



Research Article

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Ear Problems in Relation to Temporomandibular Joint Disorders in Iraqi Adults

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Abstract

Background: Patients with temporomandibular disorder had many otological symptoms, which might result from anatomical and functional proximity between it and the ear. **Objective:** To evaluate the correlation between temporomandibular joint disease and ear signs and symptoms. **Methods:** A prospective, observational study in which 278 of 1375 patients with temporomandibular joint disorder (TJMD), according to the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD), were selected. A questionnaire was applied for the severity of ear symptoms, such as earache, ear fullness feeling, tinnitus, hearing loss, and vertigo sensation, and was analyzed. **Results:** The frequency rate of TMD was 20.21%, with females (64.38%) and males (35.61%); it was detected most commonly (32.01%) in the age group between 51 and 60 years, on the right side (58.63%) and left side (41.36%), and also in the urban (58.99%) and rural (41.01%) areas; otological symptoms were otalgia (33.45%), ear fullness (28.05%), tinnitus (24.82%), hearing loss (09.35%), and dizziness/vertigo (07.55%). Significant associations were found with otalgia ($p=0.011$), ear fullness ($p=0.024$), tinnitus ($p=0.032$), and hearing loss ($p=0.041$), while no significant results were found between sociodemographic characteristics and TMD ($p=0.0621$). **Conclusions:** The study declared a significant correlation between temporomandibular joint disorders and otological symptoms.

Keywords: Ear; Otological manifestation; Temporomandibular joint disorders.

مشاكل الأذن المتعلقة باضطرابات المفاصل الصدغية الفكية لدى البالغين العراقيين

الخلاصة

الخلفية: لدى مرضى اضطراب الفك الصدغي العديد من الأعراض الدماغية، والتي قد تنتج عن القرب التشريحي والوظيفي بينه وبين الأذن. **الهدف:** تقييم العلاقة بين مرض المفصل الصدغية الفكية وعلامات وأعراض الأذن. **الطرائق:** دراسة مستقبلية وملاحظة، تم اختيار 278 مريضاً من أصل 1375 مصاباً باضطراب المفصل الصدغية الفكية (TJMD)، وفقاً لمعايير التشخيص البحثية لاضطرابات الفك الصدغية (RDC/TMD). تم تطبيق استبيان لشدة أعراض الأذن، مثل ألم الأذن، شعور بالامتلاء في الأذن، طنين الأذن، فقدان السمع، والإحساس بالدوار، وتم تحليله. **النتائج:** كان معدل تكرار اضطراب المفصل الفكي الفكي 20.21٪، مع الإناث (64.38٪) والذكور (35.61٪)؛ وقد تم اكتشافه بشكل أكثر شيوعاً (32.01٪) في الفئة العمرية بين 51 و 60 سنة، وفي الجانب الأيمن (58.63٪) والجانب الأيسر (41.36٪)، وأيضاً في المناطق الحضرية (58.99٪) والريفية (41.01٪)؛ كانت الأعراض الأذنية هي ألم الأذن (33.45٪)، وامتلاء الأذن (28.05٪)، طنين الأذن (24.82٪)، فقدان السمع (09.35٪)، والدوار/الدوار (07.55٪). تم العثور على ارتباطات ذات دلالة مع ألم الأذن ($p=0.011$)، وامتلاء الأذن ($p=0.024$)، والطنين ($p=0.032$)، وفقدان السمع ($p=0.041$)، بينما لم تجد نتائج ذات دلالة إحصائية بين الخصائص الاجتماعية الديموغرافية واضطراب المفصل الفكي الفكي ($p=0.0621$). **الاستنتاجات:** أثبتت الدراسة وجود ارتباط مهم بين اضطرابات المفاصل الصدغية الفكية والأعراض الدماغية.

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INTRODUCTION

Temporomandibular joint disorders (TMJD) refer to a broad scope of clinical issues that impact the muscles of mastication, the temporomandibular joint (TMJ), and the nearby soft tissues, and it's one of the major reasons for chronic orofacial non-dental origin pain. Furthermore, according to a meta-analysis, the overall incidence of TMJD is about 31% in adults, and these diseases are more common in females aged 20-40 and increase with age [1]. TMJD had a remarkable part in socioeconomic status, which was often connected to comorbidities such as anxiety and depression and other psychological problems; its intensity could be analyzed utilizing various modalities that classified anamnestic, clinical, and diagnostic criteria. The main reliable and correct tool for TMJD diagnosis was the Diagnostic Criteria for TMD (DC/TMD) [2]. TMJD

impacts alone or combines articulation and muscles of mastication. The main usual features of TMD include painful TMJ, oral opening restriction, non-symmetrical mandibular motion, in-front ear area and masticatory muscle ache, and joint noises such as clicks or crepitus [3,4]. TMJD is one of many multifactorial diseases and has been basically linked to 5 etiological factors, including facial injury, severe TMJ pain, semi-functional vitalities, and psychological factors such as stress, depression, and anxiety; however, the exact cause of TMJD remains unknown, making conservative treatments the preferred initial approach [5]. Furthermore, several ear-related features of TMJD have been recorded, yet they have a minimum clinical presentation compared to genuine TMJD clinical features. Over the last few decades, the clinical features associated with TMJD have included tinnitus, gaze imbalance, earache, a

burning sensation in the TMJ area, alterations in hearing levels, and sensations of tightness and fullness in the ear; epidemiological observations indicate that the incidence of ear symptoms in the general population ranges from 10% to 31% and rises to 85% in patients with TMJD [6]. Several researchers have found a correlation between TMJD and ear clinical problems due to their anatomical proximity, dysfunction of the Eustachian tube, common embryonic origins, and neuro-muscular/neuro-vascular connections; additionally, almost all TMJD patients would benefit from treatments such as occlusal splints, acupuncture, correcting parafunctional patterns, muscle-stretching exercises, physiotherapy, pharmacotherapy, and low-level laser therapy [7]. Several researchers have found that patients with ear symptoms show significant or complete improvement after treatment for TMJD, while other researchers have found that treatment for TMD is sometimes unhelpful, and its effectiveness in relieving ear symptoms remains unconfirmed. Under normal circumstances, patients with ear symptoms caused by TMJD consult an otolaryngologist; however, because of initial diagnostic insufficiencies, they sometimes do not receive accurate management, resulting in their symptoms persisting indefinitely [8]. The aim of the current study was to evaluate the correlation between temporomandibular joint disease and ear signs and symptoms.

METHODS

Study design and sample selection

A prospective observational study was conducted involving 1375 adult patients with ear complaints who visited the otolaryngology clinic over a 1-year period and sought medical advice for their ear issues; from this group, only 278 patients met the inclusion criteria and were diagnosed with temporomandibular joint disorder (TMJD) according to the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD). Additionally, the presence of cardinal features was noted, including pain in the TMJ, joint crepitus or clicking sounds, limitations in mandibular movement, and tenderness in the masticatory muscles.

Inclusion criteria

The inclusion criteria were a diagnosis of temporomandibular joint disorder resulting in unilateral ear complaints.

Exclusion criteria

The exclusion criteria were children or patients with neurological diseases or head and neck tumors in their treatment; patients who were incapable of understanding or replying to RDC/TMD; patients with any local ear pathologies; patients with previous ear surgery; patients with any referred otalgia other than from TMJ; patients with incomplete data; patients lacking informed consent; and patients with bilateral ear problems.

Data collection and outcome measurement

The selected participants were asked to fill out a pre-designed questionnaire, then a precise and thorough history and Ear, Nose, and Throat (ENT) clinical examination "starting with the ears via otoscopic examination, followed with a complete nose and throat examination," as well as tuning fork tests assessment, as well as full audiological tests, in addition to an orofacial consultation.

Ethical considerations

The study protocol was approved by the Ethics Institutional Committee, College of Medicine, Mustansiriyah University (ID 456, dated 09-12-2024), and patients' verbal consent was obtained.

Statistical analysis

Statistical Package for Social Science (SPSS) version 25 (IBM SPSS Software, Chicago, Illinois, United States). Clinical data utilizing mean, frequency, standard deviation (SD), and percentages. Data entry was done using Microsoft Excel 2019, and a P-value <0.05 was noted as statistically significant.

RESULTS

Among all 1375 patients, 278 of them had TMJD, so the frequency rate is 20.21%, and the age ranged from 18 to 65 years; the mean age was 38.47 ± 1.25 , with the highest occurrence of TMJD in the age group 51 to 60 years (32.01%), as there were 89 patients found within this age-group scope. Among all studied participants, 35.61% were males and 64.38% were females, with a female/male ratio of 1.8:1.0; the right side was 58.63% and the left side was 41.36%. Also, the urban patients were 58.99%, while rural patients were 41.01%. There were no significant results regarding patients' demographic distribution and TMD ($p = 0.0621$) (Table 1).

Table 1: Sociodemographic characteristics and temporomandibular disorder (n=278)

Parameters	Number	p-value
<i>Gender</i>		
Male	99(35.6)	0.622
Female	179(64.4)	
<i>Site</i>		
Right	163(58.6)	0.612
Left	115(41.4)	
<i>Residency</i>		
Urban	164(59)	0.630
Rural	114(41)	
Total	278	0.0621

Regarding the ear symptoms, Table 2 shows the number of patients and the percentage of their symptoms between sample distributions. Otalgia, or "earache," was detected in 93 patients and had been the main ear symptom (33.45%). However, 157 patients (56.47%) had multiple ear symptoms.

Table 2: Ear symptoms of the patients studied

Symptoms	n(%)	p-value
Otalgia	93(33.45)	0.011
Ear fullness	78(28.05)	0.024
Tinnitus	69(24.82)	0.032
Hearing loss	26(9.35)	0.041
Vertigo	21(7.55)	0.074

Significant associations were found between TMJD and otalgia ($p=0.011$), ear fullness ($p=0.024$), tinnitus ($p=0.032$), and feeling of hearing loss ($p=0.041$), while it was not statistically significant for vertigo ($p=0.074$). TMJD symptoms in the studied patient's sample included jaw click, jaw pain, reduced oral opening, jaw deviation, and painful masticatory muscles; jaw clicking (33.45%) was the main symptom, as shown in Table 3. The pure-tone audiogram showed the impaired hearing was conductive, "not sensorineural," or had a mixed component.

Table 3: Temporomandibular joint disorder (TMD) symptoms

TMD symptoms	n(%)
Jaw clicking	93(33.45)
Jaw pain	61(21.94)
Trismus (reduced mouth opening)	52(17.98)
pain in masticatory muscles	47(16.9)
Jaw deviation	25(8.99)

DISCUSSION

TMJD is challenging to diagnose due to the complex links between its signs and symptoms, but it is usually diagnosed clinically, and imaging is essential for surgical management. Therefore, when a physician who doesn't recognize these clinical variations may misdiagnose the problem, inefficient management results in unsuccessful and improper prediction [9]. The current study reported that the peak frequency was seen in the fifth decade, and it might result from degenerative changes among those age-group patients, as well as TMJD being commoner in females; this phenomenon is possibly due to females being very sensitive to their health care and requesting expeditious medical attentiveness. The studies by Valesan *et al.* [1], Magalhães *et al.* [10], and Naderi *et al.* [11] yielded similar findings. Another finding in the current study was that TMJD was more prevalent among urban residents compared to rural residents; this trend may be attributed to easier transmission, greater accessibility to healthcare, and higher health awareness in urban areas. Furthermore, most cases were on the right side; this pattern might happen since the majority were right-handed and right-sided chewing, while both-sided TMJD was unusual. The above-mentioned findings were consistent with those of Adegbiyi *et al.* [12] study. Many research studies were performed to analyze the correlation between the frequency of ear symptoms and TMJD. In the current study, otalgia was the main presenting otological symptom, and it was the leading indicator for seeking otological consultation because the trigeminal nerve innervates TMJ and the ipsilateral ear (Eustachian tube dysfunction). This finding was seen in Adegbiyi *et al.* [12], Badel *et al.* [13], and Musat *et al.* [14] studies, while a Kusdra *et al.* [15] study found that

tinnitus was the main otological symptom. Again, a study performed by Aldè *et al.* [16] detected that aural fullness was the most common otological symptom, the same as Mejersjö and Pauli [17] study. Furthermore, the current study showed significant associations between TMJD and the otological symptoms, while there were no significant differences between it and the studied demographic patient's distribution. The Macie *et al.* [9] and Magalhães *et al.* [10] studies agreed with these findings. In the current study, the main TMJD symptom was earache (otalgia), and it had a significant association with jaw clicking; the finding goes in line with Mejersjö and Pauli [17] and Kaygusuz *et al.* [18] studies. A small number of TMJD patients, along with their related otologic clinical features, were referred to the ENT setting for expert diagnosis and treatment; the main sources of referral included family doctors, casualty workers, and the oro-maxillofacial section. However, before they went for medical consultations, a greater number of them obtained various medicines from the pharmacies [12].

Study Limitations

Limitations of the current study include a larger-population community, multicentric studies, and treatment modalities.

Conclusion

Peak frequency was seen in the fifth decade, with female predominance; otalgia was the main presenting otological symptom, and jaw clicking was the main TMJD symptom, a significant association between temporomandibular disorders and otological symptoms, even without local causes in the ear, while there were no significant results regarding patients' demographic distribution and TMJD.

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