Influence of sleep quality on pain characteristics, anxiety symptoms and catastrophizing in patients with painful temporomandibular disorders treated in private orofacial pain clinic

Influência da qualidade do sono nas características da dor, sintomas de ansiedade e catastrofização em pacientes com disfunção temporomandibular dolorosa atendidos em clínica privada

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ABSTRACT

BACKGROUND AND OBJECTIVES: Extensive literature has shown that poor sleep quality, anxiety symptoms and catastrophizing contribute to worsening of temporomandibular disorder (TMD) conditions. However, most studies are conducted in public institutions. Therefore, the aim of this study was to evaluate the influence of sleep quality on pain characteristics and psychological factors in patients with symptomatic TMD treated in a private orofacial pain clinic.

METHODS: This is a cross-sectional study. Forty-four adult patients were selected according to the Axis I of the diagnostic criteria for TMD (DC/TMD) and completed the questionnaires Pittsburgh Sleep Quality Index(PSQI); Pain Catastrophizing Scale (PSC) and Generalized Anxiety Disorder Scale (GAD-7). The sample was divided into poor sleep quality and good sleep quality based on PSQI scores. The Visual Analogue Scale (VAS) quantified pain intensity and the pain duration was recorded in months.

RESULTS: 63.64% of the patients had muscle TMD (myofascial pain), 18.18% had joint TMD (arthralgia) and 18% had both disorders. 72.73% of all patients had pain for more than 6 months. Patients reporting poor sleep quality had more anxiety symptoms (p=0.009) and catastrophic thoughts related to pain (p=0.006); of these, 93.7% had pain for more than 6 months. Negative correlations were observed between age and pain intensity, and between age and anxiety symptoms.

CONCLUSION: Poor sleep quality was significantly associated with anxiety, catastrophizing and pain duration in TMD patients treated in orofacial pain private practice.

Keywords: Anxiety, Catastrophization, Facial pain, Private practice, Sleep quality, Temporomandibular joint disorders.

RESUMO

JUSTIFICATIVA E OBJETIVOS: Extensa literatura demonstrou que a má qualidade do sono, os sintomas de ansiedade e a catastrofização contribuem para o agravamento da disfunção temporomandibular (DTM). No entanto, a maioria dos estudos foi realizada em instituições públicas. Portanto, o objetivo deste estudo foi avaliar a influência da qualidade do sono nas características da dor e nos fatores psicológicos em pacientes com DTM dolorosa atendidos em uma clínica particular.

MÉTODOS: Este é um estudo transversal. Quarenta e quatro pacientes adultos selecionados de acordo com o Eixo I dos critérios diagnósticos de DTM (DC/TMD) responderam aos questionários Índice de Qualidade do Sono de Pittsburgh (PSQI); Escala de Catastrofização da Dor (PSC) e Escala de Transtorno de Ansiedade Generalizada (GAD-7). A amostra foi dividida em qualidade de sono bom e ruim de acordo com os escores do PSQI. A intensidade da dor foi mensurada através da Escala Analógica Visual (EAV) e a duração da dor foi registrada em meses.

RESULTADOS: De uma amostra de 44 indivíduos 63,64% dos pacientes apresentaram DTM Muscular (dor miofascial), 18,18% DTM articular (artralgia) e 18% ambos. 72,73% dos pacientes apresentavam dor há mais 6 de meses. Os pacientes que relata-

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HIGHLIGHTS

- Studies conducted in private practice settings are rare, and the profiles of these patients should be compared with those patients from the public service.
- Patients with poor sleep quality had significantly higher levels of anxiety symptoms and catastrophizing scores, as well as the majority of chronic pain symptoms.
- TMD management must include sleep patterns and approaches such as patient education and sleep hygiene to enhance the effectiveness of TMD treatments and, ultimately, yield preventive benefits.

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ram má qualidade do sono apresentaram mais sintomas de ansiedade (p=0,009) e pensamentos catastróficos relacionados à dor (p=0,006); destes, 93,7% apresentavam dor há mais de 6 meses. Houve correlações negativas entre idade e intensidade da dor e entre idade e sintomas de ansiedade.
CONCLUSÃO: A má qualidade do sono foi significativamente associada à ansiedade, à catastrofização e à duração da dor em pacientes com DTM atendidos em clínica privada.
Descritores: Ansiedade, Catastrofização, Dor facial, Qualidade do sono, Setor privado, Transtornos da articulação temporomandibular.

INTRODUCTION

Temporomandibular disorders (TMDs) encompass a group of musculoskeletal and neuromuscular conditions that affect the temporomandibular joints (TMJs), the masticatory muscles and all associated tissues. The most common symptom is pain, usually localized to the muscles of mastication and/or the preauricular area. Chewing and other mandibular functions aggravate the pain. In addition to these symptoms, patients often report restricted mouth opening and temporomandibular joint noises. These complaints make TMD the second reason for treatment in the dental practice[1].

The Importance of sleep and psychosocial risk factors for the development and worsening of pain is well known in the literature[2-10]. However, the relationship between sleep and pain is complex and the presence of sleep disorders, such as sleep disturbed breathing (DRS) or insomnia, can exacerbate chronic pain[10,11].

A recent systematic review showed that the presence of pain appears to have profound effects on sleep quality of TMD patients[6]. The Orofacial Pain Prospective Evaluation and Risk Assessment (OPPERA), a study specifically designed to investigate and identify biopsychosocial, environmental, and genetic determinants that contribute to the onset and persistence of TMD, also supported a significant association between sleep quality and TMD. The prospective cohort evidence showed that symptoms of sleep disorders preceded the onset of TMD[10,12].

The role of psychosocial factors in the development and maintenance of TMD is also well known. There is a high prevalence of mental disorders in TMD patients, especially in patients with masticatory muscle disorders[3,4,13]. In addition, there is a significant association between painful TMD, depression, and anxiety[4,5]. In view of this, factors related to sleep disorders, anxiety and catastrophization may contribute to the worsening of the patient's condition, reduce their ability to modulate pain and increase pain intensity[3,1].

Although it is known that the majority of TMD patients are treated in private orofacial clinics[14,15], most studies on the issue are carried out in public health facilities. Studies in private practice are rare and the outcome of these patients may differ from the public service patient profile. Since pain is the main reason for treating patients[16], information about such parameters could be valuable for the introduction of complementary protocols in the therapy of TMD patients.

Based on this, the aim of the present study was to investigate the influence of sleep quality on pain characteristics and psychological factors in painful TMD patients in private orofacial pain practice. The null hypothesis being that there are no differences in sleep quality on these variables.

METHODS

This cross-sectional study was conducted according to the guidelines of the Committee on Ethics and Research (CAAE: 24545619.0.0000.5411) in a private orofacial pain practice.

The study sample included consecutive adult patients, 79.5% female, mean age 36.9±15.6 years, whose main complaint was pain in one or more of the following areas: temporalis muscle, preauricular region, and masseter muscle, who attended a private practice for orofacial pain in Franca, São Paulo, Brazil, for the first time between January and July 2019 and agreed to participate. The inclusion criteria were: 1) patients over 18 years of age who completed the questionnaires used at their initial consultation; 2) the presence of at least one of the painful diagnostic criteria for TMD (DC/TMD)[17-21] painful axis I diagnosis myofascial pain, arthralgia 3) the absence of systemic rheumatological and/or psychiatric diseases and/or others physical pain disabilities.

Data collection

122 patients filled out questionnaires on aspects of catastrophizing, anxiety and sleep quality in the waiting room before the consultation. All patients seen during initial treatment with compatible TMDs received a medical report that included personal information, medical and dental history of major complaints and a Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) physical exam. Of these, 44 patients met the inclusion criteria and were included in the study sample. Then they signed the Free and Informed Consent Term (FICT).

TMD diagnosis was only performed by a single investigator, TMD specialist, who was thoroughly trained in the DC/TMD. This protocol is the ongoing reference for consistent TMD diagnoses for clinical research goals. The DC/TMD protocol includes a two-axis analysis that provides diagnoses on both physical and psychosocial data. The Axis I protocol is based on guidelines for medical history record and clinical assessment, while the Axis II protocol includes an assessment of multiple psychological factors[17;20;21].

The sample was divided into two groups based on PSQI scores: poor sleep quality (PSQI≥5) and good sleep quality (PSQI≤5).

Outcome variables

The Pittsburgh Sleep Quality Index (PSQI) was used to assess sleep quality. The PSQI is a self-applicable instrument for assessing the quality of sleep-in relation to the previous month. This questionnaire measures some sleep components such as subjective sleep quality, sleep latency, sleep duration, usual sleep efficiency, sleep disturbances, use of sleeping pills and daytime disturbances. The values of these components are added together to obtain a global score, ranging from 0 to 21, the higher the score, the worse the quality[22].

The Pain Catastrophizing Scale (PCS) was used to assess the magnitude of catastrophizing. It is a self-fillable questionnaire consisting of thirteen items in which the patient must state to what extent he presents the thoughts or feelings described in the questionnaire, whereby a five-point gradation is always considered. The instrument consists of three subscales: hopelessness, magnification and rumination. The score varies from 0 and 52 points[23].

The Generalized Anxiety Disorder Scale (GAD-7) was used to recognize symptoms of generalized anxiety disorder. The GAD-7 items describe the most important diagnostic aspects of the Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) for generalized anxiety disorder. In GAD-7, patients were asked about the most common symptoms of generalized anxiety disorder. The scores range from 0 to 21, with scores of 0-4, 5-9, 10-14, and 15-21 indicating minimal, mild, moderate, and severe anxiety symptoms, respectively[24].

Pain intensity was rated on a Visual Analogue Scale (VAS) from 0 to 100mm. Pain duration was categorized as less than 6 months or equal to or greater than 6 months.

Statistical analyses

Quantitative Outcome Variables: age, pain intensity, PSQI, PCS and GAD-7 scores, were expressed as mean and standard deviation (SD). The Kolmogorov-Smirnov test was used to assess normality (p<0.050) and a log10 transformation was performed when the continuous variable results were significant (p<0.050). After the Log 10 transformation, the normality test was repeated. Qualitative outcome variables were expressed as percentages. The Pearson's correlation coefficient was used to assess the relationship between the quantitative outcome variables.

Age, pain intensity and psychosocial differences between the groups were analyzed using the Student t test for an independent sample. The proportion of patients regarding diagnosis, gender and duration of pain was calculated using the Chi-square test. The Minitab Statistical Software was used to analyze the data. The significance level was established at 5%.

RESULTS

From a total of 122 medical records, 44 consecutive adult patients, (79.5% female, mean age 36.9±15.6 years) who met the inclusion criteria were included in the study sample.

The results of this study showed that most of patients (81,82 %) had poor sleep quality. Regarding the duration of pain, 72,73% of them typically had pain for more than 6 months. Descriptive results are presented in table 1. For the diagnosis of TMD patients, 63.64% had masticatory muscle disorders, 18.18% had TMJ disorders and 18% had both disorders.

Relationship between sleep quality, psychometric characteristics and pain intensity

Patients with poor sleep quality (PSQUI ≥ 5) had significantly higher rates of anxiety symptoms (p=0.009) and catastrophizing (p=0.006), and the majority had pain symptoms for more than 6 months (93.7%). There were no significant differences between sleep quality, pain intensity and age (Table 2).

Negative correlations were found between age and pain intensity (r=-0.404; p=0.007) and age and anxiety symptoms (r=-0.383; p=0.01). Anxiety symptoms scores were positively correlated with poor sleep quality and catastrophizing traits (r= 0.334; p=0.02; table 3).

Table 1. Gender and pain duration according to sleep quality according to the Pittsburgh Sleep Quality Index in patients with symptomatic temporomandibular disorders treated in a private orofacial pain clinic

	Good sleep		Poor sleep		Total	
	n	(%)	n	(%)	n	(%)
Sample	8	(18.18)	36	(81.82)	44	(100)
Gender						
Female	5	(14.29)	30	(85.71)	35	(79.55)
Male	3	(33.33)	6	(66.67)	9	(20.45)
Pain duration						
0 - 6 months	6	(50.00)	6	(50.00)	12	(27.27)
> 6 months	2	(6.25)	30	(93.75)	32	(72.73)

Table 2. Mean, standard deviation for age, pain intensity, catastrophizing and anxiety symptoms by sleep quality according to the Pittsburgh Sleep Quality Index in patients with symptomatic temporomandibular disorders treated in a private orofacial pain clinic

	Good sleep		Poor sleep		t*	p-value**
Characteristics	Mean	SD	Mean	SD		
Sleep quality	3.750	1.282	9.583	3.027		
Age (mean ± SD)	47.13	17.68	34.67	14.39		>0.05
Pain intensity	5.13	2.95	7.05	1.91		>0.05
Catastrophizing	7.88	8.24	19.58	12.99	-3.23	0.006
Anxiety	6.38	3.89	11.38	4.13	-3.26	0.009

*Student t test. **Statistical significance difference (p<0.05). Pain intensity according to VAS. Catastrophizing by Pain Catastrophizing Scale. Anxiety symptoms according to the Generalized Anxiety Disorder Scale.

Table 3. Correlations of pain intensity, age, anxiety, catastrophizing and sleep quality in patients with symptomatic temporomandibular disorders treated in a private orofacial pain clinic

	r*	p-value**
Pain intensity x age	- 0.404	0.007
Anxiety x age	- 0.383	0.010
Catastrophizing x anxiety	0.334	0.027
Sleep quality x anxiety	0,531	0,001

* Pearson correlation (r). ** p-value. Statistical significance difference (p<0.05).

DISCUSSION

This study evaluated the characteristics of symptomatic TMD patients treated in private orofacial pain practice in terms of sleep quality, anxiety symptoms, pain-related catastrophizing and pain characteristics. For the diagnosis of TMD, most patients had muscular TMD, consistent with most studies.[1] The main results showed that patients with poor sleep quality had significantly higher levels of anxiety symptoms and catastrophe scores and most chronic pain symptoms. No significant differences were found in the relationship between sleep quality and age, pain intensity and gender. Thus, the hypothesis of this study was partially rejected since poor subjective sleep quality was associated with significant changes in psychometric characteristics and longer duration of pain. However, pain intensity, age and gender did not correlate with sleep quality.

It is noteworthy that this study is one of the few examining the association between sleep quality and variables such as anxiety, catastrophizing and pain characteristics in patients with painful TMD attended in orofacial pain private practice. Another study also assessed pain-related variables and psychosocial aspects to identify subtypes of TMD patients attended in a private clinic. They concluded that screening patients with painful TMD is easy to perform, clinically relevant, and can represent a step towards individualized treatment planning for each patient[25]. Research examined the association between pain intensity and psychosocial variables in another study with TMD patients in a private practice. In contrast to the present study, gender had an important and independent influence on pain intensity[26].

Most of the sample in this study had poor sleep quality, consistent with a study who also observed higher scores for poor sleep quality in TMD patients[27]. The OPPERA cohort and case-control studies even showed a variability of up to about twice the TMD incidence rate in participants with poor sleep quality compared to participants with good sleep quality. These data underscore the importance of addressing TMD and sleep quality at the same time to achieve better outcomes[10,11].

Regarding sleep quality and pain intensity, this study found no significant correlation between them. The study[27] also found no differences in pain intensity between the two groups, good and poor sleep quality. In contrast, another study reported a positive association between poor sleep and higher pain scores[28].

Similarly to the results of this study, another study described higher poor sleep scores in 609 people with TMD compared to 88 healthy controls. The study showed no gender differences based on mean PSQI scores. They also found a significant association between sleep quality and chronic pain as in the sample of the present study, where the majority of poor sleep patients had pain for more than 6 months, a trait of chronicity[29].

All these results on pain and sleep are justifiable since the relationship between these two phenomena is a vicious circle with mutually interfering influences. A night of unsatisfactory sleep is followed by a day of increased pain, which is then followed by a night of unrefreshing sleep and morning sleep discomfort[30]. Current knowledge of this interaction between sleep and pain seems to play a role in pain management. Sleep deprivation appears to have a deactivating effect on multiple systems with predominantly analgesic properties, while systems with predominantly hyperalgesia properties are activated[31,32].

Regarding the relationship between sleep quality and psychosocial aspects, the results of this study showed a positive correlation between catastrophizing, sleep quality and anxiety symptoms, as was also shown in another study[33]. A recent study suggested that psychosocial issues may act as causal mediators' mechanisms through which poor sleep quality would contribute to the development of TMD. Initially, poor sleep quality would have a direct negative impact on pain. This could consequently induce anxiety and stress, symptoms that would act as mediators in the causal pathway between poor sleep quality and TMD pain[34].

Finally, after analyzing the results of this study, it could be observed that some of them agree to studies with sample of patients attended by public health services and others do not. For example, poor sleep quality was associated with higher levels of anxiety, catastrophizing and longer duration of pain, data consistent with these studies. On the other hand, unlike many studies that have found positive correlations between poor sleep quality and higher pain intensity, age and female gender, this research has not confirmed these results.

This study found negative correlations between age and pain intensity and anxiety and age. It is possible to presume that these disagreements could be related to the private practice setting, the socioeconomic level of these patients and better access to information. However, due to the small sample size, these conclusions cannot be drawn. Further studies with larger samples in private clinics are needed to confirm these hypotheses.

This study's screening of patients with painful TMD in primary care for sleep quality, pain characteristics and psychosocial issues could help characterize the patient profile in the private clinic, identify and provide a framework for the development of more individualized treatments. Therefore, treating TMD must include sleep patterns and simple approaches such as focusing on patient education and sleep hygiene, which can improve the effectiveness of TMD treatments and ultimately have preventive benefits.

There are some limiting factors. First, this study was conducted on a population of TMD patients without a control group. Therefore, further studies are needed with samples that include patients with painful and non-painful TMD as well as patients without TMD. The relatively small sample size was another limitation of this study.

More robust samples are recommended strategies for greater credibility of the results and to use them for comparisons with other researchers and cultures. Third, the social data, drug usage, and comorbidities of the patients were not collected. Forth, sleep quality was not assessed based on the best available methods, but was measured using a validated subjecti-

ve, widely used measure. Future studies should assess sleep quality including instrumental measurement strategies such as polysomnography.

CONCLUSION

Poor subjective sleep quality was associated with significant changes in psychometric characteristics and longer duration of pain. However, pain intensity, age and gender did not correlate with sleep quality.

AUTHORS' CONTRIBUTIONS

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Statistical Analysis, Data Collection, Conceptualization, Resource Management, Project Management, Research, Methodology, Writing - Preparation of the original, Writing - Review and Editing, Software, Supervision, Validation, Visualization
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