

## Temporomandibular disorders in Al-Ahsa province, KSA: An epidemiologic study

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هذه الدراسة والتي امتدت لفترة سنة كاملة ركزت على دراسة اضطرابات المفصل وقواعد هذه المشكلة من الناحية الوبائية وسط المرضى المراجعين لقسم الأسنان بمستشفى الملك فهد بالهفوف خلال تلك الفترة .

هذه دراسة مرجعية لعينة مرضى وعينة ضابطة ولقد شملت ٧٢ مريضاً سعودياً يعانون من اضطرابات المفصل الفكي الصدغي و٧٢ مريضاً آخرلاً يعانون من نفس العلة ولكن متطابقين في النواحي الوبائية الأخرى . تم الاختيار عشوائياً كما جرت المقابلات والفحص بعيادات قسم الأسنان . علماً بأن معاينة الحالات قد جرت بواسطة أخصائيي الأسنان وأخصائيي الطب النفسي كل على حده . تم جمع المعلومات في استمارات معدة مسبقاً كما تم تحليلها إحصائياً بواسطة نظام (إ بي أنفو) عن طريق الكمبيوتر .

شكل مرضى اضطرابات المفصل الفكي الصدغي نسبة ٤,٨% من عدد مراجعي عيادات قسم الأسنان ولم تثبت الدراسة أي احتمال علاقة ما بين الحالة الاجتماعية والاقتصادية وحالات اضطرابات مفصل الفك الصدغي  $P > 0.05$  هذا ولقد أوضحت الدراسة أن متوسط الفتح القصى للفم أقل في مرضى اضطرابات المفصل الفكي الصدغي منها في الحالات العادية . أتضح من الدراسة أيضاً أن الاضطرابات النفسية أكثر تواجداً في حالات اضطرابات المفصل الفكي الصدغي . هذا ولقد لوحظ أن حالات القلق والإحباط تشكل ٥٠% من حالات الاضطرابات النفسية بينما تشكل حالات الإحباط ٣٢,١% . كما لوحظ أن المرضى الذين يعانون من اضطرابات نفسية لديهم قابلية بنسبة ٤,٤٥ مرة أن يصابوا باضطرابات المفصل الفكي الصدغي والعكس هو الصحيح

This one-year epidemiological study was designed to investigate TMD, among dental patients attending King Fahad Hospital, Hofuf. It is a retrospective case-control study of 72 Saudi TMD patients cross matched with 72 control subjects. The latter were randomly selected, interviewed and examined in the dental department. Subjects were assessed separately both by a dental specialist and a psychiatrist. Data were collected on a predesigned form, and was statistically analyzed using an Epi-Info 6. TMD cases among the attendants at the dental department were 4.8%. No significant associations ( $P > 0.05$ ) were found between socio-economic factors and the distribution of TMD cases. The mean opening extent of the mouth in the TMD patients was significantly lower than that in the controls ( $P < 0.001$ ). The study also showed that psychological problems were more prevalent among TMD patients. Anxiety-depression was 50% of the psychiatric disorders, while depression constituted 32.1%. This study also showed that patients with psychiatric problems were prone to TMD 4.5 times greater than those without and vice-versa. A liaison psychiatrist should be considered for TMD management. A simplified and valid psychiatric screening test is recommended to help dentists detect those TMD cases in need of psychiatric consultation.

### Introduction

Temporomandibular disorders (TMD) is a collective term embracing various clinical problems that involve the masticating musculature and the temporomandibular joint (TMJ). TMD problems are characterized by pain in the masticatory muscles, the temporomandibular joint and associated hard and soft tissues, limitations in jaw function and sounds in the TMJ.<sup>1</sup> On the basis of some studies, recurrent headache was added to the list of major symptoms of TMD.<sup>2,3</sup> The signature of TMD is pain provoked by function.<sup>4</sup> Resting pain unrelated to jaw function is less common and should direct the clinician to consider alternative disorders.<sup>5</sup>

Epidemiologic data relating to the type of individuals in whom TMD develop may be categorized broadly as demographic and etiologic.<sup>6</sup> Demographic data describe definitive variables such as gender, age, nationality, marital status, years of education and occupation. Causal variables may include stress, depression, oral habits and occlusal scheme. This study aimed to assess the relationships among socio-economic factors (age, gender, marital status and education), psychological factors (anxiety and depression) and physical habits (bruxism, clenching, trauma, chewing gum, eating on one side and occlusal disharmony) in TMD subjects.

### Materials and Methods

The study was conducted in the dental department of King Fahad Hospital, Hofuf (KFHH) in 1997. KFHH is located in Al-Ahsa province in the

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Eastern region of the Kingdom of Saudi Arabia. The study followed a case-control design, among the 673 TMD cases treated at the dental department.

A sample of 72 patients (25 males & 47 females) with a confirmed diagnosis of TMD was chosen on a systematic random basis (2 cases/week). The TMD patients were cross-matched with a control group of 72 subjects who had dental problems other than TMD during the same period.

In this study, a TMD diagnosis was established if the patient had pain and discomfort in the TMJ's, muscles of mastication and/or had masticatory dysfunction for a period exceeding 6 months.<sup>7</sup>

Then, all subjects were seen by a psychiatrist to diagnose possible psychiatric problems according to the WHO standards in the International Classification of Mental and Behavioral Disorders.<sup>8</sup> Informed consent was obtained from all subjects according to ethical requirements. A form was designed to collect data from both TMD subjects and control group (Fig. 1). Data were statistically analyzed using an Epi-Info 6.<sup>9</sup>

المملكة العربية السعودية  
وزارة الصحة  
مستشفى الملك فهد بالهفوف  
قسم الأسنان

استبيان اضطرابات مفصل الفك الصدغي

رقم الملف

رقم تسجيل العائلة

اسم المريض

العصر

الجنس

الجنسية

العدالة الاجتماعية

العنوان

المستوى التعليمي

الهنة

التسلسل	السؤال	نعم	لا
١	هل يؤثر هذا الألم على نومك؟		
٢	هل يؤثر هذا الألم على روتين حياتك اليومي؟		
٣	هل تشتكي اضطرابات بالجهاز الهضمي أو فرحة بالمعدة أو الأمعاء؟		
٤	هل تعاني من روماتزم المفاصل؟		
٥	هل تعاني من آلام بالظهر أو الرقبة؟		
٦	هل تسمع صوت أمام الأذن عند فتح أو إغلاق الفم؟		
٧	هل تحسن بألم عند فتح الفم كبيراً أو عند المضغ؟		
٨	هل تحسن بألم عند تناول وجبة كبيرة أو بعد زيارة طبيب الأسنان؟		
٩	هل حدث أن قشلت في فتح فمك قبل ذلك بحرية؟		
١٠	هل تشعر بالألم بالفك والخد و الوجه بصورة عامة؟		
١١	هل تعني من صداع من فترة لأخرى؟		
١٢	هل تعرف إذا كنت تصبر أسنانك أثناء النوم؟		
١٣	هل تعاني من عادة عض أسنانك على بعضها كثيراً أثناء النوم؟		
١٤	هل تمضغ طعامك دائماً بجهة واحدة من الفم؟		
١٥	هل حدث أن تعرضت لحادثة أو ضربة على الفك؟		
١٥	هل لديك عادة مضغ العلك أو اللبان؟		

Fig. 1. Questionnaire on temporomandibular joint disorders.

## Results

Table 1 shows that the number of TMD cases (4.8%) was close to the figure for orthodontic

Table 1. Distribution of TMD Patients among attendants at the dental clinic in KFHH during 1997.

Sex	TMD patients (4.7%)		Non-TMD Subjects (95.3%)*		Total (100%)	
	No.	%	No.	%	No.	%
Males	260	38.6	6322	46.5	6582	46.2
Females	413	61.4	7158	53.5	7671	53.8
Total	673	100.0	13580	100.0	14253	100.0

Note: TMD cases were 4.8% of all attendants while others included: \*Restorative (27.5%), Oral surgery (24%), Endodontics (16.5%), Prosthodontics (12%), Periodontics (9.8%) and Orthodontics (5.4%).

Table 2. Comparative distribution of TMD subjects and the control group by socio-economic features.

Histories	TMD subjects		Control Group		Odds Ratio	X <sup>2</sup>	P-Value
	No.	%	No.	%			
<b>Sex</b>							
Males	25	34.7	24	33.3	1.00	0.03	>0.05
Females	47	65.3	48	66.7			
<b>Marital status</b>							
Married	43	59.7	49	68.1	1.44	1.08	>0.05
Single	29	40.3	23	31.9			
<b>Education</b>							
Illiterate	12	18.1	6	8.3	2.42	2.97	>0.05
Elementary	17	23.6	15	20.8	1.17	0.16	>0.05
Intermediate	13	18.1	8	11.1	1.76	1.39	>0.05
Secondary	19	26.4	28	38.9	0.56	2.56	>0.05
University	10	13.8	15	20.9	0.61	1.21	>0.05
<b>Occupation</b>							
Housewife	29	40.3	33	45.8	0.80	0.45	>0.05
Student	20	27.8	17	23.7	1.24	0.33	>0.05
Professional	9	12.5	5	6.9	1.91	1.27	>0.05
Nonskilled worker	7	9.7	12	16.6	0.54	1.52	>0.05
Jobless	7	9.7	5	6.9	1.44	0.36	>0.05

Note: Skilled workers were not involved in this study because none were present during the period of the study.

cases (5.4%) among all cases treated in the dental department of KFHH in 1997. Non-significant associations ( $P>0.05$ ) were found between socio-economic factors and the distribution of TMD subjects (Table 2). Table 2 also shows that the number of TMD females was approximately double that for males while the number of married TMD subjects was higher than that for single subjects. There were no significant variations in the mean ages the TMD subjects and the control group. The mean opening extent of the mouth in the TMD subjects was significantly less than that in the control group ( $P<0.001$ , Table 3).

Chewing on one side, clenching, bruxism, attrition and deflective contacts as well as psychological problems, were significantly more prevalent among the TMD subjects (Table 4). A

**Table 3.** Mean age and mean extent of mouth opening between the TMD Subjects and control group.

Studied Variable	TMD Subjects (n=72)		Control Group (n=7)		t-test	P-Value
	Mean	±SD	Mean	±SD		
Age opening	26.9	7.6	28.8	7.5	1.512	>0.05
Extent in mm	35.6	11.5	43.8	4.8	5.582	<0.001

**Table 4.** Distribution of TMD subjects and the control group by trauma, habits, occlusion and psychological factors.

Studied Variables	TMD subjects (n=72)		Control group (n=72)		Odds Ratio	$\chi^2$	P-Value
	No.	%	No.	%			
<b>Trauma</b>	12	16.7	6	8.3	2.2	2.29	>0.05
<b>Habits</b>							
1. chewing gum	16	22.2	17	23.6	0.17	0.04	>0.05
2. chewing on one side	31	43.1	12	16.7	3.78	8.59	<0.01
3. clenching	9	12.5	2	2.8	5.0	4.8	<0.01
4. bruxism	14	19.4	3	4.2	0.18	6.67	<0.01
<b>Occlusion</b>							
1. Attrition	40	55.6	7	9.7	11.6	34.4	<0.01
2. occlusal interference	16	22.2	7	9.7	2.7	4.19	<0.05
3. deflective contact	18	25.0	13	18	1.5	1.3	>0.05
<b>Psychological problems*</b>	28	38.9	9	12.5	4.45	13.1	<0.01

\* Anxiety-depression disorder (including 4 cases with adjustment disorder).

**Table 5.** Distribution of TMD subjects and the control group by psychiatric disorders.

Psychiatric Disorders	TMD subjects No.	TMD subjects %	Control group No.	Control group %
Anxiety	3	4.2	0	0.0
Depression	9	12.5	3	4.2
Others	2	2.8	1	1.4
Free	44	61.1	63	87.5
Total	72	100.0	72	100.0

large number (43.1%) of TMD subjects were in the habit of using one side for chewing (Table 4). Anxiety-depression disorders were 50% of the recorded psychiatric disorders, while depression constituted 32.1% (Table 5).

## Discussion

The percent of TMD subjects (4.8%) shown in Table 1 may be far less than the actual prevalence in Al-Ahsa community for reasons discussed in previous studies.<sup>10,11</sup> Females predominated among the TMD subjects with a ratio of 1.8:1 which was less than the previously reported ratios of 3.1:1 and 4:1 respectively.<sup>4,12,13</sup> This may be largely due to female interest in seeking medical treatment more routinely than males resulting in biased selection sampling.<sup>6</sup> However, Bush *et al*<sup>14</sup> in a TMD study, reported that personality, sensitivity to pain, symptoms presentation and pain related illness behavior did not vary significantly between males and females. Rugh and Solberg<sup>15</sup> reviewed several studies that investigated the prevalence of TMD in the general population. Interestingly, TMD subjects in these studies showed a female to male ratio of 1:1, whereas TMD subjects actively seeking treatment had a 3:1 ratio of females to males.

In this study, the mean age of TMD cases was  $26.9 \pm 7.6$  years. Similarly, the peak age on presentation of TMD was reported to be between 20 and 30 years,<sup>16</sup> but most cross-sectional epidemiological studies had shown higher prevalence figures for TMD namely between 20-40 year of age.<sup>17-19</sup> The lowest prevalence figures were found among children, adolescents and elderly people.<sup>10,17,20,21</sup>

The cited age-related studies led many to conclude that TMD is a self-limiting condition that will resolve with time. TMD-age related findings contrasts sharply with that of chronic back pain

individuals, in that the latter tends to persist and increase in frequency in the older age group.<sup>22</sup>

Klausner<sup>6</sup> reported that the prevalence of TMJ pain decreased with age while the prevalence of face pain remained fairly constant in the population.

Studies of the roles played by socio-economic factors in chronic pain have revealed an association among these variables.<sup>6</sup> However, in our study, socio-economic factors (marital status, education and occupation) did not show significant differences between TMD subjects and the control subjects. Our different findings may be related to the differences in social and cultural backgrounds. However, these socio-economic factors may work together as risk factors. For example, while lower level of education alone may not be a direct risk factor, its consequential socio-economic status is reflected in the levels of income and education and occupation status. On the other hand, Franks<sup>23</sup> stated that certain personality traits were more likely to be affected by TMD conditions and that there was an indication of a greater prevalence in the higher social classes.

It seems likely that life stress may play an important role in some aspects of TMD. Beaton *et al*<sup>24</sup> and Niemi *et al*<sup>25</sup> had reported a higher level of stress symptoms among TMD subjects when compared to a control group. It has been suggested that some TMD patients may have problems in coping with increased life stress and daily hassles.<sup>26</sup>

Consequently they tend to respond with elevated muscle tension.<sup>24,25,27</sup> All these factors have led workers to recognize the importance of psychophysiology factors in the etiology of TMD.<sup>27-29</sup> This study proved a significant relationship between psychologic problems and TMD cases ( $P < 0.001$ ). This agreed with other studies that related psychological problems to TMD condition.<sup>24,25,30</sup>

Those with psychiatric problems in this study were 4.5 times more prone to TMD than those without psychiatric problems (Table 4) or vice versa, as it was not clear which condition developed first. However, Juniper<sup>11</sup> believed that most cases of depression associated with TMD were the result of chronic pain and not the cause of it. TMD represents a curious combination of psychological and somatic manifestation, yet the inclusion criteria for the case definition are dependent on physical findings. Therefore the magnitude and quality of mandibular movements are usually the best objective indicators of TMJ and masticatory muscle status.<sup>31</sup>

Active range of motion (AROM) is the opening of mouth under voluntary effort. It may show hypomobility (restriction) associated with pain, TMJ internal derangement or neuromuscular disorder. Or it can be hypermobility (excessive movement) caused by joint laxity and instability in disc-condyle complex and capsule. Men open more widely than women.<sup>32</sup> But the distribution of (AROM) is relatively constant from the early teens to the old age.<sup>32</sup> A 40-mm inter-incisor opening is a realistic lower limit for person from 10-70 years of age.<sup>31</sup>

In the present study, the mean opening extent of the mouth in TMD cases ( $35.6 \pm 11.5$  mm) was significantly lower than that in the controls ( $43.8 \pm 4.8$  mm, Table 3). A number of occlusal factors have been linked with TMD. They include loss of occlusal vertical dimension, occlusal interferences and deflective occlusal contacts. The way in which occlusal factors may initiate TMD condition has spawned many speculations. Some propose that posterior tooth loss can predispose to overloading of the TMJ's particularly in the presence of parafunction.<sup>33</sup> On the other hand, the mode of action of the occlusal interference and deflective occlusal contacts can produce TMD. This may be explained by either inducing a subject to parafunction (bruxism and clenching),<sup>34</sup> or by the fact that functional movements (during mastication, speech and swallowing) and mandibular posture are adversely affected due to the subconscious avoidance of the aberrant tooth contact.<sup>35</sup>

Both explanations acknowledge that psychological stress may combine with an unfavorable occlusion to produce TMD. It is apparent that most patients exhibit some form of occlusal discrepancy, but only a small proportion present with TMD. Even in the TMD cases, occlusal variables have no significant statistical relationship with the severity of their signs and symptoms.<sup>36</sup> In this study, occlusal interferences have shown a significant relationship to TMD cases in contrast to deflective occlusal contacts. This finding gives an impression that occlusal interferences may induce a strong overexertion effect on the muscles of mastication, resulting in increased loading on the TMJ's. Hence, this leads to TMD development in high risk patients (Table 4).

Chewing on one side, bruxism, clenching and teeth attrition were found to be significantly correlated to TMD subjects (Table 4). Attrition which is the physical wear caused by movement of one tooth against another, is directly related to both bruxism and clenching and also has an effect

in reducing the occlusal vertical dimension. TMD patients chewing on one side (43.1%) were mostly not aware that they had this habit earlier before or after the TMD condition. If it was present before the TMD condition, it may be considered as a provocative factor for symptoms if it developed after. The TMD on set, it may be considered as a preventive habit in order to avoid pain on the affected side.

Based upon the findings of this study, the following conclusions are drawn:

1. The Al-Ahsa community could benefit from a well-designed TMD epidemiological study.
2. Psychological consultations should be considered in the team management of TMD.
3. A simplified and valid psychological/psychiatric screening test is needed.

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