

Prevalence of Temporomandibular Disorder in Turkish University Students: a Questionnaire Study

SUMMARY

Background/Aim: Temporomandibular dysfunction (TMD) might influence any individual with different signs and symptoms irrespective of gender or age. The aim of this study is to assess the prevalence of TMD in Oral and Dental Health Program students of İstanbul University-Cerrahpaşa. **Material and Methods:** This study include a sample of 486 students with age ranging from 18 to 24 years. The presence and severity of TMD was evaluated using the Fonseca's Anamnestic Index (FAI) and its questionnaire. The data were analysed using SPSS Version 22. The chisquare test was used to compare the data from different groups and to determine whether the differences were statistically significant. **Results:** The results showed that a total of 47,53% of students had some degree of TMD and females were generally more affected than males. These degrees were as follows: 33,95 % were classified as mild, 11,52 % moderate and 2,05 % severe signs and symptoms. The women exhibited some degree of TMD (51,8%) at a higher frequency than men (40,33%). No significant differences were observed between gender for a same TMD severity degree ($p > 0.05$). **Conclusions:** A high prevalence of mild TMD was found in this study population. In addition, tense personalities, headaches, and temporomandibular joint (TMJ) sounds were the most prevalent findings of TMD. The present study suggests that Fonseca's Anamnestic Index (FAI) has been used in screening for TMD for prevention and management of TMD in a non-patient young population.

Key words: Fonseca's Anamnestic Index, Temporomandibular Dysfunction, University Student

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Introduction

Temporomandibular disorders (TMD) is multifactorial disease process, including different clinical signs and symptoms regarding the masticatory muscles, the temporomandibular joints (TMJ) and their associated structures. It may manifest with various combinations of signs and symptoms that include not only pain-related conditions in jaw muscles and in the TMJ, but also functional disturbances of the jaws such as locking and clicking¹⁻³.

The aetiology of TMD is traditionally considered to be multifactorial, with predisposing, precipitating and

prolonging factors, however it is still debate. Several studies have been reported that factors such as psycho-emotional factors (stress, anxiety and depression), parafunctional habits, and heavy asymmetrical loads may exacerbate TMD⁴⁻⁶.

The diagnosis of early symptoms and signs of TMD is crucial in preventing or minimizing TMD signs and symptoms. Screening for the prevalence of TMD in the population is difficult for researchers and clinicians and several methods for evaluating TMD have been proposed in the literature. The anamnestic and clinical indexes proposed by Helkimo⁷ in 1974 has been widely used in TMD research. Then, Dworkin and Leresche⁸ in 1992

proposed the RDC/TMD for TMD diagnoses. Moreover, Schiffman and colleagues⁹ in 2014 was developed a new comprehensive version of the RDC/TMD, which is known as the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD).

Fonseca¹⁰ in 1992 modified Helkimo's indices and developed his anamnestic questionnaire that classifies TMD signs and symptoms as no, mild, moderate or severe TMD. It consists of 10 questions that screen for the presence of pain in the TMJ, head, and back; pain while chewing, parafunctional habits, movement limitations, joint clicking, perception of malocclusion, and sensation of emotional stress. This index is a simple, easy, and low-cost tool that displayed the signs and symptoms of TMD for the nonpatient population. Thus, it serves as a preliminary screening tool for TMD.

Based on the epidemiological studies, a broad prevalence peak of TMD symptoms is present between 20 and 40 years of age, with a lower prevalence in younger and older people¹¹⁻¹². Many studies published related to the university students of different countries have reported that the TMD prevalence ranged from 17% to 87% due to differences in the populations studied, diagnostic criteria, examination methods, and inter- and/or intra-rated variations of examining practitioners¹³⁻³².

There is no such study about TMD prevalence in Turkish university students according to our knowledge. Thus, the aim of this study was to investigate the prevalence of TMD in university students using Fonseca's questionnaire.

Material and Methods

This study was carried out on students studying in Vocational School of Health Related Professions of Istanbul University-Cerrahpaşa between December 2013 and 2018. The study sample consisted of 510 students (197 males and 313 females) with age ranging from 18–24. The participants were requested to complete the questionnaire which comprised two main parts. The first part contained questions on demographic information and past medical, dental, and TMJ history. In the second part was asked Fonseca's 10 questions which was translated into Turkish by researchers. The participants were informed that the 10 questions should be answered with "yes", "no" and "sometimes" and that only one answer should be marked for each question. The subjects were required to sign an informed consent before their participation in the study.

Participants who had a clinical diagnosis of TMD with or without treatment, and subjects who were undergoing orthodontic treatment were not included in the data analysis. Each 'yes' answer was assigned a

value of 10, each 'sometimes' answer a value of 5, and each 'no' answer a value of 0. The sum of the points was used to classify the participants into four categories: TMD-free (0 to 15 points); mild TMD (20 to 40 points), moderate TMD (45 to 60 points), and severe TMD (70 to 100 points).

Statistical analysis

The data were analyzed using the statistical package SPSS for Windows, (version 22 IBM Corp. Armonk, NY, USA). Chi-square test was used to determine the significant association with different grouping factors. *P*-values less than 0,05 were considered statistically significant for all statistical tests.

Results

Of 510 questionnaires distributed, 497 were completed by the participants. Of these 497 questionnaires, 11 were excluded from the study based on the aforementioned criteria. 486 students were left for analysis which included of 181 (37,24%) men and 305 (62,75%) women. The answers of the participants to each question of FAI is shown in Table 1. The most frequently reported problems were related to being a tense person (18,1%), followed by headaches (17,28%) and then TMJ sounds (16,25%) for the "yes" responses. Among the "sometimes" responses, the most frequently reported problems were fatigue or muscle pain when you chew and being tense person with 27,77%. The least frequently reported problem was difficulty moving your jaw with 1,64% for the 'yes' and 18,1% for the 'sometimes' responses.

Among the participants, 255 (52,46 %) had no TMD, 165 (33,95 %) had mild TMD, 56 (11,52 %) moderate TMD and only 10 (2,05%) had severe TMD (Table 2). There was no significant difference, although the participants classified as being TMD-free (52,46 %) was marginally higher than that of participants with other TMD degree (mild, moderate and severe; 47,53%). The participants classified as mild TMD was significantly higher ($p < 0,001$) than that of severe and moderate.

Table 1. Response of the participants to Fonseca's 10 questions

Question Number	Fonseca Question	Women 305			Man 181		
		No n(%)	Sometimes n(%)	Yes n(%)	No n(%)	Sometimes n(%)	Yes n(%)
1	Do you have difficulty opening your mouth wide?	245 (80,32)	54 (17,70)	6 (1,96)	139 (76,79)	38 (20,99)	4 (2,20)
2	Do you have difficulty moving your jaw to the sides?	248 (81,31)	53 (17,37)	4 (1,31)	142 (78,45)	35 (19,33)	4 (2,20)
3	Do you feel fatigue or muscle pain when you chew?	196 (64,26)	88 (28,85)	21 (6,88)	125 (69,06)	47 (25,96)	9 (4,97)
4	Do you have headaches?	159 (52,13)	95 (31,14)	61 (20)	109 (60,22)	39 (21,54)	23 (12,70)
5	Do you have neck pain or a stiff neck?	218 (71,47)	63 (20,65)	24 (7,86)	146 (80,66)	26 (14,36)	9 (4,97)
6	Do you have ear aches or pain in the area (temporomandibular joint)?	221 (72,45)	72 (23,6)	12 (3,93)	145 (80,11)	27 (14,91)	9 (4,97)
7	Have you ever noticed any noise in your temporomandibular joint while chewing or opening your mouth?	166 (54,42)	89 (29,18)	59 (19,34)	107 (59,11)	44 (24,3)	20 (11,04)
8	Do you have any habits such as clenching or grinding your teeth?	173 (56,72)	78 (25,57)	54 (17,70)	115 (63,53)	49 (27,07)	17 (9,39)
9	Do you feel that your teeth do not come together well?	230 (75,40)	62 (20,32)	13 (4,26)	146 (80,66)	30 (16,57)	5 (2,76)
10	Do you consider yourself a tense (nervous) person?	154 (50,49)	88 (28,85)	63 (20,65)	109 (60,22)	47 (25,96)	25 (13,81)

Table 2. Distribution of the University Students According to Gender and TMD Degree

	Non-TMD n(%)	Mild n (%)	Moderate n (%)	Severe n (%)	Total n (%)	Chi square p-value
Female	147 (48,19)	112 (36,72)	38 (12,45)	8 (2,62)	305 (62,75)	0.398
Man	108 (59,66)	53 (29,28)	18 (9,94)	2 (1,1)	181 (37,24)	

The percentage of mild, moderate or severity TMD was slightly higher in females (36,72%; 11,47%; 2,6%) than males (29,29%; 8,83%; 1,1%), but no significant differences was observed between gender for a same severity degree ($p>0.05$).

Most of the participants were younger than 20 years (age 18- 24,27%; age 19- 26,33%). There was no significant difference between TMD degree and different age group in our sample (Table 3). However, the severity of TMD increased with increasing age.

Table 3. Response of the participants to Fonseca's 10 questions

Question Number	Fonseca Question	Women 305			Man 181		
		No n(%)	Sometimes n(%)	Yes n(%)	No n(%)	Sometimes n(%)	Yes n(%)
1	Do you have difficulty opening your mouth wide?	245 (80,32)	54 (17,70)	6 (1,96)	139 (76,79)	38 (20,99)	4 (2,20)
2	Do you have difficulty moving your jaw to the sides?	248 (81,31)	53 (17,37)	4 (1,31)	142 (78,45)	35 (19,33)	4 (2,20)
3	Do you feel fatigue or muscle pain when you chew?	196 (64,26)	88 (28,85)	21 (6,88)	125 (69,06)	47 (25,96)	9 (4,97)
4	Do you have headaches?	159 (52,13)	95 (31,14)	61 (20,0)	109 (60,22)	39 (21,54)	23 (12,70)
5	Do you have neck pain or a stiff neck?	218 (71,47)	63 (20,65)	24 (7,86)	146 (80,66)	26 (14,36)	9 (4,97)
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8	Do you have any habits such as clenching or grinding your teeth?	173 (56,72)	78 (25,57)	54 (17,70)	115 (63,53)	49 (27,07)	17 (9,39)
9	Do you feel that your teeth do not come together well?	230 (75,40)	62 (20,32)	13 (4,26)	146 (80,66)	30 (16,57)	5 (2,76)
10	Do you consider yourself a tense (nervous) person?	154 (50,49)	88 (28,85)	63 (20,65)	109 (60,22)	47 (25,96)	25 (13,81)

There were higher numbers of subjects with mild than with moderate and severe TMJ dysfunction in each clinical condition (Table 4). The order of frequency of all studied

clinical conditions was 'no,' 'sometimes,' and 'yes,' and there was a statistically significant difference ($p < 0.001$) among 'yes,' 'sometimes,' and 'no' for all the clinical conditions.

Table 4. Distribution of TMD degree according to the responses of participants

	TMD-Free	Mild	Moderate	Severe	P value
Difficulty during mouth opening					
Yes	1 (0,2)	1 (0,2)	5 (1,02)	3 (0,61)	< 0,001
Sometimes	15 (3,08)	45 (9,25)	28 (5,76)	4 (0,82)	
No	239 (49,17)	119 (24,48)	23 (4,73)	3 (0,61)	
Difficulty during lateral deviatios					
Yes	0	2 (0,41)	3 (0,61)	3 (0,61)	< 0,001
Sometimes	13 (2,67)	43 (8,84)	26 (5,34)	6 (1,23)	
No	242 (49,79)	120 (24,69)	27 (5,55)	1 (0,2)	
Pain during mastication					
Yes	10 (2,05)	10 (2,05)	8 (1,64)	2 (0,41)	< 0,001
Sometimes	43 (8,84)	60 (1,23)	27 (5,55)	5 (1,02)	
No	202 (41,56)	95 (19,54)	21 (4,32)	3 (0,61)	
Headache					
Yes	10 (2,05)	38 (7,81)	30 (6,17)	6 (1,23)	< 0,001
Sometimes	41 (8,43)	72 (14,81)	20 (4,11)	1 (0,2)	
No	204 (41,97)	55 (11,31)	6 (1,23)	3 (0,61)	
Neck pain					
Yes	10 (2,05)	11 (2,26)	10 (2,05)	2 (0,41)	< 0,001
Sometimes	31 (6,37)	36 (7,40)	18 (3,70)	4 (0,82)	
No	214 (44,03)	118 (24,27)	28 (5,76)	4 (0,82)	
TMJ pain					
Yes	5 (1,02)	4 (0,82)	8 (1,64)	4 (0,82)	< 0,001
Sometimes	46 (9,46)	38 (7,81)	10 (2,05)	5 (1,02)	
No	204 (41,97)	123 (25,3)	38 (7,81)	1 (0,2)	
TMJ sounds					
Yes	25 (5,14)	23 (4,73)	26 (5,34)	5 (1,02)	< 0,001
Sometimes	47 (9,67)	65 (13,37)	19 (3,90)	3 (0,61)	
No	183 (37,65)	77 (15,84)	11 (2,26)	2 (0,41)	
Parafunctional habits					
Yes	20 (4,11)	25 (5,14)	20 (4,11)	6 (1,23)	< 0,001
Sometimes	46 (9,46)	58 (11,93)	21 (4,32)	2 (0,41)	
No	189 (38,88)	82 (16,87)	15 (3,08)	2 (0,41)	
Malocclusion perception					
Yes	5 (1,02)	5 (1,02)	6 (1,23)	2 (0,41)	< 0,001
Sometimes	23 (4,73)	38 (7,81)	28 (5,76)	3 (0,61)	
No	227 (46,7)	122 (25,1)	22 (4,52)	5 (1,02)	
Perception of stress					
Yes	15 (3,08)	35 (7,20)	32 (6,58)	6 (1,23)	< 0,001
Sometimes	37 (7,61)	77 (15,84)	18 (3,7)	3 (0,61)	
No	203 (41,76)	53 (10,90)	6 (1,23)	1 (0,29)	

Discussion

The aim of this study was to evaluate the prevalence of signs and symptoms of TMD based on

FAI among university students in Turkey. The Fonseca's questionnaire allows collecting a lot of important data in a short period that can be very useful for the early detection and diagnosis of TMD. It is also

easy to understand for the volunteers and has almost no influence on the individuals and their answers.

In published studies based on FAI, the prevalence rate of TMD was observed to vary from 22,6 to 87% . These prevalence rates were reported by Karthik *et al.*²⁷ 22,6%, Jagdhari *et al.*²² 23%, Rokaya *et al.*²⁸ 30,6%, Conti *et al.*¹³ 42%, Al Moaleem *et al.*²⁶ 43,5%, Modi *et al.*²¹ 45,16%, Habib *et al.*²⁴ 46,8%, Bonjardim *et al.*¹⁹ 50%, Bicaj *et al.*²⁹ 53,21%, Nomura *et al.*¹⁸ 55,4%,

Pedroni *et al.*¹⁵ 68%, de Oliveira *et al.*¹⁷ 68,61%, Bevilaqua-Grossi *et al.*¹⁶ 87%. In this study, 47,53% of participants were found to have TMD, as classified by the FAI (33,95% mild, 11,52% moderate and 2,05% severe). These distinctions in the studies can be explained by the use of different data collection methodologies to measure the prevalence of the TMD or the fact that the samples have different racial, ethical and social backgrounds.

In this study, the most prevalent degree of TMD severity was the mild TMD for both the females and males in Turkish university students. This agrees with the studies which obtained similar findings using the Fonseca questionnaire^{13,17,18,21,23,24,27-29}. The prevalence of TMD in females (51,81%) were higher than men (40,34%), although no statistically significant difference were found between TMD severity and gender. These findings are consistent with those of other studies^{13,15,17,18,27,29}.

In the present study, the most frequently reported TMD problems were perception of stress, headaches and TMJ sounds. In contrast to our findings, Habib *et al.*²⁴ and Al Moaleem *et al.*²⁶ found that the most frequently reported TMD problems were associated to poor articulation of teeth.

In recent years, emotional disturbance, stress, anxiety and depression have been reported to play an important role as predisposing or aggravating factors in TMD³³⁻³⁶. Several studies have also shown that TMD symptoms and signs can increase in university students due to negative effects on quality of life could be primarily affected psycho-emotional factors³⁷⁻⁴¹. In the present study, 221 of 486 students who described themselves as being tense with both "Yes" (% 18,51) and "Sometimes" (% 26,95) possessed some degree of TMD dysfunction ranging from mild to severe. These findings are consistent with other studies observing that the prevalence of TMD symptoms increased in people who described themselves as being tense^{19,37-41}.

Headaches are common among the general population. Recent studies had reported that there is a significant positive association between temporomandibular pain and primary headaches (tension type headache and migraine)⁴¹⁻⁴⁴. Epidemiological studies assessed that headache are present in 50 to 80% of individuals with TMD, compared to 13 to 23% among those without TMD and with females being more frequently affected^{41,46}. In this study 58,6% of subjects complained from headache.

It was reported higher frequencies of TMJ sounds which agrees with the findings of previous studies based on the same questionnaire^{19,18,26}. In addition, the prevalence of TMJ sounds, in this study, was increased according to the severity of TMD. These findings are consistent with those of other studies^{15,18,30}.

Even though the parafunctional habits considered one of most harmful factors for the temporomandibular joint (TMJ), many questions concerning the actual causal

relationship between parafunctional habits and TMA are unsolved⁴⁶⁻⁴⁸. Most studies were observed that the prevalence of bruxism is higher in young adults than in the elderly⁴⁹⁻⁵³. Similar to these studies, parafunctional habits such as clenching or grinding was showed in 10,49% for "Yes" and 16,66% for "Sometimes"

Conclusions

The limitations of this study include the use of questionnaires in the dental assistant students in only one university to investigate symptoms of TMD. Based on the obtained data, a high prevalence of signs and symptoms of TMD was identified in Turkish university population. Emotional stress and headache which may be a important role in the development and/or progression of TMD. They were the most prevalent findings of TMD among the students classified by the FAI as severe and moderate TMD.

In conclusion, the present study suggests that Fonseca questionnaire may serve as important tools in the early diagnosis and prevention of future complications of TMD that can occur in the young population.

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