

# Relationship between bad oral habits, signs, and symptoms of temporomandibular joint disorders among Saudi population: A cross-sectional study

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## Abstract

**Background:** According to the American Dental Association, temporomandibular disorders (TMD) refer to a group of disorders characterised by pain in the temporomandibular joint (TMJ), the periauricular area, or the muscles of mastication. TMJ noise/sounds, and any deviations or restriction during jaw movements. Many oral habits are common and usually do not harm the TMJ and associated structures. However, these habits may result in TMJ disorders, if the activity goes beyond someone's physiological tolerance. The causes of degenerative changes of TMJ are believed to be multifactorial and controversial too.

**Objectives:** This study aims to evaluate the prevalence of oral habits and its relationship with temporomandibular disorders in the Saudi population of Taif city.

**Materials and Methods:** This questionnaire-based cross-sectional study was conducted from March 2021 to July 2021 at Taif city, Kingdom of Saudi Arabia (KSA). The Arabic version of a standardized questionnaire (recommended by the American Academy of Orofacial Pain) was used and distributed randomly among 441 citizens of Taif city.

**Results:** Our study showed that many respondents had different TMJ disorders, such as pain during eating, sound in jaw joint, pain around ear, temples, and cheek, headache and neck pain, change in bite, and pain during opening and closing of the mouth. On the other hand, many respondents answered that they had TMD, pain associated with nail biting/object biting, lip biting, clenching teeth, and chewing gum.

**Conclusion:** In the present study, a relationship between harmful oral habits and the development of signs and symptoms of TMDs among adolescents who lived in Taif city, KSA was noted. In the present study, no clinical examinations were conducted and only consisted of closed-ended questions, all of which may have a lower the validity rate. An effort was made to overcome these limitations by using a well-designed standardized questionnaire by the American Academy of the Orofacial Pain. We conclude that further studies are required and using of clinical examination to measure the severity of the signs and symptoms for better understanding the association of oral habits with TMJ disorders.

**Keywords:** Oral habits, orofacial pain, temporomandibular disorders, temporomandibular joint (TMJ)

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## INTRODUCTION

Temporomandibular disorder (TMD) is a term that includes various changes and issues that influence the temporomandibular joint (TMJ) and/or the masticatory muscles and adjacent structures.<sup>[1]</sup> Major symptoms include pain in the joint and in the muscle of mastication. Pain in the orofacial region may arise from temporomandibular disorders (TMDs) followed by odontogenic origin which are major causes of pain.<sup>[2]</sup> Pain or other functional disorders were strongly related to TMJ, and most commonly for headache. Sound or noise from TMJ is reported in 89% of cases, which was considered important for TMJ when combined with pain and dysfunction. Pain and other symptoms can affect chewing, swallowing, and speech and limit efficiency and comfort.<sup>[3]</sup>

Oral habits can be one of many aetiological factors of TMD, which affect occlusion, teeth and muscle of mastication, and other similar complaints due to increased nociceptive input from different areas of the masticatory system.<sup>[4]</sup> Oral habits such as nail and lip biting and chewing gum were relatively present in the TMD group in comparison with the control group. Children may develop the oral habit due to increased stress without developing TMDs in contrast to adolescents.<sup>[5]</sup> Association between oral habits and TMDs have been shown to be present according to other epidemiological studies.<sup>[6]</sup> Studies showing the association between TMD, signs and symptoms, and parafunctional habits in the Saudi population are very few. Hence, this study aimed to evaluate the prevalence of oral habits and its relationship with TMDs in the Saudi population of Taif city, Kingdom of Saudi Arabia (KSA).

## MATERIAL AND METHODS

This was a cross-sectional study that was conducted from March 2021 to July 2021 at Taif city, KSA, using the Arabic version of a questionnaire recommended by the American Academy of Orofacial Pain.<sup>[6]</sup> The original questionnaire was translated to the Arabic language and structured in the form of a total of 10 questions [Appendix 1] that were to be responded with either “yes” or “no”. The questionnaire randomly distributed among the population of Taif city. An institutional ethics committee approval was obtained from Taif University and informed consent was taken from each participant before the beginning of the questionnaire. A total of 441 individuals responded. The inclusion criteria were as under:

- individuals with all permanent dentition stage (absence of primary teeth) and
- Saudi nationals of Taif city, KSA.

The exclusion criteria were persons with a history of trauma to the orofacial region, systematic diseases affecting the bone and joints, those with history or currently undergoing orthodontic treatment and congenital defects of the TMJ. Data were analysed using the Statistical Package for the Social Sciences (SPSS) version 21 software and statistical significance was determined by the Pearson Chi-squared test. The results were regarded as statistically significant if *P* value was less than 0.05.

## RESULTS

The study consisted of 441 adolescents (99 males and 342 females) aged between 10 and 20 years. Among the total number of respondents, 77.6% comprised of females and 22.4% of males. The age range of respondents was categorized as under:

- Less than 18 years (14–17 years)
- 18–25 years
- 26–35 years and
- Above 35 years

All demographic details of the respondents were highly statistically significant, as shown in Table 1. About 31 respondents (19 males and 12 females) were excluded from the study as they did not fulfill the inclusion criteria. A majority of the respondents were female and aged above 35 years. All responses to each question are summarized in Table 2 for statistical analysis.

Most of the responses that were related to TMD and negative responses indicate that the issues that influenced the TMJ were not found in the present study. Few responses showed statistical significance [Table 2]. Most responses (greater than 70%) answered “no” for TMJ-associated questions.

In the present study, the most frequent oral habits recorded (descending order) were the following: gum chewing in 229 respondents (41%), lip biting in 164 respondents (29.4%), and teeth clenching or grinding in

**Table 1: Distribution of respondents according to gender and age**

Factor	n (%)	Chi-squared value	P
Gender			
Male	99 (22.4%)	133.898	0.000**
Female	342 (77.6%)		
Age in Years		355.036	
<18	13 (2.95%)		0.000**
18-25	65 (14.73%)		
26-35	88 (19.95%)		
Above 35	275 (62.35%)		

\*\*Indicates statistically significant. #NA: Not available

86 respondents (15.4%). Lip biting was the least found among 79 (14.2%) respondents. The overall distribution of oral habits and their prevalence are shown in Table 3. Lip and nail biting and gum chewing were noted more in males compared to females. The habit of gum chewing was slightly more in females than males [Table 3].

The most frequently reported sign or symptom of TMD was headache and neck pain in 36.7% (162), followed by pain around the ears, temples, and cheek in 28.3% (125) and joint noise among 26.3% (116) of respondents. Other signs or symptoms such as difficulty in speaking, chewing, or using the jaws was noted in 14.3% (63), change in bite in 11.9% (52), and 11.6% (51) affirmed that their “jaw locked” at times. Pain was noted during opening and closing of the jaws in about 35 (7.9%) respondents.

Table 4 shows the distribution of oral habits and their prevalence in both sexes. All responses related to sign or symptoms of TMD were highly significant, as indicated in Table 4.

### DISCUSSION

Many epidemiological studies on the TMD prevalence have been published among various populations, however, very few studies have been reported on relationship between oral habits with that of the prevalence of TMD in Saudi Arabia. Oral habits such as gum chewing, nail biting, lip biting, and tooth clenching or grinding are frequent among adolescents and are most likely to have injurious effects on the masticatory system.<sup>[7,8]</sup> It has been suggested and established in literature that oral parafunctional habits have a role in TMDs. The prevalence and association with

**Table 2: Gender-wise responses to questions with statistical analysis**

Question	Response							
	Yes				No			
	Total	Male	Female	Chi-squared value	Total	Male	Female	P
Do you suffer from difficulty or pain while opening or closing the mouth?	35 (7.9%)	7	28	0.131	406 (92.1%)	92	314	0.835
Do you have any difficulty or pain in the jaw while chewing food or talking?	63 (14.3%)	12	51	0.488	378 (85.7%)	87	291	0.625
Do you suffer from tension or stiffness in the jaw?	51 (11.6%)	7	44	2.521	390 (88.4%)	92	298	0.152
Do you feel any sounds in the jaw while opening or closing the mouth?	116 (26.3%)	26	90	0.000	325 (73.7%)	73	252	1.000
Do you suffer from pain in or around the ear or cheek or temple area?	125 (28.3%)	15	110	10.940	316 (71.7%)	84	232	0.001**
Do you suffer from any pain in the neck or constant headache or toothache?	162 (36.7%)	23	139	10.014	279 (63.3%)	76	203	0.001**
Have you ever had a blow or trauma to the head, neck, or jaws?	106 (24%)	32	74	4.801	335 (76%)	67	268	0.033
Did you feel any change in chewing your food?	52 (11.8%)	6	46	3.777	384 (87%)	90	294	0.052
Have you ever received any treatment for a problem in the jaw or joint pain?	20 (4.5%)	NA	NA	NA	421 (95.5%)	NA	NA	NA

\*Statistically significant, \*\*Highly statistically significant, #NA: Not available

**Table 3: Prevalence and distribution of habits according to gender**

Type of Habits	Response			Chi-squared Value	P
	Total n (%)	Male	Female		
Nail biting	79 (14.2%)	31 (31.3%)	48 (14.0%)	15.587	0.000**
Lip biting	164 (29.4%)	50 (50.5%)	114 (33.3%)	9.692	0.002**
Grinding of teeth	86 (15.4%)	16 (16.2%)	70 (20.5%)	0.907	0.389*
Gum chewing	229 (41%)	47 (47.5%)	182 (53.2%)	1.014	0.361*

\*Statistically significant, \*\*Highly statistically significant

**Table 4: Frequency and distribution of TMD signs and symptoms**

TMJ Signs and Symptoms	Total % (n)	Male	Female	Chi-squared value	P
Headache and neck pain	36.7% (162)	23 (23.23%)	139 (40.64%)	31.041	0.000**
Pain around ears, temples, and cheek	28.3% (125)	15 (15.15%)	110 (32.16%)	82.723	0.000**
Sound in the TMJ/joint noise	26.3% (116)	26 (26.26%)	90 (26.31%)	99.050	0.000**
Difficulty in speaking/chewing	14.3% (63)	12 (12.12%)	51 (14.91%)	225.000	0.000**
Change in bite	11.9% (52)	6 (6.06%)	46 (13.45%)	252.807	0.000**
Lock jaw	11.6% (51)	7 (7.07%)	44 (12.86%)	260.592	0.000**
Pain while opening and closing of jaws	7.9% (35)	7 (7.07%)	28 (8.18%)	312.111	0.000**

\*\*Highly statistically significant

signs and symptoms of TMD have been reported in the literature.<sup>[9]</sup>

In the present study, our aim was to find the relationship between oral habits and the signs and symptoms of TMD among young adults and adolescents of Taif city. After analysing all responses, there was a highly statistically significant relationship between bad oral habits and the development of signs and symptoms of TMD [Table 4].

Headache and neck pain were found to be the most reported symptoms of TMDs, while pain during opening and closing of the mouth was the least common symptoms reported in this study. The results of the present study found a strong and statistically significant female predominance of symptoms and signs of TMD, which is in accordance with earlier reports published in the literature in Farsi.<sup>[10]</sup> In the present study, headache and neck pain were noted in 36.7%, similar to earlier reported in Saudi adolescents by Abdel-hakim *et al.*<sup>[11]</sup> This frequency was higher in females, as described before;<sup>[10,12]</sup> however, in the present study, it was highly significant. The incidence of headache may not be related only to TMD symptoms but could be to other sources.<sup>[13]</sup> Liljestrom *et al.* concluded that TMD should be considered whenever headache is associated with ear pain, difficulty in opening the mouth, stiffness of jaw, and tenderness of masticatory muscles.<sup>[14]</sup>

Other signs and symptoms of TMD like pain around the TMJ, sound or noise in the TMJ, difficulty opening the mouth and jaw locking were uncommon. However, these were to be significantly more common in females than males [Table 4]. The frequency of restricted jaw opening, tenderness, and related pain in and around the TMJ were low in this study and the same as that recorded by Feteih.<sup>[12]</sup>

The most and very frequent oral habits was gum chewing and lip biting [Table 3] in our study and these findings are in accordance with earlier studies.<sup>[6,15]</sup> The high prevalence was found to be among female respondents more than male, which may have contributed to some emotional and genetic factors.<sup>[7,16]</sup> Another study by Motta *et al.*<sup>[16]</sup> reported that nail biting was the most prevalent habit of about 16.4% of participants. Although nail biting was the least prevalent in the present study, it is almost similar to previous reports. Similarly, studies reported a significant association between parafunctional habits and TMD.<sup>[17]</sup>

Clenching and or grinding teeth—a bad oral habit—reported to have the closest relationship with the development of signs and symptoms of TMDs, while lip

biting was reported to have the weakest relationship with the development of signs and symptoms of TMDs.

## SUMMARY AND CONCLUSIONS

In this study, there was a relationship between oral habits and the sign and symptoms of TMDs among Saudi population of Taif city, Kingdom of Saudi Arabia. The present study has a few limitations. We used a close-ended questionnaire that may have a lower validity when compared to other methods of survey/question types. However, an effort was made to overcome these limitations by using the modified Arabic version of a well-designed questionnaire recommended by the American Academy of Orofacial Pain.<sup>[6]</sup> No clinical examination was conducted (due to the COVID-19 pandemic) and any study using clinical examination of participants for oral parafunctional habits compared with their personality factors is recommended. Furthermore, case–control studies with groups with and without TMD factors and the association with oral habits could be conducted for better understanding. The prevalence rate, exact causative factors, and pathological aspects of TMD are still not complete and clear. We suggest that more studies be conducted to achieve a better understanding of all factors related to TMD so that these can be dealt with using more effective preventive and therapeutic measures.

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## Conflicts of interest

There are no conflicts of interest.

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**Appendix-1: Arabic version of questionnaire used (recommended by the American Academy of Orofacial Pain)<sup>[6]</sup>**

**Q. No Question in Arabic**

1. هل تعاني/تعانين من صعوبة أو ألم في الفك أثناء مضغ الطعام أو التحدث ؟
  - نعم
  - لا
2. هل تعاني/تعانين من شد أو تصلب في الفك ؟
  - نعم
  - لا
3. هل يوجد اصوات في الفك أثناء فتح او اغلاق الفم ؟
  - نعم
  - لا
4. هل تعاني/تعانين من ألم حول الاذن او منطقة الخد ؟
  - نعم
  - لا
5. هل تعاني من ألم في الرقبة او صداع مستمر ؟
  - نعم
  - لا
6. هل تعرضت/ي مسبقاً لضربة/صدمة في الرأس او الرقبة او الفك ؟
  - نعم
  - لا
7. هل احسست/ي بتغير في طريقة مضغ الطعام ؟
  - نعم
  - لا
  - لا اعرف
8. هل تحصلت/ي مسبقاً على علاج لآلام مفاصل الفك ؟
  - نعم
  - لا
9. هل لديك/ي احد العادات التالية ؟
  - قضم الاظافر
  - عض الشفاه
  - طحن/صر الاسنان
  - مضغ العلك
10. هل تعاني/تعانين من صعوبة أو ألم أثناء فتح او غلق الفم ؟
  - نعم
  - لا