ORIGINAL ARTICLE

IMPACT OF THE COVID-19 PANDEMIC ON THE INCREASE IN EMERGENCIES FOR TEMPOROMANDIBULAR DYSFUNCTIONS: A CROSS-SECTIONAL STUDY

IMPACTO DA PANDEMIA DE COVID-19 NO AUMENTO DAS URGÊNCIAS POR DISFUNÇÕES TEMPOROMANDIBULARES: UM ESTUDO TRANSVERSAL

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ABSTRACT

COVID-19 is a disease that has a wide clinical spectrum that ranges from completely asymptomatic conditions to severe pulmonary infection. The social isolations recommended by health authorities, despite being necessary to prevent the spread of the disease, may had have a negative impact on the mental health of the population with an increase in the number of cases of anxiety, depression and other psychological disorders. In this context, temporomandibular dysfunction (TMD), a multifactorial disease that including the psychological factor, may have worsened after the start of the pandemic period. The aim of this study was to verify whether there was a worsening of TMD symptoms during the pandemic period and what they were. The research was carried out on patients treated at the TMD clinic of Odontoclínica Central da Marinha (OCM), located in the city of Rio de Janeiro-RJ, Brazil. A retrospective cross-sectional study was carried out by collecting data from 784 electronic medical records of patients aged of 12 and over, before the pandemic, in 2019, and during the pandemic, in 2020, according to the eligibility criteria. The results obtained through statistical analyses revealed a worsening of TMD symptoms during the pandemic period. There was an increase in emergency consultations and cases of muscle and join pain. The worsening of TMD symptoms might be associated with the negative impact of the pandemic on the mental health of OCM patients.

Keywords: COVID-19; Temporomandibular Joint Dysfunction Syndrome; facial pain.

RESUMO

A COVID-19 é uma doença que apresenta um largo espectro clínico que varia de quadros totalmente assintomáticos a quadros graves de infecção pulmonar. O isolamento social recomendado pelas autoridades sanitárias, apesar de necessário para impedir a disseminação da doença, pode ter repercutido negativamente na saúde mental da população, gerando aumento do número de casos de ansiedade, depressão e outros transtornos psicológicos. Neste contexto, a disfunção temporomandibular (DTM), uma doença de caráter multifatorial, entre eles o fator psicológico, pode ter sido agravada após o início da pandemia. O objetivo deste estudo foi verificar se houve ou não o agravamento dos sintomas de DTM no período de pandemia, e quais foram eles. A pesquisa foi realizada em pacientes atendidos na Clínica de DTM da Odontoclínica Central da Marinha (OCM), situada da cidade do Rio de Janeiro-RJ, Brasil. Foi realizado um estudo transversal retrospectivo através da coleta de dados em 784 prontuários eletrônicos, de pacientes a partir de 12 anos, antes da pandemia, em 2019, e durante a pandemia, em 2020, de acordo com os critérios de elegibilidade. Os resultados obtidos, através de análises estatísticas, revelaram agravamento dos sintomas de DTM no período pandêmico. Houve aumento em consultas de emergência e em quadros de dores musculoarticulares. Concluiu-se que o agravamento dos sintomas de DTM pode estar associado à repercussão negativa da pandemia na saúde mental dos pacientes da OCM.

Palavras-chave: COVID-19; Síndrome da Disfunção da Articulação Temporomandibular; bruxismo; dor facial.

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INTRODUCTION

Temporomandibular disorder (TMD) has a multifactorial etiology and may be associated with biological, social, emotional, and cognitive factors (1,2). It is estimated that they affect about 15% of the adult population aged 20 to 40 years, with a frequency three to five times higher in women. TMDs are the second leading cause of orofacial pain, behind only of pain of odontogenic origin; therefore, they have a significant impact on the physical and psychological health of individuals (5,6).

Among the most frequent symptoms, pain stands out, which can affect various regions such as the ear, eyes, throat, head, neck, and reverberate in more distant parts of the body (7). In addition, other physical factors such as inflammation, synovitis secondary to trauma, and infection may be found. TMD may also be associated with articular disc dysfunction, with or without reduction, as well as degenerative joint diseases, such as osteoarthritis and ankylosis (8).

The World Health Organization (WHO) was alerted in December 2019 about a new strain of coronavirus, which had never been identified in humans. Initially, the virus was temporarily named 2019-nCoV and, on February 11th, 2020, it was named SARS-CoV-2. In that year, the new coronavirus was causing many patients to develop severe cases of pneumonia in the city of Wuhan, China (9).

Due to the severity level, the WHO has defined COVID-19 as a pandemic disease. Thus, various measures were instituted by global health and sanitary entities, such as social isolation and the interruption of various services characterized as non-essential, which led to a radical change in the world's population lives. These changes on routine negatively impacted people's mental health, leading to an increase in psychological disorders, such as anxiety, fear, and depression (10).

The aim of this study was to evaluate if the pandemic period had an impact on the TMD symptoms of patients treated at the TMD Clinic of the Odontoclínica Central da Marinha (OCM), in Rio de Janeiro, Brazil.

METHODS

The present study was approved by the Ethics and Research Committee of the Clementino Fraga Filho Hospital, Rio de Janeiro-RJ, Brazil, (CAAE number 56027922.5.0000.5257, opinion 5.562.290) and by the Ethics and Research Committee of the Naval Hospital Marcílio Dias, Rio de Janeiro-RJ, Brazil (CAAE number 56027922.5.3001.5256, opinion 5.597.206). The research was conducted on patients treated at the Temporomandibular Dysfunction Clinic of the OCM, a reference center for specialized dental care of the Brazilian Navy. A retrospective cross-sectional study was conducted through data collection from 784 electronic medical records of patients aged 12 years and older, before and during the pandemic, according to eligibility criteria. The collected data covered the profile of the patients (gender and age group), the diagnosis, the main complaint (signs and symptoms), and the dental intervention performed at the TMD Clinic. The data were obtained from patients treated at the TMD Clinic from August 1st to September 30th, 2019, and in the same period in 2020.

Thus, all the extracted information defined two main groups: patients treated before the pandemic, in 2019 (G1); and, a second group of patients treated during the pandemic, in 2020 (G2). Not necessarily the same patients were evaluated in both samples. The data collected before and after the pandemic do not pertain to the same patients, but rather to the records of users who met the eligibility criteria and attended appointments within the analyzed period.

Data collection was carried out by an evaluator, based on the medical record evaluation instruments developed for the study (Charts 1 and 2).

Chart 1: 2020 medical records assessment tool.

Characteristics/Variables	Answer
(1) Date of consultation:	
(2) Gender:	( )Male ( )Female
(3) Date of Birth:	
(4) First consultation:	( )Yes ( )No
(5) Patient who was discharged and returned to the consultation after the start of the pandemic:	( )Yes ( )No
(6) Patient who was undergoing treatment before the interruption of elective services:	( )Yes ( )No
(7) Subsequent consultation:	( )Yes ( )No
(8) Type of service:	( )Urgency/Emergency ( ) Elective / Consultation
(9) Patient report:	
(10) Symptoms appeared after the start of the pandemic:	( )Yes ( )No( ) Not informed ( )Not applicable

[Continue...]

[Continuation:]

(11) Symptoms worsened after the start of the pandemic:	( )Yes ( )No ( )Not informed ( ) Not applicable
(12) Reports restriction of mouth opening/closing:	( )Yes ( )No ( )Not applicable
(13) Reports daytime/night time clenching:	( )Yes ( )No ( )Not applicable
(14) Reports bruxism:	( )Yes ( )No ( )Not applicable
(15) Reports some type of dental fracture or restoration:	( )Yes ( )No ( )Not applicable
(16) The reported pain is in the muscle or near the joint:	( )Muscular ( )Joint ( )Not informed ( ) Absence of pain ( ) Not applicable
(17) Diagnosis in this consultation:	
(18) Clinical intervention, medication, or both:	( )Clinic ( )Medication ( )None ( ) Both
(19) Which intervention?	
(20) Presents dental wear:	( )Yes ( )No ( )Not informed
(21) Scheduled for treatment sequence	( )Yes ( )No ( )Not informed
(22) Reason:	

Chart 2: 2019 medical records assessment tool.

Characteristics/Variables	Answers
(1) Date of consultation:	
(2) Gender:	( )Male ( )Female
(3) Date of Birth:	
	( )Sim ( )Não
(4) First consultation:	( )Yes ( )No
(5) Patient who was discharged and returned to the consultation:	( )Yes ( )No
(6) Subsequent consultation:	( )Yes ( )No
(7) Type of service:	( )Urgency/Emergency ( ) Elective / Consultation
(8) Patient report:	
(9) Reports restriction of mouth opening/closing:	( )Yes ( )No ( )Not applicable
(10) Reports daytime/night time clenching:	( )Yes ( )No ( )Not applicable
(11) Reports bruxism:	( )Yes ( )No ( )Not applicable
(12) Reports some type of dental fracture or restoration:	( )Yes ( )No ( )Not applicable
(13) The reported pain is in the muscle or near the joint:	( )Muscular ( )Joint ( )Not informed( ) Absence of pain ( ) Not applicable
(14) Diagnosis in this appointment:	
(15) Clinical intervention, medication, or both:	( )Clinic ( )Medication ( )None( ) Both
(16) Which intervention?	
(17) Presents dental wear:	( )Yes ( )No ( )Not informed
(18) Scheduled for treatment sequence	( )Yes ( )No ( )Not informed

These instruments were based on the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD), which consists of a questionnaire that seeks to standardize examinations and diagnoses in TMD, translated into Portuguese in 2016 (11). The study instrument was divided into variables designed to detect changes in the severity or alteration of the signs and symptoms reported by patients before and during the pandemic.

The information that was not found in the electronic medical record to answer the questions of the instrument was filled in as "Not Informed" (N/I). The exclusion criteria for medical records were defined as: a second consultation on the same day at the TMD Clinic, to avoid data duplication, as well as records with inadequate information. Patients already with diagnosed joint-related diseases, related to the central nervous system, temporomandibular joint disorders, chronic mandibular hypomobility disorders, or growth disorders, were not included in the sample.

Furthermore, patients who were not clinically discharged before the interruption of elective care (variable 6 of chart 1) had variables related to patient reports and diagnosis excluded from the sample (variables 09 to 17 of chart 1), as these variables refer to patients with onset or worsening of symptoms after the start of the pandemic. In this case, the variables were defined as "Not Applicable" (N/A) in the medical record evaluation instrument. Data collection related to patient reports and diagnosis (variables 9 to 17 of chart 1; variables 8 to 14 of chart 2) was also not applied in cases of patients who returned for a second consultation within the months collected in the two years under analysis (variable 7 of chart 1; variable 6 of chart 2), as the patient had already been included in the sampling during the first consultation, with these variables also being defined as "Not Applicable" (N/A) in the medical record evaluation instrument (Figure 1).

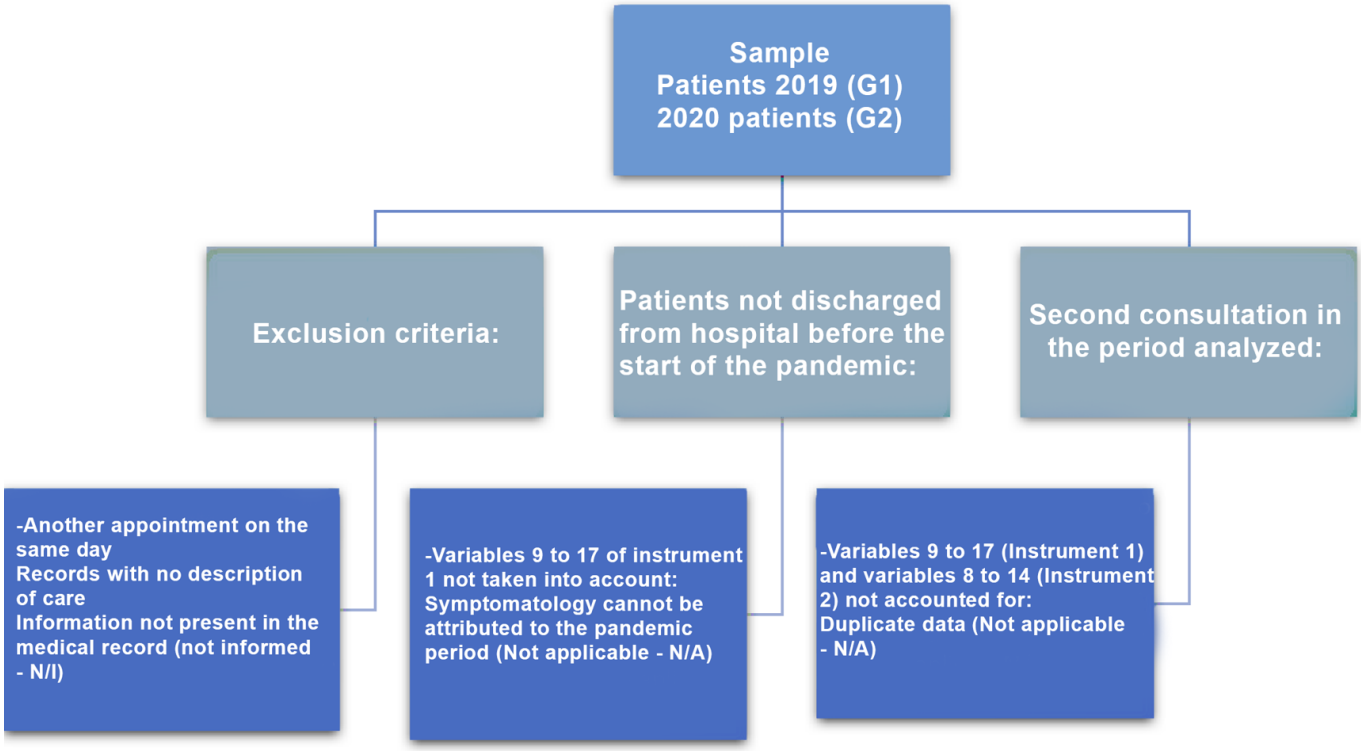

Figure 1. Flowchart representing the stages of the study methodology.

To verify if there was a worsening of cases possibly associated with the conditions of the pandemic, the following data were observed: the patient's first consultation at the TMD Clinic, or a patient with clinical discharge presenting some symptoms after the start of the pandemic, the onset of symptoms after the start of the pandemic and/or their worsening, the patient's report, and the professional's diagnosis. Patients whose clinical follow-up was interrupted due to the pandemic, or who were in a second consultation within the months analyzed, were not considered patients with symptoms possibly related to the COVID-19 pandemic.

In the 2019 evaluation (G1), the data used as a comparison to assess a possible worsening compared to 2020 were: first consultation following

the same characteristics mentioned above for the year 2020, and patients with clinical discharge who presented any complaint. The first consultation is characterized as the patient's first visit to the TMD Clinic recorded in the electronic medical record, regardless of the period analyzed.

The Statistical Package for the Social Sciences (SPSS 22, IBM Corporation, Armonk-NY, United States) was used to perform the statistical analyses. Descriptive analysis was performed based on frequency and cross-tabulations, between the periods of 2019 (G1) and 2020 (G2). A convenience sample was used with all electronic records available in the analyzed periods. For all analyses, a significance level of 5% (p=0.05) was considered. The Fisher's test and the chi-square test were used to assess the difference in dental consultations (first consultation, discharged patient, or second consultation) in relation to the two evaluated periods.

Additionally, in one of the logistic regression analyses aimed at determining the important factors in the association of factors related to pain during the pandemic, the presence or absence of muscle, joint, or both types of pain was defined as dependent variables, and the independent variables were: 'pandemic', 'gender', 'age', 'type of care', 'reports restriction of opening/closing', 'reports daytime/night time clenching', 'reports bruxism', and 'reports any type of dental or restoration fracture'. For this regression, a filter was applied for N/A and N/I in the dependent variable, presence of pain, which reduced the total number of cases to 353, as the purpose of this regression was to assess the presence of pain in relation to other variables.

In the second regression analysis, the dependent variables were the pre-pandemic periods (2019) and during the pandemic (2020), and their independent variables were: 'gender', 'age', 'first consultation', 'patient who was discharged and returned for consultation', 'second consultation in the period under analysis', 'type of care', 'reports restriction of mouth opening/closing', 'reports daytime/night time clenching', 'reports bruxism', 'reports any type of dental or restoration fracture', 'the reported pain is localized in the muscle or joint', and 'clinical intervention'. This regression used 734 records; 50 records were not used because such data were not provided in these variables (N/I). The aim was to compare the two periods analyzed, thus observing the changes that occurred from one year to the next.

RESULTS

Out of a total of 791 records, 784 were used in the analyses, with 544 and 240 occurring in 2019 and 2020, respectively. The exclusion of the 7 records occurred in the 2019 data due to incomplete information in the electronic record.

During the analyzed period, there was a predominance of dental consultations performed by female patients compared to male patients, with 339 in 2019 (62%) and 158 in 2020 (66%) (Table 1). In the age group assessment, an average of 45 (SD± 16.7) years was observed in 2019, and 47 (SD± 17.1) years in 2020 (Table 1).

Table 1: Demographic characteristics by age and gender of patients treated during the analyzed period.

	Total (n)	Age Group n (%)				Sex	
		12-19	20-59	60+	Mean (SD)	Female	Male
Before (2019)	554	36 (7%)	401 (74%)	105 (19%)	45.0 (± 16.7)	339 (62%)	205 (38%)
During (2020)	224	11 (5%)	160 (67%)	69 (29%)	47.0 (± 17.1)	158 (66%)	82 (34%)

SD – standard deviation

The results revealed a predominance of patients aged between 20 and 59 years, totaling 72% of the patients seen during the evaluation period, before and during the pandemic, indicating a very similar profile of the sample, both in gender and age group (Table 2). Furthermore, the regression analysis (Table 3) showed that the chance of reporting pain was 1.27 times higher in the age group of 20 to 59 years in 2020.

Table 2: Descriptive analysis of sex and age.

		Before (2019) n (%)	During (2020) n(%)	Total n(%)	p-value
Age group	12-19	36 (7%)	11(5%)	47(6%)	0.010 *
	20-59	401(74%)	160(67%)	561(72%)	
	60+	105(19%)	69(29%)	174(22%)	
Sex	Female	339(62%)	158(66%)	497(63%)	0.377
	Male	205(38%)	82(34%)	287(37%)	

Table 3: Logistic regression analysis to associate the presence or absence of pain during the pandemic period.

Variables	Categories	B	Standard error	Wald statistic	Significance	Odds ratios
Pandemic	2019 -pre-pandemic (ref)					
	2020 – pandemic	1.62	0.34	23.09	0.000 *	5.04
Sex	Woman (ref)					
	Man	-0.13	0.31	0.18	0.675	0.88
Age	12-19 (ref)					
	20-59	0.24	0.57	0.18	0.674	1.27
	60+	-0.10	0.62	0.03	0.874	0.91
Type of service	elective (ref)					
	urgency/emergency	0.53	0.78	0.46	0.497	1.70
Reports restriction of mouth opening/closing	No (ref)					
	Yes	3.00	1.12	7.15	0.008 *	20.15
Reports daytime/nighttime clenching	No (ref)					
	Yes	0.97	0.35	7.83	0.005 *	2.64
Reports bruxism	No (ref)					
	Yes	-1.17	0.35	11.17	0.001 *	0.31
Reports some type of dental or restoration fracture	No (ref)					
	Yes	-1.75	0.78	5.00	0.025 *	0.17
Clinical intervention	No medicines needed					
		2.30	1.07	4.63	0.031 *	9.96
	Clinical	0.62	0.44	1.98	0.160	1.87
	Both	3.99	0.73	29.99	0.000 *	53.85

*Dependent variable studied 1 = muscle and/or joint pain; 0 = no pain reported. (ref) = reference category. Nagelkerke R2 = 0.550; N = 353.

The average frequency of dental consultations performed by patients seen for the first time at the TMD Clinic was 33% and 42% of the total consultations that occurred at this clinic in 2019 and 2020 (p=0.015), respectively (Table 4). The comparison between the type of dental consultation (first consultation or second consultation), and the emergence of TMD symptoms revealed that 90% of the first consultations in 2020 were from patients who presented pain symptoms during the pandemic, compared to 36% who did not present pain symptoms (p<0.001) (Table 4). A frequency of 11% was observed in 2019 in the analysis among patients with clinical discharge and worsening symptoms, compared to 85% in 2020 (p<0.001) (Table 4).

Regarding the presence or absence of pain (muscular, joint, or both) and being the first consultation of patients in both periods, there was a significant increase (p=0.314) from 49% in 2019 to 84% in 2020. Furthermore, in the association between the presence of pain and being a returning patient with clinical discharge, there was also a significant increase (p=0.0169) from 38% in 2019 to 76% in 2020.

When observing the type of care (elective or emergency consultation), a 20% increase was revealed for emergency consultations during the pandemic period (62%) compared to the same period in 2019 (42%) (p<0.001) - Table 4. The chance of an emergency consultation occurring in relation to the elective consultation was approximately 2 times higher in the period of 2020 (Table 4).

Table 4: Descriptive analysis of the type of consultation and care; statistically significant (p<0.05).

		Before (2019)		During (2020)		Total		
		N	Percentage (%)	N	Percentage (%)	N	Percentage (%)	p-value
First consultation at the TMD clinic	No	365	67%	139	58%	504	64%	0,015 *
	Yes	179	33%	101	42%	280	36%	
(2019) Patient who was discharged and returned for consultation; (2020) Patient who was discharged and returned for consultation after the start of the pandemic.	No	483	89%	197	82%	680	87%	0,001 *
	Yes	61	11%	43	18%	104	13%	
Second consultation in the period under review:	No	246	45%	184	77%	430	55%	0,001 *
	Yes	298	55%	56	23%	354	45%	
Type of service	Elective	312	57%	82	34%	394	50%	0,001 *
	urgency/ emergency	231	42%	149	62%	380	48%	
	N/A	1	0%	9	4%	10	1%	

The frequency of reports of daytime or night time teeth clenching almost doubled (p<0.001) during the pandemic (23%) compared to the previous year (12%) – Table 5. Another important data point, seen in the regression analysis, was the 2.64 times greater chance in the relationship between clenching and the presence of pain, as well as in the association of pain with restricted mouth opening, with a 20 times greater chance of occurring in the 2020 analysis (Table 3).

The frequency of reporting muscle pain also showed a statistically significant increase (p<0.001) during the pandemic, from 13% to 35% in the year 2020 (Table 5), as well as a higher odds ratio between the periods of 2019 and 2020 (OR=5.57) - Table 3. Additionally, there was a 6.99 times higher chance of reporting dental fracture in 2020 (p<0.001) - Table 6.

Table 5: Descriptive analysis of patient reports and pain location; statistically significant (p<0.05).

		Antes (2019)		Durante (2020)		Total		
		Nª	Percentual (%)	Nº	Percentual (%)	Nº	Percentual (%)	p-value
Reports restriction of mouth opening/closing	No	225	41%	129	54%	354	45%	<0.001 *
	Yes	14	3%	14	6%	28	4%	
	N/A	304	56%	95	40%	399	51%	
	N/I	1	0%	2	1%	3	0%	
Reports daytime/night time clenching:	No	176	32%	88	37%	264	34%	<0.001 *
	Yes	63	12%	56	23%	119	15%	
	N/A	305	56%	95	40%	400	51%	
	N/I	0	0%	1	0%	1	0%	

[Continue...]

[Continuation:]

Reports bruxism:	No	179	33%	101	42%	280	36%	<0,001 *
	Yes	60	11%	43	18%	103	13%	
	N/A	305	56%	95	40%	400	51%	
	N/I	0	0%	1	0%	1	0%	
Reports some type of dental or restoration fracture:	No	234	43%	134	56%	368	47%	<0,001 *
	Yes	5	1%	10	4%	15	2%	
	N/A	305	56%	95	40%	400	51%	
	N/I	0	0%	1	0%	1	0%	
The reported pain is located in the muscle or near the joint:	Articular	24	4%	11	5%	35	4%	<0,001 *
	Muscular	71	13%	84	35%	155	20%	
	articular and muscular	9	2%	9	4%	18	2%	
	doesnt present	121	22%	24	10%	145	18%	
	N/A	310	57%	95	40%	405	52%	
	N/I	9	2%	17	7%	26	3%	

Table 6: Logistic regression analysis to associate the period before and during the pandemic.

Variables	Categories	B	Standard error	Wald statistic	p-value	Odds ratio
Sex	Female (ref)					
	Male	-0.061	0.204	0.091	0.763	0.94
Age group	12-19 (ref)					
	20-59	0.115	0.367	0.098	0.754	1.12
	60+	0.872	0.397	4.823	0.028 *	2.39
First consultation at the TMD clinic	No (ref)					
	Yes	-3.883	0.686	32.028	0.000 *	0.02
Controlled patient, but with symptoms (2020 - after the start of the pandemic)	No (ref)					
	Yes	-3.625	0.684	28.112	0.000 *	0.03
Subsequent consultation (after first consultation)	No (ref)					
	Yes	-3.092	0.396	60.836	0.000 *	0.05
Type of service	elective (ref)					
	urgency/emergency	0.726	0.577	1.582	0.209	2.07
Reports restriction of mouth opening/closing;	Not + N/A (ref)					
	Yes	-0.015	0.447	0.001	0.973	0.98
Reports daytime/night time clenching	Not + N/A (ref)					
	Yes	0.260	0.277	0.885	0.347	1.30
Reports bruxism	Not + N/A (ref)					
	Yes	0.362	0.307	1.395	0.238	1.44
Reports some type of dental or restoration fracture;	Not + N/A (ref)					
	Yes	1.944	0.712	7.449	0.006 *	6.99
The reported pain is located in the muscle or near the joint	does not present + N/A (ref)					
	Articulate	0.916	0.477	3.679	0.055	2.50
	Muscular	1.717	0.342	25.150	0.000 *	5.57
	articular and muscular	1.472	0.612	5.786	0.016 *	4.36
Clinical intervention	Not necessary + N/A (ref)					
	Medicinal	0.200	0.860	0.054	0.816	1.22
	Clinic	0.721	0.364	3.918	0.048 *	2.06
	Both	0.518	0.491	1.111	0.292	1.68

*N/A = Not applicable; N.S. = Not significant; (ref) = reference category Nagelkerke R = 0.473; N = 734

In dental consultations, patients' reports were often associated with pain complaints, clicks, or crepitus in the temporomandibular joint. Pain in function showed a 15% increase during the pandemic period (p<0.001). When comparing the data regarding the presence of pain, whether muscular, articular, or a combination of both, a significant increase (p<0.001) from 46% to 81% in 2020 was observed (Table 7). The logistic regression analysis (Table 3) showed that the chance of reporting pain in 2020 was 5.04 times higher than in 2019.

Table 7: Relationship between the presence of muscle pain, joint pain, or both, and the period before or during the pandemic; statistically significant (p<0.05); Exclusive NA/NI.

		Before (2019) p(%)	During (2020) p(%)	Total p(%)	p-value
Pain*	No	121(54%)	24(19%)	145(41%)	<0.001
	Yes	104(46%)	104(81%)	208(59%)	

When observing the characteristics of the interventions, the data indicate a 2 times greater chance of a clinical intervention occurring during the pandemic (Table 6). When relating the pain variable to the type of intervention, it was observed that if the patient reports pain, the chance of a clinical and medicinal intervention occurring increases by 53 times, and only medicinal intervention by 9.96 times during the pandemic, with no intervention as a reference (Table 6).

In the observation of clinical diagnoses, a predominance of complaints related to pain was revealed, mainly muscle pain in the masseter region, where a 16% increase was observed during the pandemic. The other diagnoses showed a smaller increase in frequency, such as cervical muscle pain (7%) and temporomandibular joint pain (3%), or maintained the same frequency, such as bruxism (10%) and clicks/crepitus in the temporomandibular joint (6%) (Table 5).

DISCUSSION

The relationship between TMD and patients' mental health has been previously established in the literature (12). During the pandemic, many people developed psychological disorders, whether due to fear, anxiety, changes in routine, or social isolation (13). Herein, there may have been a possible increase in the number of people who showed symptoms of TMD or who had their clinical condition worsened during the pandemic (14). This could be observed with the increase from 46% to 81% in the reporting of pain when comparing the periods before and during the pandemic. A previous study revealed results similar to the present study, as it found, through online questionnaires, the worsening of TMD and bruxism symptoms, associated with emotional stress during the pandemic period (15).

A predominance of the female gender was observed, with a frequency 60% higher compared to the male gender; furthermore, a greater relationship between the presence of pain and gender was observed in females, with males having a 12% lower chance of reporting pain (muscular, joint, or both). Melo Júnior *et al*. evaluated 1342 teenagers (10-17 years) and found a significantly relevant association (p=0.017) between TMD symptoms and female gender (16). The number of women was also higher in the present study, as both groups analyzed showed a similar percentage of females, which corroborates with other studies where a greater relationship between females and TMD was observed.

Regarding the age group, the results indicated a predominance of patients aged between 20 and 59 years (72%). The logistic regression analysis showed the discrepancy between ages, with a 2.39 times higher chance of attendance in the age group of 60 or more years when compared to the age group of 12 to 19 years. The results of this study corroborate with the literature review conducted by Yadav *et al*. who also identified a higher number of TMD cases in patients aged between 45 and 64 years, in studies conducted in Europe and the United States (17). The analysis of the relationship between age group and the presence of pain showed a higher report of pain in the age group between 20 and 59 years, with a 1.27 times greater chance of pain occurring in this age group compared to 12 and 19 years.

There was a higher number of first consultations during the pandemic period compared to the previous period, with almost 10% more in total attendances. This indicates that, possibly, there was a worsening of the triggering factors of TMD, with psychological health standing out, which had a strong adverse impact during this period. These data are corroborated by the fact that there was an observed increase in patients who were clinically discharged, meaning their condition was controlled, and returned with a new complaint. Another piece of data that corroborates this increase in the number of first consultations was the large reduction in second consultations in the same period, around 30%. In the relationship between dysfunctions and psychological disorders, Sójka *et al*. identified that one-third of their sample (n=324) showed more intense TMD symptoms

associated with psychological dysfunctions such as anxiety, stress, and depression (12).

In 2020, there was a 20% increase in emergency consultations, with a 2.07 times higher chance of occurring that year. This type of consultation showed a positive correlation with reports of pain, with a 1.7 times greater chance of occurring compared to elective care. The retrospective study in Alberta (Canada) evaluated the reason for seeking dental care (18) in community clinics and hospitals during the pandemic, and revealed that the main reasons for seeking care were infections, problems originating in the salivary glands, and TMDs, corroborating the data of the present study.

Another important data collected was the increase in the search for first-time care at the TMD Clinic, in the 2020 analysis, which indicates a patient with no history of the disease who started to present some clinical complaint. It is possible to identify a 90% match in being the first consultation with the onset of symptoms after the start of the pandemic. In the relationship between discharged patients who returned for care and with worsening symptoms, a correspondence of 85% between these variables could be observed. These data are of great importance and reveal how much the pandemic has intensified the appearance of TMD symptoms. A study conducted with 506 individuals also identified this increase with the pandemic, where 36% and 32.2% of the participants reported an increase in joint and facial muscle pain, respectively, and almost 50% experienced headaches and migraines more frequently (19). A systematic review in 2023 revealed that all evaluated studies showed a significant statistical correlation between TMD and COVID-19 (20).

Regarding complaints related to pain, there was a 5 times greater chance during the pandemic period; the report of muscle pain or its combination with joint pain also saw a 35% increase in 2020. This worsening can be explained by the intensification of stress, anxiety, and mental pathologies during the period (9). Furthermore, there was an 11% increase in reports of daytime or nighttime teeth clenching in 2020, and patients reporting pain were 2.64 times more likely to have a correlation between these two variables. The report of mouth opening/closing restriction increased by 3% during the pandemic and showed a 20 times greater chance in patients with pain in both periods analyzed. The assessment of the association between emotional symptoms and temporomandibular disorders in a group of young people in Asia resulted in the identification that stress and TMD constitute the greatest risks of symptom somatization (21).

Although an increase in the diagnosis of bruxism was expected between the two periods, there was no change in the periods analyzed (10%). Moreover, in the evaluation between bruxism and pain, there was a 69% decrease in this correspondence. Contrastingly, the research by Emodi-Perlman *et al*., in which questionnaires were applied in two countries (Israel and Poland), revealed a significant increase in TMD symptoms and bruxism during the pandemic period, associated with orofacial pain (14). Saczuk *et al*. also found, during the isolation period due to COVID-19, symptoms of TMD and bruxism in most of the individuals analyzed (22).

The clinical and medicinal procedures were mainly related to the relief of painful symptoms, which characterized most of the patients' complaints, highlighting the complaint of pain in function (speech, chewing, etc.) with a 15% increase in 2020. Another important piece of data was the evaluation between pain and the type of intervention, where it was observed that the chance of a clinical and medicinal intervention occurring was 53 times higher compared to not having undergone any intervention. With this, the worsening of the clinical condition of TMD during the pandemic is reinforced, which was also seen in the study by Moharrami *et al*. in Alberta (Canada), which had TMD as one of the main reasons for seeking emergency care during the lockdown period (18).

Another very interesting fact is the correlation between the presence of pain and the type of dental consultation. In the evaluation between the first consultation and pain, a correspondence of 49% was noted in 2019, while in 2020 this number rose to 84%. In the analysis between patients discharged and pain, a relationship of 38% was observed before the pandemic, and 76% after the pandemic. These data indicate the relevance of the pandemic period in the aspect of "onset of pain," which was also revealed in the study by Emodi-Perlman *et al*. conducted in two countries during the pandemic, which identified a worsening in TMD symptoms during the pandemic period (14).

The limitations of the present study include the absence of a control group to compare the prevalence of TMD between the two periods analyzed. Additionally, as it is a cross-sectional study, the data were collected only from an operating system used in the OCM, which results in information limited to that provided by the professionals who recorded in the electronic medical record, covering only a specific interval and a restricted population.

CONCLUSION

The conditions related to the pandemic period did not significantly influence the patient profile (gender and age) and the interventions performed by dentists in the TMD Clinic of OCM. However, they might have contributed to the increase in signs and symptoms of muscle and/or joint pain related to TMD, and the higher number of emergency consultations in patients of this specialized care unit.

The authors declare no conflicts of interest.

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