

# **Prevalence and Current Practices of Self-Medication among Students of the Biomedicine Degree at the Health Sciences School**

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## **Abstract**

*Self-medication is often seen as a solution for the immediate relief of symptoms, however, bringing serious consequences to consumer's health and serious public health problems in Brazil and the world. Still, regarding self-medication, the conduct of University students in the health area is observed, since the habit in this group is high. Given these facts and the need for epidemiological and toxicological evidence on self-medication of this school group, this study aims to verify the prevalence of self-medication in Biomedicine Degree students of the Universidade Brasil. It is a cross-sectional study conducted with 63 scholars from the first three graduation years of the Biomedicine degree at the Universidade Brasil, in Fernandópolis, São Paulo. A validated questionnaire with social and medication consumption variables was applied, followed by statistical analysis by the Mann-Whitney test. As a result, self-medication was considered an option for 59 of the participants, most of them juniors, female, aged between 18 and 20, with no previous college degree, with medical insurance and aware of possible health risks, even after access to classes or online surveys. The clinical condition preceding self-medication included mainly headache, myalgia, fever, and allergies. There was a preference for anthelmintic, anti-inflammatory, analgesic, antipyretic medication, mainly antibiotics, and central nervous system stimulants. The habit of self-medication increases, gradually, during the graduation period, therefore is suggested the implementation of an educational campaign in the Biomedicine course curriculum to undo this cycle of chemical substance consumption.*

**Keywords:** Cross-sectional Study, Self-medication, Adverse Reaction, Private College Students, Corticosteroids, Central Nervous System Stimulants.

## **1. Introduction**

It's defined as self-medication the practice of consuming medication without prior consultation with a health professional. Self-medication is practiced by people who deal with their health problems and

disorders through medication obtained without a doctor's prescription, thinking it is effective when consumed<sup>[1]</sup>.

This habit has been impressive for its easy accessibility to medications without medical orientation by the general population. It is noteworthy that this habit can promote adverse medication reactions to consumer health<sup>[2]</sup>. Also, with the advertising of several medications in digital media, it has become easier to acquire them in drugstores, resulting in a misinterpretation of the risks that this practice can cause, boosting uncontrolled use, causing damage to the body due to therapeutic effects<sup>[3]</sup>. It is important to point out that the high consumption of medicines is more and more frequent, causing constant damage to health.

The factors that most interfere in the self-medication occurrence are the lower social classes due to the difficulty of obtaining a medical appointment, often looking for pharmacists, friends or relatives, to acquire medicine to treat their health problem<sup>[2]</sup>. It should be noted that self-medication does not occur only in poor social classes; it is evident in people with high acquisitive power. Thus, the upper social class, even having greater knowledge and education, makes use of medications on its own, ignoring the risks they may bring<sup>[4]</sup>.

Another detail that deserves to be highlighted is the conduct of college students in the health area since self-medication in this group is high, especially students who have medical insurance<sup>[5]</sup>. Because they are biomedicine students, it is expected a higher consciousness and lower consumption of medications, however, the more knowledge, the higher is the inappropriate medicine consumption by students<sup>[6]</sup>. It is important to emphasize that self-medication has as the main problem to hide or hinder the correct diagnosis of existing diseases, causing dependence, hypersensitivity and leading to risks of large proportion and difficult clinical reversion<sup>[7]</sup>.

Still, regarding self-medication among college students, it is interesting to point out that a few studies have been found on scientific databases, mainly students of the Biomedicine Degree, which makes it necessary to carry out more research in this area. Given these facts and the need for epidemiological evidence and toxicology on self-medication of this school group, this study aims to verify the prevalence of self-medication in Biomedicine Degree students of the Universidade Brasil, Campus Fernandópolis, São Paulo.

## **2. Materials and Methods**

The study was approved by the Research Ethics Committee of the Universidade Brasil under the advisory opinion 3.261.199 and CAAE number: 10891419.1.0000.5494.

This research was a cross-sectional epidemiological study conducted from August 2019 to December 2020. The inclusion criteria considered included students enrolled from the first to the third year of graduation in the Biomedicine Degree at Universidade Brasil, Campus Fernandópolis, São Paulo with the respective signature of the Free and Informed Consent Term. It excluded those who refused to participate or presented themselves in prescription medication therapy.

A 12-question questionnaire adapted from Servidoni<sup>[8]</sup> was used for the study. The following were considered in the multiple-choice questionnaire: 1) Degree Level, 2) Gender, 3) Age, 4) Undergraduation, 5) Marital Status, 6) Health Insurance Payment, besides the use of self-medication and associated details

are in the questionnaires: 7) Self-medication without medical prescription, 8) Before self-medicating, have you looked for information, orientation or additional clarifications of the medication?, 9) Are you used to read the medicine package leaflet before self-medicating, 10) Awareness of health risks, 11) Medication Types, and 12) Previous clinical conditions. The application of the questionnaire was done individually in class to verify the prevalence of self-medication in students. The study also discussed adverse medication reactions related to the use of self-medication.

The data analysis was carried out by descriptive and inferential statistics, with values of  $p < 0.05$  and application of the Mann-Whitney test by the SPSS Statistics Software (Version 23) linked to the functionalities of the Excel program (version 2.016).

### 3. Results

The sample studied involved 63 students from the first to the third year of graduation from the Biomedicine Degree at the Universidade Brasil, being 15 (23,81%) freshman students, 19 (30,16%) sophomore students, and 29 (46,03%) junior students. Of these students, 45 (71,43%) were female and 18 (28,57%) were male (Table 1). The predominance of the age bracket was between 18 and 20 years old, with 34 (53,97%) students. 25 (39,68%) students between 21 and 30, and 4 (6,35%) students over 30 years old. Regarding the educational level, only 10 (15,87%) students had previous undergraduation and 53 (84,13%) had no previous education. Still in Table 1, 55 (87,30%) were single and 8 (12,70%) students were married. 40 (63,49%) students had no health insurance, and 23 (36,51%) of the participants reported having health insurance.

**Table 1:** Epidemiological characteristics of Biomedicine Degree students (absolute and relative values).

CHARACTERISTICS	INFORMATION	N	%
Gender	Female	45	71,43
	Male	18	28,57
Age	18 to 20 years	34	53,97
	21 to 23 years	15	23,81
	24 to 26 years	7	11,11
	27 to 30 years	3	4,76
	Over 30 years	4	6,35
Undergraduation	No	53	84,13
	Yes	10	15,87
Marital Status	Single	55	87,30
	Married	8	12,70
Health Insurance Payment	Yes	40	63,49
	No	23	36,51

Concerning the behavior of the participants about the use of non-prescription medications (Table 2),

it was verified that 59 students have already taken self-medication, 39 (61.90%) students have the habit of self-consumption of non-prescription medication (drugs that are not obligatory to present a prescription) and 20 (31.75%) students with the same habit, however, it is obligatory to present a prescription for medicine consumption. On the other hand, 4 (6.35%) students do not show the vicious cycle of self-medication. Before starting self-medication, 47 (74.60%) students looked up for information about the medicine that would be used, 16 students (25.40%) did not look up for information. As for the reading of the package leaflet, 16 (25.40%) students sought additional information, 22 students (34.92%) sometimes sought information, 20 students (31.75%) rarely sought details of the medication, and 5 (7.94%) students never sought additional information on the medicine. Of the 63 participants, 62 students (98.41%) did not believe that self-medication can bring health risks and 1 (1.59%) student believed that self-medication can cause serious risks to the body (Table 2).

**Table 2:** Variables describing the prevalence of self-medication among students.

VARIABLES	INFORMATION	Prevalence of self-medication	
		N	%
Have you ever self-medicated without a doctor's prescription?	No.	4	6,35
	Yes, but there was no need for a medical prescription.	39	61,90
	Yes, even though it is mandatory to present a medical prescription for consumption.	20	31,75
Before self-medicating, did you seek additional information, guidance, or clarification on the medication?	No.	47	74,60
	Yes.	16	25,40
Do you usually read the medicine leaflet before self-medicating?	Always.	16	25,40
	Sometimes.	22	34,92
	Rarely.	20	31,75
	Never.	5	7,94
Do you believe that self-medication can bring health risks?	No.	62	98,41
	Yes.	1	1,59

As for the most commonly used medications, Table 3 shows that anthelmintics (10.04%), anti-inflammatory medications (8.55%), analgesics (7.99%), antipyretics (7.43%), antibiotics (7.62%), and central nervous system (CNS) stimulants prevailed (example): Ritalin, Vyvanse) (7.25%), cough syrups (8.45%), cold/flu medications (10.63%), antiallergic/antihistamine (6.13%), and muscle relaxants (5.58%), and others with low consumption.

**Table 3:** Self-consumed medications by students.

MEDICATIONS	N	%
Anthelmintics	54	10,04
anti-inflammatory	46	8,55
Analgesics	43	7,99
Antipyretics	40	7,43
Antibiotics	41	7,62
stimulants (CNS)	39	7,25
cough syrups	39	7,25
cold medications	37	6,88
antiallergic/antihistamine	33	6,13
muscle relaxants	30	5,58
anti-flu	23	4,28
oral contraceptives	21	3,90
nasal decongestants/vasoconstrictors	16	2,97
Antiasthmatics	15	2,79
Antacid	12	2,23
systemic corticosteroids (oral)	10	1,86
vitamins and supplements	9	1,67
Laxatives	8	1,49
anxiolytics, antidepressants, hypnotics (treats insomnia)	8	1,49
nasal corticosteroids	4	0,74
drops otological (for ear)	3	0,56
Antidiarrheal	3	0,56
Antispasmodics	2	0,37
against flatulence	1	0,19
Others	1	0,19
Anabolics	0	0,00

Table 4 demonstrates the clinical condition before self-medication, which included cephalgia in 57 students (10.86%), myalgia in 56 students (10.67%), and cold symptoms in 47 students (8.95%), allergies in 46 students (8.76%), fever in 44 students (8.38%), sinusitis in 37 students (7.05%), pharyngitis, tonsillitis, and laryngitis in 36 students (6.86%) and epigastralgia in 35 students (6.67%) and other clinical conditions with lower rates.

**Table 4:** Clinical condition that led students to self-consumption of medications.

CLINICAL CONDITION PRECEDING	N	%
Cephalgia	57	10,86
Myalgia	56	10,67
cold symptoms	47	8,95
Allergies	46	8,76
Fever	44	8,38
Sinusitis	37	7,05
pharyngitis/tonsillitis/laryngitis	36	6,86

Epigastralgia	35	6,67
Toothache	28	5,33
Nausea	27	5,14
skin lesions	19	3,62
intestinal pain	17	3,24
Rhinitis	15	2,86
anxiety, depression and insomnia	13	2,48
Reflux	12	2,29
difficulty focusing on studies	11	2,10
ear infections or inflammations (otitis)	10	1,90
lung diseases	6	1,14
other clinical conditions	6	1,14
orofacial lesions	3	0,57

In Tables 5, 6, and 7, the inferential part of the statistical crossings was analyzed. The results of these Tables did not present significant statistical tests. However, the descriptive crossing of the junior students in Table 5 was more significant, due to the higher consumption of over-the-counter medications, knowing that it is mandatory to use a prescription to consume the medicine. Table 6 shows that the age group between 18 and 20 years old was the most significant to the use of over-the-counter medication with mandatory prescription use. Table 7, on the other hand, shows that the gender who consumes the most over-the-counter medications is women, which shows that they are the largest medications consumers.

**Table 5:** Cross-referencing data between Degree Level X With the information: Have you already self-medicated without prescription.

VARIABLES	1° year		2° year		3° year		TOTAL		Value p <sup>1</sup>
	N	%	N	%	N	%	N	%	
No.	2	13,33	0	0,00	2	6,90	4	6,35	<b>P = 0,540</b>
Yes, but there was no need for a medical prescription.	6	40,00	15	78,95	18	62,07	39	61,90	
Yes, even though it is mandatory to present a medical prescription for consumption.	7	46,67	4	21,05	9	31,03	20	31,75	
<b>TOTAL</b>	<b>15</b>	<b>100,00</b>	<b>19</b>	<b>100,00</b>	<b>29</b>	<b>100,00</b>	<b>63</b>	<b>100,00</b>	

<sup>1</sup>Value p regarding the Mann-Whitney test  $p > 0.05$ .

**Table 6:** Cross-referencing data between Age group X With the information: Have you already self-

medicated without prescription.

VARIABLES	18 to 20 years		21 to 23 years		24 to 26 years		27 to 30 years		Over 30 years		TOTAL		Value p <sup>1</sup>
	N	%	N	%	N	%	N	%	N	%	N	%	
No.	3	8,82	1	6,67	0	0,00	0	0,00	0	0,00	4	6,35	<b>P = 0,425</b>
Yes, but there was no need for a medical prescription.	21	61,76	7	46,67	4	57,14	3	100,00	4	100,00	39	61,90	
Yes, even though it is mandatory to present a medical prescription for consumption.	10	29,41	7	46,67	3	42,86	0	0,00	0	0,00	20	31,75	
<b>TOTAL</b>	<b>34</b>	<b>100,00</b>	<b>15</b>	<b>100,00</b>	<b>7</b>	<b>100,00</b>	<b>3</b>	<b>100,00</b>	<b>4</b>	<b>100,00</b>	<b>63</b>	<b>100,00</b>	

<sup>1</sup>Value p regarding the Mann-Whitney test P>0.05.

**Table 7:** Cross-referencing data between Gender X With the information: Have you already self-medicated without prescription.

VARIABLES	Female		Male		TOTAL		Value p <sup>1</sup>
	N	%	N	%	N	%	
No.	3	6,67	1	5,56	4	6,35	<b>P = 0,210</b>
Yes, but there was no need for a medical prescription.	30	66,67	9	50,00	39	61,90	
Yes, even though it is mandatory to present a medical prescription for consumption.	12	26,67	8	44,44	20	31,75	
<b>TOTAL</b>	<b>45</b>	<b>100,00</b>	<b>18</b>	<b>100,00</b>	<b>63</b>	<b>100,00</b>	

<sup>1</sup>Value p regarding the Mann-Whitney test P>0.05.

## 4. Discussion

It is important to emphasize that the practice of self-medication is mostly performed by women between 18 and 20 years old during the 3rd year of graduation from the Biomedicine Degree at Universidade Brasil, Campus Fernandópolis, São Paulo. For Fernandes et al.<sup>[9]</sup>, the high rate of self-medication among biomedicine degree students is due to the information acquired during graduation. Rossi and collaborators<sup>[10]</sup> explain that microbiology and pharmacology disciplines can bring problems if not correctly addressed in the course curriculum. The same authors report that students who have already studied the disciplines considered themselves able to self-medicate and indicate medicines to other people.

For the adepts of this practice, self-medication is considered a way out for an instantaneous relief of the symptoms, however, it can cause serious damages to health<sup>[9]</sup> and even death-risk, in case of not known



for what the medicine is indicated and the type of medication effect in the organism is.

It is also important to point the adverse events to medications, which are causing a major problem in worldwide public health, generating a high cost and resulting in high mortality rates<sup>[11]</sup>. In this context, it is important to highlight the consumption of central nervous system stimulants (CNS) by University students, such as Ritalin and Vyvanse (Table 3). Students reported that they could easily obtain these medications without a medical prescription, using them to increase concentration capacity and mental performance during classes, as well as sleep deprivation, consuming twice as much during exams to keep them active during bimonthly evaluations.

To Chatterjee<sup>[12]</sup>, brain stimulants are psychostimulants with the ability to increase mental functions such as memory, attention, concentration, wakefulness, and intelligence, in addition to antidepressant properties, improving mood and cognitive development, for this reason, many students in college education consume these substances indiscriminately. Morgan et al.<sup>[13]</sup> make it clear that the use of CNS stimulants increases stress levels, which can reduce the students' life quality, making them susceptible to diseases and have repercussions on clinical practice and patient care.

Another very important aspect is the anti-inflammatories consumed by students (Table 3). It is good to remember that diclofenac and nimesulide cause liver toxicity reactions. The toxicity of diclofenac is associated with glucuronic acid, its main reactive metabolite, which makes the covalent binding of cells<sup>[14, 15]</sup>. According to Pedroso and Batista<sup>[16]</sup>, the chronic use of this medication has been related to drug-induced hepatitis, which happens asymptotically. The authors suggest that diclofenac may have been potentialized when associated with vitamins B1, B6, and B12. The nimesulide toxicity is due to mitochondrial dysfunction, with depletion of the enzyme's nicotinamide adenine dinucleotide phosphate and glutathione, occurring the increase of reactive oxygen species, calcium, and hepatic cell necrosis<sup>[17]</sup>. According to Bernardes et al.<sup>[18]</sup>, nimesulide is frequently associated with hepatic lesions such as acute drug-induced hepatitis, which in the majority of cases occurs within therapeutic doses, thus, hepatotoxicity is associated with the formation of reactive metabolites that encode proteins, induce oxidative stress and mitochondrial injury.

This fact highlights that drugstores sell medicines without prescription, stimulating self-medication, even if the medicine requested does not require a medical prescription and the symptoms manifested are not of great relevance. Another inference of such manifestation is the sale and delivery of the medication to the customer. It is important that the pharmacist has specific knowledge about the medication, the symptoms, and guides how the medication's effect can affect the body, as well as its chemical composition and adverse reactions. Thus, the pharmacist should guide the consumer in the search for the medication only when necessary and prescribed by the doctor<sup>[19]</sup>.

The inappropriate ingestion of medications is often described as insignificant by most people, but it should be noted that the practice of self-medication can cause risks and complications to the body, evolving with digestive hemorrhages, bacterial resistance, and allergic reactions to the medication, making the individual addicted to the medicine. At the beginning of the medication's effect, self-medication offers well-being and relief at the moment, prolonging and covering up an undiscovered disease, causing the person to develop serious complications<sup>[20]</sup>.

Still, regarding self-medication criticism, the consumption of various types of medications is



observed (Table 3) by students and some of these medications should be pointed out to prolonged use. Thus, it is important to evidence that with the concomitant use of corticosteroids, various organ systems can suffer serious functional damage, occurring serious adverse events in the organism<sup>[21]</sup>. The excessive use of this medicine causes unbalanced “sodium-potassium” ions equilibrium, increasing the excretion of water and mineral salts, dehydrating the cells<sup>[22]</sup>. Another effect is the inhibition of fibroblasts, causing purpurities and ecchymosis, besides the loss of collagen and the conjunctive tissue<sup>[23]</sup>. The most worrying is the chronic use of this medication that induces apoptosis of osteoblasts, contributing to avascular necrosis<sup>[24,25]</sup>. It is verified that prolonged treatments with high doses of corticosteroids have side effects that make the treatment a dangerous alternative for the user<sup>[26]</sup>. Due to these diversities, the wrong use of this medicine becomes dangerous to the health and even to the consumer’s life, and may contract another type of disease, worsening the clinical condition, or even leading to the patient's death<sup>[27]</sup>.

What draws attention is the self-medication used by health professionals themselves, even with all the levels of information and experiences they deem fit for this practice, although they know of all the risks and harm that can occur during the process<sup>[28]</sup>.

## **5. Conclusion**

Students know the risks and side effects that medications can cause to health, yet self-medication is frequent among undergraduate students of the Biomedicine Degree at the University of Brazil. It is suggested educative action to undo this cycle, starting with the pharmacies, prohibiting the sale of medications without presenting a prescription, as well as the implementation of pedagogical methods in the course of biomedicine can influence the actions of substance consumption, reducing the practice of self-medication and improving the students’ quality life.

## **CONFLICTS OF INTEREST**

The authors declare no conflict of interest.

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