

PREVALENCE OF TMJ PAIN SYMPTOM IN ADULTS AND ITS ASSOCIATION WITH PREDISPOSING FACTORS

PREVALÊNCIA DO SINTOMA DE DOR NA ATM EM ADULTOS E SUA ASSOCIAÇÃO COM FATORES PREDISPOONENTES

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ABSTRACT: To estimate the prevalence of temporomandibular joint (TMJ) pain symptom and to verify its association with predisposing or perpetuating factors. Cross-sectional study of adult patients, with 488 medical records of patients assisted at the Clinics of the School of Dentistry of IMED, in the city of Passo Fundo, RS, Brazil. The data were collected through the anamnestic record based on patient self-report. The chi-square test at 5% significance level was used to evaluate the relationship between the outcome of TMJ pain and the variables. In addition, bivariate and multivariate Poisson analyses were performed at 5% significance level to confirm the associations, including to the multivariate analysis the variables with $p \leq 0.20$ in the bivariate analysis. The prevalence of TMJ pain in this adult population was 21.52% (n=105). There was an association between TMJ pain and the variables of teeth clenching and habit of biting objects ($p < 0.05$). This study concluded that the prevalence of TMJ pain symptom agrees with the mean prevalence found in the literature for studies with convenience samples, and teeth clenching and the habit of biting objects may represent perpetuating or predisposing factors for such condition.

KEYWORDS: Temporomandibular Joint. Temporomandibular Joint Dysfunction Syndrome. Temporomandibular Joint Disorders. Pain. Habits.

INTRODUCTION

Temporomandibular disorders (TMD) are an enigma and a challenge for health professionals and this may occur because they include a heterogeneous set of diseases that involves changes in the temporomandibular joints (TMJ) and mastication muscles, as well as in related structures such as the ears (AGGARWAL et al., 2006; MOTGHARE et al., 2015a).

The main symptoms of this heterogeneous condition of psychophysiological disorders are mandibular and TMJ pain, presence of joint sounds, difficulties to open and close the mouth and to eat, and occasional pain at rest (CARDOSO; CAMPOS KRAYCHETE; CORREIA DE ARAÚJO, 2011; REGINA et al., [s.d.]). Temporomandibular disorder may often be associated with pain conditions in other parts of the body, such as the head, neck, shoulders, and back (MACFARLANE et al., 2001; WIESINGER et al., 2007).

The diagnosis is mostly based on the clinical history of the patient and the findings of the physical examination (SCRIVANI; KEITH; KABAN, 2008). A large retrospective study (n = 4528) performed by a single examiner throughout 25 years showed that the most common signs and

symptoms were facial pain (96%), auditory discomfort (82%), headache (79%), and mandibular discomfort or dysfunction (75%) (COOPER; KLEINBERG, 2007).

Patients reporting orofacial pain may often present generalized pain and therefore TMD may represent the manifestation of a more comprehensive pain sensitivity disorder (AARON; BURKE; BUCHWALD, 2000). This chronic pain condition may lead to psychological, sleep, and psychosocial disorders in these patients (CARDOSO; CAMPOS KRAYCHETE; CORREIA DE ARAÚJO, 2011; OHRBACH; DWORKIN, 1998; WILSON et al., 1994).

Some population-based studies indicate that TMD affects 10 to 15% of adults and only 5% of them seek treatment (DE FIGUEIREDO et al., 2009; LIM et al., 2010), which represents a significant portion of individuals unfit to work and large medication consumers (CARDOSO; CAMPOS KRAYCHETE; CORREIA DE ARAÚJO, 2011). This condition affects more people between 20 and 40 years old, and it is twice more common in women (FILLINGIM et al., 2009; GILLBORG et al., 2017; HONGXING et al., 2016; JUSSILA et al., [s.d.]; KARIBE et al., 2015; KIM et al., 2015; MAIXNER et al., 2011; MARTINS-

JÚNIOR et al., 2010; STUANI et al., 2008; TECCO et al., 2011), possibly due to the biological differences, including hormonal and psychosocial factors (KIM et al., 2015; WIECKIEWICZ et al., 2014).

The etiology of TMD is complex and multifactorial, and it may include biological, anatomical, environmental, social, emotional, and cognitive factors (KIM et al., 2015; WIECKIEWICZ et al., 2014). The most common causes are musculoskeletal conditions, responsible for at least 50% of the cases (REITER et al., 2012), and for the intra-articular causes, the most common one is articular disc displacement involving the condyle-disc relationship (GAUER; SEMIDEY, 2015; MURPHY et al., [s.d.]).

Factors such as parafunctional habits, joint and muscle trauma, skeletal and occlusal relationships, anxiety, and depression have not yet been explained in cross-sectional studies regarding whether they might predict the onset of TMD or even represent causal influences on the risk of TMD development (DAHLSTRÖM; CARLSSON, 2010). Hence, it is important to diagnose TMD and associate it with potential predisposing factors, in order to prevent orofacial pain.

The present study aimed to estimate the prevalence of the TMJ pain symptom and associate it with predisposing and perpetuating factors.

MATERIAL AND METHODS

Study design, setting, and participants

This cross-sectional, qualitative, and observational study was performed from March 2014 to June 2017 through a convenience sample obtained by the medical records of patients assisted at the Clinics of the School of Dentistry of IMED, in the city of Passo Fundo, Rio Grande do Sul, Brazil. The eligibility criteria for inclusion in this study were patients over 18 and under 60 years old, without distinction of gender or race. The medical records that were not completely filled out were excluded.

Sample

From a total of 1036 medical records, 548 were excluded after applying the eligibility criteria, which resulted in a sample of 488 records. The data were collected using the information available in the anamnestic record, based on patient self-report.

Variables

Temporomandibular joint pain was considered the main outcome and it was

dichotomically classified (yes/no). The other variables were considered exposure variables, such as gender (male and female), age (19-30, 31-45, 46-60), marital status (single, married and/or with a partner, widow(er), divorced) level of education (incomplete elementary school, complete elementary school/incomplete high school, complete high school/incomplete higher education, complete higher education), depressive disorder (yes/no), coffee consumption (yes/no), previous facial trauma (yes/no), habit of biting nails (yes/no), biting objects (yes/no), and teeth clenching (yes/no), regardless of whether it was a day or night habit.

Data collection

The data were initially collected with the creation of an Excel spreadsheet to fill out data such as gender, age, marital status, level of education, depressive disorder, coffee consumption, TMJ pain, previous facial trauma, habit of biting nails, biting objects, and teeth clenching.

Statistical analysis

All data were analyzed by the Stata™ 12 software (StataCorp™ LP, Texas, USA). First, a descriptive analysis was performed for the main characteristics of the sample by means of relative and absolute frequencies, and the prevalence of the main outcome (TMJ pain) was calculated. Pearson's chi-square test was applied to verify the association between the presence of TMJ pain and the independent variables. Bivariate and multivariate Poisson analyses were performed at 5% significance level to confirm the associations, including to the multivariate analysis the variables with $p \leq 0.20$ in the bivariate analysis.

Ethical considerations

The present study was approved by the Research Ethics Committee of Faculdade Meridional/IMED, under report #638.976/2014.

RESULTS

In this study, most of the sample consisted of women (86.68%) and the prevalent age group was 46-60 years (42.62%). As for the level of education, most of the sample had completed high school/incomplete higher education (41.60%). The prevalence of patients with TMJ pain symptom was 21.52% (n=105).

Table 1 shows the association between the main outcome (TMJ pain) and the independent variables.

Table 1. Distribution of independent variables associated with TMJ pain (n = 488).

	TMJ pain				Total n	P
	No		Yes			
	n	%	n	%		
Gender						0.009*
Male	43	66.15	22	33.85	65	
Female	340	80.38	83	19.62	423	
Age						0.278
19-30 years	106	74.13	37	25.87	143	
31-45 years	108	78.83	29	21.17	137	
46-60 years	169	81.25	39	18.75	208	
Marital Status						0.550
Married and/or with a partner	170	78.34	47	21.66	217	
Single	185	78.72	50	21.28	235	
Divorced	13	68.42	6	31.58	19	
Widow(er)	15	88.24	2	11.76	17	
Level of education						0.146
Incomplete Elementary School	126	81.29	29	18.71	155	
Complete Elementary School/Incomplete High School	75	83.33	15	16.67	90	
Complete High School/Incomplete Higher Education	155	76.35	48	23.65	203	
Complete Higher Education	27	67.50	13	32.50	40	
Depressive disorder						0.396
Yes	27	72.97	10	27.03	37	
No	356	78.94	95	21.06	451	
Coffee consumption						0.138
Yes	148	75.13	49	24.87	197	
No	235	80.76	56	19.24	291	
Teeth clenching						0.000*
Yes	115	68.86	57	33.14	172	
No	268	84.81	48	15.19	316	
Biting nails						0.460
Yes	75	75.76	24	24.24	99	
No	308	79.18	81	20.82	389	
Biting objects						0.014*
Yes	53	67.95	25	32.05	78	
No	330	80.49	80	19.51	410	
Previous facial trauma						0.753
Yes	29	80.56	7	19.44	36	
No	354	78.32	98	21.68	452	

*statistically significant for Pearson's chi-square test (p<0.05)

The prevalence reasons obtained in the multivariate analysis with the variables associated with TMJ pain are presented in Table 2.

Table 2. Association between TMJ pain and associated factors, by the bivariate and multivariate regression analysis.

	TMJ pain			
	Bivariate Analysis		Multivariate Analysis	
		p		p
Gender	1.72(1.07;2.75)	0.02*	1.44(0.84;2.45)	0.17
Level of education	1.18(0.97;1.43)	0.08*	1.10(0.89;1.35)	0.35
Coffee consumption	0.77(0.52;1.13)	0.19	0.86(0.58;1.27)	0.46
Biting objects	1.64(1.04;2.57)	0.03*	1.62(1.03;2.5)	0.03**
Teeth clenching	2.18(1.48;3.20)	0.00*	2.11(1.43;3.11)	0.00**

*statistically significant for the bivariate Poisson analysis, 5% significance level; **statistically significant for the multivariate Poisson analysis, 5% significance level.

DISCUSSION

Among the types of orofacial pain, the second type of disorder most commonly found is the temporomandibular disorder (TMD), with prevalence estimated between 3 and 15% of the population (BENDER, 2014). However, studies show that such prevalence may vary from 4.9% (ADÈRN et al., 2014) to 60% (CAMPOS et al., 2014) according to the age of the individuals studied (FARSI, 2003). In a cohort study from 1966 performed in Northern Finland, 1962 individuals aged 46 years old in average were interviewed from 2012 to 2013 and 18.5% self-reported the presence of TMJ pain (JUSSILA et al., [s.d.]). On the other hand, a study performed in Sweden with 6300 participants showed by means of self-report that 11% of the adult population presented TMJ pain (GILLBORG et al., 2017). In the present study, 21.52% of patients reported having temporomandibular joint pain. These data should be interpreted considering that the sample included patients assisted in the dental clinic of IMED, meaning these were patients seeking dental care, and that data were extracted from the clinical files by means of patient self-report, which may have overestimated this symptom.

However, most of the epidemiological studies on TMD have been limited to cross-sectional or case-control designs, mostly with convenience samples. These studies report higher prevalence in women than in men, with a ratio ranging from 2:1 for the general population and 8:1 in the clinical environment (BUSH et al., 1993).

In the present study, the patients that self-reported TMJ pain were mostly women (86.68%). However, when performing the statistical analysis of multivariate correlation, the factor of gender cannot be considered a risk factor for TMD for this specific sample in our study. The evidence shown over the last years indicates substantial differences of gender in the clinical and experimental responses to pain. Women present higher prevalence of painful conditions than men, including orofacial pain and other TMD symptoms (FILLINGIM et al., 2009).

In a 3-year prospective study with 266 participating women aged 18 through 34 years, initially free of pain, 16 patients (6%) developed TMD. Such development was followed by increased headache, muscle pain, and other types of pain that were not observed in participants who had not developed TMD. The participants who developed the condition also reported experiencing more back, chest, and menstrual pain at the beginning of the

study than the participants who had not developed TMD (LIM et al., 2010).

Several studies corroborate these findings with the reason that women in reproductive age (20 to 40 years old) constitute the great majority (around 80%) of individuals suffering from TMD, which raises interest on genetic and hormonal issues that may explain this fact. It was observed that polymorphisms in genes that code the enzymes involved in the metabolism of estrogen are candidates for the list of TMD support (CARDOSO; KRAYCHETE, 2010; FERREIRA; SILVA; FELÍCIO, 2016).

Some studies also associate this prediction for the female gender as an interaction of biological (differences in muscle structure and connective tissue), hormonal, psychological, and social factors (PRESS; FACIAL; DIGITAL, 2008; WARREN; FRIED, 2001).

The studies show that several factors have been investigated for a potential relation to TMD, including bruxism (MOLINA et al., 1997), teeth grinding or clenching, biting the tongue, cheeks, lips, or nails (DE LEEUW et al., 1994; MARBACH; LENNON; DOHRENWEND, 1988; TSOLKA et al., 1995), history of moderate or severe trauma, and orthodontic treatment or third molar extraction (PULLINGER; MONTEIRO, 1988), as well as other factors such as headaches (DE LEEUW et al., 1994; MOLINA et al., 1997), pain in other parts of the body (DE LEEUW et al., 1994; MORROW et al., 1996), depression, stress, and anxiety (DAHLSTRÖM; CARLSSON, 2010; DE LEEUW et al., 1994; MARBACH; LENNON; DOHRENWEND, 1988).

The present study showed, after the multivariate analysis, an association between some factors such as teeth clenching (IRR: 2.11; CI 95% 1.43-3.11) and the habit of biting objects (IRR: 1.62; CI 95% 1.03-2.5), which are considered microtraumas, with TMJ pain symptoms reported by the patients. Similar results were observed by Motghare et al., in their study with adolescents ages 10 through 19 years, which verified the association of the habit of biting lips, objects, and nails, and teeth clenching with signs and symptoms of TMD, showing higher prevalence of signs and symptoms observed in women (MOTGHARE et al., 2015b).

In another study performed with adolescents aged 16 through 19 years to verify the prevalence of signs and symptoms of TMD and its relation to parafunctional habits, the habit of biting objects was significantly associated with the presence of TMD symptoms (OLIVEIRA et al., 2016).

Other studies show a relation of parafunctional habits as contributing factors that either predispose TMD or are considered risk factors (KARIBE et al., 2015; KOBBS et al., 2005; OLIVEIRA et al., 2016; WINOCUR et al., 2006).

According to Fernandes et al., in their study with adolescents to investigate predisposing factors of TMD pain, there was an association with parafunctional habits. They also claimed that parafunctional habits promote the maintenance and/or progression of TMD pain, leading to muscle overload and consequently worsening the disorder (FERNANDES et al., 2015).

According to Sproesser, the habit of teeth clenching does not necessarily induce the painful symptom of the disorder (SPROESSER, 2002). However, the literature reports that the parafunctional habits are risk factors of TMD (RODA et al., 2007).

Studies affirm that stress has a large influence on TMD, acting as an etiological factor for the production of parafunctional habits, and it is an aggravating factor for the pathological condition, affecting the quality of life and consequently the social life of the individual (RESENDE et al., [s.d.]; SUVINEN et al., 2004).

The association between pain and teeth clenching may be attributed to either damaged muscle fibers or a reduction of blood supply, considering the perfusion of the masseter is significantly hindered in individuals with voluntary isometric contractions (MICHELOTTI et al., 2010). Moreover, chronic teeth clenching increases the friction between the TMJ components by decreasing the proper lubrication from the synovial fluid, and a hypothesis is created to explain the beginning of the process of articular disc displacement, which causes pain (CARDOSO; KRAYCHETE, 2010).

This study presents the association between

some predisposing factors and TMD pain. Because they are important factors for the development of TMD, these variables deserve the attention of health professionals. However, it is worth noting the existent number of studies performed on TMD and the great difficulty to compare such studies due to the lack of standardization of diagnostic criteria.

This study had some limitations. It was a cross-sectional study with a convenience sample of patients assisted in a dental school, and therefore it may not represent a population. However, the results show associations with some factors such as parafunctional habits and biting objects, which agrees with the literature consulted. Thus, more attention should be given to such habits when patients report them, in order to prevent diseases and/or early treatment to hinder the evolution of the condition to more severe cases.

Moreover, the study will continue in a second phase with the return visit of patients who reported TMJ pain, for a concrete diagnosis of TMD and the proper treatment of these patients.

CONCLUSION

The prevalence of TMJ pain symptom agrees with the mean prevalence found in the literature for his type of study, and that teeth clenching and the habit of biting objects may be perpetuating or predisposing factors for such condition.

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RESUMO: Estimar a prevalência do sintoma dor na articulação temporomandibular (ATM) e verificar sua associação com fatores predisponentes ou perpetuantes. Estudo transversal de pacientes adultos, com 488 prontuários de pacientes atendidos na Clínica de graduação da Escola de Odontologia da IMED do município de Passo Fundo. Os dados foram coletados através da ficha anamnésica baseando-se no auto relato, do paciente. O teste do qui-quadrado, com nível de significância de 5%, foi utilizado para avaliar a relação entre o desfecho dor na ATM e as variáveis. E para confirmar as associações, foram realizadas análises de Poisson, bivariada e multivariada, com nível de significância de 5%, sendo incluídas na análise multivariada as variáveis com $p \leq 0,20$ na análise bivariada. A prevalência de dor na ATM nessa população adulta foi de 21,52% (n=105). Encontrou-se associação entre dor na ATM e as variáveis apertamento dental e hábito de morder objetos ($p < 0,05$). Neste estudo pode - se concluir que a prevalência do sintoma dor na ATM está de acordo com a média de prevalência encontrada na literatura para estudos com amostra de conveniência e os fatores apertamento dental e hábito de morder objetos podem ser perpetuantes ou predisponentes para tal condição.

PALAVRAS-CHAVE: Articulação Temporomandibular. Síndrome da disfunção da Articulação Temporomandibular. Transtornos da Articulação Temporomandibular. Dor. Hábitos.

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