

**Systematic Review**

## The Prevalence of Temporomandibular Disorder in Iran: A Literature Review

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### KEY WORDS

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### ABSTRACT

**Statement of the Problem:** Temporomandibular joint disorder (TMD) will appear if there is a problem with the temporomandibular joint, bones, related muscles, or ligaments. This complication causes severe joint pain near the ears, head, neck, and jaws. TMD has been reported to affect 40 to 70% of adults.

**Purpose:** Based on previous studies, the present review aimed to determine the prevalence of TMD among the Iranian population.

**Materials and Method:** This review and meta-analysis was performed according to the PRISMA guidelines. All relevant studies published during 2000-2023 were retrieved by a systematic search in available international databases, including Web of Science, Science Direct, Scopus, PubMed, and Google Scholar, and domestic Persian databases, including SID, Magiran, and Iran Medex. Finally, 22 completely related studies were selected to investigate the main objective. The Comprehensive Meta-analysis (CMA) software was used for data analysis in this systematic review.

**Results:** Initially, 212 articles were retrieved, of which 116 were duplicate studies. Further, 39 studies were excluded after evaluation of the title and abstract, and 35 studies were excluded after considering the inclusion and exclusion criteria. Finally, 22 articles were included in the meta-analysis. The pooled prevalence of TMD in Iran was 0.56 (0.44-0.68).

**Conclusion:** In general, the prevalence of TMD in the Iranian population is relatively high. Therefore, it is necessary to develop strategies to educate people, especially those at risk. Furthermore, due to the presence of TMD in children and students in some parts of the country, it is necessary to perform essential examinations in preschools to prevent the development of this disorder in later life.

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### Introduction

Temporomandibular joint (TMJ) is important for chewing, swallowing, speaking, and even breathing. In addition, TMJ is the only joint in the body that is made of the connection between two symmetrical joints that act in harmony [1]. Therefore, temporomandibular disorder (TMD) is a term that refers to problems with the masticatory system, which includes the TMJ, the musculo-

skeletal system, and the supporting bone. TMD has been reported to affect 40 to 70% of adults, while its prevalence in children with deciduous teeth and a mixed dental system reaches 16% and 90% [2-5].

TMD is a multifactorial disease with acquired and hereditary factors. The acquired factors include infection, injuries, surgery, radiation therapy, habits, tumors, etc. The hereditary factors consist of hemifacial micro-

somnia, hemifacial atrophy, juvenile rheumatoid arthritis, oncology, muscle spasm, ectopic occlusal contact, stress, systemic disease, and immunological factors [5].

To diagnose the signs and symptoms of TMD, a complete medical and dental history is first obtained from the patient to discover any hereditary or acquired disorder. In addition, a history of trauma and pain should be provided. Then, the patient's clinical examination begins with palpation of the posterior temporal, medial, and anterior muscles, a superficial and deep masseter, lateral pterygoid, sternocleidomastoid, superior trapezius, suboccipital and posterior neck muscles [5-7]. Then, several parameters are essential to be considered, which include touching the TMJ in the opening and closing position of the mouth, lateral movements, pain in touching, the presence of joint sounds, initial deviation in opening the mouth, jaw returning to the middle position (deviation), continuous deviation of the jaw to the end deflection, the patient's degree of prevention, and occlusion [5].

The most common signs and symptoms of TMD are hamstring and TMJ pain, muscle dysfunction, joint sounds, headache, abnormal jaw movement, mouth opening, abrasions, and tingling [3, 5, 8-9]. It should be noted that the incidence of TMD symptoms increases with age increase [8]. Children, however, have difficulties describing pain and identifying its source, and the relationship between signs and symptoms is not clear in children [5].

Since TMD is the most common jaw disorder that affects the masticatory muscles, bony components of the TMJ, and soft tissue fragments of TMJ (especially the articular disc and ligament joints), it is important to survey this complication in society. In addition, no review study has been conducted on the prevalence of TMD in Iran, so it is necessary to conduct a systematic review to shed more light on this lacuna.

## **Materials and Method**

### **Searched databases and search strategy**

This study aimed to investigate the prevalence of TMD among the Iranian population. For this purpose, systematic searches of internationally available databases, including Web of Science, Science Direct, Scopus, PubMed, and Google Scholar, were performed between 2000 and 2021. In addition, databases with the Persian language, such as SID, Magiran, and Iran Medex, included Farsi keywords. Systematic reviews were per-

formed using Mesh terms "Temporomandibular", "Joint", "Disorders", "Iran", "TMD", "TMJ", "Dental" and "Prevalence", "Occlusion", "Signs", "Symptoms", "Patients" and "Dental". For other databases, the same Mesh terms were used similarly. In addition, unofficial reports, articles in a letter-to-editor format, and unpublished articles and content posted on internet sites were removed from the list of downloaded files.

### **Inclusion and exclusion criteria**

The inclusion criteria were studies whose abstracts and full texts were available, and studies not reporting the desired statistical parameters were excluded.

### **Study selection and data collection**

After the electronic search of all databases, screening was done in three phases by the authors separately, including phases I, II, and III, to determine the eligibility of studies. In phase I, the titles and abstracts of articles were checked, and in phase II, studies with unrelated titles or not matching the included criteria were deleted. In phase III, the final selected full-text articles were evaluated to extract the desired results. Furthermore, the references of full-text articles were thoroughly evaluated to verify that no articles were missed for inclusion in the study (reference checking). In addition, the citations from the full-text articles were checked (citation tracing) to make sure that the search was thorough and successful. The two researchers independently examined the quality and risk of bias of studies, and the disagreements between them were resolved through discussion or consultation with a third researcher. Finally, 22 published articles were reviewed in the present study (Figure 1). The literature search for articles was done according to the PRISMA guidelines [10].

### **Data analysis**

The Comprehensive Meta-analysis (CMA) software was used to analyze the data. After feeding the information of the articles into the CMA, the  $I^2$  and Q-value tests were used to detect the heterogeneity of the studies. If the  $I^2$  index was high, the random model was used; otherwise, the fixed model was employed. Begg's and Egger's tests as well as the funnel plot were used to evaluate the dispersion bias.

## **Results**

### **Study selection**

In the initial search of international and domestic data

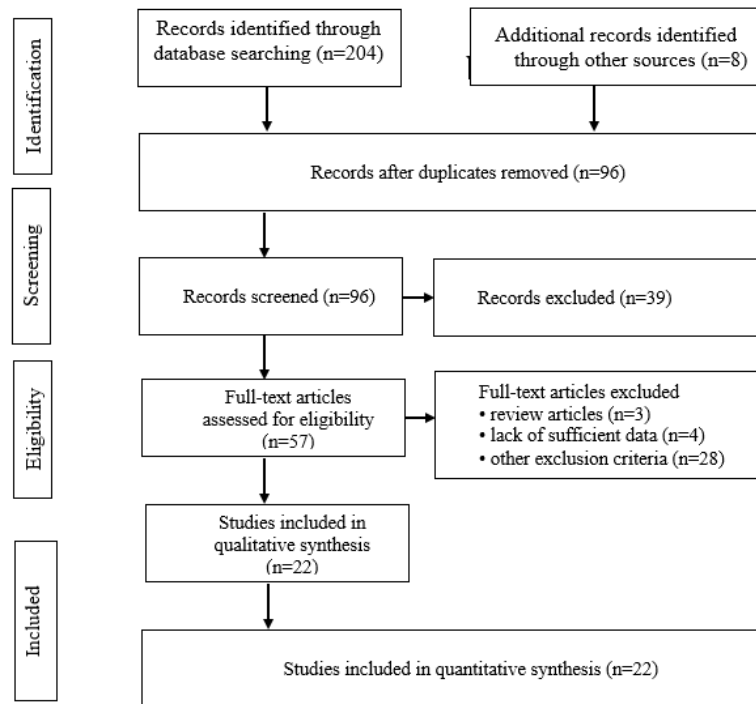


Figure 1: Flow diagram of study identification according to PRISMA

bases until April 2021, 204 articles were retrieved. The manual search also yielded 8 articles. Of these, 116 articles were duplicates and excluded. After reviewing the title and abstract of the remaining 96 articles, 39 irrelevant articles were excluded. After the full-text analysis of the remaining 57 articles, 35 articles were excluded.

**Descriptive results**

In this review, the results of 22 studies were extracted, which can be seen in Table 1. These results included the study year, research population, study location, age cat-

egory, gender, sample size, and prevalence of TMD. In addition, other key results for each study are presented in Table 1.

**Analytical results**

The meta-analysis done on previous studies showed that the pooled prevalence of TMD in Iran is 0.56 (0.44-0.68) (Figure 2). According to the funnel plot, the distribution of published studies was symmetric, and also the Begg’s test indicated no bias in the study ( $p$  Value= 0.37) (Figure 3).

**Meta Analysis**

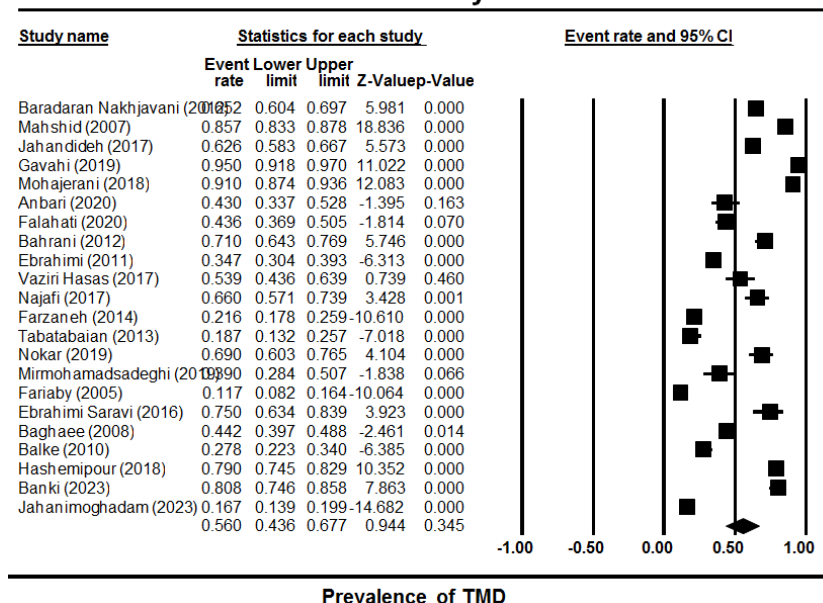


Figure 2: The results of previous studies on the prevalence of TMD in Iran

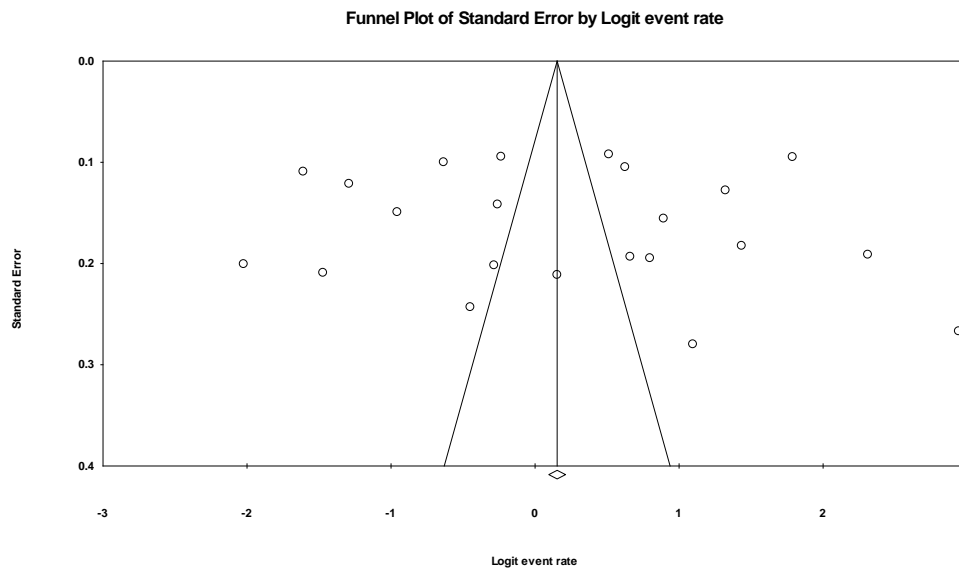


Figure 3: Funnel plot of standard error

### Discussion

The present meta-analysis investigated the prevalence of TMD in Iran. Most of the studies included in this meta-analysis showed that the prevalence of TMD in the Iranians is relatively high (56%). According to different studies, the prevalence of TMD has been investigated in students. The results of studies done by Baradaran Nakhjavani and Fardi (2012) in Tehran, Fariaby and Mohammadi (2005) in Kerman, and Baghaee *et al.* (2008) in Mashhad showed the prevalence of TMD among elementary school students in the age range of 7-12 years was 11.7%-65.2% [11-13]. This value, however, was 79% among high school students in the studies done by Ebrahimi *et al.* in Mashhad (2011) and Hashemipour *et al.* in Kerman (2018) [14-15]. Some studies have also focused on the prevalence of TMD in patients referred to dental centers. In the study of Jahandideh in Rasht (2017), the prevalence of TMD was 66.6% [16], while it was reported to be 91% by Mohajerani (2018) [17] and 14.4% by Sahebi and Bostani (2010) in Tehran [18]. The prevalence of TMD has also been reported to be 43.6% by Falahati in Isfahan (2020) [19] and 91% by Ebrahimi Saravi (2016) in Sari [20].

According to these results, it can be argued that TMD disorders are the main reason for the referral of more than 40% of adults to dental clinics. The variation in the results of various studies could be related to differences in sample size, the multifactorial nature of this problem, the role of different etiologic factors, and variable diagnostic methods for the evaluation of TMD.

The most common reported symptoms of TMD were

unilateral or bilateral articular sound, jaw deviation, limitation of mouth opening, muscle tenderness, and pain in the maxillary joint [21-28]

In most similar studies, the prevalence of TMD was higher in women than in men. For example, in the studies of Kitsoulis *et al.* (2011) [29], Shetty *et al.* (2010) [30], Mohajerani *et al.* (2018) [17], and Vaziri Hasas (2017) [31], the prevalence or severity of TMD was higher in women than in men. In addition, Lasemi Saravi *et al.* [32] (2008) found that gender is an influential factor in TMD frequency.

According to the studies of Jahandideh *et al.* (2017), Lasemi Saravi *et al.* (2008), and Johansson *et al.* (2003), the prevalence of TMD was significantly higher in people with parafunctional habit than in those without this habit and also in people with a history of trauma than in people without a history of trauma [16, 32-33]. Thus, parafunctional habits and trauma can be considered the risk factors for TMD.

Based on the results of the previous studies, the prevalence of TMD is relatively high among Iranian patients referred to dental centers. Therefore, planning the necessary education for people in the community, especially the high-risk individuals (older age group, people with oral parafunctional habits, and history of trauma, jaw dislocation, and loss of posterior teeth), can effectively prevent these TMJ complications. In addition, increasing dentists' awareness of the clinical symptoms of this disorder can help differentiate TMD pain from a variety of headaches, earaches, and other neurological pains and help treat the patients.

**Table 1:** The results of previous studies on the prevalence of Temporomandibular Disorder (TMD) in Iran

Authors (study year)	Research population	Study location	Age category (year)	Gender (sample, size, person)	Prevalence of TMD (%)	Other key results
Baradaran Nakhjavani <i>et al.</i> (2012) [11]	Elementary school students	Tehran	Range: 7-9	Female (205) and male (195)	65.2	Class III occlusion, bruxism, and Deep Bite
Mahshid <i>et al.</i> (2007) [34]	Ordinary people	Tehran	Range: 18-77	Female (839) and male (64)	85.7	Bruxism and trauma
Jahandideh <i>et al.</i> (2017) [16]	Patients referred to dentistry centers	Rasht	Range: 7-9	Female (282) and male (218)	62.6	
Gavahi <i>et al.</i> (2019) [35]	Patients with mandibular fracture	Yazd	Range: 3-59 7-9	Female (70) and male (225)	95	
Mohajerani <i>et al.</i> (2018) [17]	Patients referred to dentistry centers	Tehran	<27, 27-45, >45 (193) and male (141)	Female Three groups	91	
Anbari <i>et al.</i> (2020) [36]	Law students	Bandar-e-Anzali	Range: 18-25	Female (67) and male (33)	43	Hidden anxiety
Falahati <i>et al.</i> (2020) [19]	Patients referred to dentistry centers	Isfahan	Mean: 33.8	Female (101) and male (101)	43.6	Orthodontic treatment ( $p=0.42$ ) and parafunctional habits ( $p=0.46$ ) were not significantly different between the two groups (with and without TMD)
Bahrani <i>et al.</i> (2012) [37]	Dental and non-dental students	Shiraz	Range: 18-30	Female (100) and male (100)	Dental students: 80 Non-dental students: 62	
Ebrahimi <i>et al.</i> (2011) [14]	High school students	Mashhad	Range: 14-18	Female (400) and male (40)	34.7	Clicking, muscle tenderness and temporomandibular joint (TMJ) tenderness
Banki <i>et al.</i> (2023) [21]	dental student	Golestan	Range: 18-28	98 male-95 females	80.8	Bruxism and trauma history
Nokar <i>et al.</i> (2019) [39]	Patients with TMD	Tehran	Range: 15-65 Mean: 36.6	Female (65) and male (58)	69	Occlusal factors playing a role in the etiology of TMD
Mirmohamad-sadeghi <i>et al.</i> (2019) [40]	Patients with and without TMD chosen before the third molar surgery	Tehran	Range: 15-30 Mean: 24.3	Total female and male (71)	39	-
Fariaby and Mohammad (2005) [12]	Elementary school students	Kerman	Range: 9-12	Male (240)	11.7	Limitations in mouth opening, deviation in jaw opening
Ebrahimi Saravi <i>et al.</i> (2016) [20]	Patients referred to dentistry center	Sari	NR	Female (41) and male (27)	75	Among 68 patients, muscle pain
Jahanimoghadam <i>et al.</i> (2023)[41]	Elementary school students	Kerman	Mean: 9.18	327 male-273 female	16.5 female-16.9 male	Awake and sleep bruxism
Baghaee <i>et al.</i> (2008) [13]	Preschool children	Mashhad	6	Female (221) and male (231)	44.2	Clicking, crepitus, deviation
Balke <i>et al.</i> (2010) [42]	Attendees of medical healthcare centers	Mashhad and Zoshk	Urban: [range: 18-64, mean: 33.68±10.31] Rural: [range: 18-65, mean: 32.07±10.83]	Female (171) and male (52)	Urban: 24.4 Rural: 31.7	Disc displacement
Hashemipour <i>et al.</i> (2018) [15]	First- to-fourth-grade high school students	Kerman	Range: 14-18, Mean: 15.0±1.1	Total female and male (368)	79	Pain in masticatory muscles, pain at mouth opening

### **Limitation**

There was a problem accessing some databases and full-text article.

### **Conclusion**

In general, the pooled prevalence of TMD in Iranians is 0.56 (0.44-0.68). Oral parafunctional habits and trauma can affect the incidence of TMD. The most common symptoms of TMD include joint sounds, jaw deviation when opening the mouth, muscle tenderness, and masticatory muscle pain.

### **Conflict of Interest**

The authors have declared that no conflict of interest exists.

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