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RESEARCH ARTICLE (ORIGINAL)

# Use of the main psychoactive drugs during the COVID-19 pandemic among higher education students

*Consumo das principais substâncias psicoativas em tempos de pandemia COVID-19 nos estudantes do ensino superior*

*Consumo de las principales sustancias psicoactivas en tiempos de la pandemia de COVID-19 en estudiantes de enseñanza superior*

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**Abstract**
**Background:** The higher education student population has a special risk of use and abuse of psychoactive drugs.
**Objective:** To analyze the use of psychoactive drugs in higher education students and their relationship with the sociodemographic variables and the COVID-19 pandemic onset.
**Methodology:** An analytical, observational, and cross-sectional study was conducted. Data were collected through a questionnaire applied after the first semester of the 2020/2021 school year to 8875 students of the Polytechnic Institute of Bragança from Portugal. A stratified sample of 825 participants for each of the five schools.
**Results:** Alcohol and tobacco are the most used and abused substances due to the practice of binge drinking/smoking. Psychoactive and recreational drugs are less used. Use is affected by sociodemographic variables: gender, age, school, chronic diseases, and parents' education/occupation. During the pandemic COVID-19, students perceive an increase in use except for alcohol.
**Conclusion:** The use of psychoactive drugs in higher education students is affected by sociodemographic variables and the COVID-19 pandemic.

**Keywords:** psychotropic drugs; students; higher education; COVID-19

**Resumo**
**Enquadramento:** A população estudantil do ensino superior tem especial risco de consumo e abuso de substâncias psicoativas.
**Objetivo:** Analisar o consumo das principais substâncias psicoativas nos estudantes do ensino superior e a sua relação com as variáveis sóciodemográficas e com o surgimento da pandemia COVID-19.
**Metodologia:** Estudo analítico, observacional e transversal. Dados recolhidos por questionário aplicado após o primeiro semestre do ano letivo 2020/2021, na população de 8875 estudantes do Instituto Politécnico de Bragança em Portugal. Amostra de 825 estratificada para cada uma das cinco escolas.
**Resultados:** Álcool e tabaco são as mais consumidas e de forma abusiva pela prática de *binge drinking/smoking*. Os medicamentos psicoativos e as drogas recreativas são menos consumidos. Os consumos são afetados pelas variáveis sociodemográficas: sexo, idade, escola, portadores de doença crónica, escolaridade e profissão dos pais. Durante a pandemia COVID-19, os estudantes percecionaram aumento dos consumos exceto o álcool.
**Conclusão:** O consumo de substâncias psicoativas pelos estudantes do ensino superior é afetado pelas variáveis sociodemográficas e pela pandemia COVID-19.

**Palavras-chave:** substâncias psicoativas; estudantes; ensino superior; COVID-19

**Resumen**
**Marco contextual:** La población estudiantil de la enseñanza superior está especialmente expuesta al riesgo de consumo y abuso de sustancias psicoactivas.
**Objetivo:** Analizar el consumo de las principales sustancias psicoactivas entre los estudiantes de enseñanza superior y su relación con las variables sociodemográficas y la irrupción de la pandemia de la COVID-19.
**Metodología:** Estudio analítico, observacional y transversal. Datos recogidos mediante un cuestionario realizado después del primer semestre del año académico 2020/2021, en una población de 8875 estudiantes del Instituto Politécnico de Braganza, en Portugal. Muestra de 825 estratificada para cada una de las cinco escuelas.
**Resultados:** El alcohol y el tabaco son las sustancias más consumidas y de las que más se abusa a través de borracheras/tabaco (*binge drinking/smoking*). Los medicamentos psicoactivos y las drogas recreativas se consumen menos. El consumo se ve afectado por variables sociodemográficas: sexo, edad, escolaridad, enfermedad crónica, educación y profesión de los padres. Durante la pandemia de la COVID-19, los estudiantes percibieron un mayor consumo, excepto de alcohol.
**Conclusión:** El consumo de sustancias psicoactivas de los estudiantes de enseñanza superior se ve afectado por variables sociodemográficas y por la pandemia de la COVID-19.

**Palabras-clave**: psicotrópicos; estudiantes; educación superior; COVID-19

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## Introduction

The concept of psychoactive, traditionally associated with substances that affect human psychic activity and behavior, has not been consensual over time, not only because of the increasing amount of psychoactive substances but also because there is no equal definition and legal regulation between countries (Arbour et al., 2019). Psychoactive substances can be divided between clinical use and recreational and abusive use. However, drugs of clinical use can be abused, and recently some drugs of abuse have been used for medical purposes, for example, cannabis (Subeliani et al., 2019).

The most referenced and freely used substances worldwide with psychoactive capacity are alcohol and tobacco, followed by psychoactive drugs and illicit recreational drugs (Arbour et al., 2019). Of all the psychoactive substances, alcohol is considered by some researchers to be the most problematic psychoactive drug today because it is socially seen as a *non-drug*, is easily accessible, and its problematic physical, psychosocial, and addictive effects are often overlooked (Fein et al., 2018). Tobacco, being the second most widely used psychoactive substance in the world, poses greater measurable health risks, namely severe pulmonary complications, cancer, and addiction (Ahluwalia et al., 2019).

In turn, psychoactive drugs are less used, but they represent an equally or more serious problem due to the extreme risks of dependence and overdose with an enormous impact on public health (Subeliani et al., 2019). There is no consensual classification in the literature, but most authors divide psychoactive drugs into four groups: neuroleptics and antipsychotics, anxiolytics and hypnotics, antidepressants, and mood stabilizers (Arbour et al., 2019). Anxiolytics and antidepressants are the most currently used worldwide. In Portugal, data from the National Health Council report (Conselho Nacional da Saúde - CNS, 2019) show consumption of more than twice the average of the European community, having tripled their use in the last two decades. According to researchers and various working groups, the most well-known recreational drugs are cocaine, cannabis and derivatives, heroin, amphetamines, ecstasy, LSD, hallucinogenic mushrooms, glues, and solvents (Arbour et al., 2019). Of all psychoactive substances, recreational drugs pose the greatest danger to public health, and many are considered illegal, which in part limits their use (Neicun et al., 2020).

In modern society, deviant behaviors regarding the use of psychoactive substances have emerged in recent years, condensing consumption into very short time intervals, namely with alcohol and tobacco. Binge drinking corresponds to the consumption of five or more alcoholic drinks within 2 hours for men and four or more for women (Wechsler & Nelson, 2001). Binge smoking does not yet have a clear definition, but it is associated with the occasional, excessive use of tobacco during an evening or social event (Cancer Institute of New South Wales in Australia, 2022). Studies show that binge drinking in adolescents and young adults, naturally associated with academic gatherings, has serious metabolic consequences as a result of the body's previous maladaptation and risk of intoxication (Molina et al., 2018), leading to a decrease in brain mass and cognitive capacity.

Although this study focuses on the four most usual psychoactive substances (alcohol, tobacco, psychoactive medication, and recreational drugs), it is pertinent to mention that there are many others with effects on the central nervous system, such as caffeine from coffee or energy drinks and stimulants.

This study aimed to analyze the use of psychoactive substances in higher education students and its relationship with sociodemographic variables and the onset of the COVID-19 pandemic.

## Background

The use of psychoactive substances is a public health problem in all age groups, particularly among in higher education students. Review studies report that the use of two or more psychoactive substances is common in the general population, particularly the combination of alcohol and tobacco (Tarren & Bartlett, 2017). Recent studies in students show a high prevalence of use of psychoactive substances, namely alcohol and tobacco, highlighting the high prevalence of drunkenness and binge drinking and the combination with psychoactive and/or recreational drugs (Anes & Antão, 2018; Bento et al., 2021). Other studies report that the use of psychoactive drugs in students is often a secondary cause of the consumption of other psychoactive substances or a solution to reduce the pressure they are subjected to during exam season (Lyons et al., 2020).

The literature evidences the interference of sociodemographic factors in the use of the main psychoactive substances, as well as the association between people who use and people with health problems (Chelieh et al., 2019), younger people, and people with higher education levels (Neicun et al., 2020). The literature also highlights that higher education students use more drugs than the rest of the population (Anic et al., 2018), and health students use more drugs in general (Font-Mayolas et al., 2019). Males abuse alcohol and tobacco the most (Anes & Antao, 2018; Tarren & Bartlett, 2017), while females are the primary users of psychoactive drugs (Bento et al., 2021). Changes in consumption patterns due to the COVID-19 pandemic need to be further investigated. However, data from the European Monitoring Centre for Drugs and Drug Addiction (2020) and recent studies point to a considerable increase in anxiety or depression states, as well as an increase in the use of the main psychoactive substances (Jodczyk et al., 2022; Stanton et al., 2020).

## Research question

What is the prevalence of the use of the main psychoactive substances among higher education students during the COVID-19 pandemic?

How are the respondents' sociodemographic variables and the onset of the COVID-19 pandemic associated with the use of these substances?

## Methodology

A quantitative, descriptive, analytical, and cross-sectional study was conducted on a sample of 825 respondents selected from the population of 8875 students enrolled in the Polytechnic Institute of Bragança (IPB) in the academic year 2020/2021. This stratified sample was proportional to each of the five IPB schools: School of Health (ESSA), School of Technology and Management (ESTIG), School of Agriculture (ESA), School of Education (ESE), and Mirandela School of Administration, Accounting, and Tourism (ESACT).

A probabilistic sample stratified by schools was established. The Sample Size Calculator, available online by Raosoft, was used to calculate the sample. A confidence interval was set at 99% and variance at 5%, yielding the need for 618 responses. The only inclusion criterion was being a student enrolled in any study cycle at the IPB in the academic year 2020/2021, and the exclusion criterion was the refusal to give informed consent.

For data collection, a two-part questionnaire in Portuguese and/or English was used. The first part included the independent sociodemographic, academic, family unit, and health variables: gender, age, school, course, academic degree and year, nationality, type of enrollment, father's and mother's education and profession, existence of chronic illness, and COVID-19 screening. The second part of the questionnaire included the dependent variables related to active substance use and all questions referred to behaviors of the previous semester. For the second part, we used an adaptation of the Portuguese AUDIT scale (Alcohol Use Disorders Identification Test) for alcohol use, available on the website of the Intervention Service for Additive Behaviors and Addictions (*Serviço de Intervenção nos Comportamentos Aditivos e nas Dependências* - SICAD). For alcohol, tobacco, psychoactive drugs, and recreational drugs, new scales were created for this research.

The questionnaire was applied immediately after the 1st school semester (March and April 2021), during the COVID-19 pandemic, with synchronous classes. A Google Forms template was used, automatically available by email to all IPB students.

Authorization was obtained from the IPB Ethics Committee (opinion no. 31/2021), complying with all applicable ethical rules, namely the Declaration of Helsinki, where anonymity and informed consent were ensured.

A total of 825 questionnaires were collected, and the criteria for stratified sampling by schools were met. Subsequently, a descriptive statistical analysis of the sample was performed using absolute and relative frequency tables, as well as measures of central tendency, mean and median. The chi-square test was used to detect statistically significant differences between dependent and independent qualitative variables. Student's t-tests for two independent samples or One-Way ANOVA tests for more than two independent samples, both only when population normality was verified, were used to detect statistically significant differences between qualitative independent variables and quantitative dependent variables. In cases where population normality was not verified, the Mann-Whitney test for two independent samples and the Kruskal-Wallis parametric test for three or more independent samples were used. Statistical significance was checked whenever the *p*-value was less than or equal to 0.05. All statistical analyses were performed using IBM SPSS Statistics, version 20.0 (Chicago, Illinois, United States of America).

## Results

Table 1 shows that the sample is mostly female (75.4%) and aged 22 years old or younger (65.8%). At the academic level, the most represented variables are ESSA (28.6%), ESTIG (27%), Bachelor's degree (81.8%), and the first course year (34.8%), Portuguese nationality (82.4), and ordinary enrollment (73.3%). Of the total, 8% of the students suffer from chronic illnesses, and 12.4% have had a positive COVID-19 screening. Regarding the family unit, most have both parents, both are employed (58.5%), and the predominant education level is secondary education (39.7%) and elementary education (29.6%). According to the National Occupation Classification (*Classificação Nacional de Profissões* - CNP), personal, protective, and security services workers are the main occupation in the family unit with 24.9%, followed by skilled industry workers with 22.8%. Specialists in intellectual and scientific activities represent 15.9%. The predominance of unskilled workers in 8.7% of the family units is worth mentioning.

**Table 1**

*Sociodemographic, academic, health, and family unit characteristics*

| | | *n* | *n* % |
|---|---|---|---|
| **Gender** | Female | 622 | 75.4% |
| | Male | 203 | 24.6% |
| **Age group** | 22 years old or younger | 543 | 65.8% |
| | 23 to 25 years | 155 | 18.8% |
| | More than 25 years | 127 | 15.4% |
| **School** | ESSA | 236 | 28.6% |
| | ESE | 147 | 17.8% |
| | ESTIG | 223 | 27.0% |
| | ESACT | 158 | 19.2% |
| | ESA | 61 | 7.4% |
| **Main academic degree** | CTESP | 40 | 4.8% |
| | Bachelor's degree | 675 | 81.8% |
| | Master's degree | 110 | 13.3% |
| **Main course year** | 1st year | 287 | 34.8% |
| | 2nd year | 258 | 31.3% |
| | 3rd year | 249 | 30.2% |
| | 4th year | 31 | 3.8% |
| **Nationality** | Portugal | 680 | 82.4% |
| | Foreign | 145 | 17.6% |
| **Type of enrollment** | Portuguese ordinary | 605 | 73.3% |
| | International ordinary | 113 | 13.7% |
| | Association leader, Erasmus, or student worker | 107 | 13.0% |
| **Chronic illness** | No | 759 | 92.0% |
| | Yes | 66 | 8.0% |
| **With a positive COVID-19 test** | No | 723 | 87.6% |
| | Yes | 102 | 12.4% |
| **Parents present** | None | 12 | 1.5% |
| | Only one | 64 | 7.8% |
| | Both | 749 | 90.8% |
| **Parents' employment** | None | 89 | 10.8% |
| | One of the parents | 253 | 30.7% |
| | Father and mother | 483 | 58.5% |
| **Parents' academic qualifications** | Primary school | 59 | 7.9% |
| | Elementary school | 222 | 29.6% |
| | Secondary school | 297 | 39.7% |
| | Higher education | 171 | 22.8% |
| **Main profesional category in the family unit** | Armed forces professions | 4 | 0.5% |
| | Government officers and bodies' representatives | 56 | 7.6% |
| | Specialists in intellectual and scientific activities | 117 | 15.9% |
| | Technicians and associate professionals | 36 | 4.9% |
| | Administrative staff | 65 | 8.8% |
| | Personal, protective, and security services workers | 183 | 24.9% |
| | Farmers and skilled workers | 16 | 2.2% |
| | Skilled industry workers | 168 | 22.8% |
| | Plant and machine operators | 27 | 3.7% |
| | Unskilled workers | 64 | 8.7% |

*Note*. *n* = absolute frequency; *n* % = relative frequency; ESSA = School of Health of Bragança); ESSE = School of Education); ESTIG = School of Technology and Management; ESACT = School of Communication, Administration, and Tourism; ESA = School of Agriculture; CTESP = Higher Technical Professional Course.

Table 2 shows that the vast majority of students (67.2%) used at least one of the following psychoactive substances: alcohol, tobacco, medication, and recreational drugs. Alcohol is the most used substance (59.4%), followed by tobacco (31.6%). The use of medication (7.3%) and recreational drugs (7.6%) is much lower. As regards combined use, 22.1% use two psychoactive substances, 6.5% use three, and 1.2% use all of those studied. Overall, the average use is 1.1 psychoactive substances per student.

The usual alcohol user profiles are one to two drinks per month (16.6%), three to four drinks per month (18.6%), and one to two drinks per semester (17.1%). More than one-third of the students who drink alcohol (36.3%) have engaged in binge drinking. With the COVID-19 pandemic, the majority (58.2%) perceived a decrease in consumption.

Regarding tobacco, the most prevalent smoking profile is five to nine cigarettes per day (24.9%), followed by one to four (20.3%). Of the students who smoke, 46.7% have engaged in binge smoking. With the COVID-19 pandemic, the perception of increased or maintained consumption was more prevalent among students, 37.2% and 34.5%, respectively.

Regarding the use of psychoactive drugs, the vast majority (85.0%) reported the use of anxiolytics, followed by sedatives, antidepressants, and antipsychotics, respectively 50.0%, 25.0%, and 20.0%. The most common way of obtaining these drugs is by prescription, whether for emergency situations or acute crises and daily intake, respectively 46.7% and 45.0%. Self-medication in emergency situations or acute crises represents 20.0% and daily intake 15.4%. With the COVID-19 pandemic, most students perceived an increase in consumption (58.3%).

Finally, with regard to recreational drugs, cannabis represents the majority of consumption (85.7%), followed by cocaine and ecstasy, with much lower consumption, both at 15.9%. The frequency of consumption is scattered, although the majority use recreational drugs once to three times a semester (28.6%) and 3 to 4 times a week (15.9%). With the COVID-19 pandemic, most perceived maintenance (39.7%) or increase (33.3%) in consumption.

**Table 2**

*Use of the main psychoactive substances*

| **Alcohol** | | | | **Psychoactive drugs** | | | |
|---|---|---|---|---|---|---|---|
| | | *n* | *n* % | | | *n* | *n* % |
| Used? | No | 335 | 40.6% | Used? | No | 765 | 92.7% |
| | Yes | 490 | 59.4% | | Yes | 60 | 7.3% |
| User profile | 1 to 4 times per semester | 146 | 29.8% | Type? | Anxiolytics | 51 | 85.0% |
| | 1 to 4 times a month | 182 | 37.1% | | Sedatives | 30 | 50.0% |
| | 1 to 4 times a week | 127 | 25.9% | | Antidepressants | 15 | 25.0% |
| | 1 to 2 times a day | 21 | 4.3% | | Antipsychotics | 12 | 20.0% |
| | mais que 2 vezes por dia | 14 | 2.9% | How? | Daily self-medication | 8 | 15.4% |
| Binge drinking | No | 312 | 63.7% | | SOS self-medication | 12 | 20.0% |
| | Yes | 178 | 36.3% | | Daily intake prescription | 27 | 45.0% |
| Use during COVID-19 pandemic | Decreased | 285 | 58.2% | | SOS prescription | 28 | 46.7% |
| | Maintained | 165 | 33.6% | Use during COVID-19 pandemic | Decreased | 4 | 6.7% |
| | Increased | 40 | 8.2% | | Maintained | 21 | 35.0% |
| | | | | | Increased | 35 | 58.3% |
| **Tobacco** | | | | **Recreational drugs** | | | |
| Used? | No | 564 | 68.4% | Used? | No | 762 | 92.4% |
| | Yes | 261 | 31.6% | | Yes | 63 | 7.6% |
| User profile | 1 to 3 times a semester | 39 | 14.9% | Type | Cocaine | 10 | 15.9% |
| | 1 to 3 times a month | 17 | 6.5% | | Cannabis | 54 | 85.7% |
| | 1 to 3 times a week | 20 | 7.7% | | Heroin | 2 | 3.2% |
| | 4 to 6 times a week | 14 | 5.4% | | LSD | 6 | 9.5% |
| | 1 to 4 times a day | 53 | 20.3% | | Amphetamines | 2 | 6.3% |
| | 5 to 9 times a day | 63 | 24.1% | | Glues and solvents | 0 | 0.0% |
| | 10 to 20 times a day | 46 | 17.6% | | Hallucinogenic mushrooms | 5 | 8.0% |
| | 21 or more times a day | 9 | 3.5% | | Ecstasy | 10 | 15.9% |
| Binge smoking | No | 139 | 53.3% | | Others | 7 | 11.1% |
| | Yes | 122 | 46.7% | User profile | 1 to 3 times a semester | 18 | 28.6% |
| Use during COVID-19 pandemic | Decreased | 74 | 28.4% | | 4 to 6 times a semester | 5 | 7.9% |
| | Maintained | 90 | 34.5% | | 1 to 2 times a month | 4 | 6.3% |
| | Increased | 97 | 37.2% | | 3 to 4 times a month | 4 | 6.3% |
| | | | | | 5 to 6 times a month | 1 | 1.6% |
| **Total number of psychoactive substances used** | | | | | 1 to 2 times a week | 7 | 11.1% |
| | *n* | *n* % | | | 3 to 4 times a week | 10 | 15.9% |
| None | 271 | 32.8 % | 32.8% | | 5 to 6 times a week | 6 | 9.5% |
| 1 | 308 | 37.3 % | 67.2% | | Every day | 8 | 12.7% |
| 2 | 182 | 22.1 % | | Weekly use? | No | 31 | 50.8% |
| 3 | 54 | 6.5 % | | | Yes | 32 | 49.2% |
| 4 | 10 | 1.2 % | | Use during COVID-19 pandemic | Decreased | 17 | 27.0% |
| Total | 825 | | | | Maintained | 25 | 39.7% |
| Average number of psychoactive substances used | | 1,1 | | | Increased | 21 | 33.3% |

*Note*. *n* = absolute frequency; *n %* = relative frequency; SOS = emergency situation or acute crisis.

The arrows in Table 3 indicate which groups of sociodemographic, academic, health, and family unit variables are associated with increased drinking and abuse. Alcohol consumption is associated with the following factors: male gender, ESTIG, and the fourth course year. Binge drinking is associated with the male gender, ESTIG, and students between 23 and 25 years old. Regarding the family unit, higher education is associated with a higher

prevalence of alcohol consumption.
A higher prevalence of tobacco smoking is associated with the following academic and health factors: ESTIG, the Bachelor's degree, the fourth year of study, Portuguese students, association leaders, and the existence of a chronic illness. Binge smoking is associated with younger students and students without a chronic illness. Higher drug use is associated with only students with a chronic illness. Higher use of recreational drugs is associated with the male gender, the existence of a chronic illness, and a positive test for COVID-19. Regarding the family unit, higher education levels and armed forces and intellectual professions are associated with higher consumption among their children.

**Table 3**

*Association between sociodemographic, academic, health, and family unit variables and the consumption of psychoactive substances*

| | **Qualitative - chi-square test** | | | | | | | | **Quantitative** |
|---|---|---|---|---|---|---|---|---|---|
| | Alcohol | | Tobacco | | Psychoactive drugs | | Recreational drugs | | N.º of different psychoactive substances |
| | Used? | Binge Drinking? | Used? | Binge Smoking? | Used? | Self-medication? | Used? | Weekly use? | |
| Gender | $p$ = 0.001<br>↑ Male | $p$ = 0.008<br>↑ Male | $p$ = 0.061 | $p$ = 0.103 | $p$ = 0.192 | $p$ = 0.740 | $p$ < 0.001<br>↑ Male | $p$ = 0.002<br>↑ Male | *t de Student*<br>$p$ = 0.001<br>↑ Male |
| Age group | $p$ = 0.170 | $p$ = 0.023<br>↑ 23 to 25 years | $p$ = 0.227 | $p$ = 0.001<br>↑ 22 years or younger | $p$ = 0.052 | $p$ = 0.740 | $p$ = 0.054 | $p$ = 1.00 | ANOVA<br>$p$ = 0.036<br>↑ 23 to 25 years |
| School | $p$ = 0.0143<br>↑ ESTIG | $p$ = 0.028<br>↑ ESTIG | $p$ < 0.001<br>↑ ESACT | $p$ = 0.416 | $p$ = 0.861 | $p$ = 0.959 | $p$ = 0.120 | $p$ = 0.017 | ANOVA<br>$p$ = 0.031<br>↑ ESTIG<br>↑ ESACT |
| Degree | $p$ = 0.406 | $p$ = 0.289 | $p$ = 0.048<br>↑ Bachelor's degree | $p$ = 0.409 | $p$ = 0.488 | $p$ = 0.520 | $p$ = 0.440 | $p$ = 0.361 | ANOVA $p$ = 0.046<br>↑ Licenciatura |
| Course year | $p$ = 0.001<br>↑ 4th year | $p$ = 0.732 | $p$ < 0.001<br>↑ 4th year | $p$ = 0.307 | $p$ = 0.05 | $p$ = 1.000 | $p$ = 0.053 | $p$ = 0.774 | ANOVA<br>$p$ < 0.001<br>↑ 4th year |
| Nationality | $p$ = 0.870 | $p$ = 0.001 | $p$ < 0.001<br>↑ Portuguese | $p$ = 0.089 | $p$ = 0.117 | $p$ = 0.960 | $p$ = 0.507 | $p$ = 0.805 | *t* de Student<br>$p$ = 0.076 |
| Enrollment | $p$ = 0.527 | $p$ = 0.887 | $p$ < 0.001<br>↑ Association leader | $p$ = 0.776 | $p$ = 0.771 | $p$ = 0.795 | $p$ = 0.072 | $p$ = 0.776 | ANOVA $p$=0.01<br>↑ Association leade |
| Chornic illness | $p$ = 0.403 | $p$ = 0.978 | $p$ = 0.049<br>↑ With chronic illness | $p$ = 0.041<br>↑ Without chronic illness | $p$ < 0.001<br>↑ With chronic illness | $p$ = 0.370 | $p$ < 0.001<br>↑ With chronic illness | $p$ = 0.496 | t de Student<br>$p$ = 0.015<br>↑ With chronic illness |
| COVID-19 screening | $p$ = 0.341 | $p$ = 0.077 | $p$ = 0.192 | $p$ = 0.431 | $p$ = 0.813 | $p$ = 0.565 | $p$=0.004<br>↑ Positive | $p$ = 0.032<br>↑ Negative | t de Student<br>$p$ = 0.077 |
| Family unit's employment | $p$ = 0.675 | $p$ = 0.411 | $p$ = 0.424 | $p$ = 0.688 | $p$ = 0.086 | $p$ = 0.233 | $p$ =0.496 | $p$ = 0.898 | ANOVA<br>$p$ = 0.690 |
| Family unit's education level | $p$ = 0.033<br>↑ Secondary school<br>↑ Higher education | $p$ = 0.242 | $p$ = 0.471 | $p$ = 0.807 | $p$ = 0.293 | $p$ = 0.075 | $p$=0.001<br>↑ Higher education | $p$ = 0.316 | ANOVA<br>$p$ = 0.046<br>↑ Higher education |
| Family unit's profession | $p$ = 0.071 | $p$ = 0.449 | $p$ = 0.086 | $p$ = 0.164 | $p$ = 0.783 | $p$ = 0.074 | $p$=0.010<br>↑ Armed forces and intellectual activities | $p$ = 0.377 | Kruskal-Wallis<br>$p$ = 0.043<br>↑ Armed forces and intellectual activities |

Note. ↑ = group with significance; ANOVA = parametric test for mean comparison; Kruskal-Wallis = non-parametric test of variance; $p$ = significance value; *Student's t* = Student's *t*-test; ESTIG = School of Technology and Management; ESACT = Mirandela School of Communication, Administration, and Tourism.

## Discussion

The use of psychoactive substances by IPB students is significant, considering that they are a population at risk, according to Anic et al. (2018). However, it is lower when compared to the larger national study of Bento et al. (2021).

Although alcohol is the most used psychoactive substance, the major problem lies in the high prevalence of binge drinking, in line with the study by Bento et al. (2021). Interestingly, in the context of the COVID-19 pandemic, IPB students perceived a decrease in alcohol drinking, contrasting with the studies of Stanton et al. (2020) and Jodczyk et al. (2022), perhaps because students witnessed a decrease in social gatherings.

Regarding tobacco, the results of 31.6% of smoking students represent not only a much higher prevalence in relation to the general population, in line with Anic et al. (2018), but also relatively higher when compared to 19.4% of the national reality of higher education students (Bento et al., 2021). During the COVID-19 pandemic, most students perceived a maintenance or increase in tobacco use, which is in line with the findings in the studies by Stanton et al. (2020) and Jodczyk et al. (2022). These results of high tobacco use reflect an underlying problem in the IPB student population, although the COVID-19 pandemic itself may have boosted consumption.

The use of psychoactive drugs in only 7.3% of students shows a very low prevalence when compared to the 42.2% of the Portuguese national reality (Bento et al., 2021). However, the pattern of female students being proportionally the greatest users remains. Of the IPB students who use psychoactive drugs, most perceived an increase in consumption during the COVID-19 pandemic, in line with the increase in anxiety or depression pointed out by the European Monitoring Centre for Drugs and Drug Addiction (2020) and the study of Stanton et al. (2020). These results clearly reinforce the association between the COVID-19 pandemic and an increase in depressive states with consequently higher psychoactive drug use among students.

With regard to recreational drugs, the results show that consumption in the IPB is also much lower than the national reality described by Bento et al. (2021). However, most students perceived the maintenance of consumption during the COVID-19 pandemic.

In sociodemographic terms, the data indicate that the male gender is the biggest user and the one that most combines several psychoactive substances, thus translating into a higher risk of addiction, as also pointed out in other studies (Anes & Antão, 2018; Tarren & Bartlett, 2017). Of all the psychoactive substances studied, only binge smoking is associated with younger students. The results reveal that students from the School of Health of Bragança use and abuse psychoactive substances much less tan others, contrary to the literature that points out students from health courses as the greatest users (Font-Mayolas et al., 2019). These results establish that health students have more literacy about psychoactive substances, which translates into lower consumption. On the other hand, students with chronic illnesses are associated with higher tobacco use, psychoactive drug use, and higher numbers of different psychoactive substances, in line with some of the findings of Neicun et al. (2020) and Chelieh et al. (2019). These data reinforce that chronic illnesses are a debilitating factor for students, many in need of treatments involving psychoactive drugs. A higher family unit's education level is associated with higher consumption of alcohol and a higher combination of different psychoactive substances, which is corroborated by the study of Görgülü et al. (2016).

Overall, the results are not completely overlapping with other studies. On the one hand, data were collected during the COVID-19 pandemic, with periods of greater social isolation of students and synchronous classes. On the other hand, the population of IPB students has different sociodemographic characteristics. This study provides some unexpected results, different from other studies, namely the decrease in alcohol drinking among students, taking into account the pandemic context.

## Conclusion

The consumption of alcohol and psychoactive and recreational drugs is lower among IPB students than in most national studies, except for the proportionally higher tobacco use. During the COVID-19 pandemic, students perceived a decrease in alcohol consumption but an increase in tobacco and psychoactive and recreational drug use. In sociodemographic terms, being a male and younger student is associated with higher consumption and binge drinking/smoking abuse. However, psychoactive drugs are used more by women. Younger students are the greatest tobacco smokers, while older students combine different psychoactive substances. The results also show that health students use and abuse less and that the existence of chronic illness is a factor that increases consumption. Regarding the family unit, higher education levels and intellectual professions are associated with a higher use among their children.

This study allowed verifying the level of consumption of the main psychoactive substances and identifying sensitive variables associated with the consumption of the main psychoactive substances among higher education students in the population studied. Data collection during a pandemic also helped to understand that abuse in short time intervals was maintained and, in general, the consumption of the main psychoactive substances increased, except alcohol.

The results and main conclusions allow defining the groups in which intervention is possible. Nursing, as a science of knowledge and action, can contribute significantly to the development of health awareness and promotion measures, with the participation of students, in critical areas for their quality of life and well-being. The national school health programs, in which nurses are already actively participating, aim, among many other aspects, to empower young people to identify risks and enhance protective measures. The transition and adaptation to

higher education require hard work in the empowerment and promotion of positive, safe, and inspiring educational environments, taking into account the mission of higher education institutions. Successful academic integration of students is important, identifying health risk situations in a timely manner, as well as ensuring articulation and referral to differentiated health care if warranted.

In the study population, more awareness and promotion measures would be important, especially during student reception. Smoking cessation programs and awareness programs on the consequences of binge drinking/smoking are an example. It is also important to have greater psychological support for chronically ill students and female students, as they are more prone to using psychoactive drugs.

Although some results are in line with the literature, this study was developed within a specific context of the COVID-19 pandemic and in only one higher education institution, so the results cannot be extrapolated to a non-pandemic context and the entire population of higher education students.

Similar studies are important for the scientific community to identify which behaviors and risk groups are associated with the use of the main psychoactive substances among higher education students.

## Author Contributions

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## References


Ahluwalia, I. B., Arrazola, R. A., Zhao, L., Shi, J., Dean, A., Rainey, E., Palipudi, K., Twentyman, E., & Armour, B. S. (2019). Tobacco use and tobacco-related behaviors: 11 countries, 2008-2017. *Morbidity and Mortality Weekly Report*, *68*(41), 928–933. https://doi.org/10.15585/mmwr.mm6841a1

Anes, E., & Antão, C. (2018). Consumo de tabaco, álcool e drogas em jovens estudantes. *INFAD Revista de Psicología*, *2*(1), 133. https://doi.org/10.17060/ijodaep.2018.n1.v2.1189

Anic, G. M., Sawdey, M. D., Jamal, A., & Trivers, K. F. (2018). Frequency of use among middle and high school student tobacco product users: United States, 2015–2017. *Morbidity and Mortality Weekly Report*, *67*(49), 1353–1357. https://doi.org/10.15585/mmwr.mm6749a1

Arbour, L., Bém, P., Branson, R., Cattaui, M., Cardoso, F. H., Clark, H., Clegg, N., Dreiffus, R., Elbaradei, M., Gaviria, C., Grover, C., Kazatchkine, M., Kwasniewski, A., Lagos, R., Motlanthe, K., Obasanjo, O., Papandreou, G., Ramos-Horta, J., Sampaio, J., … Uteem, C. (2019). *Classificação de substâncias psicoativas: Quando a ciência foi deixada para trás: Relatorio 2019*. Comissão Global de Politica sobre Drogas. http://www.globalcommissionondrugs.org/wp-content/uploads/2019/06/2019Report_POR_web.pdf

Bento, M. C., Barroso, T., Ferreira, Teresa Rodrigues Henriques, C., Pimentel, H., Ramos, L., Rosa, A., & Vinagre, M. (2021). *Comportamentos de saúde e bem-estar dos estudantes do ensino superior politécnico: Um diagnóstico a partir da perspetiva dos estudantes*. Conselho Coordenador dos Institutos Superiores Politécnicos. https://ccisp.pt/wp-content/uploads/2021/06/Relatorio-Saude-1.pdf

Cancer Institute of New South Wales in Australia(2022). *Effects of smoking*. https://www.icanquit.com.au/reasons-to-quit/smoking-and-your-health/social-smoking-and-binge-smoking

Chelieh, M., Kadhum, M., Lewis, T., Molodynski, A., Abouqal, R., Belayachi, J., & Bhugra, D. (2019). Mental health and wellbeing among Moroccan medical students: A descriptive study. *International Review of Psychiatry*, *31*(7–8), 608–612. https://doi.org/10.1080/09540261.2019.1675276

Conselho Nacional de Saúde. (2019). *Sem mais tempo a perder: Saúde mental em Portugal: Um desafio para a próxima década Conselho Nacional de Saúde*. https://www.cns.min-saude.pt/wp-content/uploads/2019/12/SEM-MAIS-TEMPO-A-PERDER.pdf

Curran, C. P., & Marczinski, C. A. (2017). Taurine, caffeine, and energy drinks: Reviewing the risks to the adolescent brain. *Birth Defects Research*, *109*(20), 1640–1648. https://doi.org/10.1002/bdr2.1177

European Monitoring Centre for Drugs and Drug Addiction. (2020). *European Drug Report: Trends and Developments* https://www.emcdda.europa.eu/system/files/publications/13236/TDAT20001ENN_web.pdf

Fein, G., Price, M., & Cardenas, V. A. (2018). Borderline personality disorder symptoms in treatment-naïve actively drinking alcoholics. *Alcohol*, *68*, 81–89. https://doi.org/10.1016/j.alcohol.2017.10.005

Font-Mayolas, S., Hernández-Serrano, O., Gras, M. E., & Sullman, M. J. (2019). Types of polydrug use among Spanish students in health sciences. *Journal of Addictions Nursing*, *30*(2), 108–113. https://doi.org/10.1097/JAN.0000000000000274

Görgülü, Y., Çakir, D., Sönmez, M. B., Köse Çinar, R., & Vardar, M. E. (2016). Alcohol and psychoactive substance use among university students in edirne and related parameters. *Noropsikiyatri Arsivi*, *53*(2), 163–168. https://doi.org/10.5152/npa.2015.9907

Jodczyk, A. M., Kasiak, P. S., Adamczyk, N., Gębarowska, J., Sikora, Z., Gruba, G., Mamcarz, A., & Śliż, D. (2022). PaLS study: Tobacco, alcohol and drugs usage among Polish University students in the context of stress caused by the COVID-19 pandemic. *International Journal of Environmental Research and Public Health*, *19*(3),1261. https://doi.org/10.3390/ijerph19031261

Lyons, Z., Wilcox, H., Leung, L., & Dearsley, O. (2020). COVID-19 and the mental well-being of Australian medical students: Impact, concerns and coping strategies used. *Australasian Psychiatry*, *28*(6), 649-652. https://doi.org/10.1177/1039856220947945

Molina, P. E., Nelson, S., & Molina, P. E. (2018). Binge drinking ' s effects on the body. *Alcohol Research: Current Reviews, 39*(1), 99–109. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6104963/pdf/arcr-39-1-e1_a12.pdf

Neicun, J., Yang, J. C., Shih, H., Nadella, P., van Kessel, R., Negri, A., Czabanowska, K., Brayne, C., & Roman-Urrestarazu, A. (2020). Lifetime prevalence of novel psychoactive substances use among adults in the USA: Sociodemographic, mental health and illicit drug use correlates: Evidence from a population-based survey 2007–2014. *PLoS ONE*, *15*(10), 0241056. https://doi.org/10.1371/journal.pone.0241056

Nielsen, S. (2017). *Non-medical and illicit use of psychoactive drugs*. Spinger International. https://doi.org/10.1332/030557311X574234

Stanton, R., To, Q. G., Khalesi, S., Williams, S. L., Alley, S. J., Thwaite,

T. L., Fenning, A. S., & Vandelanotte, C. (2020). Depression, anxiety and stress during COVID-19: Associations with changes in physical activity, sleep, tobacco and alcohol use in Australian adults. *International Journal of Environmental Research and Public Health*, *17*(11), 1–13. https://doi.org/10.3390/ijerph17114065

Subeliani, D., Otiashvili, D., Kutelia, L., Beselia, A., Mgebrishvili, T., Vardanashvili, I., & Kirtadze, I. (2019). Patterns of use of new psychoactive substances and perceived benefits and negative effects: Results of online survey in Georgia (country). *Journal of Substance Use*, *25*(3), 324-329, https://doi.org/10.1080/14659891.2019.1692927

Tarren, J. R., & Bartlett, S. E. (2017). Alcohol and nicotine interactions: Pre-clinical models of dependence. *American Journal of Drug and Alcohol Abuse*, *43*(2), 146–154. https://doi.org/10.1080/00952990.2016.1197232

Wechsler, H., & Nelson, T. F. (2001). Binge drinking and the american college students: What's five drinks? *Psychology of Addictive Behaviors, 15*(4), 287–291. https://doi.org/10.1037/0893-164X.15.4.287