ORIGINAL ARTICLE

Temporomandibular disorder in adults: retrospective study

Disfunção temporomandibular em adultos: estudo retrospectivo

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ABSTRACT

BACKGROUND AND OBJECTIVES: The temporomandibular disorder (TMD) comprises clinical signs and symptoms involving masticatory muscles, the temporomandibular joint (TMJ) and associated structures, does not affect all people equally, and all individuals are not equally susceptible to it. The aim of this study was to investigate signs and symptoms present in individuals with TMD.
METHODS: Cross-sectional study with 471 individuals with TMD, 394 women and 77 men, based on data from clinical records, diagnostic exams and treatment of patients seen at the Federal University of Pelotas, Brazil, from 2000 to 2017.
RESULTS: Data showed that 84% of the individuals were women. The most prevalent age group was 20-39 years old (45%, p<0.01). The most reported main complaints were TMJ pain (29.9%, p<0.01) for both genders, and facial pain (18%, p<0.01). The most common signs and symptoms were muscle pain, TMJ pain, facial pain and clicks in women and parafunctional habits in men, followed by limited mouth opening and tension headache. Dentate patients were the majority in the study (58%, p<0.01), followed by partial edentates (30%, p<0.01).
CONCLUSION: The data found showed a high prevalence of TMD and the importance of its prevention in order to improve the health and well-being of the population.
Keywords: Facial pain, Temporomandibular joint, Temporomandibular joint disorder syndrome.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A disfunção temporomandibular (DTM) apresenta sinais clínicos e sintomas envolvendo músculos mastigadores, articulação temporomandibular (ATM) e estruturas associadas, não incide igualitariamente em todas as pessoas e todos os indivíduos não são igualmente suscetíveis a mesma. O objetivo deste estudo foi investigar sinais e sintomas presentes em indivíduos com DTM.
MÉTODOS: Estudo transversal retrospectivo em 471 indivíduos portadores de DTM, 394 mulheres e 77 homens, a partir de dados obtidos de fichas clínicas, exames de diagnóstico e tratamento de pacientes atendidos na Universidade Federal de Pelotas, no período de 2000 a 2017.
RESULTADOS: Dados mostraram que 84% dos indivíduos foram mulheres. A faixa etária mais prevalente foi dos 20-39 anos (45%, p<0,01). As queixas principais relatadas foram dor na ATM (29,9%, p<0,01) para ambos os sexos e dor facial (18%, p<0,01). Os sinais e sintomas mais presentes foram dor muscular, dor na ATM, dor facial e estalidos em mulheres e hábitos parafuncionais em homens, seguidos por limitação de abertura bucal e cefaleia tensional. A maioria dos pacientes eram dentados (58%, p<0,01), seguidos pelos edentados parciais (30%, p<0,01).
CONCLUSÃO: Os dados encontrados evidenciaram elevada prevalência da DTM e a importância da sua prevenção com o objetivo de melhorar a saúde e o bem-estar da população.
Descritores: Articulação temporomandibular, Dor facial, Síndrome da disfunção da articulação temporomandibular.

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INTRODUCTION

The temporomandibular joint (TMJ) is considered the most complex joint in the human body because it allows rotational and translational movements due to the double articulation of the condyle, where any movement performed on one side effects the opposite. For the TMJ to function properly, the joint, dental occlusion and neuromuscular balance should be harmonious[1].
The temporomandibular disorder (TMD) encompasses a wide range of alterations of the TMJ, head and neck muscle, and surrounding tissues[2,3]. It's considered a division of musculoskeletal and rheumatologic disorders and an important causative factor of non-dental pain of the stomatognathic system. TMD consists of clinical signs and symptoms involving the masticatory muscles, TMJ and associated structures. There is a consensus that there is no specific etiological factor for TMD. It presents diverse and multifactorial characteristics, which include traumatic fac-

tors, degenerative problems, harmful habits, abnormal position of the condyle and articular disk, excessive activity of the masticatory muscles and psychosocial and psychological variables of occlusal alterations[4-6]. TMD is also linked to psychological factors such as stress, depression and anxiety[7-12].

Currently, individuals are not equally susceptible to TMD. Women represent the majority of patients seeking treatment[11,13-16], with more severe conditions, along with school-age adolescents, suggesting that genetic and epigenetic factors also contribute to temporomandibular dysfunction[17-19].

The occurrence of this type of dysfunction has increased considerably, and the estimate is that 50 to 75% of the population exhibit at least one sign and 25% have associated symptoms, and these values may be higher according to the type of study and studied population[2]. The main signs and symptoms are intra-articular pain, muscle spasms, intra-articular pain combined with muscle spasms, reflex pain, pain when opening and closing the jaw, irradiated pain in the temporal, masseteric or infraorbital area, crepitus, ear pain or tinnitus, irradiated neck pain, chronic headache, ear fullness, among others[1,20-22]. Functional occlusal alterations may or not be present[4,5,23].

TMD[24] has a severe impact on patients' quality of life, impairing work activities (59.09%), school (59.09%), sleep (68.18%), as well as appetite and eating habits (63.64%). In addition, the condition tends to worsen with time[25].

There is a need for deeper knowledge about the signs and symptoms of TMD, enabling health professionals in possession of these data to collaborate in better understanding how common this disease is in the population[26]. Therefore, the present study conducted a survey of signs and symptoms present in patients seen in an extension project clinic of the Federal University of Pelotas' School of Dentistry (FO-UFPEL).

METHODS

Data from medical records of patients with TMD seen at the FO-UFPEL in standardized clinical records was collected, adapted from the Fonseca Anamnesis Index[27], filled by extension members, and supervised by their General Coordinator, as well as clinical examinations following the method recommended by Okeson[28].

The selection of medical records was done by intentional sampling, and those whose dental history and evaluation protocols were complete and filled out, with no erasures, and signed by the responsible professor were chosen. Intentional sampling is indicated because it facilitates the collection of essential data. From the anamnesis protocol and dental clinical examination, performed during the initial consultation, data that correlated gender and age and the presence of TMD signs and symptoms was collected, as well as the main complaint present in genders, painful signs and symptoms present, and the presence or absence of teeth.

The following data was also collected: gender, age, duration of TMD symptoms up to the time of attendance, spontaneously reported complaints, symptoms for which patients responded affirmatively in the initial interview, and clinical signs/symptoms detected in the dental examination. The diagnosis of bruxism was based on the patient's report, anamnesis, and presence of cracks, fractures, and marked tooth wear, presence of symptoms of pain or muscle sensitivity upon awakening, report of teeth grinding during sleep, and self-perception of daytime clenching.

Statistical analysis

All data in this study was tabulated and organized in a spreadsheet and then submitted to statistical analysis using the Biostat 5.0 (Windows version) and GMC (2002) software. Initially, only descriptive statistics were used; however, due to the presence of nominal variables, a comparative analysis was made using the Chi-square test for independent samples.

RESULTS

The data collection indicated that, from 471 valid analyzed clinical records, 394 women and 77 men sought care at the FO-UFPEL Clinic from 2000 to 2017.

Regarding age, a distribution was made in four groups, for both genders: zero to 19; 20 to 39; 40 to 59 and over 60 years old, with statistical significance at the 1% level (p<0.01). There was no difference between the lowest and highest age group studied (p>0.05), which had the lowest prevalence in the study, differing statistically from the other age groups (p<0.01). There was a higher prevalence in the 20 to 39 age group, which differed in relation to the others, including the following age group (p<0.01). Regarding the difference between genders, the Chi-square and Pearson's correlation tests presented no statistical significance (p>0.05); they also showed no correlation (r=0.923) in relation to gender and the different age groups.

As for the main complaint reported by patients, the results were: TMJ pain, facial pain, otalgia, bruxism, mandibular pain, tension headache, joint noise, trismus, mouth opening limitation, odontalgia and cervical pain (neck pain). The data regarding type and absolute and relative frequency are shown in table 1.

Table 1. Main complaint reported by individuals of both genders

(p<0,01)	Genders		
	Men	Women	Total
Main complaint			
Mandibular pain	5 (6.5%)	38 (9.6%)	43 (9.1%)
Tension headache	6 (7.8%)	36 (9.1%)	42 (8.9%)
TMJ pain	21 (27.3%)	120 (30.5%)	141 (29.9%)
Otalgia	1 (1.3%)	44 (11.2%)	45 (9.6%)
Facial pain	8 (10.4%)	77 (19.5%)	85 (18.0%)
Mouth opening	1 (1.3%)	14 (3.6%)	15 (3.2%)
TMJ noise	6 (7.8%)	18 (4.6%)	24 (5.1%)
Bruxism	22 (28.6%)	21 (5.3%)	44 (9.3%)
Cervical pain	2 (2.6%)	1 (0.3%)	3 (0.6%)
Odontalgia	6 (7.8%)	5 (1.3%)	11 (2.3%)
Trismus	2 (2.6%)	20 (5.1%)	22 (4.7%)

TMJ = temporomandibular joint.

The Pearson's Chi-square test was performed for the absolute frequencies of the main complaint, regardless of gender. The results showed statistical significance at the 1% level (p<0.01) (Table 2).

Table 2. Main complaint for both genders

Main complaint	Cases
TMJ pain	141 (29.9%)
Facial pain	85 (18.0%)
Otalgia	45 (9.6%)
Bruxism	43 (9.3%)
Mandibular pain	43 (9.1%)
Tension headache	42 (8.9%)
TMJ noise	23 (5.1%)
Trismus	22 (4.7%)
Mouth opening	15 (3.2%)
Odontalgia	10 (2.3%)
Cervical pain	2 (0.6%)

TMJ = temporomandibular joint.

The main complaint, TMJ pain, was the most prevalent and the one which Pearson's x^2 test showed a significant difference in relation to the others (p<0.001). Facial pain was the second most reported complaint and differed from the other less prevalent complaints (p<0.01). Mandibular pain, tension headache, otalgia and bruxism were similarly reported (p>0.05) but differed from those of lower prevalence (p<0.01). Odontalgia and cervical pain were the least reported complaints and differed from each other (p<0.05). Pearson's 2 X 2 Chi-square test analysis (Table 2) showed that TMJ pain was the most reported complaint by both genders, with no significant difference between them (p>0.05), the same occurred with the complaint of facial pain (p>0.05).

However, bruxism and odontalgia were the most frequent complaints among men (p<0.01), while otalgia (p<0.05) was more common among women. Facial pain did not differ statistically between genders (p>0.05). For the reports of mandibular pain, tension headache, mouth opening limitation, neck pain, and trismus, due to the small number of samples, Williams' G-test was used; there was no statistical difference comparing men versus women (p>0.05). Pearson's Chi-square test, regarding the reports of mouth opening and neck pain, showed similar results (p>0.05).

The data on signs and symptoms found in the population can be seen in tables 3 and 4 and compared by Pearson's chi-square, presenting statistical significance.

The most frequent signs and symptoms were muscle pain, TMJ pain, facial pain and clicking; their frequencies did not differ (p>0.05). The frequency of parafunctional habits did not differ from TMJ pain, facial pain, clicking and bruxism (p>0.05). Mouth opening limitation, tension headache, and occlusal interference also did not differ (p>0.05), although the latter was similar to the frequency of otalgia (p>0.05). Signs and symptoms that appeared with similar frequency were otalgia, stress, wear facets, facial edema/asymmetry, odontalgia and neck pain (p>0.05).

Table 3. Distribution of absolute and relative frequencies of signs and symptoms

	Genders	
(p<0,01)	Men	Women
Signs and symptoms		
Odontalgia	26 (33.8%)	113 (28.7%)
Tinnitus	16 (20.8%)	93 (23.6%)
Orbit	9 (11.7%)	73 (18.5%)
Cervical	18 (23.4%)	119 (30.2%)
Tension headache	21 (27.3%)	180 (45.7%)
Facial pain	28 (36.4%)	252 (64.0%)
Asymmetry	22 (28.6%)	121 (30.7%)
Drugs	19 (24.7%)	194 (49.2%)
Facets	43 (55.8%)	103 (26.1%)
Muscle pain	46 (59.7%)	258 (65.5%)
Stress	22 (28.6%)	129 (32.7%)
Parafunctional habit	54 (70.1%)	202 (51.3%)
Bruxism	49 (63.6%)	188 (47.7%)
Mouth opening	27 (35.1%)	188 (47.7%)
Clicks	30 (39.0%)	237 (60.2%)
Crepitus	7 (9.1%)	42 (10.7%)
TMJ pain	36 (46.8%)	247 (62.7%)
Interferences	33 (42.9%)	161 (40.9%)
Ear	14 (18.2%)	156 (39.6%)

TMJ = temporomandibular joint.

Table 4. Distribution in order of relative and absolute frequencies of the signs and symptoms observed regardless of gender, reported or not as the main complaint

Signs and symptoms	Yes	No
Muscle pain	304 (64.5%)	167
TMJ pain	283 (60.1%)	188
Facial pain	280 (59.4%)	191
Clicks	267 (56.7%)	204
Parafunctional habits	256 (54.4%)	215
Bruxism	237 (50.3%)	234
Mouth opening	215 (45.6%)	256
Tension headache	201 (42.7%)	270
Guides/interferences	194 (41.2%)	277
Otalgia	170 (36.1%)	301
Stress	151 (32.1%)	320
Facets	146 (31.0%)	325
Edema/asymmetry	143 (30.4%)	328
Odontalgia	139 (29.5%)	332
Cervical pain	137 (29.1%)	334
Tinnitus	109 (23.1%)	362
Orbit	82 (17.4%)	389
Crepitus	49 (10.4%)	422

TMJ = temporomandibular joint.

The lowest frequencies found were for tinnitus, pain in the eyes and crepitus, which differed in relation to the others and among themselves (p<0.01).

When comparing genders, Pearson's Chi-square test analysis (Table 4) showed that parafunctional habits, wear facets (p<0.01) and bruxism (p<0.05) were more frequent in men. TMJ pain (p<0.05), facial pain, clicking, tension headache, and otalgia (p<0.01) were more frequent in women. There was no difference among other signs and symptoms (p>0.05).

As for the presence of teeth in the population seen at the extension project (Table 5), Pearson's Chi-square test for absolute frequencies, regardless of gender, presented statistical significance at the 1% level (p<0.01). The highest frequency was of individuals in the dentate group (n=274), which differed in relation to the second highest frequency (p<0.01), that of individuals in the partial edentate group (n=142). The lowest frequencies, which differed from the two highest (p<0.01), were the fully edentate group and the partially edentate and unimaxillary group, although their frequencies were statistically similar to each other (p>0.05).

Table 5. Absolute and relative frequency according to dental presence

| | Types of dental arch | | | |
	Dentate	Partially edentate	Fully edentate	Unimaxillary and partial
Gender				
Men	56 (73%)	13 (17%)	5 (6%)	3 (4%)
Women	218 (55%)	129 (33%)	23 (6%)	24 (6%)
Total	274 (58%)	142 (30%)	28 (6%)	27 (6%)

Comparing the dental presence between the genders, from the analysis of Pearson's 2 X 2 Chi-square test on the absolute frequencies shown in Table 5, there was a statistically significant difference (p<0.01) in dentate individuals between the genders, in which more dentate men were found than women. On the other hand, in the group of partially edentate individuals, there was a higher frequency in women (p<0.01). There was no statistically significant difference between genders in the fully edentate group and in the individuals of the partially edentate and unimaxillary groups (p>0.05).

DISCUSSION

This study showed that most of the patients were women in a five times higher proportion. This finding is in accordance with the literature[11,13-16,21,29-34], which cites causal factors for this phenomenon, such as hormonal[13], sociocultural, among others. Female gender hormones would also play an important role in the development of TMD in women, which would explain the peak of dysfunctions at the fertile age[13], besides, according to authors, it's typical for women to seek treatment more frequently[14,25], which would explain their higher proportion. In research that studied individuals at random and not only in symptomatic groups, there was a higher prevalence of women than men with TMD[7,18,23,29,30]. However, searching for the etiological factors was not an objective of the present work, limited by the initial cli-

nical records studied, but rather to unveil new information and confirm or deny other studies' findings.

Regarding age, results showed that there is a differential, with a higher prevalence of individuals affected by TMD in the 20 to 39 age group, in accordance with the literature retrospective[13,14,21,35], although contradicting the study[17] in relation to women. As a differential, no difference was found in gender regarding all age groups studied. Authors[13] mention the particularity that the most affected age group coincides with the individuals' full fertility phase, so perhaps the hormonal factor is relevant in this aspect. However, the percentage of individuals between 40 and 59 years old who sought care was also relevant, partly contradicting the study[13].

The main complaint has considerable relevance, since it's the factor that makes the individual seek treatment. In the present study, in accordance with previous studies[8,18,20,36], the results showed that TMJ pain, facial pain, otalgia, bruxism, mandibular pain, tension headache, joint noise, trismus, mouth opening limitation, odontalgia and neck pain were the most frequent complaints. TMJ pain was the most prevalent among individuals, followed by facial pain, both similarly between genders. However, to a lesser extent than those, but still important, mandibular pain, tension headache, otalgia and bruxism were similarly mentioned. To a lesser extent, odontalgia and neck pain were also reported.

It's interesting that bruxism and odontalgia were found to be the most frequent complaints among men, which is in accordance with several studies that indicate that bruxism is more prevalent in men[21,32,37,38], although some studies claim the opposite[39-42] or indicate a similarity between genders[7,15,43,44], that is, this issue is controversial in the literature. The description of otalgia was more reported by women than by men. Complaints related to mandibular pain, headache, mouth opening limitation, cervical pain and trismus, although important, were rarely mentioned by the patients.

The survey of signs and symptoms showed greater presence of muscle pain, TMJ pain, facial pain and clicking. To a lesser extent, parafunctional habits, TMJ pain, facial pain, clicking and bruxism were found. In order, the frequency of mouth opening limitation, tension headache and occlusal interferences were observed in the clinical records. To a lesser degree, and similarly, conditions of otalgia, stress, wear facets, facial edema/asymmetry, odontalgia and neck pain were reported. The lowest frequencies found were tinnitus, pain in the eyes and crepitus. These findings have particularities regarding the prevalence found, but in agreement with the typical signs and symptoms found in individuals with TMD[39,45], showing the complexity of factors involved in the appearance of signs and symptoms in individuals with TMD. Therefore, comparing findings between different studies is greatly difficult in part due to the great variation in methodology used, as well as the variability in location, type and size of studied samples[46]. It was relevant to find that parafunctional habits, wear facets and bruxism were more frequent in men than in women, which was opposite to some authors' findings[21,32,40], and in accordance with the other findings in the literature[42,43]. Also in agreement with previous studies are the findings that TMJ pain, facial pain, clicking, tension headache and otalgia were more frequent in women[21,46,47].

Regarding the presence or absence of teeth in the population, in agreement with studies[40], a higher frequency of dentate individuals with some type of alteration or disorder was found, which would indicate that the total or partial absence of teeth could not be pointed as a predisposing factor for the occurrence of TMD, contrary to studies[4,19,32].

Nevertheless, the frequency of partially edentate individuals was significant. This finding may be explained by the fact that the most frequent age range with alterations was between 20 and 39 years old, in which it's assumed that dentate and partially edentate individuals are in good numbers. However, this assumption needs further study.

Another important finding was that there was a higher frequency of dentate men than women, while in the partially edentate individuals the numbers were the opposite. In this case, would dental absences be an important predisposing factor for the higher frequency of dysfunctions in women? This theory doesn't explain the fact that there was no difference between genders when the arches were fully edentate, although unlike other studies, the functional state of the prostheses used by patients was not analyzed, as in researches[5] that found an association between poor prosthetic conditions and TMD. On the other hand, there is already evidence that occlusion, which could be affected by poor or absent prosthetic conditions, would have no specific role in TMD[6].

The conditions of patients affected by changes or dysfunctions in the stomatognathic system, in this case TMD, are complex and multifactorial[1,13,28,48]. There is no consensus in the literature on the etiological factors. Also, to uncover these factors was not the purpose of this study, but rather to present a local scenario of the characteristics present in patients who sought help at the FO-U-FPEL due to parafunctions and/or TMD. The objective is that this information helps to better understand the particularities of patients with these disorders.

CONCLUSION

TMD was more prevalent in women and in the 20 to 39 age group. The prevalence of signs and symptoms in men were bruxism, parafunctional habits and wearing facets. Women had a higher frequency of painful symptoms and joint noises. Occasional pain was the most frequent in both genders. Dentate patients were more affected by TMD. The data found showed the importance of TMD prevention to improve health and well-being.

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, Supervision, Validation, Visualization
Renato de Andrade Waldemarin
Statistical Analysis, Data Collection, Conceptualization, Visualization
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Statistical Analysis, Conceptualization

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