

Voice-Related Disability of Iranian Patients With Temporomandibular Disorders

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Summary: Introduction. The relationship between handicaps because of voice disorders and temporomandibular disorders (TMDs) severity was examined.

Method. Fifty-two Persian women with temporomandibular disorder (TMD) were examined by two dentists in separate sessions and the assessment protocol of the Dentistry Clinic of Tehran University of Medical Sciences was filled by both dentists and finally they gave their opinion separately about the existence of TMD and categorized the severity of TMD as mild, moderate, and severe. To assess perceived disability resulting from voice disorders in TMD patients, the voice handicap index (VHI) questionnaire was used.

Results. The total score of VHI in 80.8% of patients with TMD was equal to or more than 14.5. A significant positive relationship was found between the severity of TMD and the total score of VHI ($P = 0.000$, $r = 0.79$).

Conclusions. It seems that a comprehensive voice assessment should be included in the evaluation of TMD, and considering different effects of voice disorders on patients' lives, a complete voice evaluation including voice-related disability is necessary to understand the nature of pathophysiology of TMD.

Key Words: Voice disorder—Voice handicap index—Temporomandibular disorders—Persian.

INTRODUCTION

Temporomandibular joint (TMJ) is necessary for normal oral functions. This joint plays a prominent role in chewing, swallowing, speech, and oral health.¹ When opening the mouth, TMJ causes forward and backward movements of mandible and limits its lateral movements.² According to previous studies, one of three adults suffers from temporomandibular disorder (TMD).³ One of the most complex disorders of the body is temporomandibular dysfunction. These disorders either result from abnormal functions of the muscles of mastication, or TMJ and associated structures, or both.^{1,3} Displacement of the joint leads to abnormal connection between the articular disc and mandibular condyle and causes loss of smooth joint function.⁴ The loss of normal functions leads to increased pressure on muscles and joints. Although this disorder can be related to stress, sex, personality, and anxiety,^{1,5,6} the exact etiology for TMD has not been found.⁶ The prevalence of TMD has been estimated between 5% and 10%, and women have found to be more susceptible than men.¹ Dysfunction of TMJ represents muscle tensions in head and neck that are directly transmitted through the muscular connections between jaw and hyoid bone to the larynx.⁷ As a result, vocal changes can be the symptoms associated with temporomandibular dysfunction. Causative factors in the development

of temporomandibular dysfunction, such as hyper tension of oral areas—the face and neck, limited mouth range of motion, limited mandibular movement during speech—are similar to dysphonia that can effect acoustic features of the voice.⁸ TMJ problems often lead to decreased voice range, voice fatigue, and sound displacement changes. Changes of resonance and voice fatigue can lead to voice complaints in patients with TMD.⁷ Silva et al⁹ showed that in patients with severe TMDs, reduced loudness, increased noise, and changes in resonance lead to a change in voice quality of these patients. Disordered vocal quality can't play its main role in delivering verbal and emotional messages⁶; as a result, disordered voice, similar to other physical problems and diseases, may be associated with emotional consequences.⁷ Thus, patients with voice disorders have been reported having emotional and psychological problems as direct consequences of their problems.^{8,9} These patients experience social, communicative, physical, and emotional problems in their professional, daily, and personal life.^{10,11}

Benign voice disorders have an effect on quality of life in general¹² and on quality of life associated with voice in particular.¹³ As Piron and Roch¹⁴ have emphasized on the relationship between TMD and dysphonia, it seems that comprehensive evaluation of voice, including the impact of voice disorders on the quality of life in patients with different degrees of TMD, helps to better understand the nature of the relationship between TMD and dysphonia. In this study, handicaps due to voice disorders in patients with TMD and also the relationships between handicaps because of voice disorders with TMD severity were examined.

METHOD

Fifty-two Persian women participated in this cross-sectional study. They were selected from the Dentistry Clinic of Tehran University of Medical Sciences in Tehran. The participants' age ranged from 20 to 48 years (mean = 29.6 years).

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The inclusion criteria were: age range between 18 and 50, existence of functional TMD under the dentist diagnosis, no history of trauma/face surgery, no craniofacial anomalies, no history of hearing problems, no history of laryngeal diseases, no history of neurological and hormonal diseases, nonsmokers, lack of history of speech and voice therapy, Persian language, and nonprofessional voice users. None of the women participating in the study, based on self-reporting, were in menopause period. One of the participants was excluded from the study when she was perceived by two dentists to have different severities of TMD.

First, subjects were examined by a dentist and the assessment protocol of the clinic was filled by him, and finally, he gave his opinion about the existence of TMD and categorized the severities of TMD as mild, moderate, or severe. According to the assessment protocol of the clinic, the dentist examined the excursive movements of the mandible and performed the palpation of mandibular and cervical muscles, and the analysis of static and dynamic occlusion.

The dentist confirmed the existence of TMD when participants represented pain in the masticatory muscles and/or TMJ, during mandibular function and on palpation of the structures, limitation or deviation of mandibular movements, an abnormal static or dynamic occlusal relation, TMJ noises, abnormal biting, unilateral chewing and bilateral ear pain.^{1,15}

Based on Kitsoulis et al,¹ subjects were categorized based on having less than two of the previously mentioned signs as mild, more than two of them as moderate, and more than four of them as severe.

All subjects were examined by two independent certified dentists who scored the severity of TMD blindly. Results were then compared and if any major discrepancy was observed between examiners the patients was excluded from the study.

To assess the perceived disability resulting from voice disorders in TMD patients, the voice handicap index (VHI) questionnaire was used. This questionnaire, developed by Jacobson et al¹⁶ in 1997, evaluates disability resulting from dysphonia. VHI contains three subtests—namely physical, emotional, and functional. Each subset consists of 10 items, and each of the overall 30 items of VHI is responded by a rating scale of five, graded from zero to four (never to always). The Persian version of VHI¹⁷ was used in the present study. The cutoff point of the Persian version of VHI questionnaire is 14.5.¹⁸ As Moradi et al¹⁸ reported, the score of 14.5 is considered as a factor which distinguishes individuals with voice disorders from those without voice disorders, and this score should be assumed to be a threshold for rating the handicap owing to voice disorders.

Based on the instruction of VHI, participants filled in the questionnaire without any help or additional explanation. The instruction of VHI was:

“These are statements that many people have used to describe their voices and the effects of their voices on their lives. Choose the response that indicates how frequently you have the same experience.”

Descriptive statistical analyses were performed to illustrate demographic and clinical features such as age, severity of

TMD, and total score of VHI. The Shapiro-Wilk test was used to evaluate the normality of the distribution of the research data.

The correlation between severity of TMD and the total score of VHI was assessed using Pearson product-moment correlation coefficient.

The *Statistical Package for the Social Sciences*, version 16.0 (SPSS, Inc., Chicago, IL) was used to run the statistical analyses. The significance level of the derived data was considered as less than 0.05.

RESULTS

The results of the Shapiro–Wilk test indicated normal distribution of data ($P = 0.37$).

Demographic data of the three groups as mild, moderate, and severe are presented in Table 1. The average age of mild, moderate, and severe groups were 29.7 ± 8.3 , 28.8 ± 8.8 , and 32 ± 7.7 , respectively.

The results showed that the highest frequency was related to patients with severe TMD and lowest frequency was related to patients with mild TMD.

The mean of total VHI score and its subtests in patients with various degrees of TMD is shown in Table 2. The results showed that the total score of VHI in 80.8% of patients with TMD was equal to or higher than 14.5.

Based on the results of the Pearson product-moment correlation coefficient, a significant positive relationship was found between the severity of TMD and the total score of VHI ($P = 0.000$, $r = 0.79$).

DISCUSSION

In the present study, perceived disability due to voice disorders was surveyed using VHI questionnaire in fifty-two women with TMD. The results indicated that the number of patients with severe TMD were prominently higher than the number of patients with mild and moderate TMD. This finding was in agreement with Ferreira et al's¹⁹ study, who reported that the number of subjects with high-grade TMD disorders is significantly greater than other subjects. It seems that patients with severe TMD went to dentistry clinics more than other groups. This result may be due to the fact that patients with TMD complain and report symptoms demonstrating pain in the joint or associated structures, that is, when the degree of the disorder increases. As Ferreira et al¹⁹ reported, there is a positive correlation

TABLE 1.
Demographics of Research Participants

Participants	Number	Height (m)	Weight (kg)	Mean Age ± Standard Deviation
Mild	10	1.6 ± 0.04	62 ± 8.5	29.7 ± 8.3
Moderate	15	1.68 ± 0.05	63 ± 9.2	28.8 ± 8.8
Severe	27	1.66 ± 0.08	65 ± 7.9	32 ± 7.7
Total	52	1.65 ± 0.05	64 ± 8.6	29.6 ± 7.3

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