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## **Abuso de psicotrópicos por estudantes de saúde no pós-COVID-19: revisão sistemática**

*Abuse of psychotropics by health students in the post-COVID-19 times: a systematic  
review*

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### Resumo

A pandemia de COVID-19 afetou a saúde mental global e os padrões de uso de substâncias psicotrópicas. Estudantes da área da saúde representam um grupo vulnerável devido à combinação de pressões acadêmicas e impacto psicossocial adicional do período pós-pandêmico. Esta revisão sistemática analisa a prevalência e os fatores associados ao uso de psicotrópicos entre estudantes da saúde no período pós-pandêmico. **Métodos:** Foi realizada busca sistemática nas bases PubMed e SciELO com os termos (*psychotropics*) E (*abuse*) E (*health students* OU *health academics*) E (COVID-19 OU *pandemic*). Foram incluídos artigos publicados após 2020 que avaliaram o uso de psicotrópicos por acadêmicos da saúde no período pós-pandêmico, e excluídos artigos que tiveram como foco outra população. Quatro artigos foram selecionados. **Resultados e Discussão:** Três estudos foram conduzidos na Europa e um na África. Um deles focou em acadêmicos da saúde, enquanto os demais os incluíram em amostras mais amplas. Os estudos demonstram alta prevalência de ansiedade, depressão, e ideação suicida, acompanhados de alto uso de substâncias psicoativas. As mais comuns foram álcool, cannabis, benzodiazepínicos e antidepressivos, com frequente uso de medicamentos sem prescrição. Fatores associados incluíram estresse acadêmico, impacto da transição para ensino presencial e dificuldades psicossociais. **Conclusão:** O período pós pandêmico impôs desafios significativos à saúde mental, acompanhados de alto uso de psicotrópicos pelos acadêmicos da saúde. São necessários estudos longitudinais para aprofundar essas relações e embasar intervenções direcionadas ao bem-estar desta população.

**Palavras-chave:** estresse psicológico; COVID-19; psicotrópicos; Consumo de Álcool na Faculdade; receptores de GABA-A.

### Abstract

*The COVID-19 pandemic has impacted global mental health and patterns of psychotropic substance use. Health students are a vulnerable population considering the combination of academic pressures and exposure to additional psychosocial challenges in the post-pandemic period. This systematic review examines prevalence and factors associated with psychotropic substance use among health students in the post-pandemic period. **Methods:** A systematic search was conducted in PubMed and SciELO using the terms (*psychotropics*) AND (*abuse*) AND (*health students* OR *health academics*) AND (COVID-19 OR *pandemic*). Articles published after 2020 that focused on psychotropic use among health students after the pandemic were included. Articles published before 2020 and focused on other populations or lacking post-pandemic context were excluded. Four articles were included. **Results and Discussion:** Three studies were conducted in Europe and one in Africa. One article focused on health students, while the others included health students as part of a broader sample. The findings reveal high prevalence of mental symptoms such as anxiety, depression, and suicidal ideation, accompanied by elevated use of psychoactive substances. The most common substances were recreational substances (e.g., alcohol, cannabis) and prescription drugs (e.g., benzodiazepines, antidepressants), often without prescription. Key factors associated with use included academic stress, transition from remote to in-person learning, and psychosocial difficulties. **Conclusion:** The post-pandemic period imposed mental health challenges, with elevated use of psychoactive substances by health students. Further longitudinal studies are essential to elucidate these relationships and assist targeted interventions to support health students' well-being.*

**Keywords:** *psychological stress; COVID-19; psychotropic drugs; alcohol drinking in college; GABA-A receptors.*

### Resumen

*La pandemia de COVID-19 ha afectado la salud mental global y los patrones de consumo de sustancias psicotrópicas. Estudiantes de ciencias de la salud constituyen una población vulnerable por la combinación de presiones académicas y desafíos psicossociales adicionales en*

*el período pospandémico. Esta revisión sistemática examina la prevalencia y factores asociados al uso de psicotrópicos por estudiantes de la salud en el período pospandémico. **Métodos:** Se realizó una búsqueda sistemática en PubMed y SciELO utilizando los términos (psychotropics) Y (abuse) Y (health students O health academics) Y (COVID-19 O pandemic). Se incluyeron artículos publicados a partir de 2020 que evaluaron el uso de sustancias psicotrópicas por estudiantes de ciencias de la salud tras la pandemia, excluyendo artículos anteriores a 2020, que no investigaran el período pospandémico y avaliaran otras poblaciones. Se seleccionaron cuatro artículos. **Resultados y Discusión:** Tres estudios se realizaron en Europa y uno en África. Uno se centró en estudiantes de ciencias de la salud, mientras que los demás los incluyeron dentro de una muestra más amplia. Los hallazgos indican alta prevalencia de ansiedad, depresión e ideación suicida, acompañada de alto uso de sustancias psicoactivas. Las más frecuentes fueron alcohol, cannabis, benzodiacepinas y antidepresivos, con uso frecuente sin prescripción. Los factores asociados incluyen estrés académico, transición a la enseñanza presencial y dificultades psicosociales. **Conclusión:** El período pospandémico impuso desafíos significativos para la salud mental, lo que resultó en mayor consumo de psicotrópicos entre estudiantes de ciencias de la salud. Se requieren estudios longitudinales para profundizar en estas relaciones y orientar intervenciones dirigidas al bienestar de esta población.*

**Palabras clave:** estrés psicológico; COVID-19; psicotrópicos; consumo de alcohol en la universidad; receptores de GABA-A

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## Introduction

The healthcare field is inherently demanding, exposing professionals and students to high levels of responsibility, prolonged workloads, and frequent exposure to suffering and mortality (De Hert, 2020; IsHak et al., 2013). These challenges often lead to psychological stress, increasing the risk of mental health disorders such as anxiety, depression, and burnout (Greenberg, 2020). The COVID-19 pandemic exacerbated these pressures, creating an unprecedented scenario of physical and emotional exhaustion for people involved with healthcare (Mittal et al., 2021). During the pandemic, professionals faced prolonged shifts, resource shortages, and exposure to trauma (by imposing a direct confrontation with imminent death), increasing the risk of developing mental health disorders (Greenberg, 2020; Kantorski et al., 2022).

Health students have been previously shown to experience increased levels of stress levels compared to same-age peers in other fields, with frequent reports of suicidal ideation, decreased empathy, serious thoughts about dropping out of medical school, among others (Hill et al., 2018). The pandemic further intensified these stressors, as students were exposed to increased academic demands and elevated workloads combined with the exposure to traumatic events, which may have contributed to heightened levels of stress, anxiety, and depression among health students (Mittal et al., 2021). In response,

some students turned to psychotropic substances, both prescribed and non-prescribed as well as recreational agents, as a coping mechanism. Studies indicate that a significant proportion of health students have engaged in self-medication or misuse of psychotropic substances, often without medical supervision (Kantorski et al., 2022; Tovani et al., 2021), raising concerns about potential abuse and dependency.

Despite the growing recognition of mental health challenges among health students, there is a lack of comprehensive research on the prevalence and patterns of psychotropic substance use and/or abuse among health students in the post-COVID-19-pandemic era. Existing studies have primarily focused on general mental health issues, leaving a critical gap in understanding the extent of psychotropic substance use among health students (Greenberg, 2020; Kuitunen et al., 2023; Kumar & Nayar, 2021; Mittal et al., 2021; Tsamakidis et al., 2021). As the world navigates through the post-pandemic era, understanding the direct impact of this global crisis on the prevalence of use, and eventual abuse, of substances which act on the central nervous system by this population is mandatory (Kantorski et al., 2022; Kumar & Nayar, 2021; Mittal et al., 2021; Wang et al., 2020), since this impact will also be felt on their professional future and the desire to persevere in the profession. The present study aims to address this gap by systematically analyzing available data on the use of psychotropic substances among health students in the post-COVID-19-pandemic period. It seeks to identify consumption patterns, types of substances consumed, and associated factors.

## **Objective**

The present study aims to address this gap by systematically analyzing available data on the use of psychotropic substances among health students in the post-COVID-19-pandemic period. It seeks to identify consumption patterns, types of substances consumed, and associated factors.

## **Methods**

### **2.1 Study Registration and Guidelines**

This systematic review was registered in the International Prospective Register of Systematic Reviews (PROSPERO; registration number: CRD42024543068). The review

protocol followed the Cochrane guidelines for Systematic Reviews and the Preferred Reporting Items of Systematic Reviews and Meta-Analyses (PRISMA) catalog criteria. The PRISMA statement enhances the transparency and rigor of systematic reviews by providing a standardized checklist and flow diagram for reporting the review process (Liberati et al., 2009; Losada et al., 2022; Marmo et al., 2022).

### **2.1. Search Strategy**

A systematic literature search was conducted on February 13<sup>th</sup>, 2024, using the SciELO and PubMed databases. The search strategy included the following terms: (psychotropics) AND (abuse) AND (health students OR health academics) AND (COVID-19 OR pandemic). There were no restrictions related to publication status. It is important to mention that the search strategy did not explicitly include terms related to mental health, as the aim of investigation was to analyze use and abuse of psychotropics by health students in the post-pandemic period. The language was restricted to English, and only papers published after 2020 were considered.

### **2.2. Criteria for Inclusion and Exclusion**

Original studies published in peer-reviewed journals were included if they focused on undergraduate or postgraduate students in health sciences, and examined the use and/or abuse of psychotropic substances. Both quantitative and qualitative studies were considered. The criteria for exclusion were duplication of manuscripts and non-full-text articles, investigations focused on populations other than health students, articles with no data on psychotropic substance use or abuse, as well as articles published prior to 2020.

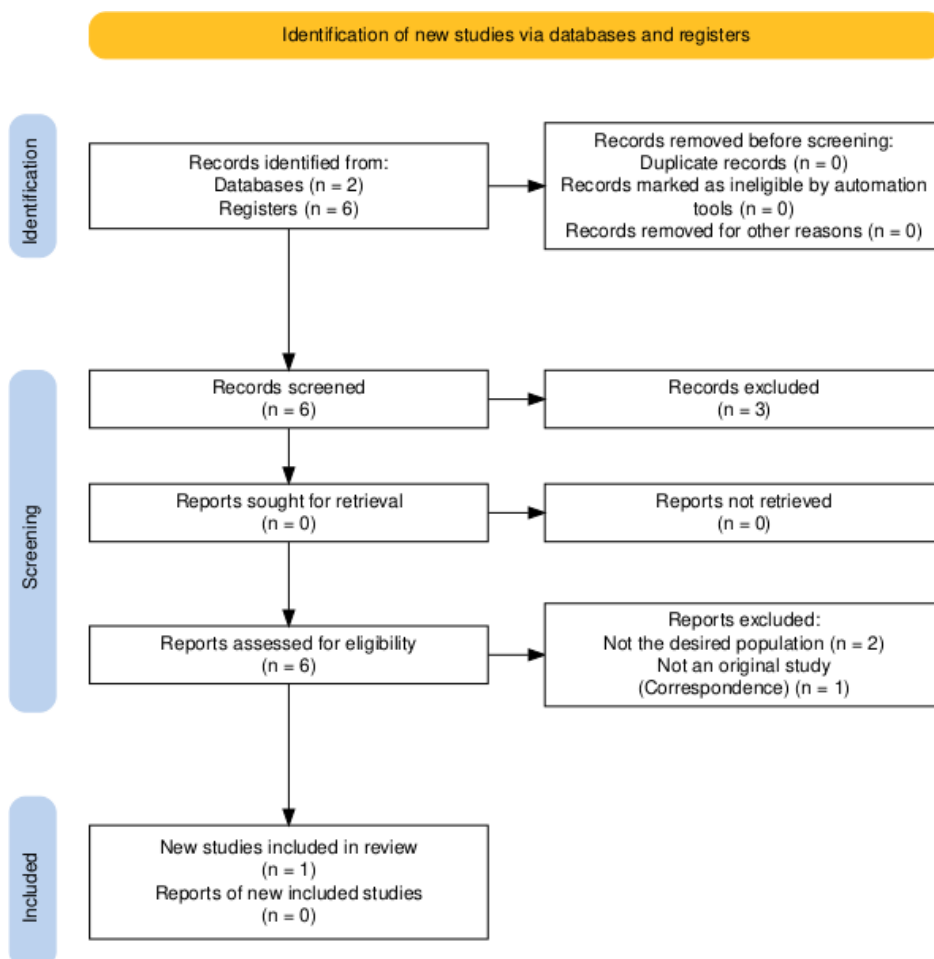
### **2.3. Number of papers obtained**

From SciELO, the search yielded 0 papers meeting the inclusion criteria. From PubMed, the search yielded a total of six papers. After applying the publication date filter (post-2020), six articles remained. Evaluating the papers individually, no manuscripts were duplicated nor non available as full text. A new search, conducted on June 14<sup>th</sup>, indicated a newly published study, which was included in the present review, totalizing

seven studies. After individual evaluation, one article was excluded as it was a correspondence article focusing on performance-enhancing drugs (Negro et al., 2021); a second article was excluded as it focused on adolescents (8<sup>th</sup> to 11<sup>th</sup> grade; Herzig et al., 2023); and a third article was excluded as it used wastewater and the population could not be estimated (Estévez-Danta et al., 2022). Thus, four manuscripts were included in the present systematic review. A flow diagram, generated with the PRISM Flow Diagram tool (Haddaway et al., 2022) can be observed in Figure 1.

**Figure 1**

*PRISM Flow Diagram indicating the selected studies (generated using the tool provided by Haddawat et al., 2020)*



## 2.4. Data Extraction

The following data were extracted: study characteristics, including author (s), year of publication, country, study design, population and sample size, duration of investigation; demographic data, such as age and sex of population, presence of any health conditions; clinical data, including symptoms, use of medicine, types of medicine, use of any pharmacological substances and time of use. In addition, the following information will be extracted, if available: etiology, diagnostic tests, and therapy approaches.

## 2.5. Strategy for Data Synthesis

Data synthesis consisted of a narrative synthesis of findings, focusing on prevalence – the extend of psychotropic use among health students - , patterns – trends depending on the types of substances used and frequency of use - , and factors associated with psychotropic use – such as sex, location, and other stressors. This approach aligns with the objective of identifying consumption patterns and associated factors of psychotropic use among health students in the post-pandemic period.

## Results

This systematic review included four studies that met the inclusion criteria, providing data on the use and potential abuse of psychotropic substances by health students in the post-COVID-19 period. The studies were conducted in various countries, particularly in Europe (Spain, Portugal and France) and in Africa (Uganda), and utilized different methodologies to examine the prevalence, patterns, and factors associated with psychotropic use among health students. The four studies were cross-sectional and used online forms to collect data. Three studies were based on self-reported forms via e-mail, while Kirabira et al., (2024) administered an online form on tablets supervised by research assistants. Overall, the findings reveal a significant impact of the COVID-19 pandemic on the mental health of students, contributing to increased use and abuse of psychotropic substances. The data extracted from the four articles can be observed in **Table 1**

**Table 1**

*Included articles, with study data, demographic data, and clinical findings*

study data							demographic data			clinical data				
author	name	year of publication	country	study design	population	sample size	age	sex	previous health conditions?	symptoms	use of medicine?	types of medicine	other pharmacological substances	time of use
Pérez-Pérez et al.	COVID-19 Pandemic Control Measures and Their Impact	2023	Spain	descriptive cross-sectional study	2nd year students of the nursing degree at the University of Valladolid (Spain) + their first and second degree relatives	877 people, with a response rate of 87%	mean age 27,25 +- 13,79	617 women (70.4%)	not informed	anxiety and depression; suicidal ideation	psychotropics	classes not evaluated (only evaluated if psychotropic drugs were used)	not reported	not reported
Pérez et al.	Mental health and drug use in college students: Should we take action?	2023	Spain	descriptive cross-sectional study	college students from Complutense University of Madrid (UCM)	6802 completed the questionnaire (4 were excluded) - 6798	mean age 21 (interquartile range 19-24)	4974 (73.2%) female	69.2% had no previous anxiety diagnose; 78.1% had no previous depression diagnose	anxiety and depression; suicidal ideation	psychoactive substances and drugs	SSRIs (melatonin) and BZDs (diazepam and lorazepam)	medicinal plants (Valerian) and illegal drugs (cannabis, ecstasy, cocaine, amphetamines and mushrooms)	for illegal drugs, use was mainly sporadic
Carton et al.	An overview of the use of psychoactive substances among students at the University of Lille during the COVID-19 health crisis: Results of the PETRA study	2023	France	cross-sectional study	college students from University of Lille France	4431 students (response rate: 6.1%)	20 years (19-22)	74.5% female	not informed	substance dependence; mental symptoms were not directly investigated	free-access substances; prescription drugs; illegal drugs	sulbutamine; BZDs; opioids; corticoids; beta-blockers; methylphenidate; modafinil; piracetam; amphetamine/ methamphetamines	alcohol; tobacco; nitrous oxide; cannabis; cocaine; MDMA; mushrooms; LSD; NPS/ GHB; heroin	less than once a month; once a month; once a week; every day or almost every day
Kirabira et al.	Burden of alcohol and other substance use and correlates among undergraduate students at Busitema University in rural Eastern Uganda after COVID-19 lockdown	2024	Uganda	cross-sectional study	undergraduate students at Busitema University in rural Eastern Uganda	658 students	18-24 (67.2%); over 25 (32.8%)	183 (69.1%) male	not informed	substance use, mental disorders	psychoactive substances	amphetamine stimulants; sedatives; hallucinogens	alcohol; tobacco; cannabis; cocaine	ever used/current use in the last 3 months

From the four articles, only the manuscript by Pérez-Pérez and colleagues (2023) focused specifically on health students (nursing school students); the other three selected articles presented data of different fields of study, all of which included health sciences. The study by Carton and colleagues (2023) included an individual investigation for each field of study, making it possible to assess the behavior and clinical data of health students separately. The remaining two studies, by Pérez and coworkers (2023) and by Kirabira et al. (2024) have included health students but analyzed their behavior along with students from different fields of study.

A total of 12,864 participants were evaluated across the four studies, with 3,495 (27.17%) being health students. The breakdown of health students was calculated as follows: 877 (from Pérez-Pérez et al., 2023) + 1057 from the total of 6798 (from Pérez et



al., 2023). For this sum, were considered as health sciences: dentistry (76), medicine (423), nursing, physiotherapy and podiatry (214); optics and optometry (99) veterinary medicine (245) + 1263 from the total of 4431 (from Carton (2023). For this sum, were considered the field: health and sports) + 298 from a total of 658 (from Kirabira et al., 2024). The number was derived from the Mbale campus, which offers medical courses.

All four studies conducted a sociodemographic profile of the sample, including age, sex, and type of accommodation. Some questionnaires presented particular sociodemographic questions, including having had COVID and the behavior towards the pandemic (if the student wore masks, was isolated from others, and so on), present in the study conducted by Pérez-Pérez and colleagues (2023); questions regarding self-assessment of family, and financial and friendship situation in the investigation by Carton et al. (2023); and questions about religion, marital status, source of funding, region of origin, and family financial status in the investigation by Kirabira and colleagues (2024).

Most participants were female, except in Kirabira et al. (2024); and the majority were in their 20s. The average age of the study conducted by Pérez-Pérez et al. (2023) was significantly higher (around 27 years old) because the survey included not only students, but also their relatives. All reviewed studies consistently reported high rates of psychotropic use among health students in the post-pandemic period, and multiple factors might have been involved in the pattern of consumption. The results from the demographic analysis and the factors associated with psychotropic use are shown in **Table 2**. Female and non-binary participants presented elevated risk of substance use, particularly benzodiazepines (BZDs) and antidepressants (Carton et al., 2023; Pérez et al., 2023; Pérez-Pérez et al., 2023). Living alone was associated with higher BZD use, reinforcing the idea that social isolation, a known consequence of pandemic-related restrictions, may have influenced substance use (Pérez et al., 2023). Similarly, being in a relationship was positively associated with increased alcohol consumption (Kirabira et al., 2024). On the other hand, students with chronic medical conditions were less likely to use alcohol, probably due to concerns about health complications (Kirabira et al., 2024).

The questions related to mental health and the use of psychoactive drugs varied in the investigations: 1) Pérez-Pérez and colleagues (2023) focused on the effects of the pandemic, and included questions regarding feelings and situations related to

confinement (such as anxiety, loneliness, stress, discussion, drug use, and technology dependency); 2) Pérez and colleagues (2023) used validated instruments such as the 7-item Generalized Anxiety Disorder Questionnaire (GAD-7) and Patient Health Questionnaire-9 (PHQ-9) to access anxiety and depression symptoms, with additional questions regarding perception of academic performance, perception of symptom change towards anxiety and/or depression after returning from isolation (pandemic), confirmed diagnosis of anxiety and/or depression, consumption of psychoactive substances, consumption of psychoactive drugs under prescription, consumption in the last 15 days (with possible answers being yes or no), and frequency of consumption in the last 6 months; 3) Carton et al. (2023) included subjective measures such as perceived level of success, type of psychoactive substance used along with quantification of use, maximum frequency of use over life-course and current period, the route of administration and reasons for use, feeling of dependence; and finally 4) Kirabira and colleagues (2024) used the Alcohol, Smoking and Substance Involvement Tool (ASSIST) to assess substance use and risk factors. The study also included questions on social and clinical factors influencing substance use, such as history of chronic medical condition, academic stress, bullying, involved in a romantic relationship, feeling pressured by relatives about academics, and family history of mental illness.

All reviewed studies consistently reported high rates of psychotropic use among health students in the post-pandemic period. The prevalence of anxiety and depression was high, and these conditions were significantly correlated with increased psychotropic use. The pandemic played a significant role in shaping substance use, as many students reported that the return to in-person learning exacerbated symptoms of anxiety and depression, possibly leading to increased substance use as a coping mechanism (Pérez et al., 2023), but a causal relation cannot be affirmed, considering that none of the investigations presented a longitudinal investigation, with pre- and post-pandemic scenarios in comparison with each other. Students with lower academic performance perceptions were at higher risk of substance use (Pérez et al., 2023). Additionally, students who reported symptoms of anxiety and depression in the post-pandemic return to the university showed higher psychotropic intake, suggesting that the transition back to in-person learning was a stressor contributing to substance use (Pérez et al., 2023).

**Table 2**
*Sociodemographic profile of the health students and relation to psychotropic use*

Factor	Association with psychotropic use	Comparison group	Study reporting association
Gender (female & non-binary)	Higher psychotropic use, mainly BZDs and antidepressants	Compared to male	Pérez-Pérez et al., 2023 Pérez et al., 2023 Carton et al., 2023
Living alone	Higher BZD use	Compared to living with family or in shared housing	Pérez et al., 2023
Symptoms of anxiety and/or depression	Higher psychotropic use in students who reported symptoms	Compared to students who did not report symptoms	Pérez-Pérez et al., 2023 Pérez et al., 2023 Carton et al., 2023
Return to in-person learning	Higher psychotropic use in students who reported feeling the impact of the return	Compared to those who did not report impact	Pérez et al., 2023
Romantic relationship	Increased likelihood of alcohol use	Compared to those not in a relationship	Kirabira et al., 2024
History of chronic medical conditions	Lower alcohol use	Compared to students without chronic conditions	Kirabira et al., 2024
Field of Study	Higher use of nitrous oxide (Health & Sports)	Compared to all other academic fields	Carton et al., 2023
Self-perception of academic performance	No direct link to psychotropic use (only to mental health symptoms)	-	Pérez et al., 2023

In relation to the pattern of psychoactive substances used, all reviewed studies consistently reported high rates of psychotropic use among health students in the post-pandemic period. Alcohol and cannabis were the most frequently consumed substances, with prevalence rates ranging from 24% to 80% for alcohol (Kirabira et al., 2024; Carton et al., 2023), and 3.4% to 43.6% for cannabis (Kirabira et al., 2024; Pérez et al., 2023). Alcohol was the most prevalent substance used in the last 3 months, and the second most used was tobacco. Following the ASSIST, the moderate to high risk use was significantly

higher in users of other substances (21.4%) compared to alcohol users (12.9%) (Kirabira et al., 2024).

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Prescription psychotropic drugs, particularly BZDs and antidepressants, were widely used, often without prescription or medical supervision. BZDs and opioids, although with relatively low prevalences of use, are among the most commonly misused prescription medication; nevertheless, other prescription drugs were also reported. The students using such compounds reported the use as coping mechanism or for recreational purposes rather than for medical need. **Table 3** summarizes the prevalence of the most commonly reported legal psychotropic substances among health students.

**Table 3**

*Prevalence of legal psychotropic substance use among health students*

Substance	Prevalence range	Studies reporting
Alcohol	24 - 80%	Kirabira et al., 2024 Carton et al., 2023
Tobacco	3% - 40.3%	Kirabira et al., 2024 Carton et al., 2023
Cannabis	3.4% - 43.6%	Kirabira et al., 2024 Pérez et al., 2023
Benzodiazepines (BZDs)	11.3% - 15.4%	Pérez et al., 2023 Carton et al., 2023
Opioids	13.1% - 14.7%	Carton et al., 2023
Corticoids	9.3%	Carton et al., 2023
Beta-blockers	3.3%	Carton et al., 2023
Methylphenidate (stimulants)	0.5%	Carton et al., 2023
Modafinil	0.6%	Carton et al., 2023

Illicit drugs also presented elevated prevalence among health students, mostly for recreational and coping purposes (Carton et al., 2023; Kirabira et al., 2024; Carton et al., 2023). Cannabis was the most commonly used illicit substance, with prevalence rates ranging from 3.4% (Kirabira et al., 2024) to 43.6%, with the highest prevalence reported observed among Spanish health students (Pérez et al., 2023). The use of MDMA (4.9%) and cocaine (3.4%) was also reported (Carton et al., 2023). Students who reported high

levels of academic stress were more likely to use illicit substances in the post-pandemic period. **Table 4** summarizes the prevalence of illicit drug use among health students.

**Table 4**

*Prevalence of illegal psychotropic substance use among health students*

Substance	Prevalence range	Studies reporting
Cannabis	3.4% - 43.6%	Kirabira et al., 2024 Pérez et al., 2023
MDMA	4.9%	Carton et al., 2023 Pérez et al., 2023
Cocaine	3.4% - 7.5%	Carton et al., 2023
LSD	1.6%	Carton et al., 2023
Ecstasy	10.8%	Pérez et al., 2023
Methamphetamine	~ 1%	Carton et al., 2023
GHB	~ 1%	Carton et al., 2023

Pérez and colleagues (2023) also investigated the consumption of alternative psychoactive substances, including medicinal plants. The findings indicate that at least half of the participants had consumed some psychoactive substance at least once, with 34.9% reporting valerian (*Valeriana officinalis*), a popular medicinal plant used to treat insomnia and anxious symptoms. This indicates that a considerable percentage of the analyzed students may have sought natural alternatives to traditional psychotropic agents.

## Discussion

The COVID-19 pandemic has significantly influenced the mental health and the use of psychotropic substances among youths (Bliddal et al., 2023; Kuitunen et al., 2023; Maguire et al., 2022), including college and University students. Given the pre-existing psychological burden among health students (Hill et al., 2018), it was hypothesized that the additional stress evoked by the COVID-19 pandemic would influence the use of psychotropics by this population. This discussion integrates findings from four studies

(Carton et al., 2023; Kirabira et al., 2024; Pérez et al., 2023; Pérez-Pérez et al., 2023) to analyze the how the pandemic, combined with other factors, impacted the use of substances with central nervous action by academics of health sciences. It explores the relationship between pandemic-related stressors and psychotropic substance use, addressing the study's primary objective.

The reviewed studies consistently report high prevalence rates of self-reported anxiety, depression, and suicidal ideation among health students (Carton et al., 2023; Kirabira et al., 2024; Pérez et al., 2023; Pérez-Pérez et al., 2023). The reported data indicate that, beyond the well-established academic pressures inherent to health education, the pandemic intensified pre-existing issues by disrupting academic routines and imposing further health-related concerns. These combined stressors may have led to the increased self-medication behaviors observed, as students apparently have sought relief through central nervous agents. These findings align with the hypothesis that the pandemic exacerbated pre-existing mental health challenges, which in turn might have evoked increased reliance on psychotropic substance use as coping mechanism. However, it is important to note that none of the available studies provide comparative data on substance use before and during – or after – the pandemic, limiting the ability to establish a direct causal relationship.

It is remarkable that the substance use among university students has significantly increased over time (Paul et al., 2024), with variations in the types of substances used and their prevalence. Although evidence is still scarce, some studies demonstrate that the pre-pandemic usage rates were significantly lower compared to post-pandemic levels among youths in general (Lamer et al., 2024) and specifically among university students (Kantorski et al., 2022). The reviewed studies align with this trend, demonstrating high prevalence rates of both legal substances (such as alcohol and tobacco) and illegal substances (such as cannabis). Of particular concern is the misuse of prescription psychotropic drugs, notably BZDs and opioids, with a significant number of health students already reporting dependence. Kirabira and colleagues (2024) identified alcohol as the most commonly consumed substance, and more importantly, almost one fourth of students reporting have used alcohol within the last three months, indicating a high prevalence of recent use. More importantly, considering that this study was the only one investigated which presented a research associate to accompany the participants during

the filling of the survey, although the questionnaires were guaranteed anonymous, it is possible that these levels were influenced by the intimidation of having someone supervise the form. Nevertheless, these findings align with the global trend of increased substance use among university students during the pandemic. Other investigations aiming to understand the predispositors of BZD and opioid use by university students indicated that most drug users had psychiatric follow-up, what could endorse a significant level of distress by this population (Thomas et al., 2024).

Although not the focus of the present investigation, gender and sexual identity appeared to influence the substance use in the post-COVID era by health students. Pérez and collaborators (2023) found that female and non-binary students presented higher rates of anxiety, depression, and suicidal ideation. Non-binary individuals, in particular, exhibited higher rates of psychoactive substance use. The gendered role of caregiving and societal expectations contribute to these disparities, as highlighted by Pérez-Pérez et al. (2023), where women were more likely to perceive neglect in the care of chronically ill family members and experienced long-term symptoms such as fatigue. This trend extends the academic environment. Previous investigations on sexual and gender minority people has indicated that these populations tend to present different health-risk behaviors, including higher rates of drug abuse, alcohol addiction, and other forms of intoxication (Singh et al., 2023). This population usually have poorer health than cisgender heterosexual people, and minority stressors, such as discrimination, could play a key role in mental health (Hughes et al., 2023). To bridge this knowledge gap, further research is crucial to explore the experiences of this population, in particular in university students, in order to develop evidence-based support systems tailored to their needs within the academic environment.

Several risk and protective factors for substance use were identified in the data evaluated. Notably, anxiety and depression symptoms were strongly correlated with increased consumption of BZDs, antidepressants and cannabis (Pérez et al., 2023; Pérez-Pérez et al., 2023). Living alone was also associated with increased BZD use, possibly due to increased social isolation, exacerbated during and after the pandemic (Pérez et al., 2023). Meanwhile, alcohol use was more prevalent among students in romantic relationships, although the underlying reasons for this association demand further exploration (Kirabira et al., 2024). Interestingly, fourth-year students showed lower



substance use, possibly due to reduced stress from academic pressures and increased hopefulness about post-graduation life. These findings suggest targeted interventions could mitigate substance use among at-risk groups.

It is important to acknowledge the limitations of the reviewed studies, and consequently, of the present review. The inability to establish causal relationships due to the descriptive nature of the investigation (Pérez-Pérez et al., 2023) and self-selection bias in survey participation (Pérez et al., 2023) directly affect the outcomes. The low response rate and monocentric design in (Carton et al., 2023) and the investigation in only two out of the six *campi* of the Busitema University (Kirabira et al., 2024) limit the generalizability of findings. In addition, the four studies here analyzed represent data from Europe (Spain, Portugal and France) and Afrika (Uganda), but may not reflect the reality of other students from different countries and cultures. It is expected that further studies aiming at elucidating the behavioral pattern and substance use of students, including investigations from other continents and countries, will fill in such gaps in the future.

Furthermore, from the four studies, only one investigated health students specifically (Pérez-Pérez et al., 2023), and one study included a separate investigation for each of the four fields of study, including health sciences (Carton et al., 2023). The other two included articles present general information about University students, even though a considerable part of the participants were from health sciences.

Despite these limitations, the four studies provide valuable insights into the mental health and substance use challenges faced by university students. But the lack of research focusing on mental health and the use and abuse of psychoactive substances by health students in the post-pandemic period only reinforces the need for further investigation and attention to this very pertinent issue.

As a future perspective and given the high prevalence of mental health disorders and substance use among university students, several recommendations can be numbered. First, most students using and abusing psychoactive substances were seeking either a recreational effect or a cognitive burst; thus, it is highly possible that there were feeling overloaded and needed a scape from the heavy routine, or that they felt they were not as productive as they should be. This leads to the need for robust and sufficient psychological support programs. This strategy should comprise mostly counseling services and peer support groups. Pérez-Pérez et al. (2023) and Pérez et al. (2023)

emphasize the importance of early diagnosis and intervention to improve students' educational, personal, and professional outcomes.

Secondly, Universities should provide education on the risks of substance misuse and offer treatment services for students struggling with dependence. As Carton and colleagues (2023) and Kirabira et al. (2024) suggest, interventions should address the specific substances prevalent among students and consider the influence of gender and sexual identity. In the case of our aim population, health students are intrinsically involved in the well-being of others but can also neglect themselves. The study by Carton et al. (2023) showed that nitrous oxide was more frequently used by health students, indicating that the toxicity of the product is most probably underestimated in a population normally more experienced in evaluating drug adverse effects.

Finally, further efforts and investments must be placed on research to monitor the mental health and substance use trends among university students, particularly in the post-pandemic context. It is well established that students are a population at risk of developing addictive and health-risk behaviors, and the fear of an uncertain professional future may trigger the use and abuse of psychoactive drugs (Carton et al., 2023). Therefore, implementing comprehensive support systems and preventive measures within academic institutions is crucial to mitigate these risks and promote the well-being of students.

These findings support the notion that exposure to significant stressors, such as the pandemic, increase reliance on psychotropic agents. The observed associations to increased substance use among health students reinforce the link between psychological distress and self-medication. The post-pandemic academic and social reintegration likely acted as an additional stressor, further exacerbating this pattern in this particular population.

## Conclusion

The pandemic has affected the substance use patterns of university students, most probably due to the elevated rates of perceived mental health symptoms, such as anxiety and depression. The reviewed studies suggest that these stressors combined with the stress evoked by the pandemic, most probably leading to the observed increased consumption

of psychotropic substances. Given the cross-sectional nature of the included studies, it remains necessary to further investigate the causal mechanisms underlying these factors.

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