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Original Article

Artigo Original

Signs and symptoms of temporomandibular disorders in women and men

Sinais e sintomas de desordem temporomandibular em mulheres e homens

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Keywords

Temporomandibular Joint Disorders
Stomatognathic System
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ABSTRACT

Introduction: Women are more likely to present temporomandibular disorders (TMD); however, studies comparing genders in Brazilian samples are rare. **Purpose:** To analyze the proportion of men and women, as well as the association between gender and age, problem duration, and TMD symptoms in patients admitted to an university clinic for treatment. **Methods:** Interview and assessment data of protocols from 1,000 patients diagnosed with TMD were collected and analyzed and then divided into two groups, male (n = 177) and female (n = 823). The exploratory analysis was based on contingency tables and χ^2 test was carried out. Subsequently, the logistic regression model was used and the odds ratios (OR) concerning the evaluated comparisons were calculated. **Results:** Females were more prevalent in the sample, and mean ages and TMD duration were similar between the groups, with higher occurrence in young adults (19 to 40 years old). The OR values showed an association between the female gender and the signs/symptoms of pain in the temporomandibular joint, pain in the facial muscles, neck and shoulders, headache, fatigue in the muscles of mastication, otologic symptoms, and dysphonia. Women had two times higher chances of presenting these symptoms than men. **Conclusion:** In the sample of Brazilian patients with TMD, the number of women who presented a higher prevalence of painful symptoms was greater, followed by otologic symptoms and complaints of dysphonia. The prevalence of joint noise was similar in both studied groups.

Descritores

Transtornos da Articulação Temporomandibular
Sistema Estomatognático
Sinais e Sintomas
Diagnóstico
Mulheres
Homens

RESUMO

Introdução: Mulheres são mais susceptíveis às desordens temporomandibulares (DTM), contudo, estudos que tenham comparado os gêneros em amostras brasileiras são raros. **Objetivo:** Analisar a proporção de homens e mulheres, bem como a associação entre o gênero e as variáveis idade, duração do problema e sintomas de DTM em pacientes admitidos para tratamento em uma clínica universitária. **Métodos**: Foram coletados e analisados dados de entrevista e avaliação de mil protocolos de pacientes com diagnóstico de DTM, divididos em 2 grupos, masculino (n=177) e feminino (n=823). Foi realizada a análise exploratória a partir de tabelas de contingência e teste do χ^2. Posteriormente, foi utilizado o modelo de regressão logística e calculadas as *odds ratio* brutas (OR) referentes às comparações avaliadas. **Resultados:** Na amostra prevaleceu o gênero feminino e as médias de idade e de duração da DTM foram semelhantes entre os grupos, predominando a faixa etária de adultos jovens (19 a 40 anos). Os valores de OR evidenciaram associação entre o gênero feminino e os sinais/sintomas dor na articulação temporomandibular (ATM), dor nos músculos faciais, pescoço e ombros, cefaleia, fadiga nos músculos mastigatórios, sintoma otológico e disfonia, tendo sido a chance das mulheres os apresentassem duas vezes maior do que os homens. **Conclusão:** Na amostra de pacientes brasileiros com DTM foi maior o número de mulheres e essas apresentaram maior prevalência de sintomas dolorosos, seguidos pelos otológicos e queixas de disfonia. A prevalência de ruído articular foi semelhante nos grupos estudados.

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INTRODUCTION

The second most common kind of orofacial pain found are the temporomandibular disorders (TMD), with an estimated prevalence between 3 and 15% of the population[1]. The TMD are recognized by the American Academy of Orofacial Pain as a group of musculoskeletal and neuromuscular conditions that involve the temporomandibular joints (TMJ), the muscles of mastication, and the associated tissues, whose signs and symptoms are varied and might include difficulties in mastication, speaking, and other orofacial functions[2].

Studies with different population samples have described and tried to understand the complex symptomatology that is involved in the TMD by approaching the relations between symptomatology, gender, and age of the patients[3–7].

Evidence from the previous year indicates substantial differences of gender in the clinical and experimental responses of pain[6]. Women showed higher prevalence of painful conditions than men[6,8], including both orofacial pain and other TMD symptoms, with proportions varying from two to six women for each man, usually with ages between 20 and 40 years[1,9–12].

The distribution of age and gender in orofacial pain cases, especially TMD, suggests a possible link between its pathogenesis and the female sexual hormone, the estrogen[11,13], or between TMD and the mechanisms of pain modulation, as women show more sensitivity to most of the pain modalities[4,6,8,14].

Besides these physiological differences, it is important to notice the psychological or behavioral factor involved in it, which can be attributed to the large amount of women seeking treatment both to TMD or other painful conditions[11]. However, these factors might interact to some extent in the determination of difference prevalence between the genders.

It is important to consider that, many times, the differences between men and women are presented as secondary data in studies that were not initially planned to investigate the distribution of symptomatology between genders, which is reported only as a part of sociodemographic descriptions[7,9,10].

Understanding the manifestation of some signs and symptoms of TMD regarding gender incites more reflections on this matter and provides other perspectives to establish more adjusted and directed therapeutics.

Therefore, as TMD has a relevant prevalence and the analysis of health problems in different populations contributes, at least in some part, to its comprehension and solution, the objective of the study was to describe the proportion of men and women who seek TMD treatment. In addition, the way signs and symptoms are distributed between the two genders was investigated, and the association between gender and age, problem duration, and TMD symptoms was verified.

METHODS

This is an analytical retrospective study whose project was approved by the Research Ethics Committee of the institution (Process number 2006.1.933.58.6.). All clinical records included a consent form signed by the patients, ensuring the use of their evaluation and treatment data in this research.

Sample selection

A total of 1,000 protocols of detailed dentistry interview and evaluation were chosen from 1,500 database records of patients who sought care in *Clínica de Dor Orofacial e DTM* [Orofacial Pain and TMD Clinic] of the School of Dentistry of Ribeirão Preto, during 15 years of practice (from 1989 to 2005), before changing its operation system. Patients were sent to perform specific tests after being examined in the screening area of the school, where they arrived through indications from medical centers or even from specific health professionals of the city and of several regions in the states of São Paulo and Minas Gerais. Patients were admitted to TMD treatment if they presented TMD signs and symptoms at clinical exam[3].

Of the 1,000 analyzed records, 177 (17.7%) patients were men and 823 (82.3%) were women. The sample selection was conducted through convenience, that is, considering only the protocols that had been completely filled out, without obliterations, and signed by the responsible professor.

The exclusion criteria comprised incomplete protocols, without proper completion, showing obliterations, or lack of signature from the professional in charge. Protocols of patients who had central or peripheral neurological disorders, heart diseases, surgery, and/or tumor history, or head and neck trauma, besides pregnant women and subjects using analgesics, anti-inflammatory, or psychotropic drugs, occlusal splint, or those who had been submitted to any other kind of TMD treatment before the initial evaluation, were also excluded.

Interview and clinical exam

According to the routine of the Orofacial Pain and TMD Clinic of the institution, the subjects were interviewed by dentistry students, supervised by three teachers and two specialized technicians with degree in Dentistry and Speech Language Pathology and Audiology regarding the complaints that made them seek treatment. They also answered a questionnaire about the signs and symptoms of TMD, with positive or negative answers, which were registered in their records. The questions were developed for each symptom or sign (joint noise) as follows:

- Do you frequently feel…?: (Neck and shoulder pain, headache [migraine], fatigue in the muscles of mastication, pain in the facial [masticatory] muscles; earache, ear fullness;, tinnitus or noise inside the ear, difficulty in opening the mouth, difficulty in closing the mouth, difficulty in chewing, difficulty in yawning [functional difficulties]);
- Do you frequently notice…?: (Noise [click, noise of crackling, or some other noise] in the TMJ, teeth sensitivity, you cannot completely open your mouth [limited mouth opening], your voice is hoarse or has some kind of alteration).

The questions were detailed or the location was indicated, like the muscles of mastication, or the TMJs, whenever it was necessary. The investigated signs and symptoms are found in Table 1.

The dentistry clinical exam consisted of the evaluation of excursive jaw movements, palpation of the mandibular

and cervical muscles, and analysis of the static and dynamic occlusion[3].

TMD was diagnosed when the subjects reported TMD symptoms during the clinical exam, and when they presented three or more manifestations, such as pain in the muscles of mastication and in the TMJs during the mandibular function, when touching structures, limitation or deviations of the mandibular movements, TMJ noise, and abnormal static or dynamic occlusal relation[3].

Subjects were divided into two groups according to gender: male group and female group. The proportion of men and women in the sample was determined and then the comparison between the groups was done, considering the information in the medical records regarding age and TMD duration until the first day of appointment, as well as concerning the presence of the reported symptoms during anamnesis.

Statistical Analysis

All statistical analyses were performed through the Software SAS, version 9.0. The χ^2 test and the odds ratio (OR) were applied to analyze the differences between men and women. Thus, for all the binary variables, data were analyzed in contingence tables and through logistic regression analysis. The two proportion test was applied to analyze if there was prevalence of any age range. The level of significance adopted was 5% ($p < 0.05$) for all analyses.

RESULTS

Of the 1,000 patients whose records were analyzed, 177 (17.7%) were men and 823 (82.3%) were women. A proportion of 4.6 women for each man was found. The age varied between 12 and 83 years, and the mean was 33.04 years with a standard deviation of 13.86 years for the male group and between 11 and 77 years (33.26±12.73 years) for the female group. There was a predominance of young adults (59.9%) in the sample compared to the sum of other age ranges (40.1%) ($p<0.001$). There was no association between age and gender (Table 2).

The duration of symptoms varied from 1 to 276 months for the male group (58.38±63.83 months) and from 1 to 468 months for the female group (58.60±59.89 months).

In general, women reported symptoms more frequently as compared to men. The OR values indicated that the following symptoms were statistically associated with the female gender: pain in the TMJ, pain in the facial muscles, pain in the neck and shoulder region, headache, fatigue in the muscles of mastication, teeth sensitivity, at least one otologic symptom (e.g., otalgia, tinnitus, ear fullness sensation), and dysphonia. The joint noise presented similar occurrence frequencies (%) in both genders (Table 1).

DISCUSSION

In this study, which analysed 1,000 records of Brazilian patients with TMD, the mean age were similar between the female and male groups, prevailing the young adult subjects (19 to 40 years old). Women had approximately two or more chances of developing painful symptoms and dysphonia complaints than men, but they had similar chances of presenting joint noise as compared with men.

Results confirmed the previous findings regarding the proportion of women and men, the mean age, and the mean of problem duration in several samples[3,7,9,10,12].

It has been discussed that, in general, age seems to be a variable with more influence on women than on men. More specifically, studies pointed out that the TMD tends to begin after puberty, and the increase in the severity of signs and symptoms generally reaches its peak during the reproductive age, with higher prevalence in women aged 20 to 40 years[11].

Table 1. Absolute frequencies, percentages, and odds ratio of the symptoms related to temporomandibular disorder in the female and male groups

Symptom	Female (n=823)		Male (n=177)		p-value	OR*	95% CI*
	n	%	n	%			
Neck and shoulder pain	468	57	56	32	<0.01	2.85	2.02–4.02
Facial muscles pain	667	81	115	65	<0.01	2.31	1.62–3.29
Dysphonia	114	14	12	7	0.01	2.21	1.19–4.10
Otologic symptoms (at least one)	497	60	75	42	<0.01	2.07	1.49–2.88
Headache	453	55	68	38	<0.01	1.96	1.41–2.74
Teeth sensitivity	376	46	54	31	<0.01	1.92	1.35–2.71
TMJ pain	611	74	107	60	<0.01	1.89	1.34–2.65
Fatigue in the muscles of mastication	454	55	72	41	<0.01	1.79	1.29–2.50
Functional difficulties	255	31	43	24	0.08	1.40	0.96–2.03
Joint noise	561	68	119	67	0.81	1.04	0.74–1.48
Limited mouth opening	196	24	45	25	0.15	0.92	0.63–1.33

*OR and 95% CI refer to the female group as a reference category; p-value indicates the OR level of significance (χ^2 test).

Caption: TMJ = temporomandibular joint; OR = odds ratio; 95% CI = 95% confidence interval

Table 2. Absolute frequencies and percentages of the groups based on age and analysis of the association between age ranges and genders

Age range	Female (n=823)		Male (n=177)		χ^2	p-value
	n	%	n	%		
Adolescents (11 to 18 years old)	98	80	24	20	3.26	0.35
Young adults (19 to 40 years old)	493	82	106	18		
Adults (41 to 64 years old)	208	84	38	16		
Elderly (above 65 years old)	24	73	9	27		

p-value: probability in the χ^2 test. $p>0.05$ nonsignificant.

The fact that women showed more chances of having the majority of the investigated symptoms is consistent with previous findings[7]. Also, most of them are related to pain, which suggests a differentiated activation of the endogenous analgesia system of men and women[5] and in the central processing of nociceptive stimuli[5,15]. Studies using neuroimaging reveal activation of the common cortical and subcortical regions in men and women, as well as activation of the gender-specific regions as a brain response to painful stimuli. In general, men show higher activation of the cognitive areas, central sympathetic area, and inhibition of the limbic region, whereas women present higher activation of the affective and autonomic regions[6,16].

Sexual hormones, especially estrogen, perform an important role in the painful sensitivity, even in the muscles of mastication and TMD pathogenesis, and the pain threshold, and its tolerance varies according to the menstrual cycle phase[4,5,8,17].

As estrogen is a risk factor for TMD and other craniofacial pain conditions, studies with animals and humans have showed that it can have a peripheral and central action in pain modulation[14]. They have also showed that sexual hormones and estrogen receptors regulate the sensitivity of the trigeminal neurons or that they have some influence on the pain trigeminal pathways (or in the spinal trigeminal nucleus)[18-20].

There is also evidence that the estrogen levels might act not only on metabolism, but also on the development and restitution of TMJ and associated structures, such as bones, cartilages, and joint disk, and they can influence the synthesis of collagen and elastin (which constitute the structure of the joint disk)[11]. Despite the potential of the estrogen to modulate multiple biological processes in the TMJ region, including inflammation, metalloproteinase activity, and pain modulation, none of these processes can fully explain the TMD predilection for the female gender, which suggests that other dependent mechanisms are also involved[21].

In addition, headache is a common complaint by many TMD patients, and it can be associated with pain in the muscles of mastication and TMJ, besides being more frequent in women[1,22]. Another interesting aspect is that women with headache present higher chances of experiencing painful TMD (both myogenic and arthrogenic) compared with women who did not suffer from headache[23].

Among the signs and symptoms with female gender prevalence, dysphonia deserves special attention because the vocal quality is also a factor that is strongly influenced by the hormonal variations throughout life, especially in women, because it shows more variations when important hormonal fluctuations happen[24,25]. In this sample, women showed 2.21 times more chances of presenting dysphonia complaint than men. However, in a previous study, dysphonic women did not present more pain in the muscles of mastication than the control group[26]. Furthermore, dysphonia in TMD patients might be due to the limited amplitude of the mandibular movements during speech production, with a consequent change in the resonance and compensatory adjustments[27].

In this study, joint noise, which might indicate dislocation of the joint disk or alterations in the TMJ form, was seen in both genders with the same frequency, as previously verified[12].

The long duration of TMD symptomatology verified in this sample is also an aspect to be considered, because signs and symptoms such as muscle pain, TMJ pain, and joint noise, are not only TMD manifestations, but they can also worsen with time, due to the need of adaptations or compensations that involve the musculature and stomatognathic functions[28]. The TMD average duration was similar between the male and female groups and no statistical difference was found between them for functional difficulties (difficulty to chew, swallow, and speak) or limitation of the mouth opening. Nevertheless, in both groups, these complaints had a prevalence of >24% and might have a relevant meaning for health and quality of life, because they are often expressed only when there are great functional limitations and discomfort. On the other hand, the exam of orofacial functions reveals not only high prevalence of orofacial myofunctional disorders in TMD patients[28], but also a high degree of compromise of the mastication and swallowing functions[29,30].

Further controlled studies involving the comparison between men and women, with TMD and healthy, regarding orofacial myofunctional conditions, is important to understand how they are presented as to gender, so one can act, if necessary, in a targeted and efficient manner.

By assuming that women are more susceptible to pain and a certain level of pain is necessary so that a person can seek medical care, we assume that in part, the differences in the prevalence between men and women might be due to painful sensitivity[12], especially in studies like this one, which was carried out in a university clinical center, where patients sought treatment.

However, in the analysis of any disease or dysfunction that shows some predilection for a gender, it is important to notice three possible casual factors, the biological and physiological differences, the behavioral factors, and genetic heritage[11]. Also, the age of subjects might interact with the other factors.

This study carried out with a sample of Brazilian patients presents the evidence of different prevalence and manifestations of TMD signs and symptoms between men and women. Furthermore, future studies should analyze the responses to treatment according to gender.

CONCLUSION

There was prevalence of the female gender among the patients who sought TMD treatment in a university clinical center, in a proportion of 4.6:1. The female group presented about two times higher chances of presenting symptoms related to pain (neck and shoulder pain, facial muscle pain, pain in the TMJs, and headache) and to the voice than the male gender, whereas the frequency of reports of joint noise, functional difficulties, and limited mouth opening was similar between the studied groups. There was no gender association with the problem duration or age.

**CLPR developed and outlined the study, chose the interview/assessment protocols of patients, did data processing and analysis, and wrote the text; MAMRS developed and outlined the study, collected data, chose the patients' interview/assessment protocols, and reviewed and approved the text; and CMF developed and outlined the study, analyzed and interpreted data, and reviewed and approved the text.*

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