(RESEARCH ARTICLE)

Prevalence of signs and symptoms of temporomandibular joint disorders and associated factors among Iranian dental student

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Abstract

Introduction: Temporomandibular disorders include a number of clinical signs and symptoms that involve the muscles, temporomandibular joint, and teeth. The aim of this study was to investigate the prevalence of signs and symptoms of temporomandibular joint disorders in dental students of Golestan University of Medical Sciences in the academic year 1400-1401.

Method: In this study, 193 dental students were selected from the population under study by available sampling method. First, the necessary information was collected through interviews and completing the checklist. Male and female students were randomly selected and were subjected to a complete examination in terms of the health of the temporomandibular joint. After data entry in SPSS software version 19, the data was described with the help of frequency and percentage and chi-score test. A significance level of 0.05 was considered.

Results: 193 students participated in this study, of which 98 were male and 95 were female. There were 30 first-year students, 30 second-year students, 39 third-year students, 32 fourth-year students, 26 fifth-year students, and 36 sixth-year students. The average age of the students was 24.5 years. Occlusion of class 1, class 2 and class 3 was seen in 156 people (80.8%), 29 people (15%) and 8 people (4.1%), respectively. A history of trauma to the jaw was reported in 14 people (7.3%). 17 people (8.8%) mentioned headache. Bruxism was observed in 13 people. The results of chi square test showed that there was no statistically significant relationship between related variables to TMJ disorder and gender.

Conclusion: Considering the relatively high prevalence of temporomandibular joint disorder among dental students, further studies are recommended to investigate other related factors.
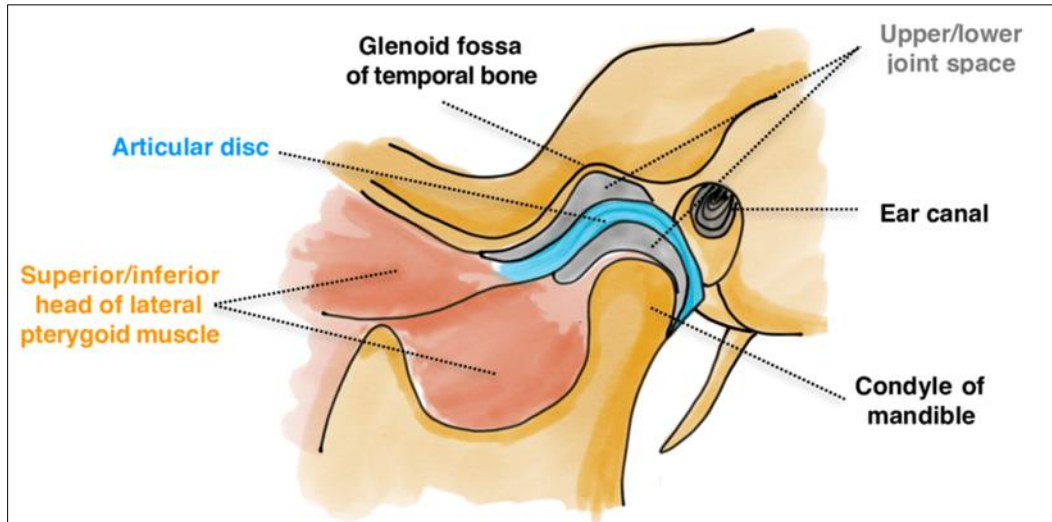
Keywords: Temporomandibular joint disorder; Students; Temporomandibular joint

1. Introduction

Temporomandibular joint (TMJ) is one of the most complex joints in the human body. This joint is able to perform rotational and translational movements (1).

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When opening the mandible, the condyle undergoes a complex movement. This movement includes two parts, rotational movement and translational movement, in which the condyle usually moves 2-5 mm to the back in the rotational movement, and 5-8 mm to the front in the translational movement (2). In the rotational movement, the upper surface of the condyle rotates against the lower surface of the disc, and in the translational movement, the condyle moves downward and forward and at the same time moves the disc forward with it in such a way that the thin middle part of the disc is placed between the convexity of the condyle head and the articular ridge (3). In most people, in the state of maximum opening of the mouth, the condyle moves downward and forward until the peak of the ridge, and when the mandible is closed, the disc with the condyle returns to the mandibular cavity (4).

Figure 1 Schematic photo of temporomandibular joint

The term temporomandibular joint disorder (TMD) refers to all disorders related to the functioning of the human masticatory system, and according to the opinion of most researchers, its causes are multifactorial and complicated due to the spread and increase of TMD (5).

Temporomandibular disorders are defined as a subgroup of craniofacial complications that involve the TMJ, masticatory muscles, and musculoskeletal structures of the head and neck. Patients with temporomandibular disorders often present with pain, limited or asymmetric movement of the lower jaw, and TMJ sounds (5).

TMD is a multifactorial disease and factors and wide range of etiologies are involved in its occurrence such as Acquired etiologies (infection, injuries, iatrogenic such as surgery, radiation therapy, habits, tumors and finally idiopathic), inheritance (hemifacial microsomia, hemifacial atrophy, juvenile rheumatoid arthritis, ankylosis) and other factors such as muscle spasm, misplaced occlusal contact, stress, systemic diseases and immunological factors (6).

There is a possibility of various abnormalities in the temporomandibular joint, including TMJ developmental anomalies, subluxation, soft tissue disorders, remodeling, arthritis, trauma, and tumors. These abnormalities cause complications such as creating asymmetry in the face, pain and swelling, problems in pairing teeth, cramps and muscle spasms, which ultimately lead to problems in a person's daily life. There is a possibility of mental conflicts such as depression or interference in the natural process of a person's life. Epidemiological studies on Caucasian populations show that approximately 50% of them have signs and 30% have symptoms of TMD. A similar prevalence has been observed in the Asian population. TMD signs and symptoms are more common in adults aged 20 to 40 years (7). TMD may be triggered by endogenous and exogenous factors and can be worsened by emotional stress (8). A 2023 systematic review study revealed that TMD prevalence in children and adolescence varies between 20% and 60% and Female had a higher prevalence of TMDs compared to male (9). Anxiety is considered as a risk factor in TMD symptomatology, as it may act as a major physiological damage (10). The possible connection between these conditions and stress and musculoskeletal disorders has been studied, but no evidence has been reported on the mechanisms of their connection.

Dentistry has become a very demanding and competitive profession. Dental school can be a very stressful and difficult environment for students and is widely associated with high levels of stress sine dental students experience theoretical knowledge, rigorous clinical work and interpersonal skills (11). 50%-75% of TMJ patients have experienced stressful life situations prior to the onset of TMD symptoms. Since the mechanisms affecting TMJ disorders are not properly

known and at the same time its prevalence in different societies has not been determined, the aim of this study was to investigate the frequency of signs and symptoms of temporomandibular joint disorders in dental students of Golestan university of medical sciences in 2022.

2. Material and methods

This study was approved by the ethics committee of Golestan University of Medical Sciences (IR.GOUMS.REC.1401.008). Using the following formula, the number of 193 dental students were selected by convenience sampling.

$$n = \frac{z_{1-\alpha/2}{}^2 p(1-p)}{d^2}$$

First, the necessary information was collected through interviews and completing the checklist. 193 dental students were randomly selected and were subjected to a complete examination in terms of the health of the temporomandibular joint.

The examinations included the following:

2.1. Biography

- 1- A history of injury to the joint, chin and face
- 2- The side of chewing food, which is unilateral or bilateral.
- 3- Orthodontic treatment that includes previous treatment or current treatment
- 4-Having any of the habits of bruxism, finger sucking, placing a hand on one side of the face or under the chin, sleeping at night which includes improper sleeping (sleeping on the stomach) and proper sleeping (sleeping on the side or back).
- 5- History of headache

2.2. Examination

- Examination of the TMJ in terms of the presence of pain with gentle pressure of the fingers while resting and during jaw movements in front of the ear and inside the ear.
- Examining the masticatory muscles, including the masticatory, temporal, internal and external pterygoid, in terms of the presence of pain and tenderness.
- Examining the amount of jaw movements including opening the mouth, lateral movements and forward orientation. The optimal amount for these movements in joint health is 35-45mm, 8-12mm and 12-8mm, respectively.
- Deviation in the path of opening the mouth, which can be in two forms (Deviation following the initial deviation in the continuation of the path of opening, the jaw returns to the middle line of the midline) and) Deflection, a continuous deviation until the end of the path, opening the mouth) will take
- Checking the presence of joint clicking: with the help of touch with fingers while opening the mouth and lateral and forward movements were recorded.
- 6- Determining the type of mal   lusion
- Determining the presence or absence of early contact in the right and left side movements on both the balance and working side and in forward movements.

People who have pain in the masticatory muscles during jaw movements and rest alone or with any of the signs of deflection while opening the mouth, restriction in jaw movements, especially opening the mouth, were considered to have masticatory muscle disorders. People who have joint pain during rest or during jaw movements alone or with deviation during opening and forward movement or restriction in jaw movements, especially in off-center movements and joint clicking, will have internal disorders.

After completing the questionnaire, people with the following characteristics will be diagnosed with TMD:

- Pain in the masticatory muscles alone or with any of the symptoms of deflection while opening the mouth, limitation in jaw movements, especially opening the mouth.
- Pain in the joint during rest or during jaw movements alone or with any of the symptoms of Deviation while opening the mouth, limitation in jaw movements, especially lateral and forward movements.

Data were analyzed in SPSS software version 22, A significance level of 0.05 was considered.
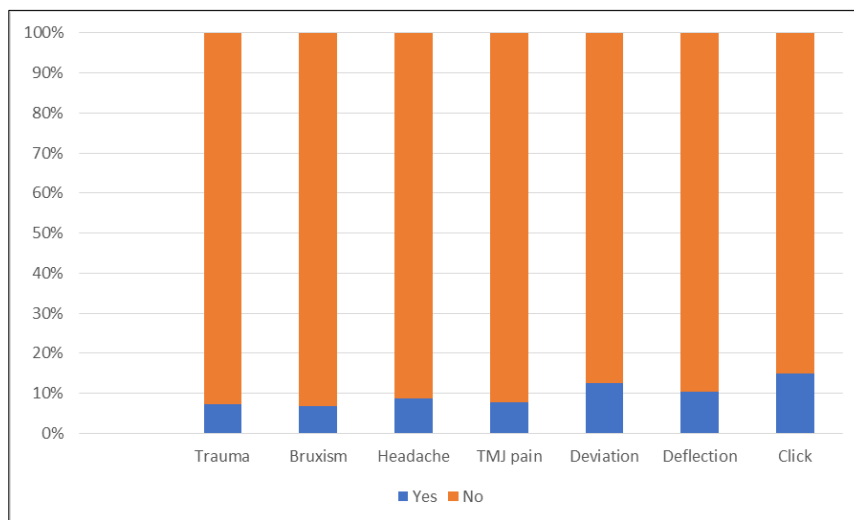
3. Results

193 students participated in this study, of which 98 were male and 95 were female. There were 30 first-year students, 30 second-year students, 39 third-year students, 32 fourth-year students, 26 fifth-year students, and 36 sixth-year students. The average age of the students was 24.5 years.

Occlusion of class 1, class 2 and class 3 was seen in 156 people (80.8%), 29 people (15%) and 8 people (4.1%), respectively. A history of trauma to the jaw was reported in 14 people (7.3%). 17 people (8.8%) mentioned headache. Teeth grinding (bruxism) was observed in 13 people.

Out of 193 students, 15 (7.8%) reported temporal joint pain and 24 (12.4%) had deviation. Only 20 students (10.4%) reported deflection. 29 people (15%) had a click along with opening and closing.
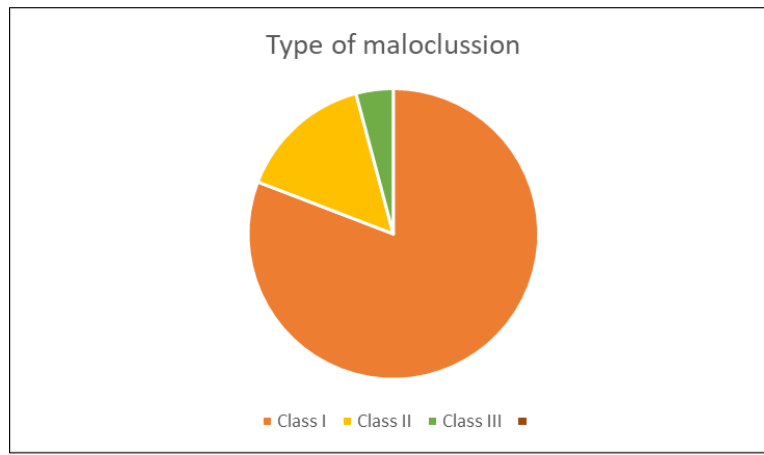
Figure 2 Contribution of malocclusion among participants

Figure 3 Contribution of TMJ disorder-associated factors among participants

Among 193 students, 14 people reported a history of trauma to the jaw, of which 8 were male and 6 were female. The results of the chi-square test showed that there is no statistically significant relationship between history of trauma to the jaw and gender (p=0.62). 17 students reported a history of headache, which 9 were men and 8 were women. The results of chi square test showed that there is no statistically significant relationship between headache history and

gender (p=0.85). 13 students reported a history of bruxism, among them 6 were male and 7 were female. The results of the Chi-square test showed that there is no statistically significant relationship between the history of bruxism and gender (p=0.73). 15 students reported pain, which 7 were male and 8 were female. Chi-square test results showed that there is no statistically significant relationship between temporomandibular joint pain and gender (p=0.74).

Table 1 Contribution of TMJ disorder variables among genders

			Male	Female	Total	P Value
Trauma history	Yes	Frequency	90	89	179	0.62
		Percentage	49/7	50/3	100	
	No	Frequency	8	6	14	
		Percentage	57/1	42/9	100	
headache	Yes	Frequency	89	87	176	0.85
		Percentage	50/6	49/4	100	
	No	Frequency	9	8	17	
		Percentage	52/9	47/1	100	
Bruxism	Yes	Frequency	92	88	180	0.73
		Percentage	51/1	48/9	100	
	No	Frequency	6	7	13	
		Percentage	46/2	53/8	100	
Pain	Yes	Frequency	91	87	178	0.74
		Percentage	51/1	48/9	100	
	No	Frequency	7	8	15	
		Percentage	46/7	53/3	100	

Table 2 Contribution of TMJ disorder among genders

Factors	Answer		Male	Female	Total	P Value
Deviation	Yes	Frequency	87	82	169	0.60
		Percentage	51/5	48/5	100	
	No	Frequency	11	13	24	
		Percentage	45/8	54/2	100	
Deflection	Yes	Frequency	88	85	173	p=0.94
		Percentage	50/9	49/1	100	
	No	Frequency	10	10	20	
		Percentage	50	50	100	
Click	Yes	Frequency	84	80	164	0.77
		Percentage	51/2	48/8	100	
	No	Frequency	14	15	29	
		Percentage	48/3	51/7	100	

Among 193 students, 24 reported deviations, 11 were male and 13 were female. Chi-square test results showed that there is no statistically significant relationship between deviation and gender (p=0.60). 20 students reported deflection, 10 of whom were male and 10 females. Chi-square test results showed that there is no statistically significant relationship between deflection and gender (p=0.94). 29 students reported click, 14 of whom were male and 15 females. The results of chi square test showed that there is no statistically significant relationship between click and gender (p=0.77).

4. Discussion

The aim of this study was to investigate the frequency of signs and symptoms of temporomandibular joint disorders in dental students of Golestan University of Medical Sciences in the academic year 2022. In this study, students from the dental fields were chosen to answer the questionnaire because they have more knowledge about the temporomandibular joint problems compared to students from other faculties in the university. The study by Bicaj et al (12) also assessed the frequency of the symptoms of TMD among dental students. Considering that temporomandibular joint disorders affect the dental-maxillofacial structure, if it is diagnosed late and the treatment is delayed, it will result in severe subsequent problems that are either irreversible or with great cost and technical difficulties. It is necessary to take proper measures and planning to reduce these habits. This was not possible without statistical analysis, so we decided to evaluate this problem by obtaining information about temporomandibular joint disorders among students.

Accurate measurements of disease incidence are necessary to determine its impact on environment. There are three methods of measuring pain: the physiological method (for example, the relationship between tissue destruction and pain), the observational method (pain rated by another person), and the self-report method. In this study, self-reporting method was used.

Epidemiological studies, which are based on information collected through checklists and questionnaires, are an effective research tool for obtaining information. The value of these studies depends on the phrasing of the questions, the perception of the target population, the number of samples and the review of the questions collectively or individually by a skilled questioner. In addition, a clinical examination by an expert can increase the validity and accuracy of clinical signs and symptoms mentioned by the patient (Sing, symptom) when there seems to be a meaningful relationship. Bicaj et al's study (12), the Fonseca questionnaire (13) seemed to have importance in the early diagnosis of TMD that can occur in the young population. Other studies also reported that there is possible to collect a lot of important data that can be very useful for early diagnosis of TMD (14-16).

The results of this study revealed a high prevalence (63.5%) of TMD symptoms among the investigated students. This result was close to what was found by some other studies (17). In this study, out of 193 students, 29 people reported click, of which 14 were men and 15 were women. The results of chi square test showed that there is no statistically significant relationship between click and gender. The most common symptom reported by people in Yassai et al.'s study was joint click (20.3%), which was consistent with Farsi et al.'s studies, and the most common clinical symptom of TMD in that study was trismus.

Considering that harmful parafunctional habits affect the dental-jaw structure, and if it is diagnosed late and the treatment is delayed, it will lead to serious problems that are either irreparable or with great cost and high technical difficulties. and the great suffering of the patient will be accompanied, recently, bone grafting techniques have also been investigated, during which good results have been obtained. The simplicity of the technique, low risk and limited side effects have had beneficial therapeutic effects, and the injection technique is accepted by patients (18). There have been tremendous advancements in the field of artificial intelligence that can help detect anatomic landmarks (19), or help with oral diagnosing and dental treatment (20). In most cases, surgery seems to be an invasive method compared to the limited symptoms experienced by the patient. Therefore, most of the efforts should be directed towards supportive treatments to limit the problem or at least reduce the symptoms to the patient's tolerable level.

5. Conclusion

Considering the relatively high prevalence of temporomandibular joint disorder among dental students, further studies are recommended to investigate other related factors.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of ethical approval

This study was approved by the ethics committee of Golestan University of Medical Sciences (IR.GOUMS.REC.1401.008).

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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