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Treatment of Temporomandibular Disorder and Orofacial Pain in Unified Health System in Brazil

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Abstract

Objective: To evaluate the severity of pain in patients treated in the specialized care network for temporomandibular disorders-related orofacial pain of Unified Health System (SUS) in the city of Belo Horizonte, Brazil, and characterize orofacial pain based on the user profile, clinical aspects, and treatments performed.

Material and Methods: Research Diagnostic Criteria for Temporomandibular Disorders of patients were evaluated at the Dental Specialty Center of Venda Nova region. Demographic data and clinical variables were collected. Descriptive and bivariate analyses were performed using the chi-square ($P < 0.05$) and Kruskal-Wallis tests.

Results: The sample consisted of 169 users, 132 (78.1%) females, with a mean age of 43 (± 15.2) years. The most common reasons for referral were pain (40.5%), followed by bruxism (25.6%) and temporomandibular joint disorders (24.4%). One hundred twenty-one (71.6%) participants reported pain, of which 46.2% had mild/moderate pain and 25.4% had severe pain. The most frequently reported diagnosis was disc displacement with reduction (DDR) (30.2%) followed by bruxism (24.9%). The most indicated treatment was cognitive behavioral therapy (95.3%) followed by an intra-occlusal splint (IOS) (54.4%).

Conclusion: According to the results, women had a higher prevalence of pain, but no association was found between comorbidities, age, and social vulnerability index.

Keywords: Temporomandibular Disorders; Orofacial Pain; Myofascial Pain; Dental Articulators

Abbreviations

TMD: Temporomandibular Disorders; OFP: Orofacial Pain; PHC: Primary Health Care; TMD-OFP: Temporomandibular Disorders-Related Orofacial Pain; CBT: Cognitive Behavioral Therapy; DN: Dry Needling; IOS: Intraocclusal Splint.

Introduction

Temporomandibular disorders (TMD) are signs and symptoms that affect the temporomandibular joints, the masticatory muscles, or both [1-3]. The most common signs and symptoms are orofacial pain and joint noise [4,5]. Orofacial pain (OFP) is associated with the soft and

mineralized tissues of the oral cavity and face. It may originate in the head and neck region or be associated with other comorbidities [1,2,6,7]. The development of TMDs is multifactorial and involves a range of clinical changes with sensory, emotional, and cognitive components for which specialized and usually multidisciplinary treatment is most appropriate [7-12].

As the main symptom of TMD, orofacial pain is a multidimensional phenomenon that may or may not be associated with biological damage, diet and eating habits, and occurs as a physiological protective mechanism [13]. Pain, especially chronic pain, can lead to disability and impaired quality of life [5,14]. The prevalence of pain in general is increasing and is the primary reason for seeking medical care [15].

Chronic pain exerts an enormous personal and economic burden, affecting more than 30% of people worldwide according to some studies [16]. In this context, the patient's behavior in the face of pain must always be considered by health professionals. In Brazil, the oral health care network is organized into levels of care to ensure the principles of universality, equity, and comprehensiveness of care. Primary health care (PHC) is the gateway to the public health care and users are attended by the Family Health Teams in the Basic Health Units. Cases that need specialized care are referred to the Dental Specialty Centers (CEO), which provide care in the minimum specialty areas (I - oral diagnostics, with emphasis on the diagnosis and detection of oral cancer; II - specialized periodontics; III - minor oral surgery of soft and hard tissues; IV - endodontics; and V - care for people with special needs) and other specialties as determined by local managers. In Belo Horizonte, there is a municipal protocol that establishes the line of care for the temporomandibular disorders-related orofacial pain (TMD-OFP) in the Unified Health System (SUS-BH) network, with two CEOs who treat the users referred by the PHCs in the municipality of Belo Horizonte, Minas Gerais [17-20].

The network of dental services specialized in TMD-OFP is still small in Brazil. There are few professionals trained to provide this type of care, and even fewer working in public services. According to the Federal Council of Dentistry, there are 1460 professionals specialized in TMD/OFP in Brazil in 2021. The National Program to Improve Access and Quality (PMAQ-CEO) assessed the services offered by Brazilian CEOs. In this population, ten CEOs from the states of Minas Gerais (2), São Paulo (2), Pernambuco (1), Santa Catarina (1), Rio de Janeiro (1), Federal District (1), and Pará (1) reported that they are specialized in TMD/OFP. Given the high prevalence of TMD/OFP, it seems that there is a high unmet need for care in public services. Therefore, the characterization of morbidity can help to describe the distribution of this disease in the population and show the profile of demand and services offered in the specialized care network to guide the expansion of services and the qualification of professionals to better cover OFP cases. The objective of this study was to characterize the morbidity profile of patients cared for TMD-OFP in a Brazilian dental specialist center and the treatment performed. Also, patients were characterized in terms of their sociodemographic status, general health status, and most common diagnoses.

Materials and Methods

This cross-sectional epidemiological study comprises individuals with temporomandibular disorder and orofacial pain. The study approved by the Institutional Ethics Committee (No: 27527819.7.0000.5149) and by the Municipality of Belo Horizonte Ethics Committee (No: 27527819.7.3001.5140). The patient's identity remained anonymous in accordance with the Declaration of Helsinki. The study was conducted in the premises of the CEO of the Venda Nova region of BH/MG and included the users who were treated in the specialized care network for DTM-OFP. The center was selected for convenience and data collection was done by consulting the medical records.

All users treated during the study period whose medical records contained complete information, including the validated questionnaire for the diagnosis of TMD/OFP, called RDC/TMD (3) completely filled out were included. This instrument is not mandatory for OFP specialists to complete, but was occasionally used to diagnose TMD along with the medical history. The exclusion criteria were treatment interruption and medical records with missing data or with missing or incomplete RDC/TMD questionnaire.

Sociodemographic variables included gender, age, and the Social Vulnerability Index [21]. The SVI scores the population on five "dimensions of citizenship": environment (access to housing and basic infrastructure), culture (access to schooling), economy (access to income and employment), justice (access to legal aid), and survival (access to health, food security, and social security), and determines the population's level of vulnerability to social exclusion. The score ranges from 0 to 1. The higher the score, the more vulnerable the population is to social exclusion, categorizing the population into low, medium, high, and very high risk. The population of Belo Horizonte was categorized into 5 groups: from 0.79 to 0.64 - Group I, from 0.62 to 0.52 - Group II, from 0.49 to 0.41 - Group III, from 0.39 to 0.34 - Group IV, and from 0.30 to 0.12 - Group V.

The other variables collected were the origin of referrals to the CEO (primary care or secondary care) and the reason for seeking health care (pain, bruxism, TMD complaints,

tooth wear, otalgia, and others, such as parafunctional habits, headache, and hyperkeratosis). Regarding the health profile, the existing systemic diseases (hypertension, diabetes, neurological, respiratory, hormonal and others) and medication use were recorded. The oral condition was recorded as dentate, totally or partially edentulous.

The outcomes recorded at baseline were the presence and intensity of pain (no pain, mild, moderate, intense), the location of pain (face, temporal, parotid-masseteric, TMJ, and other, such as ear, oral mucosa, head, mandible, infraorbital), presence of pain on palpation (yes or no), muscles with pain (masseter, temporal, TMJ, externalcleidomastoid, suboccipital, or other such as pterygoid and sternohyoid), and presence of noise (yes or no).

Cases were diagnosed according to the RDC-TMD as muscle disorders, joint disorders, degenerative processes, parafunctional habits, and others such as neuropathic pain, secondary bruxism, trauma, headache, tinnitus, Eagle syndrome, developmental disorders, and dental pain. Pain intensity data were categorized as "no pain", "mild or moderate pain", and "severe pain".

Finally, treatment variables were categorized as cognitive behavioral therapy (CBT), kinesiotherapy, thermotherapy, medication, dry needling (DN), intraocclusal splint (IOS) and others, such as rehabilitation, clinical treatment or prosthesis, surgical treatment, or adjuvant treatments with referral to other related fields. Treatment duration was recorded as the months from the first consultation to the month of discharge per improvement in TMD-OFP.

Descriptive statistical analysis was performed to calculate frequency and percentage distributions. Pearson's chi-square test and post-test were used to evaluate the association between the sociodemographic variables, diagnosis, treatment, and reported pain intensity. The Kolmogorov-Smirnov test was used to examine the distribution of data for "age at the time of treatment", "treatment duration", and "SVI". The association between "reported pain intensity" and "age at the time of treatment", SVI, and "treatment period" was examined using the Kruskal-Wallis test. A significance level of 5% was used. Statistical analysis was performed using SPSS software version 21.0 (SPSS Inc., Chicago, USA).

Results

Two hundred twenty-nine medical records were identified, of which 169 (73.7%) were included. Of the participants, 132 (78.1%) were female, with a mean age of 43 (± 15.2) years at the time of the first consultation. The mean SVI of participant addresses was 0.51 (± 0.12). A primary care dentist referred most participants (94.7%), and the most common reasons for referral were pain (40.5%), followed by bruxism (25.6%) and TMJ complaint (24.4%). Most participants reported having comorbidities such as arterial hypertension, diabetes mellitus, and others (55.6%), and the most common systemic conditions were arterial hypertension (25.4%) and neurological disorders (21.3%). A total of 51.5% of participants were taking medications and 27.2% were taking a CNS medication (Table 1).

Variables	Frequency (%)
Sex	
Female	132 (78.1)
Male	37 (21.9)
Age at the time of treatment	
Mean [± SD]	43.0 [± 15.2]
Median [min-max]	42.0 [5 - 86]
Social Vulnerability Index (SVI)	
Mean [± SD]	0.51 [± 0.12]
Median [Min – Max]	0.54 [0.17 - 0.77]
SVI - categories	
0.79 to 0.64 - Group I	22 (13.2)
0.62 to 0.52 - Group II	89 (53.3)
0.49 to 0.41 - Group III	21 (12.6)
0.39 to 0.34 - Group IV	27 (16.2)

0.30 to 0.12 - Group V	08 (04.8)
Origin of referral	
Dentist in primary care	160 (94.7)
Dentist at a CEO	1 (0.6)
Physician in primary care	05 (03.0)
Physician in secondary care	1 (0.6)
Secondary care	1 (0.6)
Hospital Care	1 (0.6)
Reason for referral	
Pain	68 (40.5)
Bruxism	43 (25.6)
ATM complaint	41 (24.4)
Dental wear	06 (03.6)
Otalgia	06 (03.6)
Parafunctional habits	1 (0.6)
Headache	1 (0.6)
Hyperkeratosis	1 (0.6)
Others	1 (0.6)
Comorbidities	
Yes	94 (55.6)
No	75 (44.4)
Systemic conditions	
Systolic arterial hypertension	43 (25.4)
Neurological disorder	36 (21.3)
Hormonal disturbances	14 (08.3)
Diabetes mellitus	11 (06.5)
Respiratory disorder	10 (05.9)
Others	20 (11.8)
Use of medication	
Yes	87 (51.5)
No	82 (48.5)
Central nervous system mediator	
Yes	46 (27.2)
No	123 (72.8)
Signs and symptoms of aggravation at the beginning of treatment	
Oral condition	

Dentate	120 (71.0)
Partially edentulous	35 (20.7)
Totally edentulous	14 (08.3)
Treatment duration (months)	
Mean [±SD]	3.5 [± 2.4]
Median [Min – Max]	3.0 [1.0 - 16.0]
Pain	
No	48 (28.4)
Yes	121 (71.6)
Pain site*	
Parotid-Masseteric	70 (57.9)
Temporomandibular joint	34 (28.1)
Face	06 (05.0)
Temporal	09 (07.4)
Ear	1 (0.8)
Oral mucosa	01 (0.8)
Head	02 (01.7)
Jaw	01 (0.8)
Infraorbital	01 (0.8)
Presence of pain on palpation	
Yes	111 (65.7)
No	58 (34.3)
Muscle with pain on palpation ┼	
Masseter	95 (56.2)
Temporal	39 (23.1)
Temporomandibular joint	23 (13.6)
Suboccipital	21 (12.4)
Sternocleidomastoid	14 (07.7)
Trapezius	06 (03.6)
Pterygoid	01 (0.6)
Noise when opening mouth– right side	
Yes	66 (39.1)
No	103 (60.9)
Noise when opening mouth– left side	
Yes	66 (39.1)
No	103 (60.9)

Noise when closing mouth– right side	
Yes	66 (39.1)
No	103 (60.9)
Noise when closing mouth – left side	
Yes	66 (39.1)
No	103 (60.9)
Clicking when protruding – right side	
Yes	66 (39.1)
No	103 (60.9)
Clicking when protruding – left side	
Yes	66 (39.1)
No	103 (60.9)
Diagnosis and treatment	
Diagnosis ╪	
Muscle disorders	49 (29.0)
Joint disorders	57 (33.7)
Degenerative processes	04 (02.4)
Parafunctional habits	87 (51.5)
Others	15 (08.9)
Indicated treatment ╪	
Cognitive behavioral therapy	161 (95.3)
Intraoral splint	92 (54.4)
Kinesiotherapy	85 (50.3)
Medication	69 (40.8)
Thermotherapy	64 (37.9)
Dry needling	12 (07.1)
Adjuvant rehabilitation treatment	08 (04.7)
Adjuvant treatment - referral	03 (01.8)
Surgical treatment	01 (0.6)

SD, Standart Deviation; Min, minimum; Max, maximum.
*Frequency and percentage of individuals who reported pain (more than one pain site could be reported).
┼ Frequency and percentage of individuals who presented pain on palpation (more than one pain site could be identified).
╪ More than one diagnosis and treatment could be defined for a single individual.
Table 1: Profile of users of the Venda Nova Dental Specialty Center from 2015 to 2018 (n=169) in Belo Horizonte, Minas Gerais, Brazil.

Twenty-eight percent of subjects reported "no pain", and subjects who reported "mild", "moderate", and "severe" pain were grouped into a single "with pain" category (71.6%). Of these, 46.2% had mild/moderate pain, and

25.4% had severe pain. The most common pain sites were the parotid-masseteric region (57.9%) and TMJ (28.1%). Pain on palpation was noted in 65.7% of participants, and the muscles with the highest prevalence of pain on palpation were the masseter (56.2%), temporalis muscle (23.1%), and TMJ (13.6%). The most common diagnosis was DDR (30.2%), followed by bruxism (24.9%), clenching (23.1%), and myalgia (17.2%). The most commonly reported treatment was CBT (95.3%), followed by IOS (54.4%), kinesiotherapy (49.7%), and medication (40.8%) (Table 1).

Individuals with pain were more likely to be women (P = 0.008) (Table 2). There was no significant difference in the frequency of comorbidities between subjects with mild/moderate, severe, or no pain, and they were similar in age and lived in areas with similar SVI (P > 0.05).

Variables	Presence of pain (%)			P
	Absent	Mild / moderate	Severe	
Sex				
Women	30 (22.7)a	66 (50.0)b	36 (27.3)a,b	0.008┼
Men	18 (48.6)	12 (32.4)	07 (18.9)	
Comorbidities				
Yes	24 (25.6)	43 (45.7)	27 (28.7)	0.465┼
No	24 (32.0)	35 (46.7)	16 (21.3)	
Age at the time of treatment				
Mean [±SD]	41.7 [±15.4]	43.7 [±16.2]	43.1 [±13.3]	0.891╪
Median [Min – Max]	42.0 [5 - 74]	43.0 [15 - 86]	41.0 [15 - 75]	
Treatment duration				
Mean (±SD)	03.5 (± 02.2)	03.6 (± 02.8)	03.2 (± 02.0)	0.929╪
Median [Min – Max]	03.0 [1 - 12]	03.0 [1 - 16]	03.0 [1 - 10]	
SVI - Score				
Mean [±SD]	0.49 [±0.13]	0.53 [±0.10]	0.50 [±0.12]	0.239╪
Median [Min – Max]	0.52 [0.17 - 0.77]	0.54 [0.21 - 0.77]	0.53 [0.20 - 0.77]	
SVI - categories				
0.79 to 0.64	08 (36.4)	10 (45.5)	04 (18.2)	0.601*
0.62 to 0.52	20 (22.5)	46 (51.7)	23 (25.8)	
0.49 to 0.41	08 (38.1)	09 (42.9)	04 (19.0)	
0.39 to 0.34	09 (33.3)	10 (37.0)	08 (29.6)	
0.30 to 0.12	03 (37.5)	02 (25.0)	03 (37.5)	

SD, Standard Deviation; Min, minimum; Max, maximum.
*Fisher's exact test and post-tests.
┼ Pearson's chi -square and post-tests.
╪ Kruskal-Wallis test and post-tests.
P = Probability value.
Values in parentheses indicate percentage in the row.
Values in bold indicate statistically significant differences between groups.
Table 2: Associations between reported pain intensity and sociodemographic variables (n=169).

Table 3 shows that individuals with muscle disorders had a higher prevalence of mild/moderate and severe pain compared with individuals without pain, and a higher prevalence of severe pain compared with mild/moderate pain (P < 0.001). Participants with joint disorders were more likely to have mild/moderate and severe pain compared with participants without pain (P = 0.031). Participants with parafunctional habits had a lower prevalence of mild/moderate and severe pain compared with no pain and a lower prevalence of severe pain compared with participants with mild/moderate pain (P < 0.001). Participants with diagnoses other than muscle disorders, joint disorders, degenerative processes, and parafunctional habits had a higher prevalence of mild/moderate pain compared with no pain (P = 0.009).

Diagnosis	Reported pain intensity (%)			P
	Painless	Mild/molderate	Severe	
Muscle Disorders				
Yes	0 (0.0)a	25 (51.0)b	24 (49.0)c	< 0.001┼
No	48 (40.0)	53 (44.2)	19 (15.8)	
Joint Disorders				
Yes	09 (15.8)a	30 (52.6)b	18 (31.6)b	0.031┼
No	39 (34.8)	48 (42.9)	25 (22.3)	
Degenerative Processes				
Yes	0 (0.0)	02 (50.0)	02 (50.0)	0.278*
No	48 (29.1)	76 (46.1)	41 (24.8)	
Parafunctional Habits				
Yes	39 (44.8)a	38 (43.7)b	10 (11.5)c	< 0.001┼
No	09 (11.0)	40 (48.8)	33 (40.2)	
Others				
Yes	0 (0.0)a	12 (80.0)b	03 (20.0)a,b	0.005*
No	48 (31.2)	66 (42.9)	40 (26.0)	

*Fisher's exact test and post-tests;
┼ Pearson's Chi-square and post-tests.
P = Probability value.
Values in parentheses indicate the percentage in the row.
Values in bold indicate a statistically significant difference.
Different letters represent statistically significant differences between groups.
Table 3: Bivariate analysis of the association between reported pain intensity and diagnosis.

Table 4 shows that participants for whom CBT was indicated were less likely to have severe pain than mild/moderate pain (P = 0.028). Individuals for whom IOS was indicated had a lower prevalence of mild/moderate and severe pain compared with no pain (P = 0.001). Participants for whom kinesiotherapy was indicated were more likely to have mild/medium and severe pain (P = 0.007). Participants taking medication were more likely to have mild/moderate and severe pain than those not taking medication (P = 0.001). Participants who were scheduled to undergo thermotherapy were more likely to have mild/moderate and severe pain (P < 0.001). Table 4 shows the association between reported pain intensity and sociodemographic variables. Women were more likely to have mild/moderate pain than no pain (P = 0.003).

Indicated treatment	Reported pain intensity (%)			P
	Painless	Light/molderate	Severe	
CBT				
Yes	46 (28.6)a,b	77 (47.8)a	38 (23.6)b	0.028*
No	02 (25.0)	01 (12.5)	05 (62.5)	
IOS				
Yes	37 (40.2)a	36 (39.1)b	19 (20.7)b	0.001┼
No	11 (14.3)	42 (54.5)	24 (31.2)	
Kinesiotherapy				
Yes	15 (17.6)a	44 (51.8)b	26 (30.6)b	0.007┼
No	33 (39.3)	34 (40.5)	17 (20.2)	
Medication				
Yes	10 (14.5)a	35 (50.7)b	24 (34.8)b	0.001┼
No	38 (38.0)	43 (43.0)	19 (19.0)	

Thermotherapy				
Yes	04 (06.3)a	38 (59.4)b	22 (34.4)b	<0.001┼
No	44 (41.9)	40 (38.1)	21 (20.0)	
Dry Needling				
Yes	0 (0.0)	08 (66.7)	04 (33.3)	0.072*
No	48 (30.6)	70 (44.6)	39 (24.8)	
Adjuvant rehabilitation treatment				
Yes	02 (25.0)	02 (25.0)	04 (50.0)	0.259*
No	46 (28.6)	76 (47.2)	39 (24.2)	
Referral				
Yes	01 (33.3)	01 (33.3)	01 (33.3)	1.000*
No	47 (28.3)	77 (46.4)	42 (25.3)	
Surgical				
Yes	0 (0.0)	01 (100)	0 (0.0)	1.000*
No	48 (28.6)	77 (45.8)	43 (25.6)	

*Fisher's exact test and post-tests;
┼ Pearson's Chi-square and post-tests.
P = Probability value.
Values in parentheses represent the percentage in the row.
Values in bold indicate a statistically significant difference.
Different letters represent statistically significant differences between groups.
Table 4: Association between reported pain intensity and indicated treatment (n=169).

Discussion

The patients treated at the CEO were adults, most of them women, who lived in areas of moderate social risk. Most sought the specialized care after being referred by a dentist at PHC, mainly for pain, bruxism, or TMJ complaints. Comorbidities and medication use were common in these patients, with arterial hypertension and endocrine disorders being the most common health conditions. Approximately ¼ of the users had tooth loss. More than half of the participants reported moderate or severe pain, with pain on palpation more common than noises and clicking sounds on mandibular movement. Multiple diagnoses were made, the most common being DDR, bruxism, and clenching. Conservative, non-drug treatment was the most common approach. Medication was prescribed to 40.8% of patients.

The greater demand for services by women has been observed previously and attributed to the fact that women seek treatment more often than men. The result has also been attributed to the fact that women are more aware of the pain stimulus and that they are more careful and attentive to their health [12].

The social, cultural, and environmental conditions of a population are reflected in the epidemiological profiles of different groups and directly related to health status [2,7,10,22]. In our sample, an average SVI of 0.51 was found, meaning that most users referred to the specialized care center had medium social risk. Although the results indicated a population at medium social risk, it is not possible to infer those socioeconomic conditions influenced the results because there was no difference in SVI between groups with different pain levels. In addition, the population samples and the instruments used for socioeconomic classification and TMD assessment differed in the two studies.

Most participants (65.7%) experienced pain on palpation and the most commonly affected muscle was the masseter (56.2%) [21]. Individuals diagnosed with muscular TMD experienced pain, which was not the case in individuals without this diagnosis (Table 3). The painful symptoms are a consequence of TMD and not a predisposing factor [14].

Theories of TMD etiology are based on the biopsychosocial model of pain, which involves a combination of biological, psychological, and social factors that provide an excellent and thorough description of patients' circumstances [19,23,24]. In this study, cognitive behavioral therapy accounted for 95.3% of the treatment approaches in the CEO studied, 54.4% used an intraoral splint, and 49.7% underwent kinesiotherapy, which consists of oral exercises to strengthen muscles, improve oral motricity, and other ways to control the condition. In the center studied, these treatments were offered by SUS. When the dysfunction is recognized, conservative, reversible,

and non-surgical therapy should be the first choice for TMD treatment, as it is effective in most cases, which supports the results of our study.

Most patients treated at the TMD specialty center had pain as the most common reason for referral. However, the etiology and causes of pain in the patients were not available in this study. The TMD symptom of orofacial pain is a multidimensional phenomenon that may or may not be associated with biological damage, diet, and eating habits, and involves a combination of biological, psychological, and social factor.

A limitation of the study was that data from axis II of the RDC/TMD were not collected. Searching for medical records was very difficult because they are organized by the person's date of birth and not by specialist. The same person may be treated in different service specialities, and there are thousands of medical records. Another limitation is that the files can only be accessed by the researchers associated with the treatment of the patients, and the medical records are reorganized after five years of inactivity.

Conclusion

Most patients treated at the TMD specialty center were women and the pain was the most common reason for referral. Pain was also more common in patients with muscle TMD than in patients with other diagnoses. However, no association was found between comorbidities, age, and SVI.

Ethical Approval

Approved by Institutional Ethics Committee and by Municipality of Belo Horizonte Ethics Committee.

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Conflict of Interest Statement

The authors declare no conflict of interest.

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