








Assessing self-medication habits among dental students from a private university in the state of São Paulo, Brazil: a cross-sectional study

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Aim: Self-medication is a common practice, often underestimated in terms of its associated risks. This behavior is observed not only among individuals with formal education in healthcare but also among students and professionals in the field. This study aimed to assess the prevalence of self-medication among dental students and graduates with training in Pharmacology and Anesthesiology, while identifying the most frequently used medications for self-treatment. **Methods:** This cross-sectional observational study was conducted using a virtual questionnaire comprising 17 items. The questionnaire was distributed to undergraduate and postgraduate dentistry students who had completed the Pharmacology and Anesthesiology courses at a private university in the interior of São Paulo, Brazil. **Results:** Among the 195 respondents, the majority (82.05%) were women, and an overwhelming 98.75% reported engaging in self-medication. Analgesics were the most frequently used drug class, with headaches being the primary condition prompting self-medication. Despite the high prevalence of this practice, 85.64% of participants acknowledged its potential risks to their health. **Conclusion:** Self-medication represents a significant concern in dental medicine, affecting both undergraduate students and graduates. Although these individuals are healthcare professionals or in training for such roles, the expectation that their medication use would be more cautious and informed is often not met, potentially leading to inappropriate drug use.

Keywords: Self medication. Dentistry. Dentists. Pharmaceutical preparations.



Introduction

Self-medication, defined as the intentional use of medications without medical or dental prescription to treat self-diagnosed diseases or symptoms¹, remains a significant public health concern in Brazil, one of the world's leading consumers of pharmaceuticals². This issue is exacerbated by the widespread distribution of pharmacies across the country, a number three times higher than the recommendation of the World Health Organization (WHO)³.

To promote consumer preference for their products, the pharmaceutical industry heavily invests in advertising over-the-counter (OTC) medications. While these drugs are generally perceived as safe, they carry potential adverse effects, which are extensively detailed in their package inserts^{4,5}. When used appropriately, OTC medications play a crucial role in healthcare systems by providing safe and effective symptom relief for minor illnesses, significantly reducing the demand for medical consultations and optimizing healthcare resources⁶⁻⁹.

However, the challenge lies in balancing the benefits of self-care with the risks associated with the indiscriminate use of medications. Inappropriate drug use may not only mask symptoms but also delay the diagnosis of serious medical conditions, ultimately compromising health and leading to economic repercussions. Ineffective management of underlying conditions results in wasted healthcare resources and prolonged patient suffering^{6-8,10,11}.

Currently, self-medication is recognized as an emerging public health issue, affecting a large proportion of the population and generating both individual and collective consequences, further burdening the Unified Health System (SUS). The use of non-prescription medications intensified during the COVID-19 pandemic, exacerbating this already concerning scenario¹².

It is essential to emphasize that self-medication is a multifactorial phenomenon, driven by dissatisfaction with delays and the perceived low quality of healthcare services, as well as the financial burden of medical consultations. Additionally, self-medication may be influenced by prior personal experiences with medications in cases of recurring symptoms, recommendations from individuals within the same social circle, or advice from pharmacists and pharmacy attendants based on their professional experience. The over-the-counter availability of medications and the anonymity provided by pharmacies further contribute to this practice¹³⁻¹⁵.

Data from the National System of Toxic-Pharmacological Information (Sinitox/Fiocruz) indicate that medications are the leading cause of human poisoning by toxic agents in Brazil¹⁶. Additionally, the WHO estimates that hospitals allocate between 15% and 20% of their financial resources to managing complications related to self-medication¹⁷. In an even more alarming perspective, the Brazilian Association of Pharmaceutical Industries (Abifarma) estimates that approximately 20,000 individuals die annually due to self-medication¹⁸. Despite the well-documented risks associated with the indiscriminate use of medications without prescription or med-

ical supervision, self-medication remains prevalent among students and healthcare professionals across various fields¹⁹⁻²¹.

Dental professionals are expected to engage in responsible self-care. During their education, dental students acquire extensive knowledge in Basic and Applied Pharmacology, covering fundamental concepts of pharmacodynamics and pharmacokinetics—key disciplines for understanding pharmacotherapy²². Furthermore, according to Federal Law No. 5,081/66, dentists are authorized to prescribe and administer pharmaceutical products for both internal and external use in Dentistry²³.

Dental prescriptions should be strictly limited to treating oral health-related conditions. In specific cases, the prescription of adjunctive medications is permitted but should be approached with caution. The practice of self-medication among dental students and professionals may be facilitated not only by their easy access to extensive pharmaceutical information but also by the widespread availability of medications, increasing the likelihood of irrational use^{3,24}.

Given the comprehensive knowledge acquired during their training and their immersion in the healthcare environment, it is understandable that dentists may feel confident in self-medicating. However, this perception contrasts with their awareness of the risks associated with self-medication. Therefore, this study aims to analyze the prevalence of self-medication among undergraduate and postgraduate dental students at a higher education institution in Mogi das Cruzes, Brazil, and to identify the most frequently used drug classes for this purpose.

Materials and Methods

After approval from the Research Ethics Committee (opinion No. 4,564,707), a cross-sectional study was conducted using a self-designed questionnaire as the data collection instrument. The questionnaire comprised 17 questions, including objective and multiple-choice questions, with spaces for discursive responses. These questions were developed by the authors, drawing inspiration from previous works related to the subject.

The questionnaire was distributed exclusively to students of dentistry at the Universidade de Mogi das Cruzes (UMC), a private higher education institution located in the interior of São Paulo, Brazil. Given that the research aimed to assess awareness levels regarding self-medication risks after students had received formal education on the subject, only students who had successfully completed the pharmacology and anesthesiology courses were included. Therefore, only undergraduate students in their fourth semester or later, as well as postgraduate students in dentistry, were eligible to participate.

The questionnaire was sent to potential volunteers a total of three times: initially in October 2020, then in December 2020, and finally in February 2021. Data collection was closed at the end of February 2021. Only fully completed responses were considered, while partially filled-out forms were excluded from the analysis. All participants were over 18 years old and voluntarily agreed to participate by providing informed

consent. The questionnaire was distributed via email, WhatsApp, Direct (Instagram), and Messenger (Facebook) through a link generated on GoogleForms®.

In addition to demographic information such as age, gender and marital status, the questionnaire included key questions related to self-medication, such as:

1. Do you consider yourself dependent on medications?
2. Do you engage in self-medication?
3. Are you aware of the risks of self-medication?
4. Do you believe self-medication can pose any harm to your health?
5. How often do you practice self-medication?
6. What are the main symptoms you experience when opting for self-medication?
7. Have you used any non-prescription medication in the last 15 days?
8. If you have used non-prescription medication, what class was it?
9. Did you use these medications under the guidance of anyone?
10. Before self-medicating, did you seek additional information about the medication?
11. After the self-administration period, were you satisfied with the disappearance of symptoms?

The inclusion criteria were: being a dentistry student (undergraduate or postgraduate) at UMC, being 18 years or older, and having successfully completed the pharmacology course in the curriculum (i.e., at least in the fourth semester of the undergraduate program). No exclusion criteria were defined.

The responses were compiled and analyzed using Microsoft Excel (Microsoft Corporation), applying descriptive statistical analysis. The main outcomes assessed included:

- Primary causes of self-medication
- Most commonly used medications
- Source of prescription or recommendation
- Satisfaction with symptom relief
- Frequency of self-medication
- Awareness of potential health risks
- Search for additional information about medication
- Dependence on any medication

Self-medication was defined as the use of medications independently or based on recommendations from non-qualified individuals. The data were subjected to descriptive analysis.

Results

Among participants meeting the established criteria, a total of 195 were included, representing 100% of the group. Both genders were present, with a predominant female majority of 82.05%. Notably, a higher quantity of young individuals, aged 18 to 25 years, accounted for 76.41%. The majority of participants were unmarried, constituting 77.44% of the total. Concerning family income, the most common range was between 1 and 3 minimum wages, encompassing 36.41% of participants, followed by 3 to 6 minimum wages, representing 31.28% (Table 1).

Table 1. Socioeconomic profile of research participants.

	Frequency (%)	Total (n)
Gender		
Female	82.05%	160
Male	17.95%	35
Age		
18-28	76.41%	149
29-38	18.97%	37
39-48	3.60%	7
>48	1.02%	2
Marital status		
Single	77.44%	151
Married	18.46%	36
Divorced	1.03%	2
Widower	0.51%	1
Other	2.56%	5
Family income		
No income	4.62%	9
Up to 1 minimum wage	2.56%	5
2-3 minimum wage	36.41%	71
4-6 minimum wage	31.28%	61
>6 minimum wage	25.13%	49

From the total sampled, the participation of individuals who have already completed their undergraduate studies was nearly equivalent to that of undergraduates. When questioned about their exposure to the Pharmacology discipline during their undergraduate studies, more than half of the respondents claimed comprehensive exposure (76.92%), while only 10.26% reported limited contact with the discipline (Table 2).

Table 2. Educational level of research participants and contact with Pharmacology during graduation.

	Frequency (%)	Total (n)
Education Degree		
Graduating	47.18%	92
Graduate without specialization	24.10%	47
Graduated with specialization	12.82%	25
Master	10.26%	20
PhD	4.10%	8
Postdoctoral	1.54%	3
Contact with Pharmacology during graduation		
There was only basic contact	10.26%	20
There was the subject within another discipline	12.82%	25
Had access to a very complete Pharmacology	76.92%	150
I didn't have any access to this subject.	0.00%	0

Additionally, among participants who confirmed medication use in this study, the majority (79.35%) stated that they did so by their own decision (Figure 1A). In second place were those who received recommendations from family, friends, or neighbors, accounting for 11.41%. Notably, among those who used medications on their own initiative, the distribution was equal, with 50% being undergraduates and 50% being graduates. Conversely, among participants who did not report using any non-prescription medication in the last 15 days, the majority (69.23%) had already completed their undergraduate studies, while 30.77% were still in the process of education (Table 2).

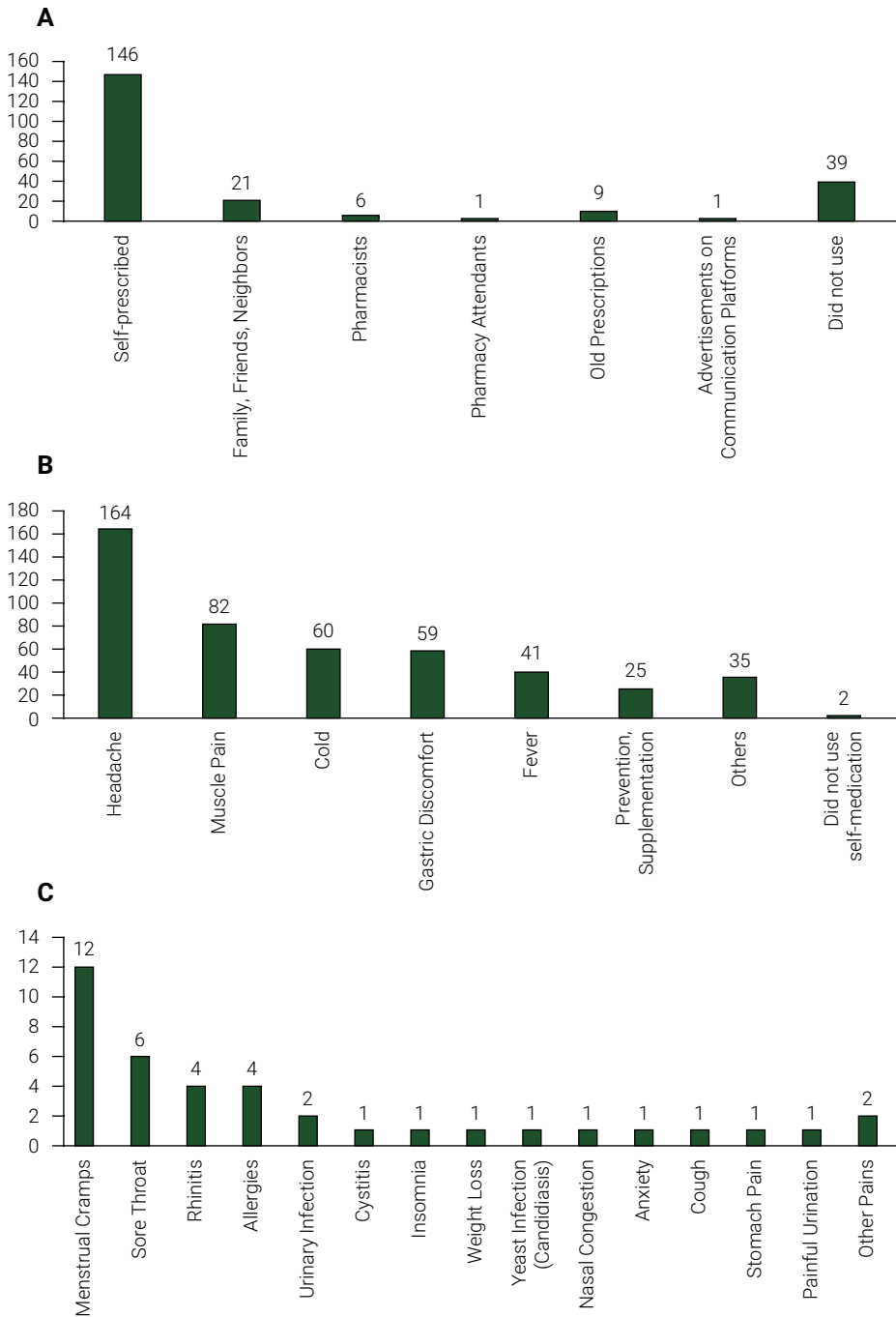


Figure 1. Identification of self-medication factors and symptoms according to the total number of reports. (1A) Decision-making for self-medication. (1B) Symptoms reported for self-medication as documented in the questionnaire. (1C) Symptoms reported for self-medication described in a narrative form by the respondents.

In this study, the most common symptom that led participants to opt for self-medication was a headache (35.19%), followed by muscular pain (17.60%), and cold symptoms (12.87%) (Figure 1B). Participants who used medications not listed in the questionnaire options had the opportunity to indicate other symptoms leading to self-medication. The most commonly mentioned symptoms included menstrual cramps (32.43%), sore throat (16.21%), allergic rhinitis (10.81%), and other allergies (10.81%) (Figure 1C).

The most consumed classes of medications by the sample were analgesics, representing 38.02%, followed by anti-inflammatories, with a rate of 19.34%. Notably, among participants who claimed not to practice self-medication, the distribution was equal, with 50% being undergraduates and 50% being graduates without specialization (Figure 2A). Regarding the use of classes of medications not listed as alternatives, 43.75% of participants reported using antihistamines, 12.5% used stomach acid inhibitors, while another 12.5% resorted to muscle relaxants. Other classes of medications, such as corticosteroids, thyroid hormones, herbal medicines, weight loss medications, and antitussives, were used by 6.25% each (Figure 2B).

Regarding participants' satisfaction with symptom relief after self-administered medication use, 97.94% of the sample reported a positive experience, while only 1.03% were not satisfied with the results. In terms of the frequency of this practice, we observed that 53.85% engaged in it infrequently. Within this group, 46.67% were undergraduates, and 53.33% were graduates. Among those who practiced it very frequently (28.72%), 51.78% were undergraduates, and 48.22% were graduates. For 16.41% of participants, self-medication was a rare habit, while only 1.03% never practiced it. Notably, regarding the high percentage of self-medication among respondents, there was no significant difference between undergraduates and graduates in the different categories. Addressing dependence, 91.79% of participants did not consider themselves dependent on any medications, while 8.21% recognized themselves as dependent (Table 3).

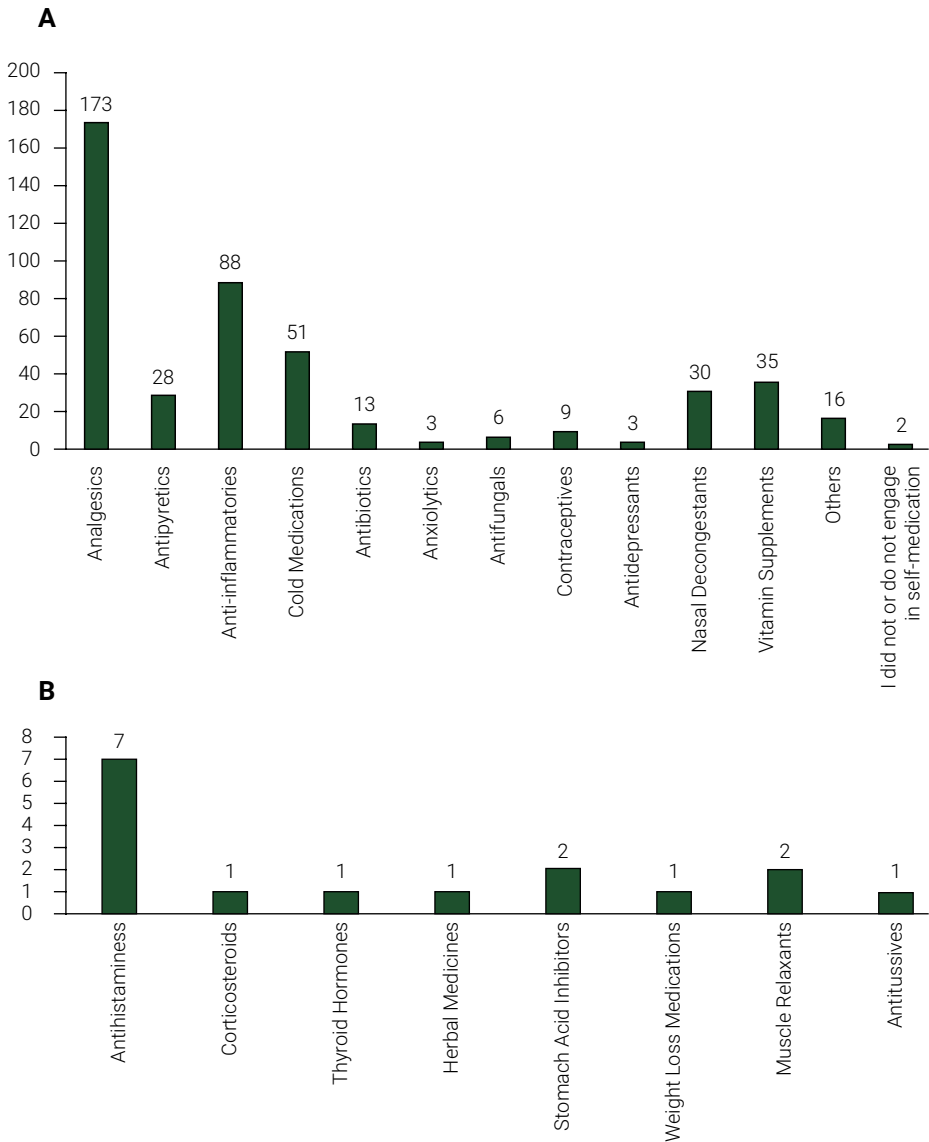


Figure 2. Identification of medication classes used in self-medication according to the total number of reports. (2A) Medication classes for self-medication as outlined in the questionnaire. (2B) Medication classes for self-medication described in a narrative form by the respondents.

Table 3. Relationships of research participants with the practice of self-medication.

	Frequency (%)	Total (n)
Satisfaction with the disappearance of symptoms		
Yes	97.94%	191
No	1.03%	2
I did not/do use self-medication	1.03%	2

Continue

Continuation		
Frequency of use		
Never	1.03%	2
Rarely	16.41%	32
Infrequency	53.84%	105
Too often	28.72%	56
Possibility of causing harm to health		
Yes	85.64%	167
No	14.36%	28
Search for additional information about the medicine		
Yes	83.59%	163
No	16.41%	32
Dependence on any medication		
Yes	8.21%	16
No	91.79%	179

Discussion

Similar to the findings of Galán Andrés et al.²⁵ (2021) and Tarley et al.²⁶ (2018), this study observed a predominance of female participants, with a significantly higher percentage compared to males. This may be related to a greater tendency among women to recognize physiological changes and seek health-related information. Additionally, the possibility of a higher proportion of female students enrolling in dentistry courses should be considered, as reported in previous studies.

Regarding age distribution, most respondents were young, a pattern commonly observed in the literature on this subject. Chaves et al.²⁷ (2017) identified a predominant age range between 21 and 25 years, while Azevedo et al.²⁸ (2014) reported ages between 18 and 30 years. This aligns with the expected profile of university students in healthcare courses.

Similarly, de Aquino et al.⁴ (2010) found that the most frequent income range was between 6 and 10 minimum wages, based on the economic context at the time, when the minimum wage was R\$300. Silva et al.²⁹ (2014) reported that 62.1% of participants had an income between 2 and 5 minimum wages (with a minimum wage of R\$540), which is comparable to the income profile identified in this study. While family income was recorded, its direct relevance to self-medication practices requires further exploration.

The findings also align with those of Silva et al.²⁹ (2014), who analyzed self-medication practices among nursing students and observed a significant association between self-medication and academic progression. Even after completing pharmacology courses, self-medication persisted, suggesting that the knowledge acquired about adverse drug reactions does not necessarily translate into reduced self-medication behavior.

Regarding medication use, 80% of participants reported using non-prescription medications in the last 30 days. This high prevalence is consistent with Azevedo et al.²⁸ (2014), who found that 65% of dental patients in Piracuruca-PI had used non-prescription medications in the previous 15 days. Similarly, Fontanella et al.³⁰ (2013) reported a self-medication prevalence of 51.5% in the 7 days before data collection among students from various academic backgrounds.

Conversely, a study by Lúcio et al.³¹ (2011) with dental students from the Federal University of Paraíba (UFPB) and the State University of Paraíba (UEPB) revealed that many students did not feel adequately prepared to prescribe medications, despite their training. At UFPB, 58.3% of students considered their knowledge insufficient, while at UEPB, this percentage was even higher (85.4%). This raises a contradiction, as a high proportion of students and professionals in the field still engage in self-medication despite acknowledging gaps in their knowledge. Costa et al.³² (2013) reinforced this issue, noting that 45% of students reported frequent doubts about safe prescribing, while 36% had occasional uncertainties. These findings highlight the need for a deeper analysis of the relationship between academic training and self-medication practices.

The study population was nearly evenly distributed between undergraduate (47.18%) and postgraduate (52.82%) students, differing from other studies that focused primarily on undergraduates. Chaves et al.²⁷ (2017) observed that nursing students associated their self-medication practices with the knowledge acquired during their coursework, even after completing pharmacology classes. A similar trend was observed in this study, where most respondents had extensive exposure to pharmacology content.

The main reasons for self-medication identified in this study align with previous findings. Damasceno et al.³³ (2007) reported that headaches (36.6%), general pain (13.4%), and fever (12.4%) were the most cited reasons. Fonseca et al.³⁴ (2010) also found that headaches (14.61%), colds (13.21%), and nausea (9.11%) were common justifications for self-medication. Tarley et al.²⁶ (2018) similarly reported that headaches were the leading cause, followed by colds/flu and fever, among both health science students and those from other fields. These findings illustrate how the motivations for self-medication vary across different contexts.

Regarding the types of medications used, Domingues et al.³⁵ (2017) found that analgesics (56.5%) were the most frequently used, followed by anti-inflammatories (20.9%) and antipyretics (12.9%). These results align with the findings of this study. Similarly, Damasceno et al.³³ (2007) reported that analgesics (58.7%) were the most used, followed by antipyretics (19.3%) and anti-inflammatories (14.2%). The preference for these medications is likely influenced by their widespread availability without the need for a prescription.

The frequency of self-medication reported in this study is comparable to findings by Souza et al.³⁶ (2017), where only 8.6% of participants considered self-medication a rare practice, while 91.4% used medications when experiencing pain. Additionally, 83.59% of respondents sought information before self-medicating, and 85.64% believed that self-medication could pose health risks. Tomasini et al.³⁷ (2015) found

a similar perception of risk, with 87.4% of respondents acknowledging the potential harm of self-medication.

Tomasini et al.³⁷ (2015) also reported that one of the main reasons for self-medication was a prior medical consultation. Many students reused previously prescribed medications when experiencing similar symptoms, believing that a new consultation was unnecessary.

This study highlights a sample composed predominantly of dental students and professionals, a group expected to have a strong foundation in health education^{22,23}. However, depending on the region or country analyzed, the literature presents mixed findings regarding the prevalence of self-medication among health science students compared to those in other fields. Some studies indicate no significant differences³⁸⁻⁴¹, while others suggest a lower prevalence among health science students^{42,43}.

There is no single measure that can completely eliminate self-medication. However, given its widespread nature and public health implications, it is essential to implement more comprehensive educational strategies. Providing detailed information about proper medication use, risks of intoxication, adverse reactions, and the financial burden on healthcare systems due to complications related to self-medication is crucial^{6-8,10}. These initiatives should extend beyond academic settings to social media platforms, ensuring greater awareness and promoting responsible medication use.

In conclusion, self-medication is a significant public health concern, with a high prevalence among both undergraduate and postgraduate dentistry students, despite their pharmacological training. Analgesics and anti-inflammatory drugs were the most commonly used medication classes, often for conditions beyond the scope of dental practice. This behavior is likely driven by the widespread availability of these non-prescription drugs. Although these individuals are current or future healthcare professionals, the expectation that their medication use would be more restrained and rational is not reflected in practice.

Data availability

Datasets related to this article will be available upon request to the corresponding author.

Conflict of Interest

The authors have no conflict of interest to disclose.

Author Contribution

Virgínia Dini Teodoro: data curation, investigation, and writing-original draft. **Tatiana Ribeiro de Campos Mello**: data curation, validation, formal analysis, and writing-review & editing. **Daniel Felipe Fernandes Paiva**: formal analysis, methodology, and writing-review & editing. **Gabriela Luiza Moreira Carvalho**: writing-review & editing. **Francine Benetti**: formal analysis, methodology, and writing-review & editing. **Carolina Bosso André**: conceptualization, formal analysis, and writing-review & editing. **Camila**

Batista da Silva de Araujo Candido: conceptualization, formal analysis, methodology, project administration, and writing-review & editing. All authors have revised and approved the final version of the manuscript.

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