

Temporomandibular disorder is more prevalent among patients with primary headaches in a tertiary outpatient clinic

Disfunção temporomandibular é mais prevalente entre pacientes com cefaleias primárias em um ambulatório de nível terciário

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ABSTRACT

Objective: The aim of this study was to estimate the prevalence of signs and symptoms of temporomandibular disorders (TMD) in patients with primary headaches attended in a tertiary neurology ambulatory. **Method:** Authorized by the Ethics Committee, the present cross-sectional study was conducted with a random sample of patients screened for orofacial pain and primary headaches at a tertiary hospital in Northeast of Brazil. **Results:** The sample consisted in 42 patients with primary headache, 59.5% male. The prevalence of > 6 TMD signs and symptoms was 54.8%. In those patients with migraine TMD was present in 71.4% and in tension-type headache in 38.1% ($p = 0.030$; OR = 4.1). TMD was related to the clinical status of headache associated or attributed to medication overuse ($p = 0.001$). **Conclusion:** TMD has a high prevalence in patients with primary headaches (54.8%). Special attention must be given to patients with migraine and headache associated or attributed to medication overuse.

Keywords: cross-sectional studies, migraine disorders, temporomandibular joint disorders, outpatient clinics.

RESUMO

Objetivo: Estimar a prevalência de sinais e sintomas de disfunção temporomandibular (DTM) e fatores associados em pacientes com cefaleias primárias atendidos em um ambulatório de neurologia. **Método:** Autorizado pelo Comitê de Ética, o presente estudo transversal foi conduzido com uma amostra aleatória de pacientes investigados para dor orofacial e cefaleias primárias em um hospital terciário no nordeste do Brasil. **Resultados:** A amostra consistiu em 42 pacientes com cefaleias primárias, sendo 59,5% homens. A prevalência de > 6 sinais e sintomas de DTM foi 54,8%. Naqueles pacientes com migrânea, DTM estava presente em 71,4% e em 38,1% daqueles com cefaleia do tipo tensional ($p = 0,030$; OR = 4,1). DTM foi relacionada à condição clínica de cefaleia por abuso de medicamentos ($p = 0,001$). **Conclusão:** A DTM é uma condição com alta prevalência em pacientes com cefaleias primárias (54,8%). Atenção especial deve ser dada a pacientes com migrânea e cefaleia por abuso de medicamentos.

Palavras-chave: estudo transversal, migrânea, desordens da articulação temporomandibular, ambulatório clínico.

Clinical practice in orofacial pain is frequently related to headache symptoms presented by patients with temporomandibular disorders (TMD). TMD is a clinical term used for series of signals covering alterations in mastication muscles, temporomandibular joint (TMJ) or associated orofacial structures¹, which is one of the musculoskeletal disorders considered the most common cause of non-dental pain in the orofacial region².

Tension-type headache (TTH) and migraine are the most common expressions of primary headaches, where migraine is widely known. Migraine is characterized by headache with unilateral location, moderate or severe pain intensity and, in general, individuals can report nausea or vomiting, photophobia and phonophobia with or without visual or sensitive symptoms (e.g., visual aura). TTH was pointed out in an

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epidemiological study as the most common type of primary headache in general population³, whose prevalence varies from 30% to 78%⁴. TTH has episodes with bilateral location of pain, mild or moderate intensity, without nausea, but it may present photophobia or phonophobia⁴.

Considering the global prevalence of headache, the greatest part of sufferers does not require medical intervention and these patients self-manage their symptoms. Those who seek treatment in a specialized tertiary clinic possibly have different elements for headaches and their clinical features, generally, need intervention by a specialist.

Headache has been reported in literature as a prevalent condition in patients with TMD, compared to those without TMD⁵. Important associations between primary headaches and TMD in adult individuals can be observed in different studies^{5,6,7,8}, and the evidence of this relationship among specific types of headache and TMD still has restrictions^{5,8}.

The purpose of the present study was to estimate the prevalence of signs and symptoms of temporomandibular disorders and associated characteristics in patients with primary headaches seen in a tertiary neurology outpatient clinic.

METHODS

Ethical issues

After authorization by the Ethics Committee of the Health Sciences Center of the Universidade Federal da Paraíba under the protocol number 287,962, a cross-sectional study was carried out at the neurology outpatient clinic of a tertiary hospital in the northeast of Brazil.

Participants and selection criteria

During 2013, patients with primary headaches were selected via random numbers and were asked to answer an interview and screen for orofacial pain and temporomandibular disorders. The sample was composed of patients, women or men, having as inclusion criteria items such as: age between 18 and 65 years old; diagnosis of primary headache according to the International Classification of Headache Disorders, 2nd edition (ICHD-II)⁴; not treated for orofacial pain or TMD in last 6 months; signed the Informed Consent Form to participate in this study.

In regard to the exclusion criteria, the following items were considered: patients with cutaneous lesions or recent trauma in the head or neck; central or peripheral neuropathies; use of antinociceptive or anti-inflammatory drugs in the 24 hours prior to data collection; dental procedures in the last three months.

Data collection

After the diagnosis conclusion of primary headaches with ICHD-II⁴, patients underwent an assessment of TMD symptoms and orofacial pain based on Fonseca's

questionnaire for TMD⁹. This index is used in Brazilian Portuguese for screening subjects with TMD and it classifies this disorder according to the severity of symptoms^{10,11}. The questionnaire has 10 questions which investigate the presence of TMD signs and symptoms as TMJ pain during chewing, pain in the occipital region, noise in the TMJ, oral habits such as clenching or grinding teeth, stress. Each question has a score and the patient must indicate for each signal or symptom with "no" (0), "sometimes" (5) and "yes" (10). Considering the experience in the clinical practice and use of the gold-standard criteria for TMD diagnosis (Diagnostic Criteria for TMD)^{12,13}, in this study TMD was considered absent in those patients with 0-5 signs and symptoms and present in those with 6-10.

Statistical analysis

Collected data were included in Microsoft Office Excel for Windows database and later statistically analyzed using Statistical Package for Social Sciences (SPSS Inc. Chicago, IL, USA) for Windows version 20.0. Quantitative data with normal distribution were analyzed through parametric tests. Associations among the variables were investigated with Pearson's chi-square test and Fisher's exact test. The association measure between an exposure (i.e., the TMD) and the possibility of an outcome (i.e., TTH or migraine) was obtained by calculating odds ratio (OR). All the analyses were conducted by considering a confidence level at 95%, and the p value was considered statistically significant when lesser than 0.05.

RESULTS

By means of random numbers, the first 21 cases of each type of primary headaches, seen at the neurology outpatient clinic, were selected and included in the analysis those that met the criteria for this study. No patient with cluster headaches and other trigeminal autonomic cephalalgias was seen in the period of data collection; therefore, the analysis consisted of two groups: (i) tension-type headache (TTH) and (ii) migraine. The sample was composed of 42 patients, 59.5% male, with mean age of 31 years (20-48), all of them diagnosed with primary headache according to the criteria proposed by ICDH-II⁴, being 21 with TTH and 21 with migraine. Secondary headaches associations (other than headache attributed to medication overuse), even likely cases of intracranial pathologic findings, were not included in this analysis.

The prevalence of > 6 TMD signs and symptoms in patients with primary headaches was 54.8%, being 64.7% of female (Table 1). TMD was present between 71.4% of the patients with migraine and 38.1% of those with TTH, with statistically significant difference ($p = 0.030$). Migraine patients were 4.1 times more likely to have TMD than those in the TTH group (Table 2).

In the migraine group, the most prevalent subtype with TMD was migraine without aura and in TTH group, the presence of TMD was higher in the chronic tension-type headache (CTTH) subtype (77.8% and 63.6%, respectively). Each subtype differed statistically from other subtypes in the TTH and migraine groups ($p = 0.01$, respectively) (Table 3).

Headache associated or attributed to medication overuse was found in 68% of female patients (Table 4) with statistically significant difference when compared to male ones ($p < 0.05$). Table 5 shows the frequency of headache associated or attributed to medication overuse and the presence of TMD. Statistical analysis revealed that TMD was related to the clinical status of 78.3% of the patients with headache associated to medication overuse when comparing the presence or absence of both variables ($p = 0.001$). For this phenomenon, the associations among the variables using Fisher's exact test and odds-ratio were also measured, highlighting that the patients with headache associated to medication overuse are 10.08 times more exposed to TMD than those without this chronification background ($p = 0.001$).

DISCUSSION

The relationship between primary headache and TMD is still not very well known. The use of different nomenclatures and classifications in literature does not always allow adequate crossing of findings.

Among the individuals with TMD, headache is one of the most common symptoms^{14,15,16,17}. Studies with epidemiological designs have shown similar findings about the relationship between individuals with headache and TMD signs and symptoms^{5,8}. The association between both conditions in clinical setting is still very little investigated; therefore, this may contribute to misdiagnosis and difficulties in the treatment of TMD or headaches considering that one can cause or worsen the other.

Table 1. Temporomandibular disorders (TMD) in patients with primary headaches.

	Female % (n)	Male % (n)	Total % (n)
TMD			
Yes	64.7 (11)	48 (12)	54.8 (23)
No	35.5 (6)	52 (13)	45.2 (19)

Chi-square test (χ^2): $p > 0.05$.

Table 2. Prevalence of temporomandibular disorders (TMD) in patients with primary headaches.

	TMD		Total % (n)
	No % (n)	Yes % (n)	
TTH	61.9 (13)	38.1 (8)	100 (21)
Migraine *†	28.6 (6)	71.4 (15)	100 (21)
Total	45.2 (19)	54.8 (23)	100 (42)

* χ^2 : $p < 0.05$; † OR: 4,1; TTH: tension-type headache; OR: Odds ratio.

In general, headache is presented as a prevalent condition in TMD patients when compared to those without TMD⁵.

The most important findings of the present study were: (1) TMD signs and symptoms are very common between migraine patients; (2) the chance of a migraine patient having comorbid TMD is four times higher than TTH patients; (3) chronic TTH and migraine without aura seem to be the most frequent primary headache subtypes in patients with TMD; (4) headache associated or attributed to medication overuse is higher in female gender; and (5) patients with headache associated or attributed to medication overuse are ten times more susceptible to TMD.

In the present sample of patients with primary headache, the prevalence of TMD was 54.8%. This prevalence was higher for female than for male patients (64.7% and 48%, respectively), but in spite of the numerical predominance, this gender prevalence was not statistically significant ($p > 0.05$).

TMD signs and symptoms were associated to migraine and TTH compared to controls without headache⁸. According to the TMD severity, it was more common to patients with moderate TMD to have diagnosis of migraine, chronic daily headache (CDH) and TTH than having no headache, mainly CDH and migraine¹⁸ (in this order). Similarly, in the current study, TMD was present mainly in patients with migraine and TTH ($p < 0.05$; OR = 4.1), confirming previous studies^{7,8,15,19}. This finding points out that TMD seems to be more frequent in patients with migraine, especially migraine without aura ($p = 0.01$).

A higher number of TMD signals and symptoms is found in children with headache²⁰, with association

Table 3. Prevalence of temporomandibular disorders (TMD) in primary headaches subtypes.

	TMD		Total % (n)
	No % (n)	Yes % (n)	
Tension-type headache			
FETTH	85.7 (6)	14.3 (1)	100 (7)
IETTH	100 (3)	0 (0)	100 (3)
CTTH	36.4(4)	63.6 (7) *	100 (11)
Migraine			
Without aura	22.2 (4)	77.8 (14) *	100 (18)
With aura	66.7 (2)	33.3 (1)	100 (3)
Total	45.2 (19)	54.8 (23)	100 (42)

* χ^2 : $p = 0.01$; FETTH: frequent episodic tension-type headache; IETTH: infrequent episodic tension-type headache; CTTH: chronic tension-type headache.

Table 4. Prevalence of headache associated or attributed to medication overuse among genders.

	Female % (n)	Male % (n)
Medication overuse headache		
Yes	68 (17)	35.3 (6)
No	32 (8)	64.7 (11)
Total	100 (25)	100 (17)

* χ^2 : $p < 0.05$.

Table 5. Association of medication overuse headache and temporomandibular disorders.

	TMD		Total % (n)
	No % (n)	Yes % (n)	
Headache associated or attributed to medication overuse			
No	73.7 (14)	26.3 (5)	100 (19)
Yes	21.7 (5)	78.3 (18)*†	100 (23)

* χ^2 : $p = 0.001$; † OR: 10.1.

between moderate and severe TMD and primary headaches in a population²¹ of children and adolescents, but some findings in adult population cannot be easily compared due to a great number of nomenclatures and different analyses.

Headache chronification due to analgesic drugs overuse was present in 68% of female gender patients with statistically significant difference compared to male ($p < 0.05$). Leeuw et al.²² found that the average number of medications reported by a female orofacial pain population is significantly higher than the comparison group ($p < 0.001$), and that analgesics are in the first top 5 medication categories used by female patients in an orofacial pain sample. It was also found that self-administration of analgesics is higher in female population with orofacial pain than in the comparison group, with statistically significant differences ($p = 0.0001$). The odds ratio value for this comparison was 5.7. In a similar way, our results found higher prevalence of medication overuse in female patients when compared to male ones. A national prevalence study conducted by Roe et al.²³ also showed that women are more susceptible to the use of several classes of medications, including those for pain conditions. In relation to this gender in particular, it was revealed that women with migraine seem to be more likely to present pain in TMD than women without headache (independent of the TMD type, whether myogenous or arthogenous)²⁴.

Headaches are a potential risk factor for diagnosis of chronic pain or TMD²⁵. Increased headache frequency indicates higher severity of TMD^{18,26}. The findings of the present study showed that 78.3% of patients with > 6 TMD signs and symptoms had headache associated or attributed to medication overuse, and that these patients are

ten times more exposed to the TMD signs and symptoms. The frequency and intensity of pain seem to increase the chances of the individuals to self-administrate analgesic drugs, which can (over the time) transform headache in a chronic condition. Literature review did not find studies describing the relationship between TMD and chronic headache due to medication overuse for comparing the present results.

It must be considered that patients with episodic attacks of TTH subtypes tend not to look for specialized treatment for being less severe than a migraine attack²⁷ or CTTH and frequent TTH, and the fact of this study has been conducted in a tertiary outpatient clinic may be influenced in the findings of this study. A limitation of this investigation consists in the sample, composed only of patients seen in a neurology outpatient clinic, without a control group without headache for comparing differences of TMD in both groups, with and without primary headache. Furthermore, this sample could not be stratified by age groups and subtypes of TMD, so this fact may be considered in consecutive research in order to elucidate specific relations between headache and TMD.

Based on results can be concluded that there is a high prevalence of > 6 signs and symptoms among patients with primary headaches. TMD is more frequent between migraine patients. Headache associated or attributed to medication overuse is a potential risk factor for comorbid TMD.

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References

1. Leeuw Rd: Orofacial pain : guidelines for assessment, diagnosis, and management. 4th ed. Chicago: Quintessence; 2008.
2. Okeson JP, Leeuw R. Differential diagnosis of temporomandibular disorders and other orofacial pain disorders. *Dent Clin North Am.* 2011;55(1):105-20. doi:10.1016/j.cden.2010.08.007
3. Rasmussen BK, Jensen R, Schroll M, Olesen J. Epidemiology of headache in a general population: a prevalence study. *J Clin Epidemiol.* 1991;44(11):1147-57. doi:10.1016/0895-4356(91)90147-2
4. Headache Classification Subcommittee of the International Headache Society. The International Classification of Headache Disorders: 2nd edition. *Cephalalgia.* 2004;24 Suppl s1:9-160.
5. Ciancaglini R, Radaelli G. The relationship between headache and symptoms of temporomandibular disorder in the general population. *J Dent.* 2001;29(2):93-8. doi:10.1016/S0300-5712(00)00042-7
6. Fragozo YD, Alves HH, Garcia SO, Finkelsztejn A. Prevalence of parafunctional habits and temporomandibular dysfunction symptoms in patients attending a tertiary headache clinic. *Arq Neuropsiquiatr.* 2010;68(3):377-380. doi:10.1590/S0004-282X2010000300009
7. Franco AL, Gonçalves DA, Castanharo SM, Speciali JG, Bigal ME, Camparis CM. Migraine is the most prevalent primary headache in individuals with temporomandibular disorders. *J Orofac Pain.* 2010;24(3):287-92.

8. Gonçalves DA, Bigal ME, Jales LC, Camparis CM, Speciali JG: Headache and symptoms of temporomandibular disorder: an epidemiological study. *Headache*. 2010;50(2):231-41. doi:10.1111/j.1526-4610.2009.01511.x
9. Fonseca DM, Bonfante G, Valle ALD, Freitas SFT. Diagnosis of the craniomandibular disfunction through anamnesis. *Rev Gaúcha Odontol*. 1994;42(1):23-4,27-8.
10. Nomura K, Vitti M, Oliveira AS, Chaves TC, Semprini M, Siéssere S et al. Use of the Fonseca's questionnaire to assess the prevalence and severity of temporomandibular disorders in Brazilian dental undergraduates. *Braz Dent J*. 2007;18(2):163-67. doi:10.1590/S0103-64402007000200015
11. Campos JADB, Gonçalves DAG, Camparis CM, Speciali JG. Reliability of a questionnaire for diagnosing the severity of temporomandibular disorder. *Braz J Physl Ther*. 2009;13(1):38-43. doi:10.1590/S1413-35552009005000007
12. Look JO, Schiffman EL, Truelove EL, Ahmad M. Reliability and validity of Axis I of the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) with proposed revisions. *J Oral Rehabil*. 2010;37(10):744-59. doi:10.1111/j.1365-2842.2010.02121.x
13. Schiffman E, Ohrbach R, Truelove E, Look J, Anderson G, Goulet JP et al. Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) for Clinical and Research Applications: recommendations of the International RDC/TMD Consortium Network* and Orofacial Pain Special Interest Groupdagger. *J Oral Facial Pain Headache*. 2014;28(1):6-27. doi:10.11607/jop.1151
14. Dando WE, Branch MA, Maye JP. Headache disability in orofacial pain patients. *Headache*. 2006;46(2):322-6. doi:10.1111/j.1526-4610.2006.00345.x
15. Ballegaard V, Thede-Schmidt-Hansen P, Svensson P, Jensen R: Are headache and temporomandibular disorders related? a blinded study. *Cephalalgia*. 2008;28(8):832-41. doi:10.1111/j.1468-2982.2008.01597.x
16. Graff-Radford SB. Temporomandibular disorders and headache. *Dent Clin North Am*. 2007;51(1):129-44. doi:10.1016/j.cden.2006.09.005
17. Glaros AG, Urban D, Locke J. Headache and temporomandibular disorders: evidence for diagnostic and behavioural overlap. *Cephalalgia*. 2007;27(6):542-9. doi:10.1111/j.1468-2982.2007.01325.x
18. Gonçalves DA, Camparis CM, Speciali JG, Franco AL, Castanharo SM, Bigal ME. Temporomandibular disorders are differentially associated with headache diagnoses: a controlled study. *Clin J Pain*. 2011; 27(7):611-5. doi:10.1097/AJP.0b013e31820e12f5
19. Stuginski-Barbosa J, Macedo HR, Bigal ME, Speciali JG. Signs of temporomandibular disorders in migraine patients: a prospective, controlled study. *Clin J Pain*. 2010;26(5):418-21. doi:10.1097/AJP.0b013e3181d10691
20. Bertoli FM, Antoniuk SA, Bruck I, Xavier GR, Rodrigues DC, Losso EM. Evaluation of the signs and symptoms of temporomandibular disorders in children with headaches. *Arq Neuropsiquiatr*. 2007;65(2a):251-5. doi:10.1590/S0004-282X2007000200012
21. Branco LP, Santis TO, Alfaya TA, Godoy CH, Fragoso YD, Bussadori SK. Association between headache and temporomandibular joint disorders in children and adolescents. *J Oral Sci*. 2013;55(1):39-43. doi:10.2334/josnusd.55.39
22. Leeuw R, Klasser GD, Albuquerque RJ: Are female patients with orofacial pain medically compromised? *J Am Dent Assoc*. 2005;136(4):459-68. doi:10.14219/jada.archive.2005.0201
23. Roe CM, McNamara AM, Motheral BR. Gender- and age-related prescription drug use patterns. *Ann Pharmacother*. 2002;36(1):30-9. doi:10.1345/aph.1A113
24. Gonçalves MC, Florencio LL, Chaves TC, Speciali JG, Bigal ME, Bevilacqua-Grossi D. Do women with migraine have higher prevalence of temporomandibular disorders? *Braz J Phys Ther*. 2013;17(1):64-8. doi:10.1590/S1413-35552012005000054
25. Franco AL, Fernandes G, Gonçalves DA, Bonafe FS, Camparis CM. Headache associated with temporomandibular disorders among young Brazilian adolescents. *Clin J Pain*. 2013;30(4):340-5. doi:10.1097/AJP.0b013e31829ca62f
26. Anderson GC, John MT, Ohrbach R, Nixdorf DR, Schiffman EL, Truelove ES et al. Influence of headache frequency on clinical signs and symptoms of TMD in subjects with temple headache and TMD pain. *Pain*. 2011;152(4):765-71. doi:10.1016/j.pain.2010.11.007
27. Bezov D, Ashina S, Jensen R, Bendtsen L: Pain perception studies in tension-type headache. *Headache*. 2011;51(2):262-71. doi:10.1111/j.1526-4610.2010.01768.x