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Self-medication among university students during the COVID-19 pandemic: a comparative analysis of different faculties

Maria Letícia Carnielli Tebet[1*], Ricardo Pasquini Neto[1], Ariele Barreto Haagsma[1], Gracinda Maria D'Almeida e Oliveira[2], Marcia Olandoski[3]

[1]School of Medicine, Pontifical Catholic University of Parana, Brazil

[2]Department of Clinical Pharmacology, Pontifical Catholic University of Parana, Brazil

[3]Department of Biostatistics, Pontifical Catholic University of Parana, Brazil

***Corresponding author:** Maria Letícia Carnielli Tebet, School of Medicine, Pontifical Catholic University of Parana, Brazil. Email: mltebet@gmail.com

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ABSTRACT

Self-medication is a widespread public health concern. University students are likely to be more prone to it since self-medication rates increase with educational level. Studies have shown that self-medication rates vary among academics belonging to different faculties, and medical students have the highest self-medication rates. However, it is unknown whether this holds in a vulnerable situation, such as the COVID-19 pandemic. It is also unknown whether differences in technical knowledge of drugs influence self-medication rates among students. Thus, this study analyzes and compares prophylactic self-medication among graduate students of different faculties in the context of the COVID-19 pandemic. This cross-sectional observational study was conducted at a private university in southern Brazil. Students from the medicine, law, life sciences, and fine arts faculties were surveyed, and their responses were compared using a chi-square test. Among 396 respondents, 29.5% reported using preventive medication for COVID-19, and medical students were the least likely to do so. The self-medication rate was 13.6% among respondents, and self-medication did not differ significantly between students of different faculties. Of the students who self-medicated 63% reported having studied the medication before using them. Furthermore, the media did not induce drug use among 81.8% respondents. These results show that medical students used fewer preventive medications during the pandemic and refute the assertion that self-medication rates are higher among medical students. They also show that self-medication rates during the pandemic were significantly lower than those before the pandemic. These revelations show a new aspect of self-medication.

Keywords: *Education, Medical Education, Self-Medication, COVID-19, Disease Prevention*

INTRODUCTION

According to the World Health Organization, self-medication is a self-care practice that involves using drugs to treat self-recognized symptoms or disorders. It also involves using substances that have been previously prescribed by professionals or suggested by third parties. 1 Self-medication can cause inaccurate self-diagnoses, delay in seeking professional help, inappropriate choice of medication, serious adverse events, contraindications, drug interactions, and dosage errors, which can lead to intoxication, dependence, and abuse.1,2

Since self-medication is associated with educational level, university students are a particularly vulnerable group.3 Studies have shown lower levels of self-medication, but its prevalence among students exceeds 80%.4-9 This may be because students intend to save costs and time, want to avoid taking medical appointments, have previous experience with medication, can easily purchase medication, or are dissatisfied with hospital medical services.10

In addition to these reasons, life science students are influenced by their professional knowledge, and students from other faculties are influenced by advertisements, old prescriptions, and suggestions from family members, neighbors, and friends.4,6,11-14

The practice of self-medication reached unprecedented levels with the emergence of the COVID-19 pandemic. Onchonga et al. reported that the prevalence of self-medication increased from 36.2% before the pandemic to 60.4%.15-17 As the world searched for preventive and curative measures, preliminary results without concrete scientific evidence led to an infodemic and dangerous scenario of self-medication.18,19

Between February and March 2020, studies were published on the potential preventive and therapeutic effects of hydroxychloroquine and chloroquine, antiviral remdesivir, and antibiotic azithromycin on COVID-19.20-22 In the following month, in vitro research on ivermectin showed promising outcomes.23 Dexamethasone came to the fore with the RECOVERY trial in June 2020, followed by nitazoxanide in July.24,25 The search for potential preventive therapies also focused on vitamins D, C, and E and zinc.26-28

It is known that self-medication rates vary among academics belonging to different faculties. However, it is unknown whether this holds in a vulnerable situation, such as the COVID-19 pandemic, along with constant media exposure to promising but unproven drugs. Thus, this study analyzes and compares self-medication among medical and non-medical students to prevent COVID-19. It intends to understand whether differences in technical knowledge of drugs alter self-medication statistics among students.

MATERIALS AND METHODS

This cross-sectional quantitative observational study was approved by the Research Ethics Committee of the Pontifical Catholic University of Paraná (CAAE: 48565021.0.0000.0020) and performed based on the ethical principles of the Declaration of Helsinki. All participants provided informed consent.

Population and Design

Data were collected using an online form that the researchers designed using Google Forms®. This form was sent to fine arts (architecture and urbanism, visual arts, cinema and audiovisual, dance, design, interior design, journalism, music, publicity and advertising, public relations, theater), life sciences (agronomy, biotechnology, biological sciences, physical education, nursing, pharmacy, physiotherapy, gastronomy, veterinary medicine, nutrition, dentistry, psychology), law (law), and medical (medicine) students of the Pontifícia Universidade Católica do Paraná – Curitiba Campus via text messaging applications, email, and social networks between November and December 2021.

Sample Size Calculation

A survey of the number of students in the fine arts, life sciences, law, and medical faculties in the Pontifical Catholic University of Paraná – Curitiba Campus was conducted. Considering the sampling of proportions in a finite population, the minimum sample size calculated for this study was 369 students with a confidence interval of 95% and a permissible relative sampling error of 8.5% (Table 1).

TABLE 1: Enrolled students and the minimum sample size based on faculty

Faculties	Enrolled Students	Sample size (%)
Fine Arts	2331	93 (3.9)
Life Sciences	3224	94 (2.9)
Law	2384	93 (3.9)
Medicine	1111	89 (8)
Total	9070	369 (4.1)

Inclusion and Exclusion Criteria

Students who were at least 18 years old, enrolled in the life sciences, law, medicine, or fine arts faculties in the Pontifícia Universidade Católica do Paraná–Curitiba Campus, and provided informed consent were included in the sample. No exclusion criteria were considered. Figure 1 illustrates how students were selected.

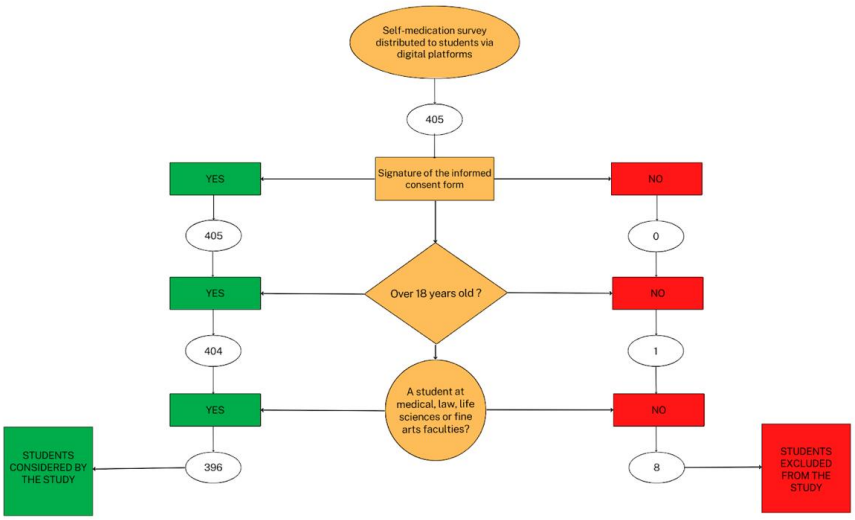

FIGURE 1: Process of selection of students

COVID-19 Self -Medication Survey

The researcher-designed online form had four sections comprising closed-ended questions. The first section consisted of the informed consent form. The second section collected sociodemographic data. The third section collected data on the faculty and year of study, and the fourth section comprised 11 questions on drugs used for COVID-19 prevention. For some of the questions, particularly those on medications used, selecting more than one option was allowed. The complete form is available as Supplementary Material.

Statistical Analysis

The results are presented as absolute and percentage frequencies. The chi-square test was used to compare the responses of students of different faculties. Statistical significance was set at $p<0.05$. Data were organized in an Excel® spreadsheet and analyzed using IBM SPSS Statistics v.28.0 software.

RESULTS

Sociodemographic characteristics

A total of 396 responses were received. Of the 396 respondents, 110, 99, 96, and 91 belonged to the law, life sciences, fine arts, and medicine faculties, respectively, of the Pontifical Catholic University of Paraná–Curitiba Campus. Most respondents were aged between 21 and 25 years, identified as females, and were enrolled in their respective courses in the fourth year (Table 2).

TABLE 2: Sociodemographic and academic data of respondents

		Fine Arts N (%)	Life Sciences N (%)	Law N (%)	Medicine N (%)	Total N (%)
Age (years)	18-20	28 (29.9)	37 (37.4)	44 (40)	20 (22)	129 (32.6)
	21-25	54 (56.3)	47 (47.5)	55 (50)	64 (70.3)	220 (55.6)
	26-30	11 (11.5)	6 (6.1)	5 (4.5)	4 (4.4)	26 (6.6)
	Over 30	3 (3.1)	9 (9.1)	6 (5.5)	3 (3.3)	21 (5.3)
Gender	Female	76 (79.2)	79 (79.8)	80 (72.7)	65 (70.3)	299 (75.5)
	Male	20 (20.8)	20 (20.2)	30 (27.3)	27 (29.7)	97 (24.5)
Year of study	1st	19 (19.8)	15 (15.1)	20 (18.1)	6 (6.6)	60 (15.2)
	2nd	9 (9.4)	21 (21.3)	8 (7.3)	20 (22)	58 (14.6)
	3rd	20 (20.8)	30 (30.3)	23 (20.9)	6 (6.6)	79 (19.9)
	4th	25 (26)	22 (22.3)	37 (33.6)	32 (24.2)	116 (29.3)
	5th	18 (24)	11 (11.1)	22 (19)	34 (37.4)	85 (21.5)
	6th	0 (0)	0 (0)	0 (0)	3 (3.3)	3 (0.8)

Using medication for COVID-19 prevention

Regarding medication use to prevent COVID-19, 29.5% of the respondents reported having taken some type of drug. Medical students were the least likely to do so; their medication use differed significantly from that of students of other faculties (p = 0.002). The most administered medications were vitamin D supplements and ivermectin (Table 3).

TABLE 3: Use of medication for COVID-19 prevention

		Fine Arts N (%)	Life Sciences N (%)	Law N (%)	Medicine N (%)	Total N (%)
Did you take any medication for COVID-19 prevention?	Yes	27 (29)	32 (32.3)	44 (40)	14 (15.3)	117 (29.5)
	No	69 (71.8)	67 (67.6)	66 (60)	77 (84.6)	279 (70.4)
If your answer is yes, which medication did you take?	Vitamin D	19 (19.8)	20 (20.2)	37 (33.6)	11 (12.1)	87 (22)
	Ivermectin	12 (12.5)	18 (18.2)	25 (22.7)	6 (6.6)	61 (15.4)
	Zinc	4 (4.2)	5 (5)	20 (18.2)	6 (6.6)	35 (8.8)
	Vitamin E	2 (2.1)	6 (6.1)	12 (10.9)	0 (0)	20 (5)
	Chloroquine/ Hydroxychloroquine	1 (1)	4 (4)	6 (5.4)	2 (2.2)	13 (3.3)
	Vitamin C	1 (1)	2 (2)	7 (6.4)	0 (0)	10 (2.5)
	Azithromycin	0 (0)	0 (0)	1 (0.9)	0 (0)	1 (0.2)
	Nitazoxanide	0 (0)	0 (0)	1 (0.9)	0 (0)	1 (0.2)

Self-medication

Of the 117 students who had taken preventive medication, only 53.8% reported that the medication was prescribed by a doctor. The self-medication practice of students of different faculties did not differ significantly (p = 0.659). The main drugs used were vitamin D supplements and ivermectin (Table 4).

TABLE 4: Self-medication for COVID-19 prevention

		Fine Arts N (%)	Life Sciences N (%)	Law N (%)	Medicine N (%)	Total N (%)
If you took any medication for COVID-19 prevention, was it prescribed by a doctor?	Yes	16 (59.3)	15 (46.9)	23 (52.3)	9 (64.3)	63 (53.8)
	No	11 (40.7)	17(53.1)	21 (47.7)	5 (35.7)	54 (46.1)
If your answer was no, which medication did you take without a prescription?	Vitamin D	5 (18.5)	8 (25)	13 (29.5)	4 (28.6)	30 (25.6)
	Ivermectin	6 (22.2)	8 (25)	14 (31.8)	1 (7.1)	29 (24.8)
	Zinc	1 (3.7)	1 (3.1)	7 (15.9)	2 (14.3)	11 (9.4)
	Vitamin E	1 (3.7)	3 (9.4)	5 (11.4)	0 (0)	9 (7.7)
	Chloroquine Hydroxychloroquine	0 (0)	1 (3.1)	0 (0)	0 (0)	1 (0.8)
	Vitamin C	1 (3.7)	1 (3.1)	2 (4.5)	0 (0)	4 (3.4)
	Azithromycin	0 (0)	0 (0)	1 (2.3)	0 (0)	1 (0.8)
	Nitazoxanide	0 (0)	0 (0)	1 (2.3)	0 (0)	1 (0.8)

Of the 54 students who self-medicated, most purchased it directly from a pharmacy (79.6%), followed by those who used leftover medication (16.7%) and those who used a pre-pandemic prescription, even though it had not been renewed by a doctor (3.7%).

Of the 54 students who self-medicated, 63% reported that they had studied the medicine before using it. Of these, 35.3% were law students, 35.3% were life science students, 20.6% were fine arts students, and only 8.8% were medical students. The action of studying the medication before using it did not differ significantly between students of different faculties ($p = 0.811$).

Regarding the knowledge of the indications and the posology of the drugs used, of the 54 students who self-medicated, 40.7% said they knew how to suggest the drugs to other people. Meanwhile, 11.1% said they might know, 13% said they would not know, and the rest did not answer the question. Furthermore, only one student reported experiencing any side effects.

Advising COVID-19 prevention drugs to family members

Students were also asked if they had ever suggested a COVID-19 prevention drug to a family member. Of the total respondents, 7.1% had made that suggestion, from those 3.5% were from the life sciences faculty, 1.8% from the law faculty, 1% from the fine arts faculty, and 0.8% from the medicine faculty. Furthermore, this action differed significantly between the students of different faculties ($p = 0.013$). Finally, 25 of the 28 students who had suggested a COVID-19 prevention drug to a family member said that the family member had no adverse effects, and three did not respond to this question.

Media influence and exposure on self-medication rates

The media influenced 18.2% of the respondents to take preventive medication during the pandemic. Among them, 3.5% were from the fine arts faculty, 5.3% from the life science faculty, 6.1% from the law faculty, and 3.3% from the medicine faculty. The influence did not differ significantly between the students of different faculties ($p = 0.34$).

DISCUSSION

As the COVID-19 pandemic spread, there were a plethora of explorations to seek preventive and curative measures.29,30 This created an infodemic, the amalgamation of "information" and "pandemic" representing an excess of ideas, both true and false. It hinders access to reliable sources and complicates the decision-making process.18

Amidst overburdened health systems, a record number of daily deaths, and the total death toll exceeding 6 million, the world was faced with multiple sources of information.31,32 The psychological stress in that situation predisposed people to using different types of medication, both with and without a prescription.33 The present study highlights this reality among university academics, with almost 30% of the sample using some medication to prevent COVID-19.

Since these drugs had not been proven to be effective during the study period, concerns regarding toxicity have become apparent.34,35 Among the substances the academics listed, vitamins and minerals are often considered dietary supplements, but they may be considered drugs depending on the purpose of their use.36 During the pandemic, they were used for their immunomodulatory potential. However, if used without a prescription, there is a risk of intoxication with organic damage, similar to other drugs. For example, vitamin D intoxication may cause hypercalcemia with symptoms of thirst, polyuria, and convulsions.37

The association of medication use with faculty differed significantly between medical and non-medical students. Medical students used less preventive medication than students belonging to the law, life sciences, and fine arts faculties. One possible explanation for this finding is that medical students have greater access to discussions on using evidence-based drugs.38

Regarding the rate of self-medication, this study's results contradict those of previous studies. This study shows that the rate is 13.6%, but previous studies that explored it in a pre-pandemic setting found that the rate exceeded 50%.6–10,39 This can be inferred as students do not resort to self-medication in an infodemic. Additionally, most students (81.8%) stated that they had not been influenced by the media to use any type of substance. The significant reduction in the self-medication rate is also because pharmacies were scarce and difficult to access during the period of social isolation.

It was also found that there was no statistical difference in the self-medication practice of students of different faculties, unlike what was observed before the pandemic. Among the 54 students who self-medicated, 63% reported having studied the drugs before using them. These students were predominantly from non-medical faculties.

Such data shows that students of other faculties sought information and knowledge and refutes the assertion that self-medication rates are higher among medical students who have access to technical information.6,12,13 Seeking technical information demonstrates non-medical students' care and concern for their health. However, it does not guarantee that they used reliable sources of information, especially considering the infodemic scenario. This consideration, and the fact that non-medical students were much more likely to refer medications to their family members, raises concerns about inadvertent self-medication practices.

Notably, the self-medication rate that this study found among college students in a pandemic scenario differs from what other studies found. Yasmin found that the self-medication rate is 43.3% for illness prevention and 71.4% for treating influenza symptoms among students in Pakistan, unlike the low self-medication rate this study found.40 This difference can be explained

by regional differences in cultural, social, and economic factors. It highlights the need for further studies on such factors and in the context of developed countries to verify the best strategies to combat the harm of self-medication.2,41,42

A limitation of this study is that it could not dichotomize the schools into those belonging and not belonging to the health field. The School of Life Sciences, which could be interpreted together with the School of Medicine, has different courses without technical training, such as the Gastronomy course. It is also possible that, in the context of intense political discussion on the subject, some students who self-medicated may not have felt comfortable participating in the study, regardless of the authors' commitment to maintaining the safety and confidentiality of participants' data. It is important to emphasize that this study was not designed to analyze the efficacy of medications as COVID-19 prophylactics but rather to analyze the practice of self-medication to prevent COVID-19.

CONCLUSION

The COVID-19 pandemic brought immense psychological stress and a widespread infodemic. In such a scenario, inappropriate self-medication may burden healthcare systems even more. University students resorted to prophylactic self-medication in the pandemic, but medical students were the least likely to do so compared to the students of other faculties. The practice of prophylactic self-medication was not widespread among academics as they sought information about the drugs that were highlighted in media and may have preferred not to expose themselves to the risks of insufficient evidence on treatment efficacy. Since self-medication rates were over 80% before the pandemic, this study reveals a new aspect of the practice. It also opens new horizons for research on self-medication, a highly harmful practice when performed irrationally.

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