behaviors, and stress. The severity of TMD increased significantly with oral overuse behaviors and stress. With each additional year of age, TMD severity was predicted to increase by 2.88 units. Compared to males, females were 2.55 times less likely to have severe TMD. The independent variables together explained 55% of the variance in TMD severity. Conclusion: Both oral overuse behaviours and stress are significantly associated with TMD severity. The study indicates that as age increases, TMD severity tends to rise, and females are less likely to experience severe TMD compared to males. The independent variables accounted for 55% of the variance in TMD severity. Keywords: TMD, Oral Overuse Behaviours, Stress, Adolescents, Fonseca, Perceived Stress Scale.

Keywords: Adolescent, Temporomandibular disorders, Anxiety disorders.

INTRODUCTION

Oral overuse behaviours, activities beyond the essential functions of chewing, swallowing, and talking, exhibit different manifestations across age groups. Some behaviours are more common in younger individuals, while others remain consistent throughout life [1]. These behaviours rely on the Temporomandibular Joint (TMJ), a hinge joint on either side of the face that enables unrestricted movement of the jaw during speech and mastication. The TMJ is controlled by muscles attached to and surrounding the joint [2]. Temporomandibular Disorders (TMD) can arise from clenching, head and neck injuries, anxiety, and malocclusion, affecting the masticatory muscles, TMJ, or both, as defined by the American Academy of Orofacial Pain (AAOP). Surprisingly, while 60-70% of the general population experience TMD symptoms at some point in their lives, only 5% actually seek treatment [3].

TMD displays a higher prevalence in women, with approximately 80% of patients being female, according to Bonjardic et al. Epidemiological studies reveal that TMJ disorder symptoms affect 60% of the entire population and over one-third of children and adolescents [4]. The prevalence and severity of TMJ disorder symptoms increase, particularly in girls aged 12-15, and continue to rise with advancing age. Typical TMD symptoms include sounds in the TMJ area, morning jaw stiffness, fatigue in the jaw, TMJ region pain, and mandibular locking or dislocation during mouth opening. Habits, such as clenching and bruxism, along with other oral behaviours, contribute to increased muscle tension, even without tooth contact or jaw movement. Trauma to the facial structures can also disrupt the masticatory system's function, leading to

***Corresponding author:**
Dr. Niharika Dara
Postgraduate, Department of Public Health Dentistry, Sri Sai College of Dental Surgery, Vikarabad, Telangana, India
Email: niharikadara@gmail.com

structural alterations [5].

Anxiety disorders, the most common psychiatric disorders, play a significant role in the pathogenesis of TMD. Elevated anxiety levels can increase muscle activity in the masticatory system, potentially causing TMD. Anxiety disorders have a worldwide prevalence of 7.3% [6]. Another risk factor for developing TMD later in life is malocclusion during childhood and adolescence, as it can decrease masticatory performance [7]. Occlusal disturbances and interferences have a strong correlation with TMD, resulting in temporomandibular joint instability and hyperactivity in the masticatory muscles. However, the influence of occlusion on the onset of TMD remains debated and controversial. There are studies addresses the underreported issue of Temporomandibular Disorders (TMD) and their diverse manifestations across adolescent age groups. With a focus on oral overuse behaviors, it explores the prevalence, risk factors, and potential impact on the temporomandibular joint [8], Hence this study was conducted shedding light on the need for increased awareness and early intervention to improve overall oral health. Understanding TMD's connections to anxiety, malocclusion, and other factors is crucial for promoting proactive care, given the discrepancy between symptom prevalence and actual treatment-seeking behavior.

METHODOLOGY

A cross-sectional study was conducted among 725 Pre-University Students with the mean age of 17 years. Ethical clearance was obtained from the institutional review board of Sri Sai College of Dental Surgery, Vikarabad. And Informed consent from the students was taken. A pilot study involving 50 students, not included in the main study, was conducted to assess the feasibility of data collection and identify any difficulties. Based on the pilot study, the total sample size of 725 was estimated using the Cochran formula (1977) to achieve adequate precision in estimating population prevalence. N = (Zα)2 pq/ d2 Where, N = Sample size required, Z = Critical value for a corresponding level of confidence = 1.96 for 95% confidence level, p = 4%=0.40 q= 6%= 0.60, D =Acceptable margin of error = 5%=0.05. kappa value of 0.85

Instruments Used

Three standardized questionnaires were used:

1. Oral Behavioural Checklist: This checklist consisted of 21 questions assessing oral overuse behaviours during waking hours and sleep.

2. Fonseca's Questionnaire: This questionnaire comprised 10 questions to assess TMD symptoms, including difficulty in opening the mouth, jaw pain, muscular pain, frequent headaches, and pain in the temporomandibular joint (TMJ).
3. Perceived Stress Scale: This scale included 10 questions to measure the level of perceived stress.

A non-probability sampling technique was employed. All Pre-University colleges in Vikarabad were included, and students present on the day of data collection were invited to participate until the desired sample size was attained. Students undergoing orthodontic treatment or recent oral or orthognathic surgeries, as well as those absent on the day of data collection or unwilling to participate, were excluded.

Data collection was conducted systematically over a two-month period from June 1, 2022, to August 30, 2022. Detailed schedules were prepared in advance, and adjustments were made as required. Seven Pre-University colleges in Vikarabad granted permission for data collection. Students were provided with detailed study information, assured of confidentiality, and given pre-determined questionnaires with instructions. Filled questionnaires were collected, and data were entered into Microsoft Excel for analysis.

Statistical analysis

Descriptive statistical analysis, including frequency tables for variables such as age, gender, and type of institution, was performed using SPSS version 25. Pearson correlation and linear regression analyses were conducted to assess significant associations between oral overuse behaviours, stress levels, and TMD.

RESULTS

In this study, the sample population consisted of 725 individuals, with mean age of 16, 51.3% being male and 48.7% female. The majority of participants were enrolled in private institutions (64.7%) compared to government institutions (35.3%). Table 1 shows the frequencies regarding oral health habits, 45.0% exhibited normal oral use, 39.3% had low overuse, and 15.7% displayed high overuse. Stress levels were categorized as low in 32.0% of the participants, moderate in 54.1%, and high in 13.9%. Temporomandibular Disorders (TMD) severity varied, with 34.6% having no TMD, 48.3% experiencing mild TMD, 12.1% having moderate TMD, and 5.0% with severe TMD.

Table 1: Frequency of the Variables – Oral overuse, Stress, TMD

Variables	Frequency	Percent
Oral overuse		
Normal	326	45.0
Low overuse	285	39.3
High overuse	114	15.7
Stress		
Low stress	232	32.0
Moderate stress	392	54.1
High stress	101	13.9
TMD		
No Tmd	251	34.6
Mild Tmd	350	48.3
Moderate Tmd	88	12.1
SEVERE TMD	36	5.0

Table 2: Corelation of TMD severity with oral overuse and Stress

Variables correlated	mean ± SD	Correlation coefficient (r)	P value
TMD severity	25.68 ± 16.742	0.583	0.000
Oral overuse	17.35 ± 7.798		
TMD severity	25.68 ± 16.742	0.628	0.001
Stress	15.49 ± 5.30		

Table 3: Linear regression with TMD severity score as the outcome variable and age, gender, type of institution, stress and oral overuse as predictors

Predictors	Regression coefficient (b)	Lower CI for b	Upper CI for b	P value
(Constant)	-56.611	-79.144	-34.079	0.000
Gender	-2.553	-4.562	-0.543	0.013
Oral overuse	0.852	0.738	0.967	0.000
Stress	1.412	1.259	1.565	0.000
Age	2.882	1.615	4.150	0.000
Type of institution	-1.063	-3.174	1.048	0.323
R^2; p value	0.55; <0.001			

Table 2 statistical analyses revealed a significant positive correlation between TMD severity and both oral overuse ($r = 0.583$, $p < 0.001$) and stress ($r = 0.628$, $p = 0.001$). A linear regression model was applied to predict TMD severity, considering age, gender, type of institution, stress, and oral overuse as predictors. In table 3 the results indicated that gender ($b = -2.553$, $p = 0.013$), oral overuse ($b = 0.852$, $p < 0.001$), stress ($b = 1.412$, $p < 0.001$), and age ($b = 2.882$, $p < 0.001$) significantly contributed to TMD severity, while the type of institution did not show a significant association ($b = -1.063$, $p = 0.323$). Overall, these findings provide valuable insights into the interplay between oral habits, stress, and demographic factors in relation to TMD severity within the studied population.

DISCUSSION

This study focuses on oral behaviours and stress in adolescents, as this period is crucial for their social and emotional development, since they represent the early period of adaptation to adulthood and may provide unique insights into risk factors [1]. Temporomandibular disturbances (TMD) are one aspect of this development, and it is important to monitor and address TMJ and TMD problems to reduce their prevalence. Oro-facial pain is responsible for a significant number of health consultations and dental appointments among adolescents [8]. However, there is a lack of knowledge and appropriate pain management in this population, emphasizing the need for further research in this area. Vikarabad is a district in the Indian state of Telangana, renowned for its diverse topography that includes hills, forests, and agricultural landscapes. The region holds historical significance, featuring ancient forts and temples that attract visitors. Vikarabad district encompasses a mix of urban and rural areas, fostering a unique blend of traditional and modern lifestyles.

The study included 725 adolescents, predominantly aged 16-17 years, with 51.3% being males and 48.7% females, Private institutions accounted for 64.7% of participants, while government institutions represented 35.3%. The inclusion of various institutions aimed to cover a wide range of socioeconomic backgrounds. The Oral Behavioural Checklist (OBC) was used as a self-reporting tool to assess oral overuse behaviours. The OBC showed good reliability in measuring unconscious behaviours, potentially due to the interaction between participants and the instrument, facilitating greater access to memory regarding these behaviours. The study found that 55% of participants exhibited oral overuse behaviours, while 45% were considered normal. This prevalence was lower than in other similar studies that used different assessment methods.

In contrast, the prevalence of oral overuse behaviours in the present sample was lower than that reported in other comparable studies, Kaplan SE, Ohrbach R et al [9,10] where the prevalence of oral overuse behaviours ranged 77%–95%. While the present study used the reliable and validated OBC, the other studies like Khawaja SN et al rated a limited number (range: 4–9) of oral parafunctional behaviours using investigator-developed questionnaires of unknown reliability [11]. Consistent with previous research, females showed higher frequencies of oral overuse behaviours. This could be attributed to hormonal changes and increased interest in exploring and adapting parafunctional behaviours during adolescence. The most prevalent oral overuse behaviours observed were eating between meals and sustained talking, potentially influenced by factors such as spending time outside the home with friends and engaging in various activities [12].

Temporomandibular disorders (TMDs) encompass a diverse group of orofacial pain disorders with a multifactorial aetiology. These conditions involve the temporomandibular joint (TMJ), masticatory muscles, and dental occlusion. TMDs often manifest with symptoms like pain, and their prevalence has led to increased research into their epidemiology and etiopathogenesis [13].

65% of them had TMD problems, while 35% did not. Similar studies reported varying prevalence rates, which could be attributed to study characteristics, questionnaire timing, and population differences. Notably, females were 2.5 times more likely to experience TMD severity compared to males. Hormonal variations, connective tissue characteristics, and muscular structures unique to females may contribute to this discrepancy. Psychological factors like anxiety and depression also appear to play a role in TMD [14,15].

The study revealed that Pre-University students diagnosed with TMD reported significantly higher Oral Behaviours Checklist (OBC) sum scores compared to those without TMD. This is consistent with previous research, which associated severe TMDs with high overuse of oral behaviours. Overuse behaviours such as chewing gum, yawning, and eating sticky foods were linked to TMDs. This overuse, combined with parafunctional masticatory activity, may contribute to temporomandibular joint osteoarthritis.

Reissmann et al. and Wetselaar et al compared temporomandibular disorders with 'awake bruxism' whereby the assessment of oral awake parafunctional behaviours was limited to the evaluation of tooth contact behaviours [16-18].

Stress is a complex phenomenon that mobilizes organic resources to cope with real or potential threats. Adolescence is a critical time when individuals are vulnerable to stress due to physical, emotional, and social changes, as well as exposure to adverse conditions. The Perceived Stress Scale (PSS) is a widely used instrument to measure stress perception, assessing the appraisal of life situations as stressful. In this study, 68% of participants reported moderate to severe stress, with a gender difference observed [19,20].

Mirowsky and Ross (1995) found in their study that gender influences the appraisal process of stressful events in ways that are consistent with the differing socialization patterns of males and females [21]. Similarly, to the present study another study conducted by Wadsworth and Compass, was related to more anxiety/depression and aggression problems where the females are having more stress than the males [22].

Psychological stress is another factor associated with TMD pain. Excessive tension can lead to constant dental clenching, altering muscle circulation and ion exchange, ultimately stimulating pain receptors [23-25]. TMD and headaches also share a connection, possibly due to muscle activity involving the head and neck. Studies have shown a higher prevalence of TMD in females, with stress being a significant contributing factor [26]. Multiple studies have examined the relationship between psychological stress and TMD. Salameh et al. reported that 70% of individuals suffering from pain were women, while Dawson et al. found that patients with TMD had elevated stress scores [27]. Furthermore, Zielinski et al. demonstrated a positive correlation between stress levels (PSS-10 score) and muscular asymmetry during teeth clenching and maximal mouth opening in female medical students [28,29].

This study uncovered significant positive correlations between TMD severity and oral overuse behaviours as well as stress levels. As the frequency of oral overuse behaviours increased, so did the prevalence of TMD severity in adolescents. These findings underscore the importance of recognizing and addressing parafunctional masticatory activity during treatment, whether nonsurgical, surgical, or post-surgical.

Limitations of the study

The study focused on Pre-University students in a specific geographic location, limiting the generalizability of findings to a broader population. Future research should include a more diverse sample to enhance the external validity of the results. The study relied on self-reported data, which may be subject to bias and inaccuracies. Participants may underreport or over report certain behaviours due to social desirability or recall issues. Incorporating objective measures, such as clinical examinations, could strengthen the validity of the findings. The cross-sectional design of the study provides a snapshot of associations at a single point in time. Longitudinal studies are needed to explore the causal relationships between oral overuse behaviors, stress, and the development of temporomandibular disorders over time.

Recommendations

Develop and implement intervention programs aimed at educating adolescents about healthy oral habits and stress management techniques. These programs could be integrated into school curricula or conducted through community outreach to raise awareness and promote preventive measures against oral overuse behaviours and stress-related issues. Advocate for regular screening of adolescents for oral overuse behaviours, stress levels, and early signs of temporomandibular disorders. Dental health professionals should incorporate counselling sessions to address identified risk factors and provide guidance on maintaining oral health and managing stress. Encourage interdisciplinary collaboration between dental professionals, psychologists, and educators. By working together, these professionals can provide holistic care, addressing both oral and psychological aspects that contribute to temporomandibular disorders in adolescents.

CONCLUSION

Temporomandibular disorders are complex conditions influenced by a multitude of factors. This study highlights the prevalence of TMD and its associations with gender, oral overuse behaviours, and stress. Understanding these factors and their interactions is crucial for improving diagnosis and treatment strategies for TMD patients. Further research in this area is essential to refine our understanding of these disorders and enhance patient care.

Conflicts of Interest

The author reports no conflicts of interest.

Funding

None declared.

REFERENCES

1. Van der Meulen MJ, Lobbezoo F, Aartman IH, Naeije M. Validity of the Oral Behaviours Checklist: correlations between OBC scores and intensity of facial pain. J Oral Rehabil. 2014;41(2):115-121.
2. Helkimo M. Studies on function and dysfunction of the masticatory system. IV. Age and sex distribution of symptoms of dysfunction of the masticatory system in Lapps in the north of Finland. Acta Odontol Scand. 1974;32(4):255-267.
3. Pimenta e Silva Machado L, de Góis Nery C, Rodrigues Leles C, Batista de Macedo Nery M, Okeson JP. The prevalence of clinical diagnostic groups in patients with temporomandibular disorders. CRANIO®. 2009;27(3):194-9.
4. Bonjardim LR, Lopes-Filho RJ, Amado G, Albuquerque RL, Goncalves SR. Association between symptoms of temporomandibular disorders and gender, morphological occlusion, and psychological factors in a group of university students. Indian Journal of dental research. 2009;20(2):190.
5. Pereira LJ, Duarte Gavião MB, Bonjardim LR, Castelo PM, Andrade AD. Ultrasonography and electromyography of masticatory muscles in a group of adolescents with signs and symptoms of TMD. Journal of Clinical Pediatric Dentistry. 2006;30(4):314-9.
6. Luyk NH, Steinberg B. Aetiology and diagnosis of clinically evident jaw trismus. Australian dental journal. 1990;35(6):523-9.
7. Bilgiç F, Gelgör İE. Prevalence of temporomandibular dysfunction and its association with malocclusion in children: an epidemiologic study. Journal of Clinical Pediatric Dentistry. 2017;41(2):161-5.
8. Barbosa C, Manso MC, Reis T, Soares T, Gavinha S, Ohrbach R. Are oral overuse behaviours associated with painful temporomandibular disorders? A cross-sectional study in Portuguese university students. Journal of Oral Rehabilitation. 2021;48(10):1099-108.
9. Kaplan SE, Ohrbach R. Self-report of waking-state oral parafunctional behaviors in the natural environment. J Oral Facial Pain Headache. 2016;30(2):107-119.
10. Ohrbach R, Michelotti A. The role of stress in the etiology of oral parafunction and myofascial pain. Oral Maxillofac Surg Clin North Am. 2018;30(3):369-379.

11. Khawaja SN, Nickel JC, Iwasaki LR, Crow HC, Gonzalez Y. Association between waking-state oral parafunctional behaviours and bio-psychosocial characteristics. J Oral Rehabil. 2015;42(9):651- 656.
12. Moghtare V, KuMar J, KaMate S, KuShwaha S, Anand R, Gupta N, Gupta B, Singh I. Association between harmful oral habits and sign and symptoms of temporomandibular joint disorders among adolescents. Journal of clinical and diagnostic research: JCDR. 2015;9(8):ZC45.
13. Wetselaar P, Vermaire EJH, Lobbezoo F, Schuller AA. The prevalence of awake bruxism and sleep bruxism in the Dutch adult population. J Oral Rehabil. 2019;46(7):617-623.
14. Poveda Roda R, Bagán JV, Díaz Fernández JM, Hernández Bazán S, Jiménez Soriano Y. Review of temporomandibular joint pathology: Part I: Classification, epidemiology and risk factors. Medicina Oral, Patología Oral y Cirugía Bucal (Internet). 2007;12(4):292-8.
15. Otuyemi OD, Owotade FJ, Ugboko VI, Ndukwe KC, Olusile OA. Prevalence of signs and symptoms of temporomandibular disorders in young Nigerian adults. Journal of Orthodontics. 2000;27(1):61-6.
16. Muzalev K, van Selms MK, Lobbezoo F. No dose-response association between self-reported bruxism and pain-related temporomandibular disorders: a retrospective study. J Oral Facial Pain Headache. 2018;32(4):375-380.
17. Manfredini D, Ahlberg J, Wetselaar P, Svensson P, Lobbezoo F. The bruxism construct: from cut-off points to a continuum spectrum. J Oral Rehabil. 2019;46(11):991-997.
18. Reissmann DR, John MT, Aigner A, Schön G, Sierwald I, Schiffman EL. Interaction between awake and sleep bruxism is associated with increased presence of painful temporomandibular disorder. J Oral Facial Pain Headache. 2017;31(4):299-305.
19. Chow JC, Cioffi I. Effects of trait anxiety, somatosensory amplification, and facial pain on self-reported oral behaviors. Clin Oral Investig. 2019;23(4):1653-1661.
20. Andreou E, Alexopoulos EC, Lionis C, Varvogli L, Gnardellis C, Chrousos GP, Darviri C. Perceived stress scale: reliability and validity study in Greece. International journal of environmental research and public health. 2011;8(8):3287-98.
21. Gagné MA. Worry and the traditional stress model. National Library of Canada. 1998; 1-314.
22. Wadsworth ME, Compas BE. Coping with family conflict and economic strain: The adolescent perspective. Journal of research on adolescence. 2002;12(2):243-74.
23. Ohrbach R, Markiewicz MR, McCall WD Jr. Waking-state oral parafunctional behaviors: specificity and validity as assessed by electromyography. Eur J Oral Sci. 2008;116(5):438-444.
24. Uhač I, Kovač Z, Valentić-Peruzović M, Juretić M, Moro LJ, Gržić R. The influence of war stress on the prevalence of signs and symptoms of temporomandibular disorders. Journal of oral rehabilitation. 2003;30(2):211-7.
25. Nomura K, Vitti M, Oliveira AS, Chaves TC, Semprini M, Siéssere S, Hallak JE, Regalo SC. Use of the Fonseca's questionnaire to assess the prevalence and severity of temporomandibular disorders in Brazilian dental undergraduates. Brazilian dental journal. 2007;18:163-7.
26. Oliveira AS, Dias EM, Contato RG, Berzin F. Prevalence study of signs and symptoms of temporomandibular disorder in Brazilian college students. Brazilian oral research. 2006;20:3-7.
27. Salameh E, Alshaarani F, Abou Hamed H, Abou Nassar J. Investigation of the relationship between psychosocial stress and temporomandibular disorder in adults by measuring salivary cortisol concentration: A case-control study. The Journal of the Indian Prosthodontic Society. 2015;15(2):148.
28. Dawson A, Stensson N, Ghafouri B, Gerdle B, List T, Svensson P, Ernberg M. Dopamine in plasma–a biomarker for myofascial TMD pain?. The journal of headache and pain. 2016;17:1-7
29. Zieliński G, Ginszt M, Zawadka M, Rutkowska K, Podstawka Z, Szkutnik J, Majcher P, Gawda P. The relationship between stress and masticatory muscle activity in female students. Journal of Clinical Medicine. 2021;10(16):3459.

HOW TO CITE THIS ARTICLE-
Dara N, Sheetal A, Abhinav TN, Parthasarathi P, Monica M, Rao KY. Association of oral over use behaviours and stress with Temporomandibular Disorders among adolescent's in Vikarabad- A cross sectional study. Int J Dent Res 2024; 9(3):78-82. doi: 10.31254/dentistry.2024.9303