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Temporomandibular joint disorders and awareness levels among dentists and dental students: The case of Alanya

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Abstract

The primary objective of this study is to evaluate dentists' awareness and attitudes regarding temporomandibular joint disorders (TMD). Secondly, it aims to investigate the prevalence of TMD among dentists and dental students. The study was designed as a descriptive cross-sectional study. The study population consisted of dentists working at the Alanya Oral Health Center, faculty members from the Alanya Alaaddin Keykubat University Faculty of Dentistry, and dental students who voluntarily participated in the study. The study was completed with the participation of 284 volunteers. All questionnaires used in the study were conducted using Google Forms. The Fonseca Amnestic Index (FAI) was administered to participants to classify TMD severity. TMD awareness level was assessed using the Temporomandibular Awareness Questionnaire (TAQ). The mean age of the 284 participants (156 women, 128 men) in our study was 23.23 ± 5.89 years. 90.1% of the participants ($n=256$) were dental students, and 9.9% ($n=28$) were dentists. According to the FAI score, 106 female participants and 153 dental students were found to have TMD. When pain conditions were examined, the number of individuals with TMD pain at rest and during chewing was the same, and 106 individuals also had teeth grinding problems along with TMD. Based on the TAQ, it was observed that both dentists and students had limited knowledge about Temporomandibular Disorders (TMD). However, they are aware that physical therapy is an effective treatment for TMD. It has been noted that dentists and students with TMD in particular wish to participate in continuing education programs related to TMD. Our study emphasizes the importance of comprehensively learning about the causes of TMD. It also draws attention to the importance of adopting a multidisciplinary approach to TMD and the collaboration between dentists and physical therapists.

Keywords: Temporomandibular joint disorders, dentists, knowledge, cross-sectional studies, physical therapy modalities

Introduction

Temporomandibular joint disorders (TMD) are a clinical condition encompassing all problems related to the jaw joint and muscles [1,2]. The effects on these structures include jaw pain, muscle pain, limited jaw movement, and clicking or locking of the temporomandibular joint (TMJ) [2].

Epidemiological studies on TMD have emphasized that TMD is a common social problem that causes orofacial pain [3]. No study has been found that determines the prevalence of TMD in Turkey as a whole. However, there are studies that evaluate the prevalence of TMD regionally [4,5].

Psychological, biological, and environmental factors contribute to the development of TMDs. In particular, emotional stress, occlusal obstacles (misalignment of teeth), tooth loss, dysfunction of the masticatory muscles, and structural changes in the TMJ can cause TMDs [2,6]. From this perspective, to diagnose and effectively treat TMD, it is necessary to be aware of and knowledgeable about all the factors that contribute to its development. Treatment applications generally involve a multidisciplinary approach. These practices encompass programs that incorporate dental care, physical therapy, and stress management. Depending on the severity of the problem and the underlying cause, pharmacological agents or surgical intervention may also be used [6].

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Despite the inclusion of the basic examination of TMJ and the clinical definition of TMD in the curricula of dental faculties in our country, there is still a lack of awareness regarding these issues, leading to their frequent neglect. There is a lack of awareness regarding which specialty patients presenting with these problems should be referred to and what type of treatment they should receive. This situation causes the patient to live with pain for a long time and negatively affects their quality of life [5]. The primary aim of this study is to evaluate dentists' awareness and attitudes regarding TMD. Secondly, it aims to investigate the presence of TMD in dentists and dental students.

Material and Methods

The study was designed as a descriptive cross-sectional study. The study population consisted of dentists working at the Alanya Oral Health Center, faculty members from the Alanya Alaaddin Keykubat University Faculty of Dentistry, and dental students who voluntarily participated in the study. The study was conducted with the participation of 284 volunteers who agreed to participate. All questionnaires used in the study were administered using Google Forms.

Informed consent was obtained from individuals who agreed to participate in the study. The study was approved by the Non-Interventional Ethics Committee of Alanya Alaaddin Keykubat University with (No: 163863; Date: 15 January 2024).

Assessment Methods

- Sociodemographic Information Form:** The demographic information of the individuals participating in the study, including their education levels, accompanying symptoms such as ear pain, tinnitus, facial pain, toothache, dizziness, and the presence or absence of pain in the jaw joint, was recorded in the data form [7]. Pain at rest and during chewing, pain intensity was assessed with visual analog scale (VAS).
- Fonseca Anamnestic Index (FAI):** The FAI was administered to participants to classify the TMD score. This questionnaire, consisting of ten questions, was developed by Fonseca and colleagues in the early 1990s. Participants were asked to answer each question with "yes (10 points)", "sometimes (5 points)", and "no (0 points)". Based on the total score obtained, individuals are classified as follows: 0-15 points=no TMD, 16-40 points=mild TMD, 41-65 points=moderate TMD, and 66-100 points=severe TMD [8].
- TMD Awareness Questionnaire:** In our study, the survey developed by Kiran et al. (2016) was adapted for use. The survey, consisting of seventeen questions, comprises sections on TMD etiology, signs and symptoms, diagnosis and management, and a section addressing the need for continuing education programs on TMD. Participants are asked to answer these questions with either "yes" or "no" [9].

Statistical Analysis

Data were analyzed using SPSS 25.0 (IBM SPSS Statistics 25 software (Armonk, NY: IBM Corp.) software package. Continuous variables are presented as mean ± standard deviation, and categorical variables are presented as frequency and percentage. Differences between categorical variables were examined using chi-square analysis. p<0.05 was considered statistically significant.

Results

The mean age of the 284 participants (156 women, 128 men) in our study was 23.23 ± 5.89 years. Ninety % of the participants (n=256) were dental students, and 9.9% (n=28) were dentists. Demographic data were presented in Table 1.

Table 1. Demographic and clinical information

Variables	Min-Max	Mean ± SD
Age (years)	18-54	23.23 ± 5.89
Body weight (kg)	40-125	66.50 ± 14.24
Height (cm)	150-196	171.17 ± 9.05
VAS rest	0	1.69 ± 1.36
VAS chewing	0-10	2.04 ± 1.87
n (%)		
Gender		
Female	156 (54.9)	
Male	128 (45.1)	
Dentist	28 (9.9)	
Dental student	256 (90.1)	
Min: minimum, max: maximum, SD: standard deviation, VAS: Visual analog scale		

According to the FAI score, 106 female participants and 153 dental students were found to have TMD. When pain conditions were examined, it was observed that the number of individuals with TMJ pain during both rest and chewing was equal, according to the VAS. Additionally, 106 individuals had teeth grinding problems in addition to TMD (Table 2).

When reviewing the responses to TMD awareness questions, it was observed that the number of individuals who did not believe factors such as psychological disorders, trauma, and parafunctional habits (73.2%) and occlusal disorders (65.8%) caused TMD signs and symptoms was higher than those who did believe this. It was observed that the number of individuals who did not think that TMD could cause headaches (74.6%), ear symptoms (78.5%), or unexplained orofacial pain (78.5%) was higher than those who thought it could. It was reported that disc dysfunction does not cause clicking sounds in the TMJ

(81.7%), mouth opening measurement (86.5%), and is not a reliable method for TMD diagnosis (81.7%) (Table 3). The number of individuals who answered "yes" to the question "Is the examination of masticatory muscles an important part of TMD diagnosis?" was 250 (84.5%). Two hundred fifty-seven individuals (90.5%) reported answering "yes" to the question "Is TMJ imaging useful for TMD diagnosis?" To the question "Should any perceived clicking in the TMJ be treated?", 243 (85.6%) individuals answered "yes". To the question "Does TMD affect the patient's psychological state?", To the question "Do NSAIDs help in the treatment of TMD?", 240 (84.5%) individuals answered "yes". To the question "Do you use muscle relaxant drugs to treat TMD?", 169 (59.5%) individuals, "Are occlusal splints inevitable for treating TMD?" 226 (79.6%) individuals, "Is physical therapy beneficial in TMD treatment?" 246 (86.6%) individuals answered "yes" to the question "Do you refer TMD patients to specialists?" 248 (87.3%) individuals answered "yes" to the question "Would you like to participate in a continuing education program on TMD?" 191 (67.3%) individuals answered "yes" (Table 3).

Table 2. Distribution of temporomandibular disorders according to demographic and clinical characteristics

Variables	TMD Presence	
	With TMD n	Non-TMD n
Gender		
Female	106	50
Male	62	66
Occupational status		
Dentist	15	13
Dental student	153	103
Presence of pain complaint		
At rest	168	116
During chewing	168	116
Headache complaint		
Yes	27	0
No	168	116
Earache complaint		
Yes	29	1
No	139	115
Teeth grinding complaint		
Yes	106	35
No	62	81
Closing movements		
Yes	61	26
No	106	90

Table 3. Temporomandibular joint awareness status

Questions	Yes n (%)	No n (%)
Can occlusal disorders cause TMD?"	97 (34.2)	187 (65.8)
Can factors such as psychological disorders, trauma, and parafunctional habits cause TMD symptoms and signs?"	76 (26.8)	208 (73.2)
Can TMD manifest as a headache?"	72 (25.4)	212 (74.6)
Can TMD present as ear symptoms?"	61 (21.5)	223 (78.5)
Can TMD be the cause of unexplained orofacial pain?"	61 (21.5)	223 (78.5)
Is measuring mouth opening a reliable method for diagnosing TMD?"	39 (13.7)	245 (86.5)
Can disc dysfunction cause a "click" sound from the TME?"	52 (18.5)	232 (81.7)
Is the examination of masticatory muscles an important part of the diagnosis of TMD?"	250 (88)	34 (12)
Is TMJ imaging useful for TMD diagnosis?"	257 (90.5)	27 (9.5)
Should any perceived clicking in the TMJ be treated?"	243 (85.6)	41 (14.4)
Does TMD affect the patient's psychological state?"	250 (88)	34 (12)
Are NSAIDs helpful in the treatment of TMD?"	240 (84.5)	44 (15.5)
Do you use muscle relaxants to treat TMD?"	169 (59.5)	115 (40.5)
Are occlusal splints essential for treating TMD?"	226 (79.6)	58 (20.4)
Is physical therapy beneficial in TMD treatment?"	246 (86.6)	38 (13.4)
Do you refer TMD patients to specialists?"	248 (87.3)	36 (12.7)
Would you like to participate in a continuing education program on TMD?"	191 (67.3)	93 (32.7)

Correlation coefficients indicate the level of agreement between two expert raters for each evaluation criterion across AI models. Higher coefficients suggest stronger agreement across expert evaluations

When TMD awareness was analyzed by severity level (mild, moderate, severe), significant differences were observed in certain items ($p<0.005$) (Table 4). The majority of the answers to the questions “Does TMD affect the patient’s psychological state?”, “Are NSAIDs useful in the treatment of TMD?”, “Do you use muscle relaxants in the treatment of TMD?”, “Are occlusal splints inevitable in the treatment of TMD?”, “Is physical therapy useful in the treatment of TMD?”, “Do you refer TMD patients to specialists?”, and “Would you like to participate in a continuing education program on TMD?” were concluded to be “Yes.” No difference was observed between groups according to the FAI Score ($p>0.05$) (Table 4).

Table 4. TMD awareness levels according to severity

Questions	No TMD (FAI 0-15 points)		Mild TMD (FAI 20-40 points)		Moderate TMD (FAI 40-70 points)		Severe TMD (FAI 70-100 points)		p
	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)	
Can occlusal disorders cause TMD?	30	86	35	68	25	25	97	187	0.017*
Can factors such as psychological disorders, trauma, and parafunctional habits cause TMD symptoms and signs?	29	87	25	78	16	34	6	9	0.466
Can it manifest as a TMD headache?	27	89	22	81	15	35	8	7	0.048*
Can TMD manifest as ear symptoms?	20	96	15	88	17	33	9	6	<0.001*
Could TMD be the cause of unexplained orofacial pain?	19	97	16	87	18	32	8	7	<0.001
Is measuring mouth opening a reliable method for diagnosing TMD?	14	102	7	96	11	39	7	8	<0.001*
Can disc dysfunction cause TMJ clicking?	22	94	11	92	13	37	6	9	0.013*
Is examination of the masticatory muscles an important part of TMD diagnosis?	100	16	88	15	47	3	15	0	0.191
Is TMJ imaging useful for TMD diagnosis?	101	15	94	9	47	3	15	0	0.268
Should any perceived clicking in the TMJ be treated?	98	18	88	15	42	8	15	0	0.433
Does TMD affect the patient's psychological state?	102	14	88	15	47	3	13	2	0.498
Are NSAIDs helpful in the treatment of TMD?	95	21	84	19	46	4	15	0	0.103
Do you use muscle relaxants to treat TMD?	68	48	64	39	28	22	9	6	0.899
Are occlusal splints essential for treating TMD?	93	23	80	23	39	11	14	1	0.556
Is physical therapy beneficial in TMD treatment?	94	22	90	13	47	3	15	0	0.049
Do you refer TMD patients to specialists?	100	16	88	15	45	5	15	0	0.397
Would you like to participate in a continuing education program on TMD?	84	32	67	36	32	18	8	7	0.363

* Chi-square analysis

Discussion

Our study, conducted to assess the attitudes and awareness of dentists and dental students towards TMD and to investigate the presence of TMD among them, included 256 dental students and 28 dentists.

Our research results showed that dentists and dental students generally have insufficient knowledge about the etiological factors causing TMD. Thirty-four point two percent of participants believed that occlusal disorders could be among the etiological factors responsible for TMD. Twenty-six point eight percent also believed that other factors, such as parafunctional habits, trauma, and psychological factors, could affect TMD. However, a review

of the literature reveals that the etiology of TMD is associated with environmental, psychosocial, and behavioral factors [10]. In addition, parafunctional habits such as bruxism and clenching, trauma, and genetic factors are also involved [11]. The effect of multiple causal factors is not yet fully understood [11]. The main symptoms of TMD include muscle pain, deviation or displacement of the mandible, jaw locking, and clicking sounds when opening and closing the mouth. Most TMD studies have indicated that women and younger age groups are most affected by these disorders [12,13].

The literature indicates that TMD is generally among the causes of headache, tinnitus, earache, or unexplained orofacial pain [14].

A survey conducted by Ciancaglini and Radaelli revealed that headaches were more common among individuals with TMD symptoms [15]. Melo and his team found that TMD symptoms were more common among individuals with headaches. While 25.4% of participants agreed that specialists recognize TMD as a cause of headache, 21.5% believed that TMD can mimic ear symptoms. Cochrane collaboration studies show that at least 33% of individuals struggle with symptoms such as facial pain and joint pain [16].

Approximately 88% of participants indicated that examining the masticatory muscles is an important part of diagnosing TMD. In many TMD patients, the most common complaint is pain originating from the masticatory muscles rather than the TMJ [17]. A condyle-disc position analysis showed that the anterior-superior position in the fossa is more stable, and all other condyle positions are less stable and maintained at the cost of increased muscle activity [18]. Occlusal factors can influence condyle position, which is crucial for the compensatory function of the masticatory system. Condylar displacement can cause muscle spasms and subsequent pain [19]. 90.5% of practitioners believe that TMJ imaging is useful for TMD diagnosis, and 85.6% believe that any clicking should be treated. However, experts disagree on this issue. The most common causes of clicking include lack of coordination in lateral pterygoideus muscle function, displacement of the articular disc, and irregularities on the articular surfaces [20]. However, the cause of clicking and the need for treatment remain controversial; it is unclear whether clicking sounds are a harmless condition or a sign of progressive internal dysfunction of the TMJ [21].

Eighty-eight percent of participants agreed with experts that TMD has a psychological effect on patients and that the two are related [17]. However, there are conflicting views on the relationship between TMD and emotional well-being. While some studies suggest a relationship between TMD disorder syndrome and emotional well-being, opposing views also exist [22]. Okeson has stated that assessing depression may yield more effective results in the management of patients with TMD and pain complaints [23]. In addition to treatment techniques, avoiding stress through enjoyable activities is generally recommended.

When the responses regarding TMD treatment are examined, the answers indicate that dentists and dental students have a higher level of knowledge about TMD treatment methods. A review of the literature on TMD treatment methods highlights that NSAIDs, muscle relaxants, and occlusal splints are among the most commonly used methods [19,24]. In particular, the belief that TMD can affect the patient's psychological state has developed [25]. A review of the literature reveals that there is information about psychological factors causing TMD, as well as information about TMD affecting a person's psychology [17]. While 84.5% of participants stated that they would use nonsteroidal anti-inflammatory drugs in TMD management, only 59.5% stated that they would use muscle relaxants. Seventy-

nine point six percent of participants believe that occlusal splints are important in TMD treatment. Eighty-six point six percent of participants emphasized that physical therapy could be effective in managing TMD. In a study by Jamalpour and colleagues, 36% of dentists considered occlusion splints to be the first-line treatment for TMD, while 80% agreed that physical therapy was beneficial [21]. Given the multifactorial etiology of TMD, managing TMD according to its cause rather than using a one-size-fits-all approach may be more effective when developing a treatment plan [9]. Approximately 87.3% of survey participants stated that they would refer patients with TMD to a specialist. Almost all dentists stated that they found TMD management difficult and believed that most patients were dissatisfied with current treatments. Sixty-seven percent of participants expressed a desire to participate in continuing education programs related to TMD and believed that such programs would be useful in their practice.

TMD was observed in 168 of the 284 participants included in the study, according to FAI. This figure is more than half of the population. Similar to our study, studies in the literature have reported that the prevalence of TMD among dental students exceeds 50% [26–28]. The fact that participants with TMD were more common in the female population than in the male population again supports the literature [26-28]. However, despite this, it shows that they are generally unaware that occlusal disorders, headaches, earaches, unexplained orofacial pain, and occlusal problems, as well as disc dysfunction, can cause TMD or be caused by TMD. However, it was observed that questions regarding TMD treatments were answered more accurately and in a manner consistent with the literature.

Conclusion

In particular, it has been observed that they are aware of the effectiveness of physical therapy in TMD treatment. Students and dentists with TMD have specifically stated that they wish to participate in a continuous education program related to TMD. From this perspective, we believe that our study is important in highlighting the need to comprehensively understand the causes of TMD. In light of this information, we emphasize the importance of adopting a multidisciplinary approach to TMD in order to eliminate unnecessary treatment time for patients and reduce healthcare costs. Thus, we highlight the importance of collaboration between dentists and physical therapists.

Ethical Approval

Approved by the Non-Interventional Ethics Committee of Alanya Alaaddin Keykubat University (No: 163863; Date: 15 January 2024).

Patient Consent

Informed consent was waived due to the retrospective design.

Conflict of Interest

The authors declare no conflict of interest.

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