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Consumption of medicines among pharmacy students during the COVID-19 pandemic

Consumo de medicamentos entre acadêmicos de farmácia durante a pandemia da Covid-19

Isabel Cristina de Lima Piza, Eliane Aparecida Suchara*

ABSTRACT

The indiscriminate use of medicines is an important health problem and it is a habit that is not restricted only to a specific age group. This article aimed to investigate during the COVID-19 pandemic the consumption of medicines among pharmacy students and to investigate their search for guidance from a pharmaceutical professional. This is a descriptive, observational and cross-sectional epidemiological study applied to students of the Pharmacy course in Barra do Garças, Mato Grosso. The sample corresponded to 47.2% (67) of the students of the private institution and with 52.5% (74) of the public network. It was observed that 46% of the interviewees came to use some medication during the pandemic in order to treat a possible manifestation of COVID-19, and 44% used it without having the diagnosis of the disease, corroborating with what was observed during the pandemic, the search for drug means to treat and/or to prevent COVID-19. The most commonly used medications were vitamin C, vitamin D, ivermectin and azithromycin. Regarding the use of other remedies, such as teas, 56.8% of the participants did not use such alternatives. Although 85% of the interviewees were aware of the functions performed by the pharmacist, only 32.6% sought pharmaceutical guidance in the pandemic. It was concluded that the consumption of medicines was frequent among the students of the pharmacy course, including the practice of self-medication. The demand for pharmaceutical guidance was low, allowing us to infer that there is a demand for efforts aimed at intensifying the importance of the pharmaceutical professional and the rational use of medicines among university students.

Keywords: Awareness. COVID-19. Drug utilization. Pharmaceutical services. Self-medication.

RESUMO

O uso indiscriminado de medicamentos constitui um problema importante de saúde e é um hábito que não se restringe apenas a uma faixa etária específica. Este artigo teve como objetivo investigar, durante a pandemia da Covid-19, o consumo de medicamentos entre acadêmicos de farmácia e averiguar a procura desses por orientação de profissional farmacêutico. Trata-se de um estudo epidemiológico descritivo, observacional e transversal, aplicado a acadêmicos do curso de Farmácia, em Barra do Garças, Mato Grosso. A amostragem correspondeu a 47,2% (67) de acadêmicos de instituição particular e foram 52,5% (74) da rede pública. Verificou-se que 46% dos entrevistados chegaram a utilizar algum medicamento durante a pandemia com finalidade de tratar um possível acometimento por Covid-19, sendo 44% os que utilizaram sem possuir o diagnóstico da doença, corroborando com o observado durante a pandemia, ou seja, a busca por meios medicamentosos para tratar e/ou prevenir a Covid-19. Os medicamentos mais utilizados foram vitamina C, vitamina D, ivermectina e azitromicina. Quanto à utilização de outros remédios, como chás, foram descartados por 56,8% dos participantes. Embora 85% dos entrevistados tivessem conhecimento das funções desempenhadas pelo farmacêutico, apenas 32,6% procuraram orientação farmacêutica na pandemia. Concluiu-se que o consumo de medicamentos foi frequente entre os acadêmicos do curso de farmácia, incluindo a prática da automedicação. A procura por orientação farmacêutica foi baixa, permitindo inferir que há uma demanda por esforços voltados a intensificar a importância do profissional farmacêutico e do uso racional de medicamentos entre os universitários.

Palavras-chave: Assistência farmacêutica. Automedicação. Conscientização. Covid-19. Uso de medicamentos.

Institute of Biological and Health Sciences, Araguaia Campus, Federal University of Mato Grosso – UFMT, Barra do Garças, MT, Brazil.
*isabel.piza@hotmail.com

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INTRODUCTION

The practice of selecting and using medication, including teas and natural products, to treat mild and moderate symptoms or self-diagnosed and/or previously diagnosed illnesses is known as self-medication (Melo, Duarte, Moraes, Fleck & Arrais, 2021; Pinto, Polkowski, Lima & Chaves, 2021; Silva, Jesus & Rodrigues, 2021). It is a social habit and not just a pharmacological one, since it arises from social behaviors of certain groups (Ruiz, Souza & Paiva 2021).

This activity was observed during the COVID-19 pandemic, including in Brazil, where the consumption of medication drew much attention (Melo et al., 2021; Ruiz et al., 2021; Sousa et al., 2021), especially when there was widespread promotion on social media of an early treatment for COVID-19, known as the "COVID-kit", composed of off-label medications that did not have conclusive scientific evidence for their use for this purpose (Melo et al., 2021). Therefore, in the context of the pandemic, indiscriminate self-medication was associated especially with these medications (Andrade, Moreno & Lopes-Ortiz, 2021; Melo et al., 2021). The irrational use of medication, fueled by the widespread promotion of self-medication on social media, can have adverse effects on health. All medication carries risks associated with its consumption, and the risk-benefit for the patient must be carefully considered when resorting to drug therapy (Leal et al., 2021; Melo, 2021). Along with medication consumption, the indiscriminate and careless use of medicinal plants has become a concern, since even therapies derived from traditional and natural practices must be proven effective and safe through rigorous clinical testing (Orsi, 2020).

Some authors describe self-medication and suggest positive aspects of the practice, viewing it as a form of self-care (Leal et al., 2021; Pinto et al., 2021). They argue that it can relieve the burden on the public health system it result in savings for both individuals and public funds (Helal & Abou-ElWafa, 2017; Bernardes et al., 2020). However, these authors always link these aspects to responsible self-medication, accompanied and guided by a qualified healthcare professional.

The understanding of self-medication as a public health aggravating factor in Brazil during the pandemic has become increasingly important, as a large proportion of the population, especially young and adult individuals, have started engaging in this practice. Notably, university students, who represent a significant portion of self-medication users, are particularly vulnerable (Helal & Abou-ElWafa, 2017; Bernardes et al., 2020; Andrade et al., 2021). The changes required by academic life make university students more susceptible to self-medication, as they experience a period of adaptation to a new lifestyle that can lead to stress and frustration.

During the pandemic period, healthcare professionals had to cope with something entirely new and unknown. In this context, pharmaceutical care has become an essential component, as pharmacists are trained to perform various roles with the population, including promoting the rational use of medicines and playing a fundamental role in disease transmission management (Rubert, R. A. N. Deuschle & Deuschle, 2021).

The role of pharmacists has become extremely important, not only due their accessibility, but also because of their authority and expertise, acting decisively in promoting access and rational use of essential medicines to the population in therapeutic monitoring (Soares, Brito & Galato, 2020), and in reducing poisonings, drug interactions, and deaths due to incorrect use of medicines, both within the community and within multidisciplinary teams formed in hospitals (Pinto et al., 2021).

Given this scenario, the present study addressed the consumption of medicines among undergraduate Pharmacy students during the COVID-19 pandemic. Specifically, we evaluated the extent to which students engaged in self-medication practices, particularly with respect to the use of "COVID-kit" medicines. Additionally, we aimed to analyze the search for pharmaceutical guidance and to assess the students' recognition of the fundamental role of pharmacists during times of crisis.

MATERIALS AND METHODS

This study corresponds to a descriptive, observational, and cross-sectional study on the epidemiological profile of self-medication during the COVID-19 pandemic among undergraduate students of Pharmacy at public and private educational institutions located in the city of Barra do Garças, Mato Grosso.

The research employed an online questionnaire based on scientific literature in the field. The questionnaire consisted of objective (multiple choice) and discursive questions focused on analyzing the participants' profile, evaluating medication consumption and self-medication practices, and their relationship with pharmacists during the pandemic, in the years 2020 and 2021. The questionnaire was divided into three parts: the first aimed to outline the participants' profile and the institution to which they belonged; the second stage aimed to investigate medication consumption, the use of the "COVID-kit" medications, the self-medication practices, and the use of alternative remedies; the third stage focused on the relationship between the students and pharmacists, including questions related to pharmaceutical guidance, their knowledge of the pharmacist's role, and the ways in which this professional operates.

This study considered cloroquine/hydroxychloroquine, azithromycin, ivermectin, prednisone, zinc, vitamin C, and vitamin D as "COVID-kit" medications. Self-medication was defined as cases in which there was no guidance from a medical professional regarding diagnosis, prescription, or monitoring of

medication consumption.

The form was distributed to students and pharmacy course groups at a private and at a public university located in Barra do Garças via a Google Forms platform link shared through an instant messaging application. The data collection period ware between February 28th and March 21st, 2022, and there was no defined recall period for the questions used in the survey. The inclusion criteria were being a student of undergraduate pharmacy course at a higher education institution (public or private) in the city of Barra do Garças; being over 18 years old and having accepted the informed consent form. Failure to meet any of these criteria resulted in exclusion from the study. Participation was voluntary for all students, so it was not possible to identify whether those who answered the questionnaire were more prone to self-medication or not.

The sample consisted of 141 participating students, corresponding to 49.3% of the total population of pharmacy students enrolled in the municipality during the questionnaire application period. The sample size was established using Openepi software, version 3.03a. The algebraic expression for proportion estimation was used to calculate the number of participants: n = [EDFFNp(1-p)]/[(d2/Z21-α/2(N-1)+p*(1-p)]. It was established that the population size was 286; hypothetical frequency of the factor of the result in the population (p): 50% (for unknown frequency); admitted sampling error d=5% and design effect (EDFF) = 1. Therefore, for a confidence interval of 90%, the calculated sample size was 140 students.

To analyze, describe, and compare the results found, a descriptive statistical analysis of the data was performed, using absolute and percentage distributions organized in figures and tables.

This study is part of a project submitted to the Research Ethics Committee of the Federal University of Mato Grosso and it was approved under the CAAE (Certificate of Presentation for Ethical Consideration) number 53993621100005587.

RESULTS AND DISCUSSION

A total of 141 responses were obtained, with 47.2% (67) from students of the private institution and 52.1% (74) from the public one. Most participants identified as female, with 70.1% (47) in the private institution and 77% (57) in the public one. The predominant age group of the students was between 18 and 25 years in both institutions, corresponding to 37.6% and 42.5% in the private and public institutions, respectively.

The academic profile obtained in the questionnaire, both in the private and public education, is similar and consistent with previous studies that report the prevalence of female gender as a recurring factor in studies investigating health academics (Helal & Abou-ElWafa, 2017; Morgan et al. 2017; Andrade et al., 2021), which may be related to the larger number of women in health-related degrees (Andrade et al., 2021). Furthermore, the predominant age group found in the survey is in line with findings from previously conducted studies (Bernardes et al., 2020; Andrade et al., 2021). Therefore, the data found regarding the academic profile are consistent with the Higher Education Map in Brazil, released in 2020 by the Semesp Institute, which outlined the profile of university students in the country, making it clear that most students are female and aged between 19 and 24 years old (Peduzzi, 2020).

When asked about their knowledge of self-medication, 98.5% of participants from the private university and 100% of participants from the public university claimed to have such knowledge, which means that they are aware of what the practice involves. University students, especially those in health-related courses, possess knowledge and understanding of what self-medication is and what the term refers to. However, despite being aware of the adverse effects and risks associated with this practice, these students are among those who engage in it the most (Picolotto, Libardoni, Migott & Geib, 2010; Helal & Abou-ElWafa, 2017; Morgan et al., 2017; Andrade et al., 2021).

Self-medication among university students has become a public health problem, as it is widely carried out and propagated indiscriminately (Picolotto et al., 2010; Helal & Abou-ElWafa, 2017; Morgan et al., 2017; Andrade et al., 2021). It is known that, prior to the pandemic, a large proportion of students already had this habit, mainly aiming to achieve good results in academic life (Helal & Abou-ElWafa, 2017; Morgan et al., 2017; Andrade et al., 2021). The reasons that lead them to self-medicate are numerous, including high workload, the need for concentration, and the high level of demand for academic performance (Morgan et al., 2017), as well as access to information, social influence, family influence (Helal & Abou-ElWafa, 2017), psychosocial factors, and difficulty of adapting to a new lifestyle (Helal & Abou-ElWafa, 2017; Morgan et al., 2017; Bernardes et al., 2020). However, during the pandemic, this medication profile changed, shifting from being focused on academic life to being focused on the prevention and/or treatment of COVID-19 and as secondary symptoms caused by isolation (Andrade et al., 2021; Ruiz et al., 2021).

Regarding COVID-19 testing, 71.6% (101) of the participants had taken the test during the pandemic. Of those, 48.5% (49) were from the public university and 51.5% (52) from the private one. Of the participants who confirmed having taken the test, 45.5% (46) tested positive for COVID-19, in which 41.3% (19) were from the public university and 58.7% (27) from the private one. Approximately 15.2% of the participants who tested positive for COVID-19 required hospitalization or observation. Despite the cancellation of in-person classes

and social isolation measures among university students during the pandemic, a high proportion of students became infected with the coronavirus (Canale et al., 2022). For a long period during the pandemic, severe cases leading to hospitalization and possibly death were reported in elderly individuals and/or those with comorbidities (Pan American Health Organization [PAHO], 2021), suggesting the false premise that young adults were not prone to COVID-19 complications.

However, at the beginning of 2021, the global scenario underwent a drastic change with the emergence of a new strain of the novel coronavirus, and young adults began to account for a large part of hospitalizations (PAHO, 2021). During the peak of contamination in 2021 (March), the occupancy rate of ICU by individuals ≤ 39 years doubled when compared to the peak of 2020 (July). Additionally, mortality rates in the same age group reached quadruple in March 2021, when compared to data from December 2020 (PAHO, 2021).

When asked about the "COVID-kit", 91.5% of the participants reported having heard about it, and a considerable portion of the respondents (46.1%) actually used some medication proposed in the kit (Table 1). Among those who used the "COVID-kit", 95.4% used it without a diagnosis of the disease. It is also observed that 58.5% of the participants who took any medication from the kit did it without recommendation or guidance of a qualified professional, and this variable was similar in both private and public education.

Table 1
Use of "COVID-kit" medication by Pharmacy students in public or private institutions during the COVID-19 pandemic (n=141).

Use of "COVID-kit" medication	Public		Private		Total	
	(n)	(%)	(n)	(%)	(n)	(%)
Yes.	29	20.6	36	25.5	65	46.1
Did not use.	40	28.4	28	19.9	68	48.2
Did not know.	5	3.5	3	2.1	8	5.7

Source: The authors.
Note. The percentages shown in the table were calculated in relation to the total number of respondents.

The data reflect what has been observed during the pandemic, as self-medication has significantly increased not only in Brazil, but worldwide, due to the population's obstinacy in obtaining not only treatment or prevention of COVID-19, but also to solve possible problems caused by social isolation (Ruiz et al., 2021). Similar studies (Bernardes et al., 2020; Andrade et al., 2021) conducted during the pandemic have reported that university students, especially those in the health field, were more susceptible to self-medication due to their pre-existing habit of practicing it before the pandemic.

In Table 2, it presents the most used medications by the students, whether by prescription or self-medication. These data corroborate with other studies previously conducted, in which it was observed that vitamin C, vitamin D, ivermectin, and azithromycin were some of the most sought-after medications by the population during the pandemic (Andrade et al., 2021; Leal et al., 2021; Silva et al., 2021). The spread of inaccurate and not entirely precise information about the off-label use of such medications led to their mass consumption in an irresponsible and indiscriminate manner (Silva & Araújo, 2020; Andrade et al., 2021; Melo et al., 2021). At times, they were recommended by healthcare professionals, however, without scientific basis, and, in other cases, used through self-medication, without any guidance or monitoring (Melo et al., 2021). It is also observed that such recommendations may have been made by pharmacists, so in this context, the importance of an ethical, conscious, and responsible role of the pharmacist is emphasized.

Another important issue is that many medications that were consumed by the population during the pandemic required a prescription signed by a qualified healthcare professional for acquisition. This highlights the critical need to follow the guidelines provided by the surveillance sectors regarding the medication prescription and dispensing.

The use of these medications and the consequent association between them was highly disseminated in Brazil, precisely due to the dissemination of the "COVID-kit" as an early treatment for the disease (Melo et al., 2021). In a study conducted among healthcare students, most participants reported that they believed in the effectiveness of these medications against COVID-19, with a significant sample stating that they had self-medicated with some of these drugs (Andrade et al., 2021). The "COVID-kit" was proposed and used, based on inconclusive studies, there was disclosure in government agencies, and distribution in the public health network at the very beginning of the pandemic, at a time when the population and healthcare professionals were extremely vulnerable and desperate for prevention and/or cure for COVID-19, making them susceptible to the indication of such medications, without proper scientific proof of their effectiveness against the disease (Melo et al., 2021; Person, Puga, Amaral & Atallah, 2021; Pinto et al., 2021; Ruiz et al., 2021; Sousa et al., 2021).

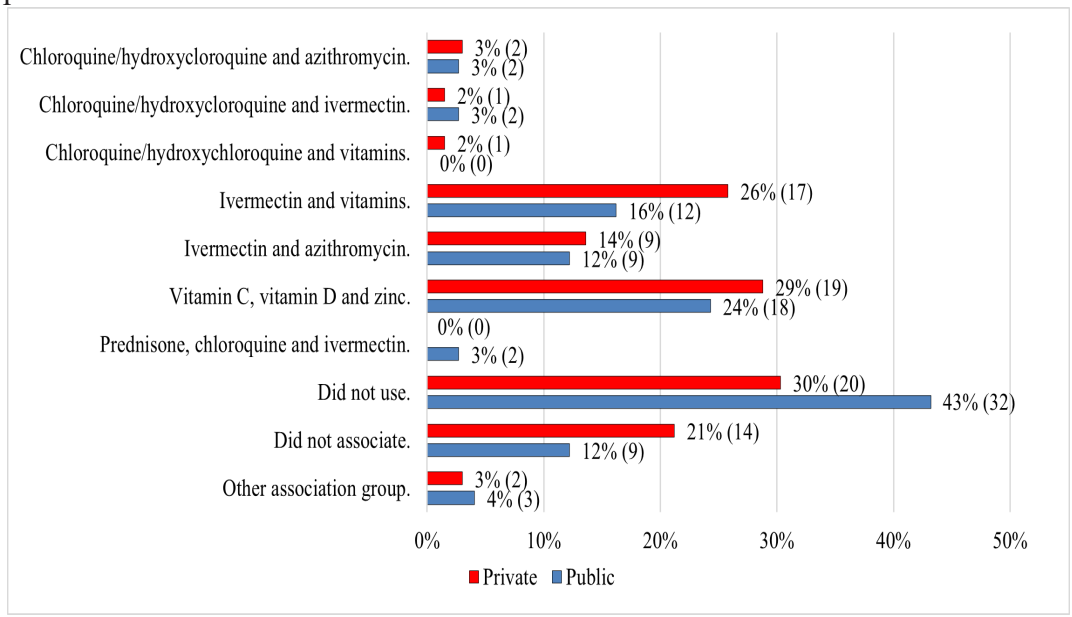
Table 2
Medications used by the Pharmacy students studied, from public and private institutions, during the COVID-19 pandemic: prescribed and non-prescribed drugs.

Medication	Public (n=74)						Private (n=67)					
	Never		Once		Twice or more		Never		Once		Twice or more	
	n	%	n	%	n	%	n	%	n	%	N	%
chloroquine/hydroxychloroquine	70	94.6	1	1.4	3	4.0	61	91.0	1	1.5	5	7.5
azithromycin	52	70.3	12	16.2	10	13.5	40	59.7	12	17.9	15	22.4
ivermectin	50	67.6	10	13.5	14	18.9	33	49.3	13	19.4	21	31.4
zinc	51	68.9	8	10.8	15	20.3	38	56.7	12	17.9	16	25.4
vitamin C	30	40.5	14	18.9	30	40.5	22	32.8	16	23.9	29	43.3
vitamin D	40	54.1	10	13.5	24	32.4	34	50.8	12	17.9	21	31.3
prednisone	64	86.5	1	1.4	9	12.2	60	89.6	4	5.9	3	4.5

Source: The authors.

The association between medications was also investigated (Figure 1), and it was observed that most participants made the junction of zinc with vitamins C and D, followed by the combination between invermectin and vitamins C and D.

Figure 1
Profile of medication associations used by Pharmacy students from the federal and private universities studied.



Source: The authors.

Chloroquine and hydroxychloroquine, due to their demonstrated potential in inhibiting the entry of some types of viruses such as Dengue, Chikungunya, and SARS-CoV-2 into the host cell *in vitro*, became targets of studies for redirecting these drugs in the treatment of COVID-19 (Brito et al., 2020; Menezes, Sanches & Chequer., 2020; Lima et al., 2021; Mattos, 2021; Pinto et al., 2021; Sousa et al., 2021). Some studies conducted in hospitals showed good results, suggesting that these drugs were associated with a rapid decrease in viral load from hospitalized patients (Corrêa, Vilarinho & Barroso, 2020; Menezes et al., 2020; Simão et al., 2020; Lima et al., 2021; Martimbianco, Bagattini, Riera & Pacheco, 2021; Mattos, 2021; Cachoni et al., 2022).

However, other studies had to be canceled due to a high mortality rate among participants, including a study conducted in Brazil, in Manaus (Corrêa et al., 2020; Melo, Paiva & Carvalho, 2021).

Studies regarding chloroquine and hydroxychloroquine are still extremely limited, mainly due to the small number of participants, because of the lack of an adequate control group, short study duration, concomitant use of other therapies, and the lack of clinical follow-up of post-COVID patients to elucidate possible adverse and toxic effects resulting from therapy (Corrêa et al., 2020; Menezes et al., 2020; Simão et al., 2020; Lima et al., 2021; Martimbianco et al., 2021; Mattos, 2021; Melo et al., 2021; Cachoni et al., 2022).

Therefore, up to the present moment, the evidence on the efficacy and safety of chloroquine/hydroxychloroquine in the treatment or prevention against COVID-19 is inconclusive and limited. Consequently, there is no data that supports the therapeutic indication of these drugs in COVID-19 (Corrêa et al., 2020; Menezes et al., 2020; Simão et al., 2020; Lima et al., 2021; Martimbianco et al., 2021; Mattos, 2021; Melo et al., 2021; Cachoni et al., 2022).

The azithromycin is an antimicrobial from the macrolide class (Santos et al., 2020), it must be sold only with proper prescription. This antibiotic has proven antiviral activity, and, for this reason, it has become one of the most researched medications during the pandemic (Silva & Araújo, 2020; Leal et al., 2021). The association between this medication and hydroxychloroquine has become one of the main therapeutic indications within hospitals and some studies have observed the efficacy of such therapy in reducing the viral load of hospitalized patients with COVID-19, demonstrating potential of this therapy in reducing disease transmission and treating COVID-19 (Cachoni et al., 2022). However, the use of such association and at the dosages recommended by the studies showed that there are risks to individuals' health, including the development of cardiac arrhythmia (prolongation of the QT interval), bacterial resistance to the antibiotic, liver, and kidney failure (Menezes et al., 2020; Simão et al., 2020; Leal et al., 2021; Pinto et al., 2021; Cachoni et al., 2022).

The antiviral and immunomodulatory properties of azithromycin are tangible, however, the paucity of data and clinical evidence in the treatment of COVID-19 makes the clinical therapeutic indication of such a drug against the new coronavirus impractical (Cachoni et al., 2022).

Another drug eligible for the kit was ivermectin, which is an antiparasitic drug for human and veterinary use (Pinto et al., 2021). The broad-spectrum action of this drug against parasites and viruses and its immunomodulatory capacity have already been proven in several studies (Heidary & Gharebaghi, 2020). The ivermectin demonstrated its effectiveness by inhibiting the binding sites of the novel coronavirus *in vitro,* making it one of the most used drugs during the pandemic (Brito et al., 2020; Silva, Jesus & Rodrigues, 2021). However, there are still many unknown mechanisms that may be linked to possible side effects, such as hepatotoxicity and neurotoxic potential (Silva et al., 2021).

Nevertheless, during the pandemic, the dosages indicated on various social networks posed great risk of experiencing such side effects by their users. Although there are still no conclusive studies regarding the efficacy and safety of ivermectin against COVID-19 (Ruiz et al., 2021; Sousa et al., 2021), many health professionals have indicated it as one of the drugs for the treatment of this disease, while pharmaceuticals companies themselves advised against using it for prophylactic purposes (Dutra, 2021; Melo et al., 2021). To date, the use of ivermectin for either prevention or treatment of COVID-19 lacks reliable scientific support and it is therefore not indicated by the World Health Organization or the COVID-19 Treatment Guidelines Panel of the National Institutes of Health (NIH) (Dutra, 2021; Melo et al., 2021; Person et al., 2021).

The prednisone is an anti-inflammatory of the corticosteroid class, which are essential steroid hormones in several physiological functions, such as the immune response, stress response, inflammation control, protein catabolism, carbohydrate metabolism and concentrations of electrolytes in the blood. Corticosteroids were efficiently used during the SARS outbreak in 2003, which led to several studies being proposed to see if such drugs could be effective against COVID-19.

This class of anti-inflammatory drugs has the ability to modulate the immune system and to control the cytokine storm that is commonly seen in severe cases of COVID-19. However, corticosteroids have also exhibited serious adverse effects, including increased viral clearance and risk of secondary infections. Therefore, corticosteroid therapy is not recommended as prophylaxis or treatment of asymptomatic, mild or moderate COVID-19, being restricted to patients who present severe and critical condition of the disease (Patel et al., 2021).

In the present study, it was not possible to correlate the consumption of these drugs with adverse effects related to self-medication or whether it occurred through an adequate prescription or not. However, the health risks of abusive use of these drugs without prescription and correct guidance are highlighted.

With regard to supplementation, this practice is often necessary to maintain adequate levels of certain nutrients in the body (Silva et al., 2022). However, during the pandemic, there was an increase in the supplementation of certain nutrients, under the prerogative of preventing and/or treating COVID-19, in which the main supplements used for this purpose were vitamins C, D and zinc. Through several studies carried out during the pandemic, it was possible to verify that patients with COVID-19 had vitamin C serum levels similar to individuals with scurvy, indicating the severe deficiency of this micronutrient (Silva et al., 2022). Research has shown that the supplementation of this micronutrient is important in the treatment of patients with moderate to severe COVID-19, as it was able to reduce levels of inflammatory markers and to boost immune functions (Hiedra et al., 2020; Silva et al., 2022).

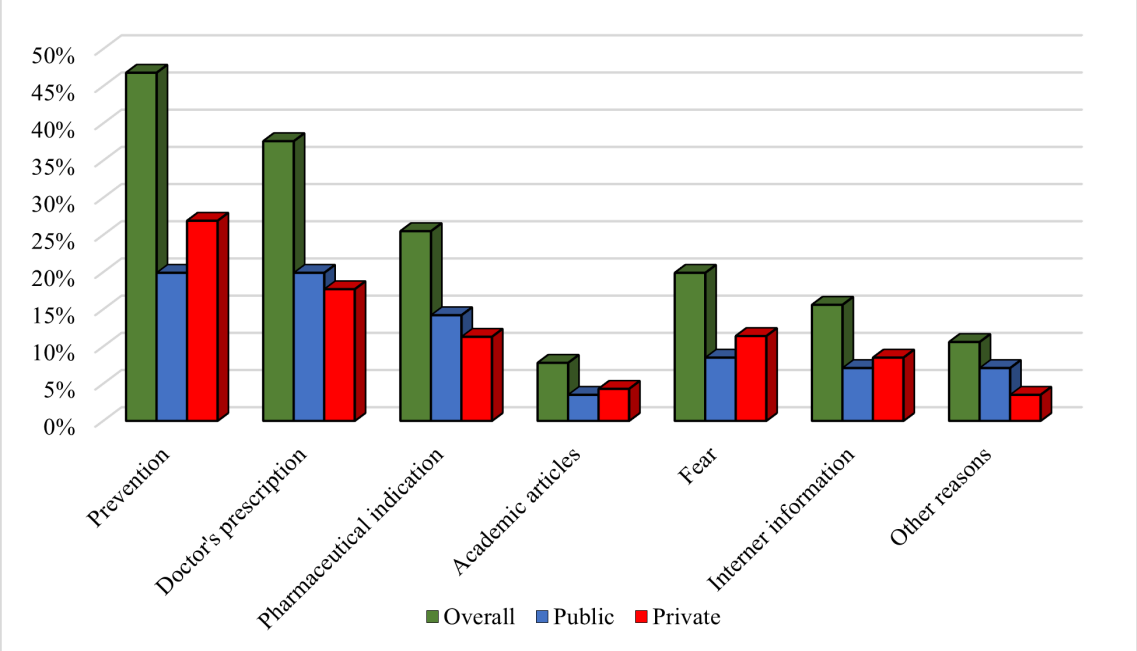
The vitamin D deficiency is associated with several disorders and diseases, and studies carried out during the pandemic showed that this deficiency was also associated with a greater risk of infection, mortality and severity of COVID-19. Thus, the supplementation with this micronutrient started to be considered for prevention and treatment of the disease. The zinc is a micronutrient

with catalytic, structural and regulatory functions, and its deficiency is closely related to reduced immune system activity (Silva et al.,2022).

However, it is worth mentioning that despite the existence of studies that prove the beneficial action of such supplements, in-depth studies are still needed to determine their efficacy and safety for this purpose.

Figure 2 presents the factors that led participants to use the "COVID-kit" drugs, in which the highest incidence was prevention, followed by medical prescription, pharmaceutical indication and fear. It is important to point out that the interviews could indicate more than one factor if they want.

Figure 2
Factors that were involved in the decision-making regarding the use of the drugs of the "COVID-kit", according to the participants (n=141).



Source: The authors.
Note. The percentages were calculated taking into account the sum of participants from both public and private universities, therefore they correlate with the total number of participants.

The data obtained partially support the study conducted by Pinto et al. (2021), which suggests that the COVID-19 pandemic led many individuals to resort to self-medication due to factors such as an overwhelmed healthcare system and fear of leaving their homes, resulting in limited access to medical specialists (Pinto et al., 2021). The findings indicate that people aimed to prevent the disease or alleviate symptoms through self-medication. The union between the search for prevention, fear, vulnerability and access to the various information disclosed in the media caused an explosion in the practice of self-medication during the pandemic period (Leal et al., 2021; Melo et al., 2021; Pinto et al., 2021; Ruiz et al., 2021).

In addition to drug options, other resources and therapeutic care (teas, rest, physiotherapy, among others) can also be used by the population for the treatment or prevention of diseases. In this study, when evaluating the use of teas as an alternative remedy during the pandemic, 56.8% of the participants answered that they did not use such alternative, corresponding to 32% of the public university students and 24.8% of the private university. On the other hand, the literature demonstrates that a large part of the world's population makes use of alternative remedies from plants to relief symptoms or pain. This high adherence is mainly associated with cost-effectiveness, quickness and easy access of such alternative, and also because they supposedly do not cause harm, according to the belief of the users (Braga & Silva, 2021). Studies have shown that during the pandemic, there was a considerable increase in the use of medicinal plants and herbal medicines, mainly due to the quest to improve immunity and to prevent infection by the novel coronavirus (Brito et al., 2020; Braga & Silva, 2021).

The belief that natural remedies pose no risks, combined with the desperate search for treatments that could prevent infection by the novel coronavirus or alleviate the symptoms of the disease, resulted in the massive use of recipes considered miraculous during the pandemic (Brito et al., 2020). Often, treatments classified as integrative and complementary are not subject to robust investigation, based only in their classification. However, as the use of tradicional treatments became very common during the COVID-19 pandemic, the World Health Organization (WHO) issued a note in May 2020 warning about the use of untested herbs and natural cures in the

context of the current pandemic (Orsi, 2020). Medicinal plants and herbal medicines, like any other medicine, can pose health risks, causing serious adverse effects and even intoxication due to contaminants that may exist in low-quality products (Brito et al., 2020).

Most respondents (53.9%) reported not having observed adverse effects after using drugs or teas against COVID-19. However, this data does not exclude the need for caution when self-medicating and the importance of seeking guidance from a specialized professional, who can assist during the treatment and determine the necessity of using such medications. Every medicine has the potential to cause adverse effects, especially when administered indiscriminately (Melo, 2021).

Adverse effects are those harmful or undesirable effects observed after the use of medicines and/or teas. Even non-prescription medicines (MIP) and those sold with a prescription but without the need to retain it can cause unwanted effects and often worsen health status when used irrationally (Sousa et al., 2021). The drugs that are part of the COVID-kit are no exception to the rule, as these off-label drugs have not yet been scientifically proven to be effective against the novel Coronavirus (Melo et al., 2021).

When asked whether they sought advice from a pharmacist in order to clarify doubts about COVID-19, 73% of participants from the federal university and 61.2% of participants from the private university reported that they did not seek the services of a pharmacist. Regarding pharmaceutical guidance provided to academics who went to drugstores to purchase medication (whether prescribed or non-prescribed), 39% of the participants reported receiving some form of pharmaceutical advice during their purchase.

A considerable part of the participants (85%) claimed to be aware of the fundamental role played by the pharmacist during the pandemic. Although this number is considered high, it is worrisome that about 15% of the participants, who are future pharmacists themselves, did not recognize the fundamental role of their professional colleagues during the pandemic. In addition to an expressive performance in relation to pharmaceutical assistance by the pharmacist (Pinto et al., 2021), investment in the training and awareness of students, particularly in the early stages, could promote a more widespread recognition of the pharmacist's role among university students.

As for the fundamental activities that could be developed by the pharmacist, the following were mentioned: providing medication orientation (36.2%), offering pharmaceutical assistance (19.9%), disseminating truthful information regarding COVID-19 (19.9%), participating in research groups for the development of drugs and vaccines against the new coronavirus (5%), and being a member of multidisciplinary teams in hospital environments (1.4%).

It is noteworthy that only 15.6% of respondents mentioned the role of the pharmacist against self-medication and the irrational use of medicines, with 12.1% corresponding to participants of public education and 3.5% of private education. However, it is essential to highlight that the role of the pharmacist in this area is crucial and necessary, as it is the official responsibility of this professional (Pinto et al., 2021; Silva et al., 2021).

The pharmacist is the health professional most accessible to the population, being in direct contact with individuals (Rubert et al., 2021; Silva & Araújo, 2020). Thus, during the pandemic, it was up to this professional to provide pharmaceutical assistance to the population, guiding and scientifically informing people about COVID-19, protective measures, the proper use of medicines and the undesirable effects caused by self-medication. In addition, pharmaceutical performance was essential in hospital pharmacies and in the multidisciplinary team that worked hard to combat the virus (Silva & Araujo, 2020; Pinto et al., 2021; Ruiz et al., 2021; Silva et al., 2021; Sousa et al., 2021).

The pharmacist has knowledge about the drugs, their interactions and possible adverse reactions. This knowledge allows this professional to offer solutions to these problems, thereby reducing hospitalization time, mortality rates and hospital costs. Additionally, they ensure quality management of the hospital pharmacy, avoiding medication shortages and waste (Silva & Araújo, 2020; Mont'Alverne et al., 2021; Silva et al., 2021; Pinto et al., 2021). It is worth mentioning that only a qualified professional, i.e., the pharmacist, can provide pharmaceutical care. This has direct implications for the efficiency of health systems and the success of drug therapy (Barberato, Scherer & Lacourt, 2019).

One limitation of the study is the non-restriction of the memory recall period, which spans approximately two years. Additionally, the sampling process did not permit identification of whether respondents who answered the questionnaire were academics more prone to self-medication. Despite the stimulus and the intense dissemination of the research among students, a large number of studies were carried out online during the pandemic period, which may have led to academic fatigue and reduced interest in completing online surveys.

The present study raised an important question regarding the consumption of medicines, including self-medication among pharmacy students. Through this study, it was observed how much students in this area are subject to self-medication, especially during times of uncertainty. Therefore, there is a crucial need to invest in the education and in the training of Pharmacy students. Extension programs should be implemented to promote the rational use of medicines, with a particular focus on the university population, since the self-medication is a health concern present in this environment.

For future studies, it is recommended to delve deeper into the reasons that lead academics to self-medicate and to expose themselves to the risks associated with this practice. Additionally, it would be beneficial to address the relationship between the professional who provides pharmaceutical assistance in drugstores and the clients, given the importance of this professional in health education of the population and in ensuring the correct use of medicines.

CONCLUSION

Considering the results obtained, it can be concluded that many pharmacy students, despite being undergraduates in the health field, resorted to using medications, including self-medications for the prevention and/or treatment of COVID-19. This behavior often occurred without seeking guidance from a qualified healthcare professional. These students placed their trust in drugs advertised as being effective treatments and/or preventatives without verifying their efficacy.

A flaw has been noted in the relationship between pharmacy students and pharmaceutical professionals, as most of these students did not seek guidance from this professional during the acquisition of medicines in the pandemic.

Given the above, there is a need to establish programs aimed at the university public, such as teaching and extension actions that propagate the rational use of medicines within higher education institutions. In addition, it is clear that there is the necessity for intense and early instruction for academics on the pharmacist's skills, as specialists in medicines and in qualified pharmaceutical care for the entire population.

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