EFFECT OF COVID-19 ON THE PREVALENCE AND SEVERITY OF TMD SYMPTOMS IN CAIRO POPULATION

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ABSTRACT

Introduction: Temporomandibular disorders (TMD) consist of numerous abnormalities that involve the TMJ, the masticatory muscles or both. Despite the uncertainty in understanding the underlying mechanism of TMD, it is quite clear that the onset and prognosis of TMD are closely related and influenced by the patient's stress level.

Aim: To evaluate and report the impact of COVID-19 on the prevalence and severity of TMD symptoms in Cairo.

Patients and methods: During the period from July 2020 to January 2021 a questionnaire was presented to patients with TMJ related complaints. This was done at the outpatient clinic of Faculty of Dentistry – Cairo University as well as patients treated at different private clinics across Cairo. The total number of questionnaires answered was 128.

Results: The results showed a statistically significant increase in the number of patients with muscle symptoms in the group with positive COVID status when compared to those with a negative COVID status. (P value <0.001).

Conclusion: From the data on hand, we conclude that the pandemic significantly impacted individuals in Cairo with TMD and it had a war-like effect as a global stressor event.

KEYWORDS: COVID-19, Pandemic, TMD

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INTRODUCTION

Temporomandibular disorders (TMD) consist of numerous abnormalities that involve either the TMJ, the masticatory muscles or both (Emodi-Perlman *et al*., 2020). Based on the research diagnostic criteria (RDC/TMD), TMD were grouped into three main categories. The first concerned primarily with muscle pain, the second with disorders related to the articular disc position, while the third group encompassed other joint disorders such as arthritis and arthralgia (Dworkin and LeResche, 1992).

TMD is reported to affect up to 15% of the general population (Nilsson, List and Drangsholt, 2005). It may have a devastating impact on their daily activities and quality of life as it is usually associated with headache, muscle pain and limited jaw movements (Sessle, 2000; de Leeuw, 2008; Scrivani, Keith and Kaban, 2008; Wadhwa and Kapila, 2008). It is noteworthy that despite the uncertainty in understanding the underlying mechanism of TMD, it is quite clear that the onset and prognosis of TMD are closely related and influenced by the patient's stress level (Lajnert *et al*., 2010; Berger *et al*., 2015; Wieckiewicz *et al*., 2017).

Starting December 2019, the world faced a threat that no one expected to live in the 21st century; an epidemic that rapidly developed into a pandemic of COVID-19 (Corona) virus (Emodi-Perlman *et al*., 2020). The ambiguity and contradictions that accompanied the early reports of the pandemic, in addition to the restrictions that came with its rapid spread such as social distancing, complete lock down and economic consequences led to unprecedented widespread state of anxiety, depression and stress in the entire world(Wang *et al*., 2020).

This study was designed to evaluate and report the impact of COVID-19 on the prevalence and severity of TMD symptoms in Cairo.

Methodology

Target Group and Survey Procedure

During the period from July 2020 to January 2021 a questionnaire was presented to patients with TMJ related complaints. This was done at the outpatient clinic of Faculty of Dentistry – Cairo University as well as patients treated at different private clinics across Cairo. The total number of questionnaires answered was 128.

The questionnaire design was of two different phases; the first related to the patient's TMJ complaint; pain, clicking, locking episodes, muscle tenderness and/or occlusal habits. The second phase focused on the COVID situation, whether the patient was infected, exposed to an infected family member, job risk level during the COVID crisis.

A pilot survey was first tested on a random sample of 10 patients to assess the presented questions. The questions were in both English and Arabic language to allow using it with a larger pool of patients. The questionnaire was designed and edited by three surgeons with previous experience in TMD management. Power analysis of the pilot study proved the sample to be sufficient for statistical analysis. A total of twenty questions were used covering the topics mentioned above. The questions were in the form of Yes or No questions and two questions required a numerical value (stress level quantification).

The effect of COVID on the TMJ status was evaluated calculating the percentage of patients with worsening TMJ symptoms after COVID infection vs. those without infection. COVID infection was only considered when a positive PCR result was available.

Statistical Analysis

The sample size was calculated based on 80% power and 95% confidence and a minimum of 121 respondents per group was suggested. Statistical assessment depended on percentages and counts,

and the results were represented as graphs. Microsoft Excel 365 was used to prepare these. Testing of two proportions between each two groups was carried out.

RESULTS

The analysis of the submitted sample's age, gender, occupation risk level showed no statistically significant difference between the study groups. Also, there was no statistically significant difference when occlusal condition, habits and parafunctional habits were analysed. (Table 1 & figure 1)

The results showed a statistically significant increase in the number of patients with muscle symptoms in the group with positive COVID status when compared to those with a negative COVID status. The results also portrayed that the Masseter & Temporalis symptoms were 2.5 folds higher in subjects with positive COVID status when compared to those with a negative COVID status. Moreover, that difference goes up to nearly 4-fold in the Pterygoid muscles and nocturnal bruxism. The positive COVID status group were nearly twice as vulnerable as the negative COVID status patients regarding development or worsening of joint noise. The COVID positive population was over 5 times more susceptible to developing a locked jaw. Although the duration of the symptoms was not significantly different between the two groups, the COVID-struck group was nearly 3 times as prone to develop TMD symptoms or have them worsened than the CoVid negative group. (Table 2 & figure 2)

TABLE (1): Demographic data, occlusal condition & habits analysis

Variables		Total (n=80)	COVID infection		P value
			Yes (n=41)	No (n=39)	
Age (mean±SD)		29.4±4.8	29.4±5.1	29.5±4.5	0.965
Gender	Male	27 (33.8%)	14 (34.1%)	13 (33.3%)	0.939
	Female	53 (66.2%)	27 (56.9%)	26 (66.7%)	
Occupation	High risk	53 (66.2%)	29 (70.7%)	24 (61.5%)	0.385
	Low risk	27 (33.8%)	12 (29.3%)	15 (38.5%)	
Malocclusion	Present	24 (30%)	13 (31.7%)	11 (28.2%)	0.733
	Absent	56 (70%)	28 (68.3%)	28 (71.8%)	
Smoking status	Smoker	13 (16.3%)	8 (19.5%)	5 (12.8%)	0.417
	Non-smoker	67 (83.7%)	33 (80.5%)	34 (87.2%)	
Nail biting	Yes	24 (30%)	9 (22.0%)	15 (38.5%)	0.107
	No	56 (70%)	32 (78.0%)	24 (61.5%)	
Pencil biting	Yes	22 (27.5%)	10 (24.4%)	12 (30.8%)	0.523
	No	58 (72.5%)	31 (75.6%)	27 (69.2%)	

TABLE (2). Symptoms analysis

| Outcome		COVID infection		P value
		Yes (n=41)	No (n=39)	
Muscle affection	Yes	36 (87.8%)	14 (35.9%)	<0.001*
MASSETER	No	5 (12.2%)	25 (64.1%)	
Muscle affection	Yes	36 (87.8%)	13 (33.3%)	<0.001*
TEMPORALIS	No	5 (12.2%)	26 (66.7%)	
Muscle affection	Yes	29 (70.7%)	7 (17.9%)	<0.001*
Med PTERYGOID	No	12 (29.3%)	32 (82.1%)	
Muscle affection	Yes	30 (73.2%)	7 (17.9%)	<0.001*
Lat PTERYGOID	No	11 (26.8%)	32 (82.1%)	
Bruxism	Yes	27 (65.9%)	8 (20.5%)	<0.001*
	No	14 (34.1%)	31 (79.5%)	
Click	Yes	33 (80.5%)	17 (43.6%)	0.001*
	No	8 (19.5%)	22 (56.4%)	
Locking joint	Yes	21 (53.2%)	4 (10.3%)	<0.001*
	No	20 (46.8%)	35 (89.7%)	
Duration (month)	mean±SD	16.4±14.4	14.7±9.3	0.645
Total percentage score	mean±SD	73.9±28.2	25.6±38.2	<0.001*
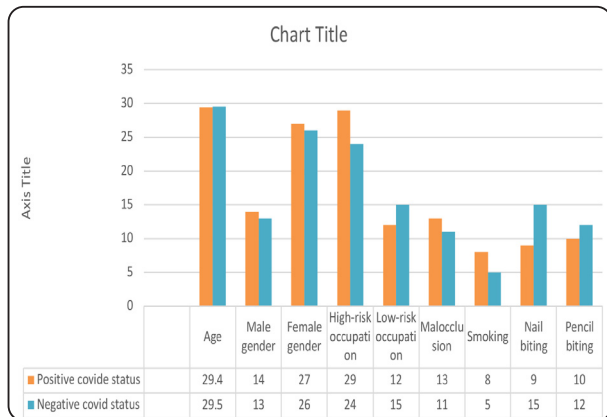
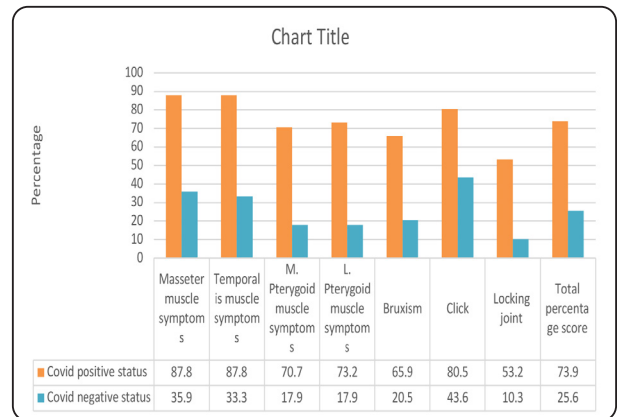Fig. (1): Demographic data, occlusal condition & habits analysis

Fig. (2): Percentage of symptoms in each group

DISCUSSION

This study aimed to assess the impact of COVID-19 -related distress on TMD symptoms. Those with chronic TMD were readily vulnerable to increased levels of stress exacerbated by the concern of contracting and transmitting the disease, especially to their household elderly along with the consequent compulsive behaviors of double checking and reassurance-seeking.

This study showed that COVID-19 can be considered as a global stressor event that is solidly capable of impacting life of patients with TMDs. The study showed significant increase in TMD symptoms in chronic TMD patients as well as development of new symptoms in asymptomatic individuals in correlation to the start of the pandemic. These findings support previous research on stress-related behavior and TMDs (Fillingim *et al*., 2013) and the effect of global stressors on the symptoms of chronic

TMD (Felten *et al*., 2019; Hanafy, Abou-Elfetouh and Mounir, 2019; Yang *et al*., 2019; Vrbanović, Alajbeg and Alajbeg, 2021; Wu *et al*., 2021). The result of this study reveals that individuals who presented with chronic TMD before the pandemic were more prone to COVID -related stress when compared to those with acute TMD. There has been a change in the incidence of masticatory muscles symptoms and joint noise throughout the lockdown period. In contrast to control population, individuals with TMD were substantially influenced by COVID -related stress disregarding the chronic or acute status of their symptoms as revealed by previous cross-sectional, case-control studies (Vrbanović, Alajbeg and Alajbeg, 2021; Wu *et al*., 2021). These findings support previous research that revealed that individuals with TMD suffer changes in global facial pain severity, oral parafunction, anxiety, depression, coping strategies and perceived quality of life. None of these studies prospectively assessed the impact of global stressor event on asymptomatic individuals, instead, variables in symptomatic versus asymptomatic were investigated(Burris *et al*., 2009; Gil-Martínez *et al*., 2016; Slade *et al*., 2016; Kapos *et al*., 2018; Ohrbach and Michelotti, 2018; Vrbanović, Alajbeg and Alajbeg, 2021; Wu *et al*., 2021). In contrast with the findings of a previous study, we found a change in TMD symptoms' percentage in patients with acute TMDs (Falla *et al*., 2021). This fact aligns with the documented effect of stress on sleep quality and quality of life in people with TMDs (Yatani *et al*., 2002). There is sufficient evidence on the impact of stress on oral behavior and development or intensification of parafunctional negative oral habits(Ohrbach and Michelotti, 2018). More studies on individuals with TMD linked decline in psychosocial status, and boosted levels of psychological distress, anxiety, depression, pain intensity and disability to a surge in devastating negative coping strategies(Uhac *et al*., 2006; Velly *et al*., 2011; Gil-Martínez *et al*., 2017).

From the data on hand, we conclude that the pandemic significantly impacted individuals in Cairo with TMD and it had a war-like effect as a global stressor event. Although a certain group of patients seemed more susceptible to the adverse effects of the COVID-related stress, all patients showed signs of exacerbated symptoms.

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