J Young Pharm, 2019;11(4):424-428
A multifaceted peer reviewed journal in the field of Pharmacy
www.jyoungpharm.org | www.phcog.net

Original Article

Prevalence of Temporomandibular Dysfunction Symptoms in Dental Surgeons

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ABSTRACT

Introduction: Temporomandibular Disorders (TMD) are defined as a set of painful and/or dysfunctional conditions related to masticatory muscles, Temporomandibular Joint (TMJ) and associated structures. This study proposed to evaluate the prevalence of TMD symptoms in dentists from Fortaleza, one Brazilian city, relating the age group, gender and time of professional performance. **Materials and Methods:** This is a cross-sectional, descriptive-analytical research. A total of 495 dentists were selected, of which 55.8% (*n*= 276) were females and 44.2% (*n*= 219) were males, with a professional working time up to 10 years (69.1%, *n*= 342), up to 30 years old (57.0%; *n*= 282). **Results:** When asked about the movements that interfered with weekly pain according to European Academy of Craniomandibular Disorders (EACD), the majority of the participants reported no pain ($p<0.01$), among the ones who answered yes, headache was the most prevalent (31%, *n*= 70), followed by pain in the temples, face, TMJ or mandible (17.3%; *n*= 39). In relation to participants who responded to have pain symptoms, headache was the most prevalent symptom. Regarding the search for treatment, the majority pointed to seek treatment with a neurologist. Despite several pain symptoms reported, most participants rated their own health with an average of 8.69±1.35. **Conclusion:** In spite of the several studies on the prevalence of TMD in the literature, there are still few studies evaluating the prevalence of TMD symptoms in dentists.

Key words: Temporomandibular Joint Disoders, Signs and Symtoms, Dentists.

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DOI: 10.5530/jyp.2019.11.87

INTRODUCTION

The Temporomandibular Joint (TMJ) is one of the most complex and active joints of the human body, composed of several structures, such as the mandibular condyle, glenoid fossa and articular eminence. It is a joint that comes into action right after the birth of the individual and continues to receive loads constantly throughout life due to food, speech, facial expressions and gestures.[1]

According to the American Academy of Orofacial Pain (AAOP), Temporomandibular Disorders (TMD) are defined as a set of painful and/or dysfunctional conditions related to mastication, TMJ and associated structures.[2] They are a subgroup of painful orofacial disorders, in which the patient reports pain in the TMJ region, fatigue of the craniocervical-facial muscles (mainly of the mastication muscles), limitation of mandibular movements and presence of articular noises.[3]

TDM is one of the most common disorders of the bucomaxillofacial region and has a multifactorial etiology.[2-4] It may include: direct or indirect traumatic injury, immunological disorders, neoplasias, stress, postural changes, parafunctional habits, abnormal functioning of chewing muscles, changes in TMJ structure, or a combination of these factors.[3]

The prevalence of TMD varies greatly in the population, this variation can be attributed to differences between races, samples and study design.[3] It is estimated that TMD is present in more than 5% of the population and that approximately 6% to 12% of the population presents clinical symptoms.[5] Although it encompasses a large age group, the highest frequency of TMD cases is between 20 and 40 years of age, being more prevalent in women than men.[3,5,6] When manifested up to 40 years, it is usually myogenic TMD and from this age group the main cause is joint degeneration, which is the arthrogenic TMD.[6]

According to Durham *et al.*[7] the incidence of the first painful episode related to TMD is 3-4% per year, with an increase in incidence with age 18-24 years (2.5%), 25-34 years (3.7%) and 35-44 (4.5%). It is reported that the first episode of TMD is strongly associated with recurrent headaches and body's pains. In adults over 45 the prevalence of TMD pain has a variable estimate, but appears to be between 2-7% and these patients appear to exhibit more objective but asymptomatic TMD signs. Overall, pain occurs as a single episode in 12% of cases, recurrent in 65% and persistent in 19%, being TMJ and muscles' pain the most reported dysfunction.

The masticatory and facial muscles are influenced by emotional factors.[8] Therefore, under stress and anxiety, hyperactivity of the muscles and joints of the face can occur, as well as parafunctional habits causing muscle and TMJ injuries.[2] There is evidence that factors such as anxiety, stress and other emotional disturbances exacerbate TMD. Around 75% of patients with TMD present significantly psychological changes.[4]

Patients with TMD tend to have pain in the TMJ region and during palpation of chewing muscles, ear pain and other otological symptoms, joint noises, mandibular deviations, limitation of mouth opening, muscle fatigue, headache and dental wear.[2] Pain and dysfunction are the most common symptoms in different types of TMD. The pain can range from mild sensitivity to extreme discomfort. The dysfunction usually appears as limitations of mandibular movements.[1]

The treatment of TMD is directed to reduce pain and improve function.[4] Therefore, it is necessary to emphasize that pains, mainly chronic ones, compromise the physical and mental state of the patient interfering in their quality of life.[2,9] Pharmacotherapy is a commonly used way to reduce morbidity and provide life quality to individuals in various clinical situations, especially those involving chronic pain.[10] Therefore, medications play an important role in the treatment of TMD patients, since 90% of these patients report pain as the main complaint, which generates disability and socioeconomic costs.[10,11]

Pharmacotherapy for TMD usually occurs empirically. Although the prescription is extensive, there is a lack of specific scientific evidence for the pathology. So, what occurs is the prescription of drugs effective for other musculoskeletal conditions. Therefore, it is used Non-Steroidal Anti-Inflammatory Drugs (NSAIDs), corticosteroids, analgesics, muscle relaxants, opioids, tricyclic antidepressants, gabapentin, etc. Several classes of drugs can be used in the treatment, some of them being more effective for muscle pain and others for joint pain. Some oral prescriptions for pain appear to be effective, such as 50 mg of sodium diclofenac 2 to 3 times daily, sodium naproxen 500 mg twice daily for 3 weeks and piroxicam 20 mg once daily for 10 days. The combination of sodium diclofenac with acetaminophen, carisoprodol and caffeine has a quick effect under masticatory muscle pain. For chronic myofascial masticatory pain with referred pain, it can be used tricyclic antidepressants, amitriptyline and nortriptyline, 10 to 35 mg per day. For patients who do not respond to or tolerate tricyclic antidepressants, it is indicated gabapentin. TMD pharmacotherapy also includes topical formulations and the use of intra-articular injections of corticosteroids (anti-inflammatory effect) and sodium hyaluronate (lubricating effect).[12]

The diagnosis of TMD has evolved substantially in the last 25 years.[13] Within a biopsychosocial model, the Research Diagnostic Criteria for Temporomandibular Disorders (RDC / TMD) is a system of classification and diagnosis of TMD widely used by professionals since its publication in 1992. Its reformulation gave rise to the Diagnostic Criteria for Temporomandibular Disorders (DC / TMD), an updated version with greater validity for clinical use and in research.[13-15]

Dental surgeons are subject to many musculoskeletal disorders such as TMD. The occupation of dental surgeon requires concentration and precision. Thus, many professionals work in postures that are not flexible seeking to obtain a better visualization of the operative field in the buccal environment of the patient. Studies indicate a high prevalence of pain symptoms mainly in the neck and shoulders.[16]

There are few studies that specifically investigate TMD in this population, with more prevalence studies of TMD in dental students than in graduated professionals.[17-19]

The objective of the present study was to evaluate the prevalence of TMD symptoms in dental surgeons in the city of Fortaleza-CE, Brazil, relating the age range, gender and time of professional performance, as well as assessing individual perception about health and the search for treatment for TMD symptoms, including medication.

MATERIALS AND METHODS

Study Population

The population was composed by dental surgeons from the city of Fortaleza- CE- Brazil, of both genders and without age limit, randomly selected by the Excel program (Figure 1).

The present study was approved in the research ethics committee by number 2.813.573 and was carried out in the city of Fortaleza- CE. This is a cross-sectional, descriptive-analytical research.

Inclusion and exclusion criteria

Inclusion criteria were:

- Dental surgeons of both genders, without age restriction;
- Dental surgeons in practice during the period of the survey.

Exclusion criteria:

- Dental surgeons who work in other cities.

The risks regarding participation in the research were minimal, such as possible psychological discomfort.

Data collection methodology

After submitting the Informed Consent Form (ICF), following the rules based on the Resolution 466/2012 of the National Health Council of the Ministry of Health the questionnaires were applied to the individuals who agreed to participate in the survey. Before the application it was made an explanation of the main objective of the research and thus the researcher explained each item of the questionnaire.

The first questionnaire was composed of eight questions, where the first three questions correspond to the questionnaire "TMD-Pain Screener"[13] and the next four last ones corresponded to the questionnaire of the European Academy of Craniomandibular Disorders (EACD).[20] The last question was related to research on the demand for health professionals, other than the dental surgeon, to treat the painful symptoms of TMD.

Sample calculation and statistical analysis

It has been calculated as necessary to evaluate a total of 495 participants (Flowchart 1) in order to obtain a sample that represents with 95% confidence in the city of Fortaleza-CE

$$Sample\ size\ n = [Np(1-p)]/\ [(d^2/Z^2_{1-\alpha/2}*(N-1)+p*(1-p)]$$

Data was tabulated in Microsoft Office Excel® software and exported to SigmaPlot software version 11.0. The analyzes were carried out adopting a confidence of 95%.

The clinical-demographic data were expressed as absolute frequency and percentage, in the other data the arithmetic mean ± Standard Deviation (SD) was used to demonstrate the observed values, with the number representation of subjects (*n*). The quantitative data were analyzed by the *Kolmogorov-Smirnov* normality test, *Dunn's* test and compared by Analysis Of Variance (ANOVA).

RESULTS

A total of 495 dental surgeons were selected, of which 55.8% (*n*= 276) were females, with a professional performance up to 10 years (69.1%,

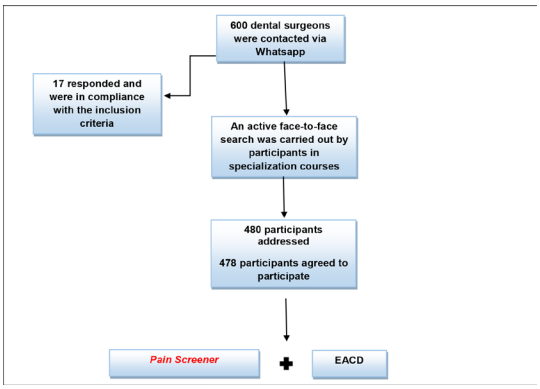

Figure 1: Flowchart of the study sample.
Source: Own authorship.

n= 342), aged up to 30 years (57.0%; *n*= 282) and classified their health with an average of 8.69 ± 1.35 (Table 1).

Regarding the last 30 days, when asked how much time lasted, on average, any pain in the area of the mandible or temporal area, most said that they did not feel pain (78.8%, *n*= 390, *p*< 0.01) and that did not feel pain or pain in the mandible upon waking (82.3%, *n*= 407, *p*< 0.01). In relation to the change in pain (improvement or worsening) in the last 30 days, worsening of mandibular habits, such as keeping teeth against, grinding or chewing gum, were the most pointed (23.9%, *n*= 118, *p*< 0.01) (Table 2).

When asked about the symptoms that occur weekly (once or more), according to EACD, the majority reported no pain during mouth movements and chewing (84.1%; *n*= 416) (*p* <0.01). For participants who responded to have pain symptoms, headache was the most prevalent symptom (31%, *n*= 153), followed by pain in the temples, face, TMJ or mandible (17.3%, *n*= 85) (Table 3). Figure 2 shows the search for treatment between dental surgeons with TMD. The most participantes searched for treatment with Neurologists. In the Table 4 we can see the correlation between the different variables.

DISCUSSION

The prevalence of a particular condition is highly dependent on the used criteria, frequency and duration. The self-report is the standard for the evaluation of prevalence of painful symptoms, which can be done through questionnaires.[21]

Musculoskeletal painful symptoms are common among dental professionals. During work, dentists are in uncomfortable positions that overload the spine and generate excessive tension in the upper limbs. The frontal flexion of the head and limb elevation during care leads to musculoskeletal disorders in the head and neck region.[22]

The results of this study show that 21.2% of dental surgeons reported feeling pain in the mandible and / or temporal region lasting more than one week, while 78.8% reported not feeling pain (*p*< 0.01). The majority also reported no pain in the mandible upon waking (82.3%, *p*< 0.01). In relation to the change in pain (improvement or worsening) in the last 30 days, mandibular habits, such as keeping teeth tucked, grinding or chewing gum, were the most pointed (23.9%; *p*< 0.01) (Table 2).

When asked about the symptoms that occur weekly (once or more), according to EACD, the majority reported no pain during mouth movements and chewing (84.1%; *n*= 416) (*p*< 0.01). While for the participants who responded to have pain symptoms, headache was the most prevalent symptom (31%, *n*= 153), followed by pain in the temples, face, TMJ or mandible (17.3%, *n*= 85) (Table 3).

Musculoskeletal pain symptoms are common in dentistry professionals. Radanovíc *et al.*[22] also through questionnaire, observed in their study that 75.9% of the dentists, 90.9% of the auxiliaries and 40% of the technicians showed pain in the neck region. Headache was the second most prevalent symptom, occurring individually in 44.8% of the cases and in 82.6% of cases where there was neck pain. Regarding the treatment for pain, 59.4% of the participants reported not seeking healthcare, being lack of time the most common reason for it (63.2%). Of the patients who sought treatment, the majority received drug treatment and in a few cases the physiotherapy. The results were obtained through a questionnaire of his own with 42 questions, among them questions for analysis of musculoskeletal disorders in the areas of hand, arm and shoulder and the visual analogue scale for pain. In the present study, headache was the

Table 1: Socio-demographic data of the study sample. Fortaleza / CE, 2018.

Variables	Af	Rf (%)	*P*
Gender			0.09*
Female	276	55.8	
Male	219	44.2	
Professional performance time			< 0.01**
Up to 10 years	342	69.1	
11 to 20 years @	54	11	
21 to 30 years @	41	8.2	
≥ 30 years @	58	11.7	
Age group			< 0.01**
Até 30 years	282	57.0	
31 to 40 years #	102	20.7	
41 to 50 years #	35	7.0	
Over 50 years #$	76	15.3	
Individual health perception			< 0.01**
2 |- 4@@	6	1.2	
4 |- 6@@	8	1.6	
6 |- 8@@	70	14.1	
8 |- 10	411	83.1	

Af= absolute frequency, Rf= relative frequency in percentage, *P*= value of *P*. * Binominal Test. ** Chi-square test. # *P*< 0.05, compared to up to 30 years; Dunn's Test. $ *P*< 0.05 compared to 31 to 40 years; Dunn's Test. @ *P*< 0.05, compared to up to 10 years; Dunn's Test. @@ *P*< 0.05, compared to individual health perceptions with grades 8-10.

Table 2: Pain Screener Questionnaire - (Axis I - DC / TMD). Fortaleza / CE, 2018.

Variables	Af	Rf (%)	*P*
1- In the last 30 days, on average, how long did any jaw or temporal area pain last on either side?			
Painless	390	78.8	
Pain lasting more than one (1) week and passed	99	20.0	
Continuous pain	6	1.2	< 0.01**
2- In the last 30 days have you felt pain or soreness in the jaw when you wake up?			
Yes	88	17.7	< 0.01*
No	407	82.3	
3- In the last 30 days, have any of these activities altered your pain (improved or worsened) in your jaw or temporal area on either side?			
Hard food or continuous chewing:			
Yes	92	18.6	< 0.01*
No	403	81.4	
Open your mouth or move your jaw forward or sideways:			
Yes	81	16.4	< 0.01*
No	414	83.6	
Mandibular habits like keeping teeth against, grinding or chewing gum:			
Yes	118	23.9	< 0.01*
No	377	76.1	
Other activities like talking, kissing or yawning:			
Yes	63	12.8	< 0.01*
No	432	87.2	

Af= absolute frequency, Rf= relative frequency in percentage, *P*= value of *P*. * Binominal Test. ** Chi-square test.

most reported symptom by dentists (31%) (Table 3) and the search for treatment was mainly by neurology (41.1%) (Figure 2).

In Chuang's study[23] with 254 Taiwanese dental students, the symptom of head or neck pain occurred with a frequency of 16.54% (*n*= 42) and difficulty or mouth opening pain in 6.69% (*n*= 17) of the sample. In the present study, 15.9% (*n*= 79) of the participants reported pain in the opening and chewing movements and 31% (*n*= 153) reported frequent headaches (Table 3).

According to Saxena *et al.*[16] dentists present a high risk for the development of musculoskeletal disorders. In their study, they observed that 83.10% of the dentists had some musculoskeletal pain in the last

Table 3: EACD questionnaire and question about treatment search. Fortaleza / CE, 2018.

Variables	Af	Rf (%)	*P*
1- Do you have pain when you open your mouth wide or chew (once a week or more)?			
Yes	79	15.9	< 0.01*
No	416	84.1	
2- Do you have pain in the temples, face and temporomandibular joints or jaw (once a week or more)?			
Yes	85	17.3	< 0.01*
No	410	82.7	
3- Have you recently noticed the locking of the jaw or cannot open it wide?			
Yes	36	7.4	
No	459	92.6	< 0.01*
4- Do you often have headaches (once a week or more)?			
Yes	153	31	< 0.01*
No	342	69	
Have you ever sought treatment with any other health care professional who has not been a dentist?			
Yes	37	7.5	< 0,01*
No	458	92.5	

Af= absolute frequency, Rf= relative frequency in percentage, *P*= value of *P*. * Binominal Test.

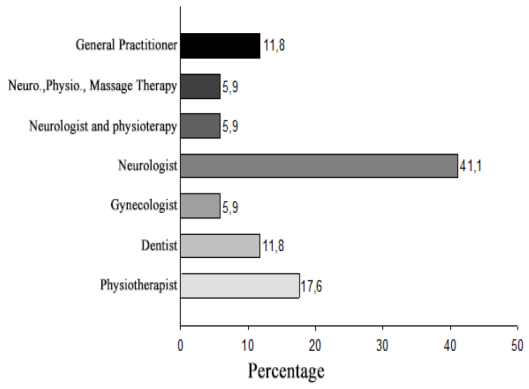

Figure 2: Search for treatment with some other healthcare professional. Values expressed as a percentage. *P* = 0.07; chi-square test.

Table 4: Correlation between variables.

Variables	Gender	Professional performance time	Age group	Individual health perception
PS 1	-0.19*	-0.08	-0.11	-0.27*
PS 2	0.13*	0.06	0.08	0.19*
PS 3A	0.04	0.12	0.17*	0.22*
PS 3B	0.03	0.12	0.15*	0.13
PS 3C	0.21*	0.12	0.17*	0.25*
PS 3D	0.13	0.08	0.10	0.04
AEDC 1	0.10	0.08	0.09	0.06
AEDC 2	0.17*	-0.00	0.05	0.02
AEDC 3	0.02	0.07	0.05	0.07
AEDC 4	0.23*	0.25*	0.24*	0.20*
Treatment search	0.19	-0.02	-0.07	0.00

r= Pearson's correlation. * *P* <0.05.

12 months and that the lack of ergonomics and sedentary lifestyle increased significantly the occurrence of pain. The authors recommend: working sitting, working in indirect vision, 4-handed dentistry should be preferred, dentists must follow some type of physical conditioning regimen, prolonged work should be avoided and intervals between steps are advisable. In addition, ergonomics and the practice of postural exercises should be encouraged during graduation.

Dentistry is considered one of the health professions with the highest stress loads. It is known that dental surgeons are part of a category in which problems in the musculoskeletal system are common, especially in the upper limbs and spine. Studies relate the various types of occupations and the health of people, where the workload, rhythm and working time influence the aggravation of musculoskeletal disorders. These are frequent in dental surgeons and often impair the functional capacity of professionals.[24]

Clinicians often experience discomfort related to the cervical region of the spine. Pain influences the quality of life and daily activities of the professional, therefore, such discussion raises the need to develop strategies for the prevention of musculoskeletal injuries for dental professionals.[22]

Analgesics are the most used drugs among TMD patients, since this pathology can manifest itself with several painful symptoms, being self-medication usual in these patients. Self-medication can be defined as the use of medications to treat (self-diagnosed) disorders or symptoms. It is influenced by society, ease of access and marketing of the pharmaceutical industry. Brazil is one of the countries that most consumes analgesics. The use of medications with no professional support may interfere with diagnosis, choice of appropriate treatment, cause health risks and drug interactions.[25]

Acetaminophen, opioids, serotonin and the noradrenergic receptor inhibitors act on the central mechanism of pain and theoretically desensitize the central nervous system for short periods, whereas NSAIDs act primarily on peripheral sensitization. NSAIDs and opioids do not appear to be effective for long-term treatment of chronic pain and its prolonged use is related to adverse effects. NSAIDs have well-reported side effects such as exacerbation of arterial hypertension, gastrointestinal lesions and impaired renal function,[12] while opioids cause tolerance, change in pain perception and euphoria.[26]

Symptoms of TMD include headaches and auditory symptoms such as tinnitus, which leads to the search for treatment with different healthcare professionals such as neurologist, otolaryngologist and physiotherapist.

Pastore *et al.*[7] observed the search for treatment after the first TMD episode and found that 55.9% sought dentist, 23.5% otolaryngologist and 17.6% general practitioner. In addition, half of the sample stated self-medicate without any indication. The authors point out that many patients do not have the understanding about the disease, which would justify that some do not seek the dentist as a first-choice professional for face, head and neck pain.

TMDs present primary and secondary etiology with aggravating and perpetuating factors, with broad symptomatology that may be related to several structures. Due to this, it is a challenge to establish the best treatment for the patient, with medicines or not.[25] Due to the still existing limitations in the knowledge of pharmacological effects on TMD-related pain, only comparisons in similar pain conditions can be made, such as back pain and tension headache.[27]

The results presented in this study bring contributions to the scientific community regarding the deepening of the study on the prevalence of TMD symptoms in dentists. The articles on TMD symptoms related to the professional activity of Dentistry were carried out mostly with university participants. Therefore, it is important to carry out studies that aim to delve deeper into the theme.

CONCLUSION

In this study, TMD-related pain symptoms were frequent, with a high prevalence of headache occurring frequently at least once a week and pain during mandibular habits, such as keeping teeth against, grinding or chewing gum. Among the individuals who sought treatment for TMD symptoms, few were those who sought treatment with dentists. Despite several reported pain symptoms, most participants rated their own health as good. Despite the various studies on the prevalence of TMD in the literature, there are still few studies evaluating the prevalence of TMD symptoms in dentists.

ACKNOWLEDGEMENT

We acknowledge all participants and São Leopoldo Mandic College.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

TMJ: Temporomandibular Joint; **AAOP:** American Academy of Orofacial Pain; **TMD:** Temporomandibular Disorders; **NSAIDs:** Non-steroidal Anti-inflammatory Drugs; **EACD:** European Academy of Craniomandibular Disorders; **RDC / TMD:** Research Diagnostic Criteria for Temporomandibular Disorders; **DC / TMD:** Diagnostic Criteria for Temporomandibular Disorders.

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Article History: Submission Date : 06-03-2019; Revised Date : 19-04-2019; Acceptance Date : 12-05-2019.
Cite this article: Cidrao ALM, Sergio A. Prevalence of Temporomandibular Dysfunction Symptoms in Dental Surgeons. J Young Pharm. 2019;11(4):424-8.