



Prevalence and Severity of Temporomandibular Disorders among Undergraduate Medical Students in Association with Khat Chewing

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ABSTRACT

Introduction: The aim of this study was to assess the prevalence and severity of temporomandibular joint disorders (TMDs) among undergraduate medical students in the presence of khat chewing over a period of time.

Materials and methods: Totally, 186 medical college students (age \leq 20 years) were randomly selected for the present study. The study subjects were divided into two groups according to age, under 20 and above 20 years. The study was based on Fonseca's anamnestic index and its questionnaire, which is composed of 10 questions and classifies the severity of TMDs. The obtained data were coded and entered into Statistical Package for the Social Sciences (SPSS) program for analysis using chi-square test at significance level of 5%.

Results: Most of the participants were male (68.8%) students and older than 20 years (63%). Those who reported with khat chewing

comprised 31.7%. From the total samples, only 38.0% was classified as having mild TMD and 0.50% were classified as having severe TMD. Poor dental articulation, grinding of teeth, headaches, tense personalities, and temporomandibular joint (TMJ) clicking were the most common clinical findings. The mean scores showed no significant difference among gender ($p \leq 0.29$) and the khat chewing ($p \leq 0.531$) groups for the 10 questions. However, it showed significant difference among age groups ($p \leq 0.025$).

Conclusion: The majority of subjects complained of mild TMD, while only a few cases showed a moderate TMD among different age groups. The most frequently reported dysfunctions were related to poor dental articulation and grinding of the teeth, frequent headaches, the clicking of joint, and tense personalities. No significant difference was found between gender and khat and nonkhat chewing groups.

Clinical significance: Khat chewing is a parafunctional habit and affects dental occlusion (especially cuspal wear) in terms of anterior guidance. Such alterations in occlusion are known to be one of the causative (predisposing) factors of TMD.

Keywords: *Catha edulis*, Dental occlusion, Fonseca's anamnestic index, Fonseca's questionnaire, Medical students, Saudi Arabia.

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INTRODUCTION

Temporomandibular joint disorder (TMD) is an umbrella term embracing a number of clinical manifestations that involve the temporomandibular joint (TMJ), teeth, and the masticatory muscles. It represents a common health problem among university students.^{1,2}

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Previous studies have shown a low prevalence of TMD among students.³⁻⁵ Other studies have concluded that their subjects complained of mild-to-moderate prevalence of TMD.⁶⁻⁹ High prevalence of TMD was reported in studies conducted elsewhere.^{3,10-13}

Regarding sex differences, TMD problems were found to be more prevalent in female subjects as compared with males as mentioned by Wahid et al,⁶ Nomura et al,¹⁴ de Oliveira et al,¹⁵ Bagis et al,¹⁶ Bahrani et al,¹⁷ and Chuang.¹⁸ However, other studies concluded that there were no significant differences between males and females.^{9,19}

Few studies have indicated that TMD affects young populations.^{12,14} While Al-Havaz et al²⁰ found no age association, Gaphor and Abdullah¹⁹ concluded that TMD is more prevalent among older age groups.

Khat (*Catha edulis*) chewing habit in the southern part of the Kingdom of Saudi Arabia (KSA) is widespread and practiced by a majority of the population.²¹ Fresh khat leaves are usually chewed during social and cultural gatherings and held in the lower buccal pouch unilaterally for long hours.^{22,23} Khat is a central nervous stimulant and is believed to improve work capacity, endure traveling, and counter fatigue during examination preparation in students.²⁴ Khat was reported to cause dental attrition, staining of teeth, TMDs (pain and clicking), cervical caries, and increased periodontal problems.^{21,24} Temporomandibular joint pain is the most common dysfunction seen among khat chewers. The pain commonly originates from TMJ and shows as a masticatory muscle dysfunction.^{24,25}

No research has investigated the relationship between the level of severity of TMD and khat chewing, although some studies have demonstrated the relation between unilateral chewing habits and TMD.²⁶⁻²⁹

Even though there are scores of universities in KSA, only a few studies have been conducted to measure the prevalence of TMD among their students.^{7,10,13} Many studies in other universities concluded that TMD is higher among medical students than other disciplines.^{7,12,13,17} Hence, the aim of the current study was to assess the prevalence and severity of TMD among undergraduate medical students and to compare the severity of TMD between them in the presence of parafunctional habits, such as khat chewing.

MATERIALS AND METHODS

This cross-sectional study was conducted in Jazan and King Khalid universities. It was approved by the ethical committee of the respective colleges. The study was carried out between January and May 2016. The sample consisted of 186 young adults (128 males and 58 females), with age ranging from 18 to 26 years. The subjects were selected randomly from the undergraduate medical

colleges (conventional samples). All the participants in this study signed a consent form.

The inclusion criteria were healthy students without a systematic problem. Students with a previous history of orthodontic treatment, cemented prosthesis, and musculoskeletal or neurological disorders were excluded from the study sample.³⁰

The selected students were divided into two groups according to age, under 20 and above 20 years respectively. The subjects who chewed khat one or two times per week for 3 years were considered as a khat chewer as mentioned by Al-Bayat et al.³¹

This study was based on Fonseca's questionnaire (FQ). This questionnaire was posted to the students, and their feedback was received. It was used to assess TMD among undergraduate medical students in the presence of khat chewing. This questionnaire was proposed by Fonseca et al in 1994³² and is commonly used to classify TMD severity, as it is good in obtaining relevant data, covers multidimensions, and provides a full true picture of TMD. It was used for its simplicity and clearness of the questions. It is composed of 10 questions as seen in Table 3, which includes checking for the presence of pain in the TMJ, head, and back while chewing, parafunctional habits, movement limitations, joint clicking, a perception of malocclusion, and sensation of emotional stress. Student participants were told that 10 questions will be posed to them and could be answered with a "No," "Sometimes," and "Yes," and only one answer should be marked for each question. For a detailed analysis of TMD severity, the answer "Sometimes" was given a score of 5, "Yes" was given a score of 10, while the answer "No" was given a score of 0. They were summed up and the total score was out of 100 maximum scores. There was no time limit for filling the forms, which means that students did not answer the questions under any effect.

The obtained total scores were compared with the clinical Fonseca's anamnestic index (FAI; Fonseca et al³²), and the subjects were classified per TMD dysfunction degree (Table 1). All relevant data were coded and entered into the Statistical Package for the Social Sciences (SPSS) program version 21.0 for Windows (SPSS Inc., Chicago, IL, USA) and then analyzed. Chi-square test was used to determine the significant association with different grouping factors. The significance level was set at 5%.

Table 1: Clinical index of TMD severity classification based on FAI

Type of TMD	Total score
No TMD	0–15
Light TMD	20–40
Moderate TMD	45–65
Severe TMD	70–100

Table 2: Distribution of the samples according to gender and khat chewing

Factors	no	Percentage
Gender		
Male	128	68.8
Female	58	31.2
Khat chewing		
Yes	59	31.7
No	127	68.3

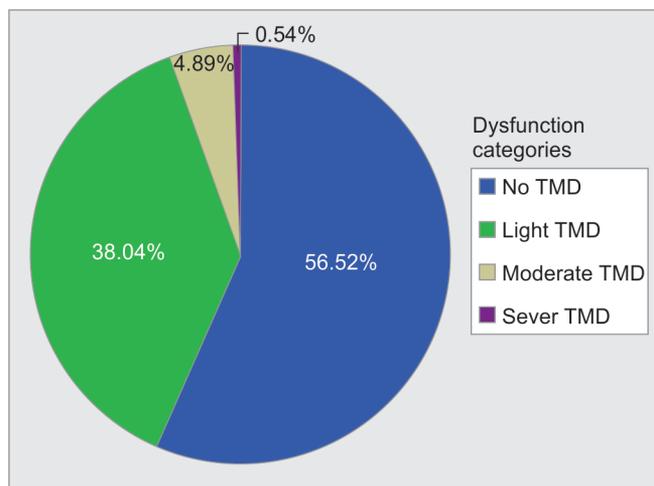
RESULTS

Out of 250 questionnaires distributed, 186 completed questionnaires were received (response rate = 74.4%). Most of the participants were older than 20 years (117, 63%) and were male students (128, 68.8%). Those who reported with khat chewing were 59 (31.7%; Table 2).

The distribution of participants according to the different levels of TMJ dysfunction based on the FAI is presented in Graph 1. Almost more than half of the participants (56.5%) were classified as having no TMD and 38.0% were classified as having mild TMD, while only 0.50% were classified as having severe TMD (Graph 1).

Regarding individual questions as shown in Table 3, the most frequently reported TMD problems were related to poor articulation of teeth (Q9: Yes = 28.0%, Sometimes = 21.5%), followed by frequent headaches (Q4: Yes = 14.5%, Sometimes = 21.0%), then being a tense person (Q10: Yes = 12.4%, Sometimes = 28.5%). The "Sometimes" responses for Q7 (TMJ clicking) and Q8 (grinding of teeth) were almost more than 25%. The "No" responses ranged from 50 to 90% for the 10 questions.

There was no association between TMDs and gender or khat chewing. However, the severity of TMDs increased with increasing age. Most of the mild TMD, 47 (40.2%), and moderate TMD, 9 (7.7%), were found among participants older than 20 years compared with under 20 years, 23 (34.3%) and 0 (0.0%) respectively. Comparison of mean scores of answers showed no significant differences among



Graph 1: Frequency of the subjects according to the severity of TMDs

gender ($p \leq 0.29$) and khat chewer ($p \leq 0.531$) groups for the 10 questions. However, it showed significant difference among age groups ($p \leq 0.025$) (Table 4).

DISCUSSION

The objectives of the present cross-sectional study were to evaluate the prevalence of signs and symptoms of TMD among medical university students through subjective data obtained from the FQ. Also, the study would allow comparing these findings with other national and international studies. The FQ was used to assess the TMD level; it is a self-administered questionnaire and allows easy collection of the information within a short period of time without any influence by the investigator's side.³² Also, FAI is a useful TMD screening tool that has important implications for the early detection and diagnosis of TMD as well as preventing TMD leading to further complications.

In the current study, almost more than half of the 186 participants were TMD free (56.5%). The most effected cases showed a low prevalence of TMD equal to 38.0%.

Table 3: Response of the participants to Fonseca's 10 questions (n = 186)

Question #	Type of the question	Response No n (%)	Response Sometimes n (%)	Response Yes n (%)
1	Is it hard for you to open your mouth?	166 (89.7)	15 (8.1)	4 (2.2)
2	Is it hard for you to move your mandible from side to side?	169 (90.9)	16 (8.6)	1 (0.5)
3	Do you get tired/muscular pain while chewing?	143 (76.9)	38 (20.4)	5 (2.7)
4	Do you have frequent headaches?	120 (64.5)	39 (21.0)	27 (14.5)
5	Do you have pain on the nape or stiff neck?	135 (72.6)	41 (22.0)	10 (5.4)
6	Do you have earaches or pain in the craniomandibular joints?	162 (87.1)	17 (9.1)	7 (3.8)
7	Have you noticed any TMJ clicking while chewing or when you open your mouth?	120 (64.5)	51 (27.4)	15 (8.1)
8	Do you clench or grind your teeth?	120 (64.5)	49 (26.3)	17 (9.1)
9	Do you feel your teeth do not articulate well?	94 (50.5)	40 (21.5)	52 (28.0)
10	Do you consider yourself a tense (nervous) person?	109 (58.6)	53 (28.5)	23 (12.4)

Table 4: Frequency of the severity of TMDs between different gender, age, and khat groups

	No TMD n (%)	Mild or Light TMD n (%)	Moderate TMD n (%)	Severe TMD n (%)	Chi square p-value
<i>Gender</i>					
Male	67 (52.8)	51 (40.2)	8 (6.3)	1 (0.8)	0.290
Female	37 (64.9)	19 (33.3)	1 (1.8)	0 (0.0)	
<i>Age (years)</i>					
Under 20	43 (64.2)	23 (34.3)	0 (0.0)	1 (1.5)	0.025*
Older than 20	61 (52.1)	47 (40.2)	9 (7.7)	0 (0.0)	
<i>Khat chewers</i>					
Yes	38 (54.0)	19 (32.2)	2 (3.4)	0 (0.0)	0.531
No	66 (52.8)	51 (40.8)	7 (5.6)	1 (0.8)	

*Significant differences

This was in agreement with the findings of Omoregie and Okoh³ (Nigeria), de Lucena et al⁴ (Brazil), Chauhan et al⁵ (India), Habib et al⁷ (KSA), and de Oliveira et al¹⁵ (Brazil). Other studies among university students concluded mild, moderate, and high prevalences of TMD as mentioned by Wahid et al,⁶ Habib et al,⁷ Khan et al,⁹ Kassab et al,¹⁰ Vojdani et al,¹¹ Ahmed and Abuaffan,¹² and Zwiri and Al-Omiri.¹³ These discrepancies could be explained by the different methodologies of data collection related to measuring the prevalence of severity of TMD, or by differences in the sample, where cultural, economic, and eating habits are considered. An additional factor to be considered is that different populations have different prevalence of the same disease.

In different studies conducted among university students in KSA, namely in King Saud University,⁷ Alqouf University,¹⁰ and North Saudi University,¹³ the prevalence of TMD was mild to moderate. However, a single study conducted in King Khalid University³³ demonstrated a relationship between TMD and malocclusion.

From Table 4, the most frequently reported TMD problems were related to poor articulation of teeth (Q9) with both "Yes" and "Sometimes"; this is in agreement with the result of Habib et al⁷ (KSA). A frequent headache was shown in 14.5% of the subjects for "Yes" and 21.0% for "Sometimes"; this was in agreement with that mentioned by Khan et al⁹ (Pakistan), Omoregie and Okoh³ (Nigeria), and Gaphor and Abdullah¹⁹ (Iraq).

The Q10 regarding "being a tense person" showed 12.4% for "Yes" and 28.5% for "Sometimes"; this may be related to the lifestyle and coincided with the findings of Habib et al⁷ (KSU), Wahid et al⁶ (Pakistan), and Nomura et al¹⁴ (Brazil). Also, the results for the "Sometimes" responses for Q7 (TMJ clicking) and Q8 (grinding of teeth) have coincided with the results of Habib et al⁷ (KSU) and Gaphor and Abdullah¹⁹ (Iraq).

We must also consider the fact that the students involved in this study are not paying fees for their university studies. This was the main reason for the controversy in the findings mentioned by Ryalata et al² (56.8%), Ahmed

and Abuaffan¹² (77.2%), Nomura et al¹⁴ (53.21%), Bahrani et al¹⁷ (71.0%), and Gaphor and Abdullah¹⁹ (76.35%). These authors concluded that TMD is higher among medical students.

There were no associations between TMDs and gender in this study. Comparison of mean scores of answers showed no significant difference among gender ($p \leq 0.29$). These results agreed with the results reported by de Lucena et al,⁴ Khan et al,⁹ Bagis et al,¹⁶ Gaphor and Abdullah,¹⁹ and Hegde et al.³⁴ These authors demonstrated and concluded no sex differences among their samples.

In the current study, most of the mild (40.2%) and moderate (7.7%) TMD cases were found among participants older than 20 (34.3%) as compared with under 20 years old (0.0%). This totally agrees with the result of Nilsson,²⁶ who concluded that TMDs increased with an increase in age.

Khat leaves are usually chewed in the lower buccal pouch unilaterally as a bolus for long hours.^{22,23} It was reported to cause TMD in the form of masticatory muscle dysfunction, pain, and clicking.^{24,25} Even though no study was conducted to investigate the relationship between the level of severity of TMD and khat chewing, previous studies demonstrated the relation between unilateral chewing habits and TMD as mentioned by Nilsson,²⁶ Chauhan et al,²⁷ Miyake et al,²⁸ and Casanova-Rosado et al.²⁹ Our result showed no differences between khat and nonkhat chewers; this could be explained by the short period of the chewing habit among the involved students in the present study.

Even though this study provided some information regarding the prevalence and severity of TMDs among Saudi university students in a particular area, long-term clinical studies are advised to be conducted in this region. This point is considered as one of the limitations of this study.

CONCLUSION

Within the limitation of this cross-sectional study among medical students and based on the FAI findings, the

majority of subjects complained of mild TMD, while only a few cases showed a moderate prevalence of TMD. The most frequently reported TMJ dysfunctions were related to poor articulation of the teeth, frequent headaches, considering oneself a tense person, and grinding teeth. No significant difference was found between both genders and the khat and nonkhat chewer groups; however, there was a significant difference between the two age groups. Longitudinal and control clinical studies in these subjects will be warranted to follow the prevalence of TMD and the health care needs of TMD patients.

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