

Prevalence of Temporomandibular Joint Pain among Patients who Reported to Dental OPD at a Tertiary Hospital in Pondicherry, India: A Cross-sectional Study

SAJANI RAMACHANDRAN¹, K RAVICHANDRAN²

ABSTRACT

Introduction: Temporomandibular Joint Disorder (TMJD) is a debilitating condition that affects the quality of a person's life. However, its aetiology remains controversial. Understanding the signs and symptoms associated with this condition is crucial for better comprehension. Determining the prevalence of TMJD can emphasise the importance of routine Temporomandibular Joint (TMJ) examinations and the implementation of preventive measures.

Aim: To determine the prevalence of TMJ pain among patients who reported to the dental Outpatient Department (OPD) between January 2015 and December 2019. Additionally, the study sought to identify potential predisposing factors for TMJ pain.

Materials and Methods: A cross-sectional study was conducted in the Dental Department at Pondicherry Institute of Medical Sciences, Pondicherry, India. The study duration was six months, from December 2021 to May 2022. The study was done by examining the medical records of all patients who reported TMJ pain during the specified period. A total of 32,094 patients' records were reviewed, and 322 patients reported pain in the TMJ region. The patients' reported signs and symptoms were extracted from their case records and evaluated. Pearson's Chi-square/Fisher's-

exact test was utilised to determine associations between the factors.

Results: The mean age of the participants was 35.4±13.2 years. Out of the 32,094 patients who attended the dental OPD, 327 (1.02%; 95% CI: 0.91-1.13) reported TMJ pain. Among these patients, 207 (63.3%) were females. Joint sounds were the most common symptom, observed in 243 (74.3%) patients, followed by emotional stress or tension, reported by 205 (62.7%) patients. Most symptoms were more prevalent in females than males. Parafunctional habits and stress/tension showed a statistically significant association ($p<0.001$) with male gender. Additionally, occlusal variation, joint sound, missing teeth, chewing with one side, parafunctional habits, and stress showed associations with age.

Conclusion: The TMJ pain was more frequently reported by women than men in the studied population. The most common symptoms reported were pain and joint sounds. The highest number of patients fell within the 30 years-55 years age group. Although the prevalence identified was 1.02%, routine TMJ examination should be conducted as a standard part of oral and maxillofacial examinations to identify any predisposing factors that may lead to TMJD in the future.

Keywords: Bruxism, Chewing, Otagia, Pain, Splint, Tinnitus

INTRODUCTION

Temporomandibular Joint Disorders (TMJDs) encompass a group of painful conditions that affect orofacial structures and are often characterised by signs and symptoms in the masticatory and articular systems of the joint. Patients suffering from TMJDs experience distress and seek a relief from their painful condition. However, the aetiology of this condition remains complex, as it can be influenced by various factors such as improper body postures, parafunctional habits, occlusal instability, trauma, dental restorations, orthodontic treatments, systemic factors, or emotional stress [1]. Often, early symptoms are disregarded, and patients only seek professional help when the symptoms become severe and significantly impact their quality of life. Identifying the contributing factors is crucial for effective TMJD management [2]. Common signs and symptoms of TMJDs include pain, clicking, crepitus, difficulty in mandibular movements, tinnitus, and headaches [3]. These symptoms may occur individually or in combination with each other. Pain, being the most significant symptom, is typically the primary reason why patients seek assistance. Treatment for TMD is typically multidisciplinary, with initial management focusing on conservative approaches. Therapeutic and reversible interventions include medication, intraoral appliance therapy, and physiotherapy. Irreversible treatments like selective occlusal adjustments are considered only if symptoms persist [3].

The prevalence of temporomandibular disorders has been reported to affect 5%-12% of the population, although it varies depending on geography, setting, and gender [4]. Determining the prevalence of TMJDs is important for screening, early diagnosis, and providing appropriate treatment. It also highlights the significance of TMJ examination in routine dental check-ups and the implementation of preventive measures. The present study was conducted to determine the prevalence of patients reporting TMJ pain at the dental OPD of a tertiary hospital in Pondicherry. While numerous studies [4,5] have been conducted in different geographical locations, there is a lack of comprehensive retrospective studies in this region that explore the various signs and symptoms associated with TMJ pain, the management methods employed, and long-term follow-up with multiple visits. Additionally, referrals of patients from other medical specialties who also experience TMJ pain and other symptoms were considered to identify possible predisposing factors for temporomandibular joint pain.

MATERIALS AND METHODS

The cross-sectional study was conducted in the Dental Department at Pondicherry Institute of Medical Sciences, Pondicherry, India. The study duration was six months from December 2021 to May 2022, following clearance from the Institute Ethics Committee (IEC:

RC/2021/54). A retrospective analysis was performed to determine the prevalence of patients reporting TMJ pain at the dental OPD between January 2015 and December 2019. The medical records of all patients were electronically accessible through the hospital information system.

During the five-year period, a total of 32,094 patients attended the OPD, with 15,317 (47.7%) being male and 16,777 (52.3%) being female. The records of patients who reported temporomandibular joint pain were identified, and relevant data for the study was collected. There were 11 (0.03%) patients with incomplete records regarding joint pain who were excluded from the study.

Inclusion criteria: Adult patients of both genders presenting with complaints of temporomandibular joint pain were included in the study.

Exclusion criteria: Patients with complaints of pain due to erupting wisdom teeth or any other odontogenic pain. Patients with a history of orthodontic treatment and with any neurological or musculoskeletal disorders. Patients with craniofacial anomalies and previous histories of facial trauma, TMJ surgeries, TMJ trauma, or fractures. Patients with incomplete records regarding joint pain were excluded from the study.

Sample size calculation: The records of all patients who reported TMJ pain were reviewed, and a data extraction sheet was used to record the collected information. Demographic data, details about joint pain, associated symptoms, joint sounds, occlusal variations, missing teeth, parafunctional habits, chewing with one side, emotional stress, treatment administered, referrals from other medical specialties, and the number of visits were recorded. Individuals with pain persisting for more than two consecutive visits were considered to have chronic pain [6].

STATISTICAL ANALYSIS

Categorical variables were presented as numbers and percentages, while quantitative variables were presented as mean and Standard Deviation (SD). The association between gender and factors such as age and symptoms was determined using the Pearson's Chi-square test or Fisher's-exact test. A p-value less than 0.05 was considered statistically significant. Data entry and analysis were performed using Microsoft Excel.

RESULTS

Out of the 32,094 patients who attended the dental OPD, 327 (1.02%; 95% CI: 0.91-1.13) reported TMJ pain. Among these, 207 (63.3%) were females [Table/Fig-1]. The mean age of OPD patients was 51.5±10 years, while the mean age of TMJ patients was 35.4±13.2 years. The youngest TMJ patient was 18-year-old, while the oldest was 82-year-old. Five completely edentulous patients reported TMJ pain. Two patients who reported pain in the TMJ region were diagnosed with trigeminal neuralgia. Among patients with TMJ pain, the most commonly reported symptom was "joint sounds," with 243 patients (74.3%) experiencing this symptom. Among those with TMJ sounds, 155 (63.8%) were females. Emotional stress or tension was reported by 205 patients (62.7%), and this was more common

Year	Male		Female		Total	
	OPD patients	TMJ pain patients n (%)	OPD patients	TMJ pain patients n (%)	OPD patients	TMJ pain patients n (%)
2015	2,976	26 (0.87)	3,014	49 (1.63)	5,990	75 (1.25)
2016	2,998	24 (0.80)	3,427	49 (1.43)	6,425	73 (1.14)
2017	3,136	29 (0.92)	3,514	53 (1.51)	6,650	82 (1.23)
2018	3,194	19 (0.59)	3,670	29 (0.79)	6,864	48 (0.70)
2019	3,013	22 (0.73)	3,152	27 (0.86)	6,165	49 (0.79)
Total	15,317	120 (0.78)	16,777	207 (1.23)	32,094	327 (1.02)

[Table/Fig-1]: Year-wise number of OPD patients and patients with TMJ pain by gender during 2015-2019.

in females, with 162 (79.0%) experiencing it. Parafunctional habits and stress/tension showed a statistically significant association with gender [Table/Fig-2]. All patients who reported TMJ pain were prescribed analgesics or muscle relaxants at the initial appointment. Patients with missing teeth and the habit of chewing on one side were advised to replace the missing teeth. Occlusal splints were provided for 35 patients (10.7%), of which 26 (74.3%) were females.

Clinical findings/symptoms	Male (n=120)	Female (n=207)	Total (n=327)	p-value
	n (%)	n (%)	n (%)	
Joint sounds	88 (36.2)	155 (63.8)	243 (74.3)	0.758
Stress/tension	43 (21.0)	162 (79.0)	205 (62.7)	<0.001
Missing teeth	61 (35.9)	109 (64.1)	170 (52.0)	0.750
Chewing with one-side	62 (37.1)	105 (62.9)	167 (51.1)	0.870
Occlusal variation	57 (36.5)	99 (63.5)	156 (47.7)	0.955
Otalgia	49 (32.9)	100 (67.1)	149 (45.6)	0.191
Headache	15 (46.9)	17 (53.1)	32 (9.8)	0.209
Bruxism/clenching	17 (70.8)	7 (29.2)	24 (7.3)	<0.001
Undergoing psychiatric treatment	4 (23.5)	13 (76.5)	17 (5.2)	0.247
Pain in other joints	8 (61.5)	5 (38.5)	13 (4.0)	0.077

[Table/Fig-2]: Gender-wise distribution of various clinical findings/symptoms among patients with temporomandibular joint pain.

*Total will add up more because few individuals had more than one clinical finding/symptom; **percentage to within clinical findings/symptoms; ***percentage to total patients with temporomandibular joint pain

After the first visit, 237 patients (72.5%) did not report back with pain. Chronic pain was observed in 23 patients (7.0%), with 19 (82.6%) of them being females. Among those with chronic pain, splint therapy was provided for 13 patients (56.5%). The highest number of patients was in the age group of 30 to 59 years (58.1%), followed by the age group of 18-29 years (36.1%). All symptoms were most commonly observed in the age group of 30-59 years. Except for headache and otalgia, all symptoms were significantly associated with age. The number of missing teeth, chewing on one side, and occlusal variations were found to be significantly related to age [Table/Fig-3]. Some patients who reported to other medical specialists were referred to the dental OPD for their associated TMJ pain [Table/Fig-4].

Clinical findings/symptoms	Total (n=327)	18-29 years (n=118)	30-59 years (n=190)	≥60 years (n=19)	p-value
		n (%)	n (%)	n (%)	
Joint sounds	243	65 (26.7)	162 (66.7)	16 (6.6)	<0.001
Stress/tension	205	65 (31.7)	139 (67.8)	1 (0.5)	<0.001
Missing teeth	170	13 (7.6)	138 (81.2)	19 (11.2)	<0.001
Chewing with one-side	167	22 (13.2)	128 (76.6)	17 (10.2)	<0.001
Occlusal variation	156	15 (9.6)	122 (78.2)	19 (12.2)	<0.001
Otalgia	149	46 (30.9)	97 (65.1)	6 (4.0)	0.053
Headache	32	9 (28.1)	22 (68.8)	1 (3.1)	0.499
Parafunctional habits	24	0	21 (87.5)	3 (12.5)	<0.001
Undergoing psychiatric treatment	17	5 (29.4)	12 (70.6)	0	0.064
Pain in other joints	13	5 (38.5)	8 (61.5)	0	1

[Table/Fig-3]: Presence of various clinical findings/symptoms by age groups. Note: Numbers in brackets are percentages to within clinical findings/symptoms

Specialty	Male (n=120)	Female (n=207)	Total (n=327)
	n (%)	n (%)	n (%)
ENT	49 (40.8)	100 (48.30)	149 (45.6)
Neurology	15 (12.5)	17 (8.2)	32 (9.7)
Psychiatry	4 (3.3)	13 (6.3)	17 (5.2)
Orthopedics	8 (6.7)	5 (2.4)	13 (3.9)

[Table/Fig-4]: Referrals from other medical specialties.

*Percentage in relation to the number of male TMJ patients; ** Percentage in relation to number of female TMJ patients; ***Percentage in relation to number of TMJ patients; ENT: Ear nose throat

DISCUSSION

The TMJDs can affect the function of the joint and the muscles of mastication. The pain in the TMJ region may arise from problems in the articular region, adjacent structures, or a combination of factors. Previous studies have consistently shown that TMJ pain and symptoms are more common in females compared to males [7-9], which is also consistent with the findings of the present study. The Temporomandibular Disorders (TMDs) has a multifactorial aetiology, with a strong bio psychosocial component and various other factors [4,10]. The peak prevalence of TMJ disorders is reported to be between 45-64 years [11,12]. In the present study, highest number of patients belonged to the age group of 30 to 59 years (58.1%), followed by the age group of 18-29 years (36.1%). The mean age of TMJ patients in the present study was 35.4 years, similar to the findings of Alhussini DA et al., [13].

Temporomandibular joint sounds are reported in 25%-50% of the general population [14]. There are different opinions regarding the clinical significance of these sounds, including their association with joint pathology or mechanical interference within the joint [15]. Tenderness with crepitus is often seen in intra-articular derangement whereas on the other hand pain during mandibular movement with headache and referred pain suggest a muscular problem [16]. In the present study, joint sounds were found in 74.3% of TMJ patients, which is higher than the findings of Miyake R et al., [17]. The relationship between missing teeth and TMJ pain is still controversial. Some propose that the lack of posterior teeth can lead to mandibular overclosure and entrapment of the auriculotemporal nerve, resulting in pain [18]. In the present study, five completely edentulous patients reported pain in the TMJ region.

Chronic pain has a significant impact on a patient's quality of life. Orofacial pain, including TMJ pain, is more prevalent in girls and adult women compared to men [1]. The increase in prevalence of psychosocial factors such as stress, depression, and anxiety in young adults and adolescents may contribute to the higher prevalence of orofacial pain [9]. In the present study, stress was self-reported by 62.7% of patients, and 5.2% were undergoing psychiatric treatment. Occlusal abnormalities and parafunctional habits like bruxism and clenching can contribute to TMJ pain [8,19]. In the present study, occlusal variations were observed in 47.71% of TMJ pain patients, while self-reported parafunctional habits were seen in only 7.34%. Headache, particularly tension headache, is a commonly associated with TMD [20]. TMD is a possible cause of headache, as a positive correlation was found between TMD and the presence of headache in studies done by Paolo C et al., and Samantha B et al., [21,22]. Associated symptoms like headache were reported by Alkhubaizi Q et al., in 15.4%, in present study headache was reported by 9.8% [4]. Bertoli FM et al., reported most frequently associated symptoms was headache and backache 20.9% [23].

Otological symptoms such as otalgia, tinnitus and aural fullness can be associated with TMD [24]. In the present study, otalgia was found in 149 (45.6%) patients, with the highest number of cases in the age group of 30-59 years. The higher prevalence of TMJ disorders in women may be related to hormonal factors and increased sensitivity to biological stimuli [24,25]. Additionally, societal expectations and cultural differences in expressing pain may play a role [26]. Overall, the present study's findings align with previous studies regarding the higher prevalence of TMJ pain and symptoms in females, the age distribution of TMJ disorders, the association with joint sounds and occlusal variations, and the presence of associated symptoms like headache and otalgia. The TMDs are not limited to pain in the TMJ region, but can also cause pain in the head, neck, and other joints. TMDs are often associated with systemic disorders such as fibromyalgia, irritable bowel syndrome, and sleep disorders [27]. In individuals with rheumatoid disease, joint sounds may be caused by a decrease in synovial fluid and condylar wear, as they often

have a degenerating form of TMJ disease. An association between unilateral mastication and mouth opening crepitus, myofascial pain, or joint locking was not found in a study by Souza RC et al., whereas in the present study, 51.1% of patients reported chewing on one side [28]. Patients with ankylosing spondylitis also have a high prevalence of TMJ disorders, according to Lomas J et al., [17]. In the present study, 4% of patients reported pain in other joints.

A study by Marklund S et al., on TMJ pain among university students found that the persistence of signs and symptoms was related to gender, but the incidence was not. In the present study, symptoms were found to persist more in females [29]. Various studies have been conducted in different geographical areas, and the results have varied [Table/Fig-5] [4,5,8,20,30-43].

Author of the study	Place and year of the study	Sample size	Variables	Results/conclusions
Henrikson B et al., [5]	Sweden 2020	1,80308	Pain in orofacial area, gender	More women with orofacial pain. Women reported pain in consecutive appointments
Stålnacke C et al., [30]	Sweden 2020	188	TMD symptoms	Presence of TMD pain high in chronic orofacial pain
Ribeiro MC et al., [31]	Brazil 2018	488	Perpetuating factors of TMD	Prevalence is 21.2%. There is an association between clenching, biting with TMD
Alkhubaizi Q et al., [4]	Kuwait 2022	199	Risk factors in TMD	Prevalence 26.8%. Men and women did not differ statistically with TMD
Goulett JP et al., [32]	Canada 1995	897	Symptoms of TMD	Prevalence 5%, 2% of population sought treatment
Bagis B et al., [8]	Turkey 2012	243	Symptoms of TMD	Pain in temporal region most common, symptoms more in females
Al-Sanabani JS et al., [33]	Yemen 2017	207	TMD signs and symptoms	Prevalence 49.76% females higher prevalence
Nadershah M [34]	Saudi Arabia 2019	500	TMD signs and symptom	More in females, 2% persistent pain, 34% clenching habit
Elio K et al., [35]	Lebanon 2020	459	TMD signs and symptoms	The TMD associated with depression, anxiety, stress
Aldhalai MA et al., [36]	Saudi Arabia 2017	318	TMD symptoms.	Headache most common 55.3%, clicking 21.1%. No significant difference in gender
Østensjø V et al., [37]	Norway 2017	562	Prevalence of TMD symptoms	A total of 7% patients had TMD symptoms, Females had higher pain intensity. Health, lifestyle, environmental factors associated with TMD pain
Sachdeva A et al., [38]	Haryana India	30000	Prevalence and symptoms	Prevalence 0.4%. Females more, crepitus, deviation of mandible more in men
Muthukrishnan A et al., [39]	Chennai 2015	3039	Prevalence of symptoms	TMJ pain in 0.8%, females more, clicking in 38.6%
Chaurasia A et al., [40]	Kanpur 2016	1009	Prevalence of TMJ disorder and symptoms	Females more, TMJ clicking most common (42.5%)
Rao MB and Rao CB, [41]	Manipal	1187	Incidence of TMJ disorder, and symptoms	Incidence was 20.3%, males more, married females more, clicking most common
Kaushak P et al., [20]	Indore	600	TMJ signs and symptoms	Stress, clicking most common females more

Modi P et al., [42]	Loni	310	Prevalence of TMJ disorders, graded according to severity	A total of 5.16% patients had TMD. No statistically significant relation between TMD severity and gender
Tak MM and Chalkoo A, [43]	Jammu and Kashmir 2018	500	Prevalence of TMJ and signs and symptoms	Females more, clicking most common
Present Study	Pondicherry 2020	32024, TMJ cases 322	Prevalence of TMJ pain, signs and symptoms	Females more, maximum in 30-59 years. Most common joint sounds, All clinical findings more in women than men, parafunctional habits more in men

[Table/Fig-5]: Similar studies on adult population which reported with TMD pain. TMD: Temporomandibular disorder; TMJ: Temporomandibular joint

Limitation(s)

One limitation of the present study was that TMJ disorders were not classified, as all patients with TMJ pain were included in the study. This may have led to a lack of specificity in the findings. Additionally, there may be a selection bias as the study samples may not be a true representation of the entire population. Another limitation was the possibility of information bias, as symptoms and history were recorded based on patient reports.

CONCLUSION(S)

The prevalence of temporomandibular joint pain in the studied population was found to be 1.02%. Female patients reported TMJ pain more frequently than males. Joint sounds were the most common symptom among the patients. Parafunctional habits and stress/tension were found to have a statistically significant association with gender. The majority of patients belonged to the 30 years-59 years age group. The inclusion of patients referred from other medical specialties suggests the need for a multidisciplinary approach in the management of TMJ disorders. Studies like these are important in determining prevalence, identifying presenting signs and symptoms, and developing protocols for early detection, prevention, and treatment of TMJ disorders. Efforts should be made to increase awareness about TMD among patients and healthcare professionals. Conducting studies on larger populations at the community level will provide a better understanding of the distribution of TMJ-related symptoms and their associated causes.

REFERENCES

- Henrickson B, Elif Aydogan A, Turgut S, Durkan R, Mutlu O. Gender difference in prevalence of signs and symptoms of temporomandibular joint disorders: A retrospective study on 243 consecutive patients. *Int J Med Sci.* 2012;9(7):539-44.
- Sharma S, Gupta DS, Pal US, Jurel SK. Etiological factors of temporomandibular joint disorders. *Natl J Maxillofac Surg.* 2011;2(2):116-19.
- Okeson J. Management of temporomandibular disorders and occlusion. 7th ed; Elsevier: 2013.
- Alkhubaizi Q, Khalaf ME, Faridoun A. Prevalence of temporomandibular disorder-related pain among adults seeking dental care: A cross-sectional study. *Int J Dent.* 2022;2022:3186069.
- Henrikson B, Liv P, Ilgunas A, Visscher CM, Lobezoo F, Durham J, et al. Increasing gender differences in the prevalence and chronification of orofacial pain in the population. *Pain.* 2020;161(8):1768-75.
- Reyes RR, Uyanik JM. Orofacial management: Current perspectives. *J Pain Res.* 2014;7:99-115.
- LeResche L. Epidemiology of temporomandibular disorders: Implications for the investigation of etiologic factors. *Crit Rev Oral Biol Med.* 1997;8(3):291-305.
- Bagis B, Ayaz E, Turgut S, Durkan R, Özcan M. Gender difference in prevalence of signs and symptoms of temporomandibular joint disorders: A retrospective study on 243 consecutive patients. *Int J Med Sci.* 2012;9(7):539-44.
- Feteih RM. Signs and symptoms of temporomandibular disorders and oral parafunctions in urban Saudi Arabian adolescents: A research report. *Head Face Med.* 2006;2:25-27.
- Hardeson JD, Okeson JP. Comparison of three clinical techniques for evaluating joint sounds. *Cranio.* 1990;8(4):307-11.
- Macfarlane T, Blinkhorn A, Davies R, Kincey J, Worthington H. Oro-facial pain in the community: Prevalence and associated impact. *Community Dent Oral Epidemiol.* 2002;30(1):52-60.
- Yadav S, Yang Y, Dutra EH, Robinson JL, Wadhwa S. Temporomandibular joint disorders in the elderly and aging population. *J Am Geriatr Soc.* 2018;66(6):1213-17.
- Alhussini DA, Mominkhan DM, Alhamed FJ, Saklou RA, Alim HM. Prevalence and awareness of temporomandibular joint disorders among patients in King Abdul-Aziz University, dental hospital. *J Dent Health Oral Disord Ther.* 2017;8(5):603-08.
- Ryan J, Akhter Hassan N, Hilton G, Wickham JIbaragi S. Epidemiology of temporomandibular disorder in the general population: A systematic review. *Adv Dent & Oral Health.* 2019;10(3):555-77.
- Deng YM, Fu MK, Hägg U. Prevalence of temporomandibular joint dysfunction (TMJD) in Chinese children and adolescents. A cross-sectional epidemiological study. *Eur J Orthod.* 1995;17(4):305-09.
- Lomas J, Gurgenci J, Campbell D. Temporomandibular dysfunction. *Australian Journal of General Practitioners.* 2018;47(4):212-16.
- Miyake R, Ohkubo R, Jakehara T, Morita M. Oral parafunctions and association with symptoms of temporomandibular disorders in Japanese university students. *J Oral Rehabil.* 2004;31(6):518-23.
- Valesan LF, Doebber CD, Réus JC, Denardin AC, Garanhani RR, Bonotto D, et al. Prevalence of temporomandibular joint disorders: A systematic review and meta-analysis. *Clin Oral Investig.* 2021;25(2):441-53.
- Fernandes PR, Henrique VS, Okeson JP, Bastos RL, Maia ML. The anatomical relationship between the position of Auriculotemporal nerve and mandibular condyle. *Cranio.* 2003;21(3):165-71.
- Kaushal P, Saha MK, Pandey P, Kakrani J. Prevalence of temporomandibular disorders in dental students: A survey in Indore city. *IJADS.* 2018 4(1):273-77.
- Paolo CD, D'Urso A, Papi P, Sabato FD, Rosella D, Pompa G, et al. Temporomandibular joint disorders and headache: A retrospective analysis of 1198 patients. *Pain Res Manag.* 2017;3203027.
- Samantha B, Parvathi S, Asokan GS. Prevalence of Temporomandibular joint disorder among medical and dental undergraduate students of Tagore Institute-A questionnaire study. *Journal of Indian Dental Association.* 2022;16(8):14-17.
- Bertoli FMDP, Bruzamolli CD, Pizzatto E, Losso E, Brancher JA, Souza J. Prevalence of diagnosed temporomandibular disorders: A cross-sectional study in Brazilian adolescents. *PLoS ONE.* 2018;13(2):e0192254. <https://doi.org/10.1371/journal.pone.0192254>.
- Marklund S, Wänman A. Risk factors associated with incidence and persistence of signs and symptoms of temporomandibular disorders. *Acta Odontol Scand.* 2010;68(5):289-99.
- Johansson A. Gender difference in symptoms related to temporomandibular disorders in a population of 50-year-old subjects. *J Orofac Pain.* 2003;17(1):29-35.
- Murrieta JF, Alvarado E, Valdez M, Orozco L, Meza J, Juárez ML. Prevalence of Temporomandibular joint disorders in a Mexican elderly group. *Journal of Oral Research.* 2016;5(1):13-18.
- Lee K, Wu YT, Chien W, Chung C, Chen L, Shieh YS. The prevalence of first-onset temporomandibular disorder in low back pain and associated risk factors. A nationwide population-based cohort study with a 15-year follow-up. *Medicine (Baltimore).* 2020;99(3):e18686. <http://dx.doi.org/10.1097/MD.00000000000018686>.
- Souza RC, Tavares E, Sousa D, Marcelo S, Oliveira R, Mariano MH, et al. Prevalence of temporomandibular joint disorders in patients with ankylosing spondylitis: A cross-sectional study. *Clin Cosmetol Investig Dent.* 2021;13:469-78.
- Marklund S, Wänman A. Incidence and prevalence of temporomandibular joint pain and dysfunction. A one-year prospective study of university students. *Acta Odontol Scand.* 2007;65(2):119-27.
- Stålnacke C, Ganzer N, Liv P, Wänman, Lövgren A. Prevalence of temporomandibular disorder in adult patients with chronic pain. *Scand J Pain.* 2021;21(1):41-47.
- Ribeiro MC, Meusel L, Gavioli M, Silveira AM, Graziela O. Prevalence of TMJ pain symptom in adults and its association with predisposing factors. *Biosci J.* 2018;34(6):1815-23.
- Goulett JP, Lavigne GJ, Lund JP. Jaw pain prevalence among French-speaking Canadians in Quebec and related symptoms of temporomandibular disorders. *J Dent Res.* 1995;74(11):1738-44.
- Al-sanabani JS, Al-Moraissi EA, Almawer A. Prevalence of temporomandibular joint disorders among Yemeni University students: A prospective, cross-sectional study. *Int J Oral Craniofac Sci.* 2017;3(2):053-59. <http://doi.org/10.17352/2455-4634.000032>.
- Nadershah M. Prevalence of temporomandibular joint disorders in adults in Jeddah, Kingdom of Saudi Arabia: A cross-sectional study. *J Contemp Dent Pract.* 2019;20(9):1009-13.
- Elio K, Nacouzi M, Hallit S, Rohayem. Prevalence of temporomandibular joint disorder in the Lebanese population, and its association with depression, anxiety, and stress. *Head Face Med.* 2020;16(19):02-11.
- Aldhalai MA, Alyami YA, Haider Y, Aldhili MK, Alyami D, Alyami SA, et al. Prevalence and severity of temporomandibular joint disorders among populations in Najran Province, Kingdom of Saudi Arabia. *World Journal of Dentistry.* 2017;8(2):90-95.
- Østenjo V, Moen K, Storesund T, Rosén A. Prevalence of painful temporomandibular disorders and correlation to lifestyle factors among adolescents in Norway. *Pain Res Manag.* 2017;2164825. <https://doi.org/10.1155/2017/2164825>.
- Sachdeva A, Bhateja S, Arora G, Khanna B, Singh A. Prevalence of temporomandibular joint disorders in patients: An institutional-based study. *SRM Journal of Research in Dental Sciences.* 2020;11(3):123-27.
- Muthukrishnan A, Sekar GS. Prevalence of temporomandibular disorders in Chennai population. *Journal of Indian Academy of Oral Medicine and Radiology.* 2015;27(4):508.

- [40] Chaurasia A, Ishrat S, Katheriva G, Choudhary PK, Dhingra K, Nagiar A. Temporomandibular joint disorder in North Indian population visiting a tertiary care dental hospital. *Natl J Maxillofac Surg.* 2020;11(1):106-09.
- [41] Rao MB, Rao CB. Incidence of temporo-mandibular joint pain dysfunction syndrome in rural population. *Int J Oral Surg.* 1981;10(4):261-65.
- [42] Modi P, Shaikh SS, Munde A. A cross sectional study of prevalence of temporomandibular joint disorders in university students. *IJSRP.* 2012;2(9):01-03.
- [43] Tak MM, Chalkoo A. Prevalence of temporomandibular joint disorders evaluation of various signs and symptoms and possible contributing aetiological factors. *J Evol Med Dent Sci.* 2018;7(38):01-05.

PARTICULARS OF CONTRIBUTORS:

1. Professor, Department of Dentistry, Pondicherry Institute of Medical Sciences, Pondicherry, India.
2. Assistant Professor, Department of Biostatistics, Pondicherry Institute of Medical Sciences, Pondicherry, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Sajani Ramachandran,
Professor, Department of Dentistry, Pondicherry Institute of Medical Sciences,
Kalapet, Pondicherry-605014, India.
E-mail: sajaniram@gmail.com

PLAGIARISM CHECKING METHODS: [\[Jain H et al.\]](#)

- Plagiarism X-checker: Apr 21, 2023
- Manual Googling: Aug 10, 2023
- iThenticate Software: Sep 20, 2023 (10%)

ETYMOLOGY: Author Origin**EMENDATIONS:** 8**AUTHOR DECLARATION:**

- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? NA
- For any images presented appropriate consent has been obtained from the subjects. NA

Date of Submission: **Apr 20, 2023**Date of Peer Review: **Jul 17, 2023**Date of Acceptance: **Sep 27, 2023**Date of Publishing: **Nov 01, 2023**