



## Self-Medication Profile of Adult Patients with Temporomandibular Disorders in Southeast Brazil

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### Abstract

**Background:** Patients with temporomandibular disorder (TMD) often have orofacial pain and may use medication without professional prescription. Self-medication and inappropriate drug intake may cause serious health problems. This cross-sectional study evaluated the self-medication profile of TMD patients, the most used medications and their effect, and the relation between self-medication and socioeconomic factors.

**Methods:** A non-representative sample (n=358) consisted of consecutive adult patients seeking TMD treatment in specialized referral centers for orofacial pain of two universities in São Paulo city, Brazil. A standardized questionnaire was used to collect the study variables before the TMD treatment: self-medication history, TMD pain intensity, sex, age, ethnicity, marital status, schooling and socioeconomic levels. Data were analyzed by descriptive statistics, chi-square test, and logistic regression models at the 0.05 significance level.

**Results:** Almost 60% of 358 TMD patients reported self-medication. Patients with severe TMD were 4.7 times more likely to self-medicate when compared to patients with low TMD intensity (O=5.7; 95% CI=2.4; 13.3; P=0.043), as well as female patients were 30% more likely to self-medicate compared to male patients (OR=2.3; 95% CI=1.1; 5.1; P<0.001). The other independent variables were not associated with self-medication. The frequencies of moderate and severe TMD in women were larger than in those in men (P<0.001). Analgesics and anti-inflammatory drugs were the most used medications. Regarding medication efficacy, 82% of patients reported some improvement after use, but 9% reported side-effect sickness.

**Conclusion:** Self-medication is common among TMD patients attending specialized clinics, and this inappropriate practice is more likely to occur in women and in patients with severe signs and symptoms of TMD.

**Keywords:** Self-medication; Temporomandibular disorder; Orofacial pain; Analgesics

### Introduction

More than 31% of the adults and elderly worldwide have one or more signs and symptoms

of temporomandibular disorder (TMD) (1), which is more frequent in women and the



middle-aged adults (2-4). The main complaints are headache, orofacial pain and discomfort during mandibular movements and in rest position (5). TMD etiology is complex, multifactorial, and patient-specific. Early TMD has a non-inflammatory origin: the pathological process is characterized by degeneration and abrasion of the joint cartilage and local thickness. These alterations are followed by superimposition of secondary inflammatory events, but ageing, systemic diseases, and hormonal factors may interfere in the patient's adaptive capacity (6). One risk factor for TMD is the presence of chronic pain, which in turn can be triggered by psychological distress, health problems, sleep disturbances, fatigue, and nutritional deficiencies (7, 8). Moreover, TMD may coexist with other pain conditions, such as fibromyalgia, back and lumbar pain, headache, arthritis, autoimmune diseases, gastrointestinal problems, allergy, depression, fatigue, and sleep apnea (2, 7-10).

As pain interferes with sleep quality, productive capacity, and social and affective relations, TMD patients may use drugs for pain relief before seeking professional healthcare. Self-medication can be defined as the selection and use of medication to prevent or treat symptoms and diseases with no prescription or orientation by a physician or a dentist (11). Self-medication comprises industrialized, synthetic, natural, or homemade substances.

Approximately 36 million people are estimated to use analgesics daily without prescription in the United States (12). In Brazil, self-medication also is common (13), and analgesics are the most used drugs (14). Self-medication is necessary and complements the health systems in poor and developing countries, the WHO had published guidelines to regulate drug utilization monitoring, including the medications that could be used for self-medication with efficacy, safety, and easy administration (15).

Many medications may be exempt from prescription but not from risk. In self-medication, the users may not follow the manufacturer's indications resulting in

inappropriate intake regarding dosage, time, or possible drug interactions. For example, the abuse of dipyron has serious safety issues (15), and headaches can be caused by excessive use of analgesics (16-20). Moreover, overuse, possible intoxication, and adverse effects may increase the expenditures in the public health system (17-20). Several factors can influence in the clinical therapeutic effect, such as chronic administration, age, general health, and habits (12). Nevertheless, it still is unclear to what extent self-medication occurs in TMD patients.

We aimed at evaluating the self-medication profile of TMD adult patients, the most used medications, their effect after intake, and the relation between self-medication and socioeconomic factors in a sample from the largest city in Brazil.

## Materials and Methods

### *Study design and sample*

The study design was a cross-sectional, dual-site survey. It followed the recommendations of the Declaration of Helsinki and the Resolution 466/12 of the Brazilian Ministry of Health. The research protocol was approved by the institutional Review Boards of the University of São Paulo (No.317.640) and the University Nove de Julho (No.285.532) and was registered in the Brazilian system for human research (CAAE 14443213.8.3001.0075).

A non-probabilistic sample consisted of consecutive patients seeking TMD treatment at a specialized clinic of two dental schools: 1) the Centre of Occlusion, Temporomandibular Dysfunction, and Orofacial Pain of the University of São Paulo Dental School, in São Paulo, Brazil, and 2) the Specialization Course in Prosthodontics of the University Nove de Julho, in São Paulo, Brazil. Both specialized referral units are located in São Paulo city, in Southeast Brazil.

The inclusion criteria were: Age over 18 yr; adult patients with spontaneous pain or with pain evoked by palpation of face, cranium or

temporomandibular joint (TMJ), in static position or during mandibular movements; no toothache at the start of the study. The exclusion criteria were: Incidence of toothache during the study; treatment with medication in the last six months; mental or psychological problems that could compromise the patient's responses.

### **Procedures**

The selected patients were invited to participate in the study and received individual information on the research protocol and confidentiality of personal data. Those who accepted to participate in the study signed a written informed consent form.

All procedures for data collection were performed by a trained examiner and dental specialist before the TMD treatment. Each patient answered a standardized questionnaire to grade TMD intensity based on restrictions to mandibular movement, orofacial pain and discomfort, cranio-cervical pain, and joint noises (21). Afterwards, the patient answered questions related to self-medication by using an instrument modified from Servidone et al. (22) on socioeconomic variables and on medication data: posology, use of medication, reason for self-medication, knowledge on medication, awareness of the manufacturer's information.

Data were analyzed by descriptive statistics, logistic regressions, and chi-square tests at the 0.05 significance level. In the multivariate analysis, logistic regression was used to look at factors that were mostly associated with self-medication. Initially, univariate logistic regression was used to calculate crude odds ratios (ORs). Missing values were disregarded. In the multivariate analysis, all variables potentially associated with self-medication were included. A stepwise procedure was used for the selection of joint variables associated with self-medication,

with variables included and excluded in each step based on the likelihood ratio. All analyses were performed with SPSS Statistics, ver. 22.0 (IBM Corp, Armonk, NY).

### **Results**

The study sample consisted of 358 TMD patients (84.4% women) with a mean age of 41 yr old (standard deviation =13). Self-medication was reported by 210 (58.6%) of TMD patients.

Table 1 shows the distribution of self-medication per variable, and the results of the univariate and multivariate models of logistic regression. Through logistic regression, in the univariable model only the variables TDM Intensity and Sex were associated with self-medication. These were also the only variables that remained in the multivariable model, where patients with severe TMD were 4.7 times more likely to self-medicate when compared to patients with low TMD intensity ( $O=5.7$ ; 95% CI=2.4; 13.3), as well as female patients are 30% more likely to self-medicate when compared to male patients (OR=2.3; 95% CI=1.1; 5.1). The distribution of participants according to TMD intensity was 50% severe, 35% moderate, and 15% low. The frequencies of moderate and severe TMD in women were larger than in those in men ( $P<0.001$ ) (Table 2). Table 3 summarizes the self-medication practices reported by this sample of TMD patients. Most respondents have read (75%) and followed (66%) the drug manufacturer's information, but they were aware that self-medication could be harmful to their health (77%). The most reported self-medication categories were analgesics (46.4%) and anti-inflammatory drugs (34.4%) (Fig. 1).

**Table 1:** Descriptive statistics of the sample (n = 358) and logistic regression models for self-medication and independent variables

<i>Variable</i>		<i>Self-medication</i>		<i>Univariate model</i>		<i>Multivariate model</i>	
Variable		Total	% Yes	OR (95%CI)	<i>P</i>	OR (95%CI)	<i>P</i>
TMD intensity	low	55	29	1		1	
	moderate	122	50	2.4 (1.2 ; 4.8)	0.010	1.8 (0.8 ; 4.3)	0.172
	severe	181	73	6.8 (3.5 ; 13.2)	0.000	5.7 (2.4 ; 13.3)	0.000
Sex	female	302	64	4.1 (2.2 ; 7.5)	0.000	2.3 (1.1 ; 5.1)	0.043
	male	56	30	1		1	
Age group	Young adult	174	61	1			
	Middle-aged	146	55	0.8 (0.5 ; 1.3)	0.398		
	Old adult	38	63	1.1 (0.5 ; 2.3)	0.758		
Ethnic group	Caucasian	240	63	1			
	African	60	60	0.7 (0.4 ; 1.2)	0.174		
	Asian	16	56	0.5 (0.1 ; 1.8)	0.272		
Marital status	Married	158	61	1			
	Single	145	56	1.3 (0.8 ; 2.0)	0.329		
	Other	38	55	1.1 (0.6 ; 2.2)	0.667		
Schooling (complete grade)	3rd grade	157	60	1			
	2nd grade	67	52	0.5 (0.2 ; 1.6)	0.240		
	1st grade	10	60	0.5 (0.2 ; 1.6)	0.269		
Socio economic level	A	23	56	1			
	B1	75	56	1.0 (0.4 ; 2.5)	0.965		
	B2	101	58	1.1 (0.4 ; 2.7)	0.868		
	C1	51	59	1.1 (0.4 ; 3.0)	0.853		
	C2	55	58	1.1 (0.4 ; 2.9)	0.892		
	D	36	64	1.4 (0.5 ; 4.0)	0.572		

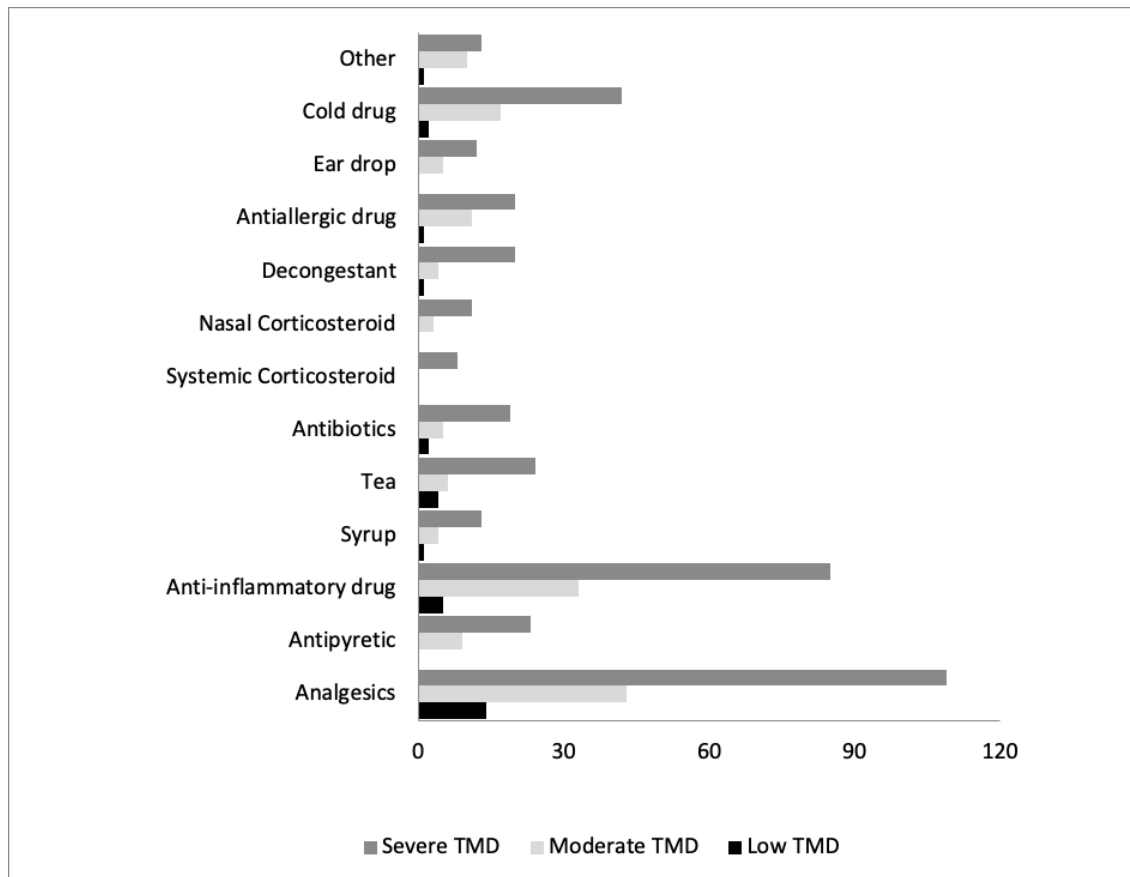
**Table 2:** Comparison of TMD intensity levels according to sex

<i>Variable</i>		<i>TMD intensity</i>			
		Low	Moderate*	Severe*	Total
Sex	Female	35	102	165	302
	Male	20	20	16	56
	Total	55	122	181	358

\*Significant difference between groups (chi-square tests,  $P < 0.001$ )

**Table 3:** Self-medication information reported by TMD patients (n = 210)

<i>Self-medication details</i>	<i>Yes</i>	<i>%</i>
Read the manufacturer’s information	157	75
Followed the manufacturer’s information	139	66
Followed indications from friends or family	79	38
Followed recommendation from a drugstore attendant	42	20
Followed TV marketing	7	3
Followed internet marketing	11	5
Followed marketing on radio, newspaper or magazine	1	0.5
Used an old prescription	115	55
Felt that the self-medication was efficacious	173	82
Felt sick after self-medication	23	11
Believes that self-medication is bad for health	161	77



**Fig. 1:** Type of self-medication reported by TMD patients (n = 210) according to TMD intensity levels

## Discussion

This study showed that almost 60% of TMD patients used self-medication. Respondents with

severe TMD and female patients were more likely to self-medicate when compared to their counterparts, but the other socioeconomic variables, e.g., age, ethnicity, marital status, schooling and socioeconomic levels, did not

affect self-medication practice. Analgesics and anti-inflammatory drugs were the most reported self-medication products. To the best of the authors' knowledge, this is the first study to investigate self-medication in a large sample of TMD patients.

Most TMD patients of the present sample were women, Caucasian, adults in their 40's, married or single, of both high schooling and socioeconomic levels, and with severe and moderate intensity of TMD signs and symptoms. This distribution can be explained the study was performed in two specialized TMD referral centers, located in São Paulo, the largest capital city in Brazil. Besides spontaneous walk-in patients, these university TMD centers receive patients from other dental clinic units, universities, hospitals, and healthcare professionals in the metropolitan region. However, the study sample was not probabilistic and representative of the city population, and the findings should not be extrapolated directly to other clinical settings.

More than half of the 358 TMD patients in the present sample (58.6%) reported self-medication, which is lower than the 76% non-specific patients who confirmed general self-medication in a medium-size city in the southern Brazil countryside (23). 83% of Brazilian otorhinolaryngologic patients had bought or used medication without prescription (22). However, the purchase or use of medication was not restricted to otorhinolaryngologic problems and may have other health complaints. The figures of the present study also were lower than the prevalence of self-medication found in southern Iran for university students of Medical Sciences (72.3%) (24) and for city dwellers and village residents (78.7%) (25). Therefore, self-medication is a common inappropriate practice that occurs across populations with diverse background and healthcare needs.

Regarding TMD intensity, self-medication was much more frequent in patients with severe signs and symptoms, explained by the fact that TMD pain can be debilitating and impact daily living negatively (2, 6, 10). Conversely, near 30% of

patients with low intensity TMD reported self-medication, and those with moderate TMD were not more likely to use self-medication, suggesting that these two groups could manage pain otherwise. These findings highlight the importance to distinguish behavioral practices among patients with different TMD severity levels and to reinforce professional advice to prevent medication overtreatment.

The sample of the present study had a ratio of 5.4 for women in relation to men and showed that female patients reported more moderate and severe TMD than male patients. Although the sample was not probabilistic, these figures should reflect the routine attendance of the two evaluated centers as TMD is more prevalent in women than men both in Brazil (21) and abroad (2, 3). Slade et al. (26) cite biological, hormonal, and psychological reasons to justify this sex-difference in TMD prevalence. A study in rats found that estradiol and testosterone reduced the joint inflammation and nociception of induced TMD (4), which could explain the role of sexual hormones in the disease mechanism.

This study showed that the percentage of women reporting self-medication was higher (64%) than that of men (30%), which corroborates previous studies in Brazil (22, 23) and in Greece (27). However, the same effect is not observed in other studies. For instance, in Iran, the self-medication prevalence was not different between female and male Medical Science students (24), but it was higher in men in a community-dwelling survey (25). Other socioeconomic variables, such as age and education, also showed effect on self-medication practice (25) or not (24) depending on the study. The results may be influenced by the sample heterogeneity, ratio between women and men, specific main independent variable of interest, and other factors, such as decision-making autonomy and access to formal healthcare.

In this sample, self-medication was not associated with age, ethnicity, marital status, schooling and socioeconomic levels, also reported previously (11). In relation to age, self-medication is a geriatric concern due to the increased exposure

to polypharmacy, medication interaction, and mistakes in dosage and administration time. However, the present study did not find any difference in self-medication among young adults (18 to 39 yr old), middle-aged (40 to 59 yr old), and old adults (60 yr old and over). Schooling and socioeconomic levels were not associated with self-medication as well, considering that the sample was derived from the urban population of the largest city in Brazil. One could expect that less education and low financial conditions would lead to inappropriate healthcare practices such as self-medication. This was found in a study with Iranian adults, mostly living in urban areas, which reported that people with more years of education were less likely to self-medication behavior (25). Conversely, an opposite possibility would be that higher education could give patients more confidence to practice self-healthcare and have more access to drugs (23).

Analgesics and anti-inflammatory drugs for relief of pain, discomfort, and inflammation were the most used drugs for self-medication, which is in agreement with previous studies (14, 16, 22, 23, 28). Most patients reported that the medication was indicated by friends, family or old prescription. Although the media and industry marketing could have a strong influence on medication consumption, few patients reported that. The drug choice often is based on the recommendation of laypersons, and the over-the-counter commerce favors the drug acquisition without professional prescription (29). Many drugs are purchased for family use, which may represent a household economic saving but also facilitates improper health treatment (16). Others share medications with friends and relatives, use remaining drugs from previous prescriptions (30), or reuse old prescriptions (23). Among Iranian Medical Sciences students, having a medicine stock was the main factor leading to self-medication practice (24). Therefore, the availability of existing drugs and opportunity of using them may increase self-medication practice across different populations.

Most TMD patients under self-medication stated that they have read and followed the

manufacturer's indications, and they were aware that self-medication can be harmful. Indeed, almost 10% reported feeling sick after intake of medication without professional orientation, although 82% reported that self-medication had some efficacy. Several medications and substances taken by the patients in this sample are not indicated for TMD problems. Another concern is that most patients had severe TMD signs and symptoms and may not have followed the ideal drug posology, which could lead to higher dosage and reduced administration time. Therefore, it is important to inform patients, caregivers, and professionals of this additional problem with self-medication.

Some limitations regarding the study design and the sample from a major metropolis do not allow causal-effect analysis or extrapolation for TMD patients in small cities and rural areas. The lack of similar studies on self-medication in TMD patients warrants further investigation to develop appropriate clinical protocols and information material for patients and dental staff. Self-medication is a public health problem, and the WHO has launched a global initiative to reduce 50% of serious and preventable harm associated with drugs in all countries by 2022.

## **Conclusion**

Self-medication is common among TMD patients attending specialized clinics, and this inappropriate practice is more likely to occur in women and in patients with severe signs and symptoms of TMD. Most patients used medications indicated by friends and relatives, or from old professional prescriptions. Furthermore, the effect of self-medication with analgesics and anti-inflammatory drugs is of short duration and may have adverse effects. Therefore, clinical examination for TMD treatment should include evaluation of self-medication for precise diagnosis, comprehensive treatment planning, and successful health-care delivery.

## Journalism Ethics considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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## Conflict of interest

The authors declare that there is no conflict of interest.

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