

Association Between Temporomandibular Joint Dysfunction and Stress Levels in Covid-19 Patients: Insights from A Cross-Sectional Study

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ABSTRACT: To investigate the relationship between temporomandibular joint dysfunction (TMD) and perceived stress levels in COVID-19 patients. Forty-five COVID-19 patients (19 males and 26 females) involved, and their joint problem severity was recorded using the Helkimo Index, while the Perceived Stress Scale (PSS-10) assessed their stress levels. Most patients had moderate to severe TMD. The results showed a significant difference in PSS-10 scores across different groups, with the lowest stress levels in group with mild dysfunction and the highest in those with severe dysfunction. The findings support the association between TMD and psychological stress, emphasizing the need to address stress in TMD treatment for improved patient outcomes.

KEYWORDS: Orofacial pain, perceived Stress, temporomandibular disorders.

INTRODUCTION

During the last years, researchers identified COVID-19, a respiratory disease caused by an infectious virus, affecting millions of people world-wide. The primary pathogen responsible for this illness is a highly contagious strain of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).¹

Temporomandibular disorder (TMD) is a world-wide problem that has been observed in more than 50% of the world's population, with about 75% having significant signs at some time, about 33% presenting related symptoms, and 5% requiring some type of treatment¹. Temporomandibular disorder is a multifactorial condition associated with psychological stress that perpetuates symptoms and is related to most cases with recurrent episodes.²

Pain is defined as "an unpleasant sensory and emotional experience that is associated with, or similar to the condition that associated with actual or potential tissue damage"³. Orofacial pain can be referred to or from other parts of the body; for example, an orofacial pain due to TMDs, or mandibular pain due to coronary arterial ischemia.⁴

Along with, depression is regarded to be a major risk for such chronic pain and had been connected to high prevalence of temporomandibular disorders⁵. The research of Anna et al. found that physical pain has a major role in psych emotional conditions.⁶ Different indexes have been proposed to diagnose TMDs. The Helkimo Index has been widely used and accepted since it has been approved for being simple and practical, permitting the measurement of the existing dysfunction and permitting it to estimate the correlation between the symptoms and the presented findings, in comparison to other related indexes^{7,8}.

The perceived stress scale (Pss-10) has been developed to evaluate the psychosocial status of TMD's patients, a psychological tool designed by Cohen et al⁹. The scale is composed of a questionnaire, which is a self-reported scale that evaluate the stress related to issues and events that the patient encountered during the last month.

This study aimed to investigate the relationship between temporomandibular joint dysfunction and perceived stress levels in patients with COVID-19 illness.

MATERIAL AND METHODS

This study was conducted at the University of Kufa/ college of Dentistry / Department of Oral Pathology from October 2021 to March 2022. One group was assigned for the study which consisted of 45 COVID-19 patients complaining from pain and dysfunction in the temporomandibular joint.

All the 45 patients were confirmed to be affected with COVID-19 by reverse transcription-polymerase chain reaction assay. All individuals agreed to take part in the study by signing a paper consent form, and the oral pathology department committee approved the study program. Subjects with partial prostheses, current orthodontic treatment, or recent trauma were excluded from the study, and the inclusion criteria included patients with full arch dentition with no oral or dental pathology.

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One specialist of oral medicine performed the Helkimo index assessment for the study group, and another specialist in oral medicine conducted the Perceived Stress Scale (Pss-10) questionnaire. The participants were classified for 3 groups according to the score of Helkimo index:

1-code 0 points: absence of dysfunction symptoms (D_i 0)

2-code 1-4 point: minor dysfunction (D_i I)

3- code 5-9 points: moderate dysfunction (D_i II)

4-code more than 10 points: severe dysfunction (D_i III)

The Arabic version ¹⁰ of the Pss-10 scale was applied for all participants. The questionnaire consisted of 10 questions related to issues and events related to problems and personal issues during the last month, and the response of the participants for each question must be as the following (1-never; 2-almost never; 3-sometimes; 4-fairly often, 5-often). The study was ethically approved by the Department of Oral Pathology/College of Dentistry/University of Kufa.

To assess qualitative variables, a statistical analysis is carried out using IBM SPSS Statistics version 26, estimating the median and quartiles. Three groups were compared using the Kruskal-Wallis's test to compare various factors. The accepted level of significance was 0.05. Any p value less than 0.05 was therefore interpreted to suggest a significant connection.

RESULTS

Forty-five COVID-19 patients complaining of temporomandibular joint dysfunction participated in this study (19 males, 26 females). According to the Helkimo index assessment, most of the patients have moderate to severe dysfunction, while those with mild dysfunction account for 28% of the sample. According to the Pss-10 scale, about half of the patients are considered to be moderately stressed, as presented in Table 1.

Table 1. The distribution of the participants according to age, sex, Pss-10 and Helkimo index.

Parameter		Count (%)
Sex	male	19 (42%)
	female	26 (48%)
Pss-10	Mild	13 (28%)
	Moderate	22 (48%)
	Severe	10 (24%)
Helkimo index	No dysfunction	0
	Mild dysfunction	13 (28%)
	Moderate dysfunction	17 (37%)
	Severe dysfunction	15 (35%)

The participants were classified into 3 groups according to the severity of the joint dysfunction, and the Pss-10 scale was tested for these groups. The median of Pss-10 points was 14 for the mild dysfunction group, 18 for the moderate one, and 20 for the severely dysfunction group, with a significant difference (P-value < 0.05) Table 2.

Table 2. Pss-10 points according to Temporomandibular joint dysfunction.

Pss-10	Temporomandibular joint dysfunction			P-value
	Mild dysfunction	moderate dysfunction	severe dysfunction	
No.	13	17	15	0.013*
median	14	18	20	
quartiles	9-17	11.5-23	17-30	

Note. Statistical analysis using Kruskal–Wallis's test

*Significant difference at p level < 0.05

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DISCUSSION

It has been determined by many researchers that coronaviruses are the second most frequent cause of viral upper respiratory tract infections (URTIs), impacting both the pulmonary system (upper and lower) and generating symptoms across the body^{11,12}. MPDFs cause pain, soreness, and discomfort in the soft tissues autonomic changes¹³. The result of the Current research align with earlier studies showing that facial pain is more frequently found in the masticatory muscle area. Moreover, the investigation discovered an association between discomfort in the frontal area and headaches, probably as a result of patients' challenges in differentiating between facial discomfort due to the forehead and headaches. Stress related to trauma or the effects of psychological stress during COVID-10 illness on the body are often connected to the MPDS. The study's conclusions supported the ideas that Schwendinger and Pocecco suggested for the effect of long period sickness in the orofacial health in patient with Corona virus infection¹⁴.

The Helkimo index is an effective and reliable tool for the assessment of temporomandibular joint and related muscles health¹⁵. The various aspects of TMDS can be evaluated with simple and direct steps to indicate the severity of the condition. Most of the patients in this study have moderate to severe TMDS, and this severity was correlated with the perceived stress and psychological condition of the participants. The temporomandibular disorder is a multifactorial condition, and stress is one of the most causative factors contributing to joint and muscle problems¹⁶. Due to its effect on the dopaminergic system, which is where stress and cortisol have a starting role in bruxism during the day, TMD is strongly associated with psychosocial problems^{17,18}.

As a result, stress needs to be recognized and correctly handled. Additionally, psychological elements have been shown to have an important role in the initiation and progression of persisted TMD¹⁹. The majority of people with anxiety disorders release stress by engaging their stomatognathic system, which includes and is not confined to teeth grinding, spasm of facial muscles, and teeth clenching, among other behaviors.

In this study, the perceived stress scale (PSS-10) was used to assess the psychological condition of the participant, and it was higher in patients with more joint dysfunction. Previous studies using the Pss-10 scale showed higher scale points correlated to headaches, TMJ sounds, muscle pain, limited mouth opening, and insufficient mandibular motion. According to a study by Ahuja et al., stress has a main role in the initiation and maintenance of TMDs, and certain elements are particularly responsible for placing dentistry students in stressful situations that expose them to TMDs²⁰.

According to Phuong et al.'s research, bruxism, TMJ pain, masticatory muscle tenderness and soreness, and tooth wear are all related to perceived stress²¹. Alkhudairy et al. showed that individuals with any type of TMD pain on the pain output had superior coping skills in stressful circumstances as compared to those with persist pain, who were not able to operate as well during stressed situations²². This finding was related to stress on the PSS-10.

In another study using the dual-axis diagnostic system (RDC/TMD), Wiczorek et al. demonstrated an insignificant relationship between the RDC/TMD Axis I index and the PSS-10 scale and that females are more aproned to this kind of stress, which lead to perpetuation of TMD symptoms²³.

CONCLUSION

The study's findings show that among COVID_19 patients with TMDs, there may be an association between perceived stress levels and temporomandibular joint dysfunction. Comprehensive TMD treatment must include stress management and psychological management. It is necessary to conduct more studies to delve into the underlying causes and create focused stress relief strategies for TMD patients.

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