

ORION
SCHOLAR JOURNALS



(RESEARCH ARTICLE)



Frequent drug use and average age of initiation, associated with gender, age groups, and family income in university students of Health Sciences in Arequipa, Peru

Vicente Fidel Urday-Concha ^{1*}, Jacinta Mayrene Abarca-Del Carpio ², Roxana Belen Ochoa-Begazo ³, Caridad Gonzales-Vera ⁴, Ana Cecilia Urday-Gonzales ⁵ and Lino José Pinto-Oppe ⁶

¹ Postgraduate School, National University of San Agustin, Arequipa, Peru.

² Dean of the Faculty of Nursing, National University of San Agustin, Arequipa, Peru.

³ Director of the Graduate Unit of the Faculty of Nursing, National University of San Agustin, Arequipa, Peru.

⁴ Faculty of Nursing, National University of San Agustin, Arequipa, Peru.

⁵ Professional Careers in Industrial and Mining Safety Engineering, Technological University of Peru, Arequipa, Peru.

⁶ Professional School of Systems Engineering, National University of San Agustin, Arequipa, Peru.

International Journal of Scientific Research Updates, 2024, 08(02), 122–136

Publication history: Received on 28 September 2024; revised on 10 November 2024; accepted on 13 November 2024

Article DOI: <https://doi.org/10.53430/ijsru.2024.8.2.0065>

Abstract

Drug use and the reduction in the average age of initiation of drug use are growing public and social health problems among university students. The purpose of the study was to estimate the prevalence of frequent consumption of psychoactive drugs in students of Health Sciences courses and to identify the average age of initiation, associated with sex, age groups, and family income. The study used a quantitative approach and a cross-sectional, descriptive correlational design. 236 students participated and the results showed, about frequent drug use, based on gender, a higher proportion of male consumers, with significant statistical differences only for basic paste $\alpha=0.05$, and cocaine $\alpha=0.01$; By age group, the older age group of students reveals higher proportions for the use of alcohol and tobacco, with statistical differences for a confidence level of 95% and, in association with family income, the higher the economic status of the family, the lower the average age of initiation of children in drug use, and the greater the frequent use of cocaine and ecstasy, with significant mean differences for a probability level, $P \leq 0.01$. In conclusion, there is an urgent need to implement a program to reduce and early prevent the use of toxic drugs in the area of Health Sciences.

Keywords: Frequent drug use; Average age of onset; University students of Health Sciences; Sex; Age; Family income

1 Introduction

The consumption of psychoactive substances by adolescents, university students, and the general population is currently an important national and global public health socio-health problem. Among the most relevant evidence that configures the growing epidemiological problem of public health, the following stand out: the continuous increase in prevalence, frequency, incidence, and consumption trends of psychoactive drugs from legal, illicit, and pharmacological trade; the reduction of the average age of initiation of consumers and, in addition, the negative effects on the physiological, psychological and social health of users that can evolve into drug dependence and addiction, causing an increase in direct and indirect deaths [1-3].

At a global level, the United Nations Office on Drugs and Crime, UNODC [1], reports that in 2021, nearly 296 million people, between 15 and 64 years old, used an illicit drug in the last year (marijuana 219 million, opioids 60 and cocaine 22 million), which represents an increase of 23% compared to 2010. The 2022 report also reveals the dramatic increase

* Corresponding author: Vicente Fidel Urday-Concha

in direct and indirect drug-related deaths, 494,000 in 2019 alone, and a global increase of 17.5% in the period from 2009 to 2019 [4].

Frequent consumption (in the last 30 days before the survey) of psychoactive substances in the university population is also a growing public and social health problem. In this regard, two studies for the case of Spain, the first [5], highlight that the drugs consumed with the highest prevalence are alcohol, tobacco, and cannabis; according to sex, consumption is slightly higher in men than in their female peers and, concerning age groups, as the age of the students increases, the frequency of consumption of tobacco, LSD, amphetamines, crystal, opium, cocaine, etc. increases.

The second study [6] records prevalences of cannabis and stimulant consumption, based on gender, with significant differences, $P < 0.001$, in favor of males. Likewise, the average age at first use is lower for marijuana consumption in males (16.2 years), and for stimulants in their female peers (18.1 years). Another survey of students aged 15 to 19 in the North of Portugal [7] reveals that the age of initiation in alcoholic beverages and marijuana for most students occurs between 13 and 16 years.

Research advances in Latin America regarding the frequent consumption of psychoactive substances in young university students, for the case of Mexico a study [8], verifies prevalences of consumption for alcohol (67%), tobacco (31.3%), marijuana (18.2%), etc. In turn, another advance [9], reports prevalences of consumption of alcohol, tobacco, and marijuana, higher in the careers of Psychology and Medicine, and lower in Nursing, with significant differences for a $P \leq 0.001$. Another article on the case of Ecuador [10], reveals the most consumed drug in the last month is alcohol (52%), followed by tobacco (22%) and marijuana (3.5%); according to sex, with rates favorable to the male gender and, associated with monthly income, with significant statistical differences for the desire to consume alcohol and tobacco, $P \leq 0.000$.

In Chile, the first study of psychoactive substances in higher education [11] highlights prevalences of last month's consumption of alcohol (68%) and marijuana (31.1%), whose rates are favorable, according to sex, to men and, by age ranges, to middle age groups. Moreover, a survey [12] of young people from a public university in the north of Chile, also highlights high consumption of marijuana for the last month prevalence (25.5%), according to gender, women consume in greater proportion than men and, by professional career, the rate of use is higher in Nursing than in Education, with a statistically significant difference of $P = 0.035$.

In the case of the university population of Peru, the Andean Community and the Project "Anti-Illegal Drugs Program of the Andean Community, CAN/PRADICAN [13], as well as the UNODC and the Project "Support for the reduction of the demand for illicit drugs in the Andean Community", UNODC/PREDEM [14], reveal for the period 2012 to 2016 the following prevalences and trends of drug use in the last month. First, for legal drugs, epidemiological indicators, by sex, show a current downward trend in consumption of alcohol (46.6% to 37.6%) and tobacco (22.1% to 16.0%), with higher consumption rates among men than among their female peers. Regarding the average age of initiation, they report a slight upward trend for alcohol (from 16.1 to 16.7 years) and tobacco (from 16.5 to 16.9 years), with the age of initiation being higher among women than among their male peers.

Secondly, for illicit drugs, the indicators also show a slight downward trend in consumption over the last month, with marijuana use from 1.6% to 1.5%, depending on sex. Use is higher among men and, according to the average age of initiation, there is a slight upward trend from 18.5 to 18.9 years, with an older age of initiation in women. The frequent use of tranquilizers without a medical prescription, similar to the previous results, also shows a downward trend (from 0.9% to 0.4%); however, the average age of initiation of consumption shows a slight decrease from 19 to 18.5 years.

In summary, the high prevalence of psychoactive substance use evidenced by the results of research advances in the university population allows us to affirm, first, that frequent drug use is a public health problem and, second, that it is a priority to address its study, including not only its effects on the health of consumers [15,16] but also incorporating control variables such as sex, economic income and age groups of toxic drug users. Considering the data of the described results, the objective of the present research was to estimate the prevalence of frequent drug use and to identify the average age of initiation of its use, associated with gender, age groups, and family income in students of the area of Health Sciences of a private university in Metropolitan Arequipa, Peru.

2 Material and method

A quantitative study with a non-experimental, cross-sectional, and descriptive correlational design was conducted [17]. The units of analysis were third-year students, semesters V and VI of the Health Sciences area, and professional careers in Dentistry, Nursing, Psychology, and Medical Technology.

2.1 Participants

The population was represented by 653 students and the inclusion and exclusion criteria were met for the selection of the sample. The selection method was probabilistic, simple random, representative, and proportional to the size of the estimated population, with a confidence level of 99% and a standard error margin of 0.15. Finally, after eliminating the incomplete data collection questionnaires or those with many missing data, the final the study's final sample and the analysis of the results of the figures and statistical tables was carried out from 236 students of both genders from the professional careers of Health Sciences.

2.2 Instrument and variables

The instrument used to collect the information was the "Epidemiological Survey on Public Health in University Students". This included 242 items, grouped into 8 dimensions, and the most relevant variables for this study were: sociodemographic characteristics of the students, consumption of legal, illegal, and medical drugs in the parameters at some time in life, last year, and last 30 days, and average age of initiation of drug use, associated with gender, age groups, and family income.

The questionnaire was developed, standardized, and qualitatively validated by experts from the European Union (EU), the Inter-American Observatory on Drugs (OID) and the Andean Community (CA). For validation, the experts applied a pilot test to students from public and private universities in each member country of the Andean Community with a double purpose. First, to evaluate the clarity and consistency of the questions, the response alternatives, and once the necessary corrections were made, to prepare the final version. Second, for validation, the following criteria were taken into account: relevance, comparability, verifiability, etc., with the aim of generating reliable and comparable data regarding drug use in higher education students in the Andean Community [18]. In Peru, the questionnaire was used in 3 specific national studies in 2009 [19], 2012 [13] and 2017 [14].

2.3 Procedure

In the present study, the data collection, introduction into a matrix, and its review were carried out in two moments, with the aim of showing objective and reliable data. In the first, the questionnaire was completed in January 2019. Once the data was processed and the statistical tables were reviewed, it was found that the prevalence of drug use in the magnitudes under study; in particular the use of inhalants and medical drugs was much higher compared to those recorded in the university population of Peru [13, 14, 19]. To resolve the mistrust, in February 2020 in-depth interviews were conducted using the "snowball" sampling scheme with students in the sample. As a result of the component analysis and systematization of the interviews, only in the case of inhalant use was it found that the students in the sample included the use of Popper or amyl nitrate.

Second, in January 2022, post-COVID-19 pandemic, the primary data matrix was processed, reviewed, and analyzed to perform the bivariate analysis regarding frequent drug use and the average age of initiation of drug use, associated with gender, age groups, and family income.

2.4 Data analysis

Descriptive statistics were used to reveal the sociodemographic profile, the average age of initiation, and the prevalence of drug use in the three magnitudes analyzed. In this case, without considering the control variables, sex, age, and family income.

For the analysis of frequent drug use associated with gender, age groups, and family income, the non-parametric statistical tests *Pearson Chi-Square* (X^2) and Fisher's exact test were used, as well as the one-way analysis of variance, complemented with the *Scheffe* method. In this case, to make multiple comparisons between the three dimensions that report the family income variable: low, medium, and high. To analyze whether the proportions of university students who consume different substances report significant differences, the *Student* test of proportions was used. Finally, the processing, description, and analysis of the results obtained were carried out through the statistical program STATA v.14.1, and in certain cases with the assistance of EXCEL.

2.5 Ethical considerations

The information was obtained through the research project "Predictive factors of risk and protection of drug use in the university population". This was approved guaranteeing the Ethical principles for Humans by the Postgraduate Unit of the Faculty of Medicine, National University of San Agustín (UNSA), by Directorial Decree (DD) No. 079-2019-UPG-FM-UNSA and, due to the Covid-19 pandemic, updated by DD, No. 067-2022-UPG-FM-UNSA.

Finally, prior to self-administering the questionnaire, students received information about the purposes of the study, their voluntary, anonymous, and confidential participation, etc., and were asked to sign their informed consent.

3 Results

The indicators of the sociodemographic variables according to Table 1, observed that the target population is made up of young people of both genders, with a predominant majority of the female sex (74.6%), reporting an average age of 22.7 years and a standard deviation (SD) of 3.3 years and, according to age ranges, 71.2% belongs to the youngest age group. Moreover, according to the level of family income, the average income revealed around S/. 2 100.0 (00/100 soles) noting a standard deviation of S/. 1 231.0 (00/100 soles).

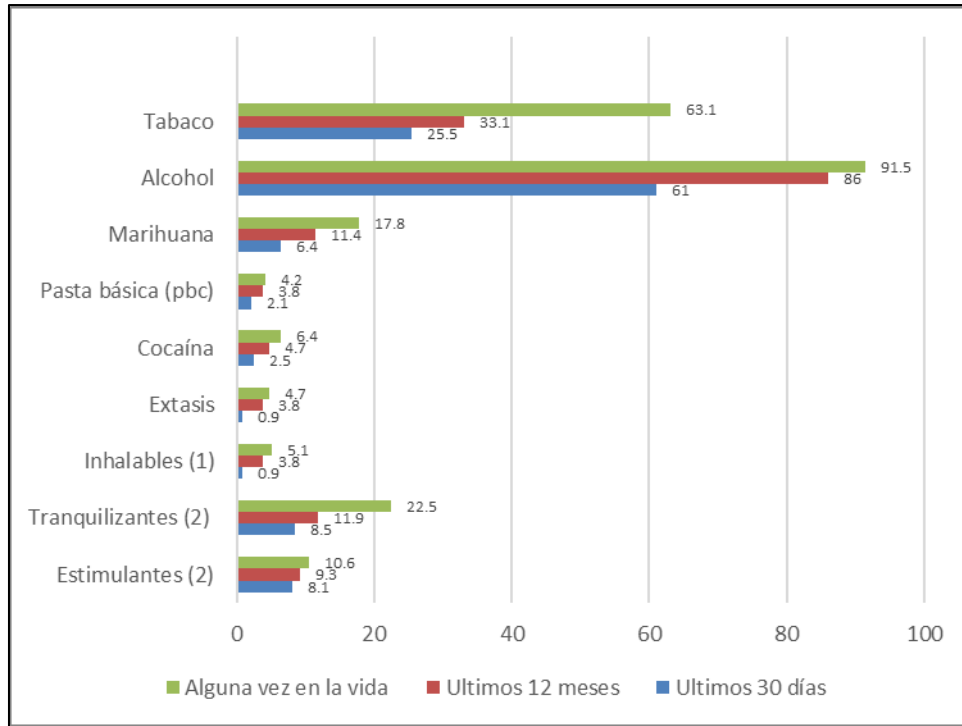
Table 1 Sociodemographic profile of Health Sciences students from a private university in Metropolitan Arequipa, Peru, 2022 (N=236, N., %)

Variables	N.	%
Sex	236	100
Women	176	74.6
Man	60	25.4
Age groups	236	100
18 to 24 years old	168	71.2
25 to 39 years	68	28.8
Family income groups	236	100
Low (up to S/. 1000)	57	24.1
Medium (S/.1,001-S/. 3,000)	141	59.8
High (S/.3,001 to +)	38	16.1

Regarding family income groups, the data showed that the difference in income, based on the students' sex, is statistically significant at the critical level of $\alpha=0.01$, with the overall balance favoring male students: $X^2=18.51$, $Pr=0.000$. Therefore, the results analyzed would have shown that the proportion of high-income male students is higher than that of their female peers.

Regarding the prevalence of drug use in the time parameters of ever in life, in the last 12 months and in the last 30 days, without considering the control variables, gender, age groups, and family income, Figure 1 reported that the prevalence of alcohol and tobacco use are the most widely used and frequently used legally traded psychoactive substances among university students. In contrast, the proportions of recent (last year) and frequent (last month) use are lower for the group of illegally traded drugs, as well as the proportions for the group of pharmacological drugs (tranquilizers and stimulants).

Regarding the average age of initiation of drug use, the results in Table 2 showed that, by gender, women begin to consume psychoactive substances from legal, illicit, and pharmacological trade at a slightly older age than men, especially in the use of ecstasy, PBC, and cocaine. On the other hand, the earliest average age of initiation was observed in tobacco use by the male gender, showing a greater typical variation (3.61 years) than in women (3.06 years).



(1) Includes the use of Popper or amyl nitrite, according to testimony from the students interviewed; (2) With or without prescription

Figure 1 Prevalence of legal, illegal, and medical substance use, without considering the variables of sex, age, and family income in Health Sciences students

Table 2 Average age of initiation of drug use, by sex, in Health Sciences students from a private university in Metropolitan Arequipa, Peru, 2022 (N= 236)

Consumption	Man			Women			Total		
	N.	Average	DT	N.	Average	DT	N.	Average	DT
Legal drugs									
Tobacco	50	17.4	3.61	99	19.5	2.72	149	17.2	3.06
Alcohol	55	17.2	2.71	161	19.1	2.47	216	17.0	2.53
Illicit drugs									
Dope	20	18.7	2.24	21	19.8	2.16	41	18.8	2.17
Basic pasta	5	18.6	0.55	5	20.2	1.79	10	19.4	1.51
Cocaine	9	19.1	1.27	6	20.0	1.90	15	19.5	1.55
Ecstasy	8	19.9	0.64	3	21.0	1.73	11	20.2	1.08
Inhalants (1)	4	17.8	1.71	8	17.8	2.76	12	17.8	2.38
Medical drugs									
Tranquilizers (2)	12	18.8	2.24	41	19.4	3.30	53	19.3	3.08
Stimulants (2)	5	20.2	1.92	19	19.2	2.46	24	19.4	2.36

(1)Includes the use of Popper or amyl nitrite, according to testimony from the students interviewed; (2) With or without a prescription.

Breaking down the average age of initiation by family income groups, Table 3 shows that young people belonging to the high-income category are exposed to tobacco and alcohol consumption at an earlier initial age. They are also exposed

to illicit drug use, particularly cannabis, cocaine, and ecstasy, at an earlier initial age compared to low- and middle-income groups.

In summary, the analysis of the average age of initiation related to the consumption of psychoactive substances allowed us to confirm, according to sex, that young male university students have a lower average age of initiation concerning the consumption of legal, and illegal drugs and tranquilizers. Whereas, disaggregating the consumption of toxic drugs according to economic status, the higher the level of family income, the lower the average age of initiation in the consumption of legal, illegal, and medical drugs, except for the use of inhalants and stimulants.

Regarding the association between frequent drug use, with the sociodemographic control variables under study. Firstly, the data presented in Table 4 regarding frequent consumption of legal drugs, based on gender, observed higher proportions

Table 3 Average age of initiation of drug use, according to family income, in Health Sciences students from a private university in Metropolitan Arequipa, Peru, 2022 (N= 236)

Consumption	Low			Half			High			Total		
	N.	Average	DT	N.	Average	DT	N.	Average	DT	N.	Average	DT
Legal drugs												
Tobacco	28	17.4	2.64	89	17.8	2.85	32	15.3	3.22	149	17.2	3.06
Alcohol	50	17.0	2.32	131	17.3	2.61	35	15.7	2.10	216	17.0	2.53
Illicit drugs												
Dope	2	20.5	0.71	22	19.0	1.98	17	18.3	2.44	41	18.8	2.17
Basic pasta	0	-	-	4	19.0	0.82	6	19.7	1.86	10	19.4	1.51
Cocaine	0	-	-	3	20.7	2.52	12	19.2	1.19	15	19.5	1.55
Ecstasy	0	-	-	3	20.3	1.53	8	20.1	0.99	11	20.2	1.08
Inhalants (1)	5	16.8	2.77	4	18.0	2.31	3	19.0	1.73	12	17.8	2.38
Medical drugs (2)												
Tranquilizers	13	19.8	3.51	27	19.6	3.03	13	18.2	2.67	53	19.3	3.08
Stimulants	5	17.6	3.21	14	19.5	1.99	5	20.8	1.48	24	19.4	2.36

(1)Includes the use of Popper or amyl nitrite, according to testimony from the students interviewed; (2) With or without a prescription.

alcohol and tobacco consumption in men compared to their female counterparts. However, the Pearson Chi-Square hypothesis test did not reveal statistically significant differences at a critical level of $\alpha=0.05$. Therefore, since there is no empirical evidence to reject the null hypothesis (H_0), the differences observed in the rates of alcohol and tobacco consumption between the genders are the result of casual fluctuations in random sampling.

Regarding the differences between age groups associated with frequent alcohol and tobacco consumption, statistical tests showed significant statistical differences for a probability level of $P\leq 0.05$. That is, the proportion of young university students who consume tobacco and alcohol in the older age group is much higher compared to that of the younger age group. In short, there is statistical evidence to reject the null hypothesis and accept the alternative hypothesis (H_1): there are real differences in the proportions of frequent alcohol and tobacco consumption between the younger and older age groups, favorable to the latter, at a critical level of $\alpha=0.05$.

Finally, when correlating family income with frequent tobacco and alcohol consumption, through a one-way analysis of variance (factor), the statistical evidence reported that the proportion of university students concerning tobacco and alcohol use increases as the family's economic status increases. However, the differences in means are not statistically significant for a confidence level of 95% in both cases, that is, there is not enough statistical evidence to reject the null hypothesis: equality of means in the population.

Table 4 Frequent consumption of legal, illicit, and medical drugs, associated with sociodemographic control variables in Health Sciences students from a private university in Metropolitan Arequipa, Peru, 2022 (N=236, N., %, and α)

Consumption	Sex		Age		Family income		
	Man	Women	18 to 24	25 to 39	Low	Half	High
Legal drugs							
Alcohol	63.3	60.2	56.6*	72.1*	50.9	63.1	68.4
	(38)	(106)	(95)	(49)	(29)	(89)	(26)
Tobacco	35.0	25.0	23.2*	38.2*	22.8	25.5	42.1
	(21)	(44)	(39)	(26)	(13)	(36)	(16)
Illegal drugs							
Dope	11.7	4.6	6.6	5.9	0.0	7.8	10.5
	(7)	(8)	(11)	(4)	(0)	(11)	(4)
Basic paste (pbc)	6.7*	0.6*	1.8	2.9	0.0*	1.4 *	7.9*
	(4)	(1)	(3)	(2)	(0)	(2)	(3)
Cocaine	8.3**	0.6**	1.8	4.4	0.0**	1.4**	10.5**
	(5)	(1)	(3)	(3)	(0)	(2)	(4)
Ecstasy	1.7	0.6	0.0	2.9	0.0**	0.0**	5.3**
	(1)	(1)	(0)	(2)	(0)	(0)	(2)
Inhalants (1)	1.7	0.6	0.6	1.5	0.0	0.7	2.6
	(1)	(1)	(1)	(1)	(0)	(1)	(1)
Medical drugs							
Tranquilizers (2)	10.0	8.0	8.9	7.4	10.5*	5.0*	18.4*
	(6)	(14)	(15)	(5)	(6)	(7)	(67)
Stimulants (2)	8.3	8.0	7.4	8.3	8.8	7.1	10.5
	(5)	(14)	(14)	(5)	(5)	(10)	(4)

91) Includes the use of Popper or amyl nitrite, according to testimony from the students interviewed; (2) With or without a prescription;
*Statistically significant differences at critical level $\alpha=0.05$; **Statistically significant differences at critical level $\alpha=0.01$

However, if the one-factor analysis of variance verifies the existence of statistically significant differences between income groups in a global way, it does not measure and reveal, however, whether all pairs of family income groups or which pairs of income groups observe significant differences in means in the population. This concern can be resolved through Scheffe's multiple comparison method. For frequent tobacco and alcohol consumption, by applying this method, it was verified that there were no significant differences in means in the population between pairs of income groups, for a critical level of $\alpha=0.05$.

Secondly, the information in Table 4 regarding the frequent consumption of illegal drugs, based on the control variables under study, using Fisher's exact test showed that the differences in the proportions of students who consume marijuana, associated with sex, age groups and family income, are not statistically significant at the 95% confidence level. Furthermore, when analyzing the data regarding the comparison between pairs of family income groups, using Scheffe's multiple comparison method, no pair observed any significant difference. Therefore, there is not enough empirical evidence to reject the null hypothesis (H_0), equality of means in the population. Therefore, the differences existing in the three income groups are the result of random sampling at random.

Regarding the consumption of cocaine paste (pbc) in the last month, associated, on the one hand, with sex and, on the other, with the three family income groups, significant statistical differences were found in means for a probability level of $P \leq 0.05$. However, the consumption of pbc, based on the age groups, did not report significant statistical differences.

In this case, the null hypothesis (H_0) cannot be rejected, there is equality of means in the population between the age groups, and the frequent consumption of pbc, attributing the statistical differences in the consumption rates to random sampling.

As for the differences in means by pairs of income groups, the Scheffe matrix, according to Table 5, with a relative certainty of 95%, showed that the means in consumption of PBC are statistically different between the pairs "low-high" (Prob=0.032) and "medium-high" (Prob=0.047). On the other hand, the mean consumption of basic pasta was not significant between low-income and medium-income students (Prob=0.818).

Table 5 Frequent consumption of cocaine paste, by family income groups in Health Sciences students from a private university in Metropolitan Arequipa, Peru, 2022 (Scheffe)

Groups	Low	Half
Half	0.01418 Prob= 0.818	
High	0.07895 Prob= 0.032	0.06476 Prob= 0.047

Regarding frequent cocaine use, its association is only statistically significant with gender and family income groups, favorable to men and the highest income level, but not with age groups, for a confidence level of 99%, $\alpha = 0.01$. Moreover, according to the results in Table 6, Scheffe's multiple comparison matrix specified that the probability obtained between the pairs of groups "low-high" and "medium-high" is $P \leq 0.006$, for both pairs of groups, much lower than the significance level 0.01. Likewise, it also showed that the means in cocaine use among students who reported "low income and medium income" are equal in the population, since the probability obtained (Prob = 0.843) is largely higher than the levels of significance analyzed: $\alpha = 0.05$ and $\alpha = 0.01$.

Table 6 Frequent cocaine use, by family income groups, in Health Sciences students from a private university in Metropolitan Arequipa, Peru, 2022 (Scheffe)

Groups	Low	Half
Half	0.01418 Prob = 0.843	
High	0.10526 Prob = 0.006	0.09108 Prob = 0.006

It is important to note that statistical tests of association have been performed on a small or non-existent absolute number of observations, which may bias statistical inferences of significance. This problem is more pronounced in the case of frequent use of ecstasy and inhalants. Therefore, these results should be viewed with some caution, as reference information only.

Thirdly, the data reported in Table 4 on the frequent consumption of pharmacological substances, associated with gender, age groups and family income, in global terms, only the use of tranquilizers, for a confidence level of 95%, observed statistically significant differences in means in its association with family income. In this case, the consumption of tranquilizers by the proportion of students who are located in the high-income category (18.4%), is significantly higher compared to that of university students in the middle-income (5%) and low-income (10.5%) categories.

Furthermore, about the analysis between pairs of income groups, the Scheffe multiple comparison matrix in Table 7 reported only the mean consumption of tranquilizers between students of "middle income and high income" presents statistically significant differences (Prob=0.030) for a probability level of $P \leq 0.05$. On the other hand, the differences in means observed between pairs of family income groups "low - middle" and "low - high", not being statistically significant, are a product of the variation inherent to random sampling.

Table 7 Frequent use of tranquilizers, by family income groups, in Health Sciences students from a private university in Metropolitan Arequipa, Peru, 2022. (Scheffe)

Groups	Low	Half
Half	(0.05562) Prob= 0.440	
High	0.07895 Prob= 0.095	0.13457 Prob = 0.030

In summary, the results of the data referring, on the one hand, to the prevalence of frequent consumption of psychoactive substances from legal, illicit, and pharmacological trade and, on the other, to the average age of initiation of consumers, associated with sex, age groups, and family income, allowed us to achieve the objective of this research. Likewise, it is worth remembering that the development of all the results of this study from Table 4 focused on the analysis of frequent consumption of psychoactive substances from legal, illicit, and medical trade, associated with the control variables under study.

4 Discussion

First, regarding the frequent consumption of legally traded drugs and the average age of initiation for their first use, associated with the sociodemographic control variables, for the case of the general population, a study in Spain, unlike our data, reports higher proportions for the frequent consumption of tobacco and alcohol. On the other hand, for the average age of initiation, according to sex, reveals earlier ages for the consumption of the two legally traded drugs by the male gender than by their female peers [20]. Furthermore, a research advance in Peru [21], records much lower prevalences for the consumption of tobacco and alcohol, as well as a lower average age of initiation for the use of the two legally traded psychoactive substances and, broken down by gender, there is concordance, men consume higher proportions than their female peers.

In the case of the university population, the results of this research are considerably lower, compared to the higher prevalences reported in Spain for alcohol and tobacco use by Nursing students [22], Psychology students [23], and the university population in general [24]. This last study, in addition, in disagreement with our data, regarding frequent alcohol consumption, based on gender, reveals statistically significant differences in favor of men, for a critical value of $\alpha = 0.00$ and, regarding the average age of onset only for alcohol intake, it also records a lower age of testing for men and women, without observing significant differences for a confidence level of 95%.

Moreover, the results presented here are much higher than those indicators shown for frequent alcohol and tobacco consumption by Mexican [25] and Colombian [26] university students, and are consistent with the prevalence of alcohol consumption in the last month among students of Health Sciences and Social Sciences at the University of Santander, Colombia [27]. Another study [9] also highlights lower prevalences for alcohol and tobacco consumption in Mexican university students of Health Sciences courses; however, unlike our findings, it records statistically significant results for frequent alcohol and tobacco use for a value of $P=0.001$.

Regarding the consumption of legal drugs in the last month, based on the differences between age groups, our data corroborates the results of two research advances in the Spanish university population [24, 28]: these studies verify that the proportions of alcohol and tobacco consumption, correlated with age groups, are higher in students from the older age groups, compared to the younger ones. In addition, only the second report shows significant statistical differences for alcohol consumption ($P<0.005$) and tobacco ($P<0.001$), favorable to older students. Another study [7] also shows that Portuguese adolescents and university students aged 17 or older consume significantly more alcohol than younger age groups, $P=0.0001$.

Furthermore, a survey of Colombian university students [26], in disagreement with our findings, observed a higher proportion of tobacco and alcohol consumers in the younger age ranges, with statistically significant differences for a probability of $P=0.04$. Two other studies at the national level, the first, in Chilean university students [11], for the prevalence of alcohol consumption in the last month, according to age ranges, unlike our results, reports a higher proportion of consumers in the intermediate ranges and, the second, in Peruvian university students [14], in agreement with the indicators shown here, shows higher proportions of alcohol and tobacco consumption in the older age ranges,

and less use in the younger age ranges, with significant differences for a confidence interval of 95%. In fact, the older the students, the more frequent the alcohol and tobacco consumption, with significant differences for a value of $P=0.05$.

Regarding the frequent consumption of legal psychoactive substances, associated with family income, our findings corroborate the trends of some research advances in the sense that the prevalence of alcohol and tobacco consumption is higher in the high [29] and middle-high [30] socioeconomic strata and are discordant, in the sense that the low economic strata are the greatest consumers of alcohol, according to results verified in Colombian university students [31]. Finally, our data is also convergent with the indicators of a study in Honduran university students of health sciences, the consumption of legally traded drugs observes higher prevalences in the middle and high socioeconomic strata [32] and, furthermore, is discordant, with the data revealed by a research advance in Ecuadorian university students in the sense that the middle and low family income strata show higher amounts of alcohol consumption [33]. In summary, the trend in indicators also highlights that, with a higher socioeconomic level, there are higher epidemiological indicators of alcohol and tobacco consumption by young university students.

In conclusion, our results and those corresponding to the research advances analyzed, show high prevalences and increasingly earlier average ages of onset for the frequent consumption of legal psychoactive substances by Health Sciences students. Specifically, the indicators reported here, for the age of onset and frequent consumption of alcohol and tobacco, are not only worrying but also alarming because they show a serious danger due to their epidemiological consequences for the individual and social public health of university consumers [10, 15, 16].

Likewise, the findings regarding frequent alcohol and tobacco consumption, associated with sociodemographic variables, confirmed that: based on gender, men are more likely to consume legal drugs and start using them at an earlier average age. Based on age groups, the proportion of consumers is higher the higher the age range of university students, with statistically significant differences for a critical level of $\alpha = 0.05$. Based on socioeconomic level, the statistical evidence showed that health sciences students who drink and smoke more, and start using them at an earlier age, are those who come from homes with a higher family income, without observing significant statistical differences.

Secondly, regarding the prevalence of frequent consumption of illicit psychoactive substances and the average age of onset of their first use, based on the sociodemographic variables sex, age groups, and family income. For marijuana use, the prevalence found by this research is much lower and differs compared to the high indicators reported in Spain, on the one hand, 32% for the general university population, based on sex, contradicting our data, with significant statistical differences in favor of women, $P \leq 0.00$ and, according to the average age of onset, 16 years for men and women [24]. On the other hand, 90.5% in a sample of students from the Education, Psychology, Nursing, and Polytechnic courses at the University of Girona [34]; 21.6% among Psychology students at the University of Huelva [23], according to gender, in convergence with our finding, men consume in greater proportion than women, and 17.8% in university students from the Lugo School of Nursing [22].

In Latin American countries, the proportions of marijuana use in the last month are also higher and differ from the low proportion observed in this study. In Colombia, the illicit drug most frequently consumed and preferred by university students is marijuana: 27% [35], 20.7% [29] and 11.2% [36]. This last study also highlights, based on sex, that men consume illicit psychoactive drugs (cocaine, marijuana, ecstasy, etc.) to a greater extent than women, with a significant difference of $P=0.004$. In turn, a survey at a public university in northern Chile [12], concerning the actual consumption of cannabis three times a month or more, a higher proportion (25.5%) is observed in Nursing and Education students and, according to gender, the rates of use are also divergent with our results, women consume in greater proportion than men. Finally, in Chile a national study in higher education [11]. It records a higher prevalence of frequent marijuana consumption (33.1%) and, according to the sex of the students, our data is consistent, men consume a higher rate than their female peers.

Regarding the frequent consumption of other illicit drugs in the Spanish university population, a study [24], compared to our data, verifies lower proportions for the frequent consumption of cocaine base, cocaine powder, ecstasy, and almost similarly, for inhalants. Furthermore, as a function of sex, concordances flourish, men consume a greater proportion of the mentioned substances, with significant differences only for the use of cocaine powder and inhalants for a critical value of $\alpha = 0.001$ favorable to Spanish university students. Another more recent study [37], verifies lower proportions for the frequent consumption of cocaine base, cocaine powder, ecstasy, and almost similarly, for inhalants. Furthermore, as a function of sex, the results are concordant.

In Latin America, unlike our statistical products, a survey of Colombian university students [36], records higher consumption proportions for cocaine and ecstasy and, based on gender, the data is similar, reporting for cocaine consumption a significant association of $P \leq 0.001$, favorable to men. Another research advance in Ecuadorian university

students [38], contradicting our finding, highlights a substantially lower proportion of cocaine consumption and, according to gender, there is concordance in the results, men consume a considerably higher proportion than women. Therefore, regarding the frequent consumption of cocaine paste, cocaine hydrochloride, ecstasy, and inhalants, according to sex, the statistical evidence of the present study revealed higher proportions of consumption in men, while only cocaine consumption showed significant differences with gender ($\alpha = 0.01$), in favor of men.

Regarding the frequent consumption of illicit psychoactive substances, associated with age groups, this research only found a higher proportion of consumers belonging to the older age group, except the use of cannabis. In this case, the trend of the epidemiological indicators of some research advances in the university population is corroborated by our result, the older age groups consume lower proportions of marijuana, while the intermediate and younger age groups show higher prevalences of consumption [11, 35, 36].

According to the bivariate analysis between the level of family income, with frequent consumption, and the average age of initiation of use of illicitly traded toxic substances, the data of this study is divergent from some research reports at an international level. In this regard, research advances in samples of young Colombian university students report, on the one hand, an association between a higher risk of consumption of psychoactive drugs and economic income (being unemployed) [39] and, on the other hand, a greater consumption of illicit drugs (marijuana, PBC, cocaine, ecstasy, etc.) in the low and middle-income economic strata, compared to the high-income stratum [35, 36].

Moreover, only the latest study [36], reveals significant statistical differences when considering the consumption of psychoactive drugs (marijuana, cocaine, ecstasy, etc.), associated with the socioeconomic stratum, for a probability of $P \leq 0.004$. In effect, the groups of students with greater family economic resources, middle and high strata, are more likely to observe a greater frequent consumption of psychotropic substances, a conclusion also corroborated by a survey of young people from a Chilean university [40], the higher the levels of family economic income, the higher the proportions of psychoactive drug consumption.

Consequently, the epidemiological indicators reported in this study and in the research advances show high proportions of frequent consumption of illicit drugs. These results generate great concern and a growing public health alarm due to their physiological, psychological, and social effects on young consumers:

On the one hand, given that the prevalence of frequent marijuana use is increasing in Peru and internationally, it is a warning bell given that cannabis use harms short-term memory, deteriorates attention, and judgment, and distorts perceptions. In addition, it reduces academic and work performance, etc., and affects brain systems that continue to develop until approximately 25 years of age [21, 41, 42].

On the other hand, although the indicators are relatively low, the increase in the prevalence of frequent consumption of cocaine paste, cocaine, and ecstasy is also worrying. In this regard, scientific evidence shows that cocaine paste and cocaine are powerful stimulants of the central nervous system, highly addictive, and dangerous for the physical, psychological, and social health of young consumers [43, 44]. On the other hand, continued consumption of ecstasy, a stimulant and recreational drug of abuse, can cause significant brain damage in cognitive processes, memory, and attention, as well as generate symptoms of depersonalization, anxiety, psychosis, and harmful social consequences for consumers, their families and the public health of society [15, 43, 44].

Thirdly, regarding the prevalence of consumption of pharmacological psychoactive substances in the last month, with or without a medical prescription, and the average age of first use, associated with the variables of sex, age groups, and family income groups. The average proportions of medical drug consumption that this study showed are higher than those revealed for the use of tranquilizers and stimulants by Spanish university students [6, 24], as well as only for the consumption of tranquilizers [45]. In this case and, depending on gender, there is agreement with our data, there are no significant statistical differences between the consumption of tranquilizers associated with the sex of the students for a critical value of $\alpha = 0.05$.

In particular, the indicators recorded in this work are, first, much higher than the low proportions of consumption of tranquilizers and stimulants without a medical prescription by young Colombian university students [27], and Mexicans [8, 46], belonging to the Medicine and Nursing careers and, based on gender, in agreement with our findings, men observe higher percentages of consumption than their female peers and, in disagreement, there are statistically significant differences in the use of stimulants, $P \leq 0.001$ in favor of men. Second, our indicators are also much lower compared to the high prevalence of frequent consumption of the two pharmacological psychoactive substances under study by Mexican university students [47].

Regarding the current consumption of psychotropic drugs, associated with the age group control variable, our results corroborate the information from two research advances in the university population in Spain. The first [48], highlights that the use of tranquilizers with or without a prescription is lower in younger age groups, compared to older age groups that observe higher proportions of consumption. The second [5], it is also verified that as age increases, the frequency of consumption of amphetamine stimulants increases.

Our results were conclusive regarding the use of medical drugs, associated with socioeconomic status: the low and high-income groups consume higher proportions of stimulants and tranquilizers, in this case, with significant statistical differences at the critical level of $\alpha=0.05$, in favor of the group of high family status. This data, on the one hand, is inconsistent with the result that the consumption of tranquilizers is higher among students of Health Sciences of an average economic income level [32] and, on the other hand, consistent with a specific finding of a survey which reveals the use of illegal psychoactive substances depends on the social economic stratum ($P=0.037$), so that the university students with greater economic resources are more likely to be involved in drug use, whose first average consumption of illicit substances is 17, 04 years old, standard deviation 2.120, for the students of the study population [29].

Therefore, the high prevalence of frequent consumption of hypnotics and stimulants with and without a prescription that this research found, compared to the advances in national and international scientific literature highlighted here, are clear warning signs due to the symptoms, health effects, and serious negative social consequences that could occur in the medium and long term in health sciences students. Tranquilizers, in particular, are drugs with a high liposolubility, and depressants of the central nervous system, they bind to receptors located in certain areas of the brain and spinal cord [49] and, its increasing consumption can cause effects on human behavior, such as sedation, drowsiness, motor incoordination, and reduction of the latency state for the onset of sleep, in addition to producing a cognitive decrease in concentration and memory [15, 50, 51].

On the other hand, stimulant psychotropic drugs cause powerful stimulating actions on the central nervous system and their frequent consumption can reduce fatigue, improve physical performance, postpone sleep, increase mental clarity and intellectual activity, etc. in young university students [51, 52]. However, justifying the consumption of pharmacological drugs under the pretext of a high curricular workload, the fulfillment of academic tasks, and a peculiar demand in health sciences careers, etc., to improve academic performance, could be a common-sense alibi because voluntary and uncontrolled self-medication can cause symptoms of depression [9], abuse and dependency [49, 52]. Since, all academic areas require daily study, high academic standards, and above all, responsibility, analysis, and deep reflection to achieve the competencies of their curricular map.

5 Conclusions

This study in a population of a private university in Metropolitan Arequipa, Peru, is one of the first, and a contribution in the field of bivariate analysis. In particular, frequent drug use, as a function of the control variables gender, age, and family income in students in the area of Health Sciences.

The frequent consumption of psychoactive substances by young university students is a growing public health problem. This research shows, on the one hand, high proportions of frequent consumers of legal and pharmacological drugs and, increasingly, the ages at which they start consuming them are fewer. On the other hand, it highlights significant statistical differences, first, between the frequent consumption of alcohol and tobacco, associated only with the age groups, favorable for the older stratum and, second, between the consumption of basic paste and cocaine, associated with the gender and family income variables, being favorable to the male sex and the highest income group.

However, descriptive-correlational research such as this one has theoretical and statistical limitations, and it is of utmost importance to make research advances at the multivariate level, through the use of statistical techniques of dependence (multiple regression, discriminant analysis, etc.) and interdependence (factor analysis, cluster analysis, etc.). This is a challenge of transcendental relevance in the field of health sciences and academia in general, to know the probable risk and protection factors that could induce or distance young university students from the growing consumption of psychoactive substances, to improve the quality of academic performance and maintain good individual and collective health.

Consequently, research in general and multivariate studies in the field of Health Sciences in particular are essential to provide greater empirical evidence and develop scientific knowledge. In this regard, the greater the empirical evidence and development of theory, the more appropriate decisions will be made for the development, management, and administration of strategic programs for the prevention and reduction of health damage caused by the consumption of psychoactive substances in the university population of Arequipa, Peru.

Recognition

This work was self-funded. However, we request the collaboration of support institutions to continue conducting academic research and contribute to overcoming drug use as a public and social health problem among university youth.

Compliance with ethical standards

Disclosure of conflict of interest

We declare that there is no conflict of interest among the authors of the article. Moreover, there was a consensus for its publication.

Statement of ethical approval

If studies involve use of animal/human subject, authors must give appropriate statement of ethical approval. If not applicable then mention 'The present research work does not contain any studies performed on animals/humans subjects by any of the authors'.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

- [1] United Nations Office on Drugs and Crime. World Drug Report 2023 [Internet]. UNODC: 2023 [accessed 10 December 2023]. Available at http://www.unodc.org/res/Special_PointsS, PDF
- [2] Organization of American States/Inter-American Drug Abuse Control Commission. Report on drug use in the Americas 2019. Executive summary. OAS-CICAD: 2019.
- [3] Barba GE, Abenza M, Navarro J, Portero A. Consumption of psychoactive substances in Health Sciences students from Albacete. Spanish Journal of Mental Health Nursing. 2018 June; (4): 11-19.
- [4] United Nations. Office on Drugs and Crime, UNODC. World Drug Report 2022. Dianova 2022 [accessed 20 December 2023]. Available at <http://www.dianovs.org/es./noticias/informe-mundial-sobre-las-drogas-2022>
- [5] Carmona JV, Bueno FJ, Peyró L, Arévalo B. Substance use in young university students in the Valencian Community (Spain). Rev. Metas de enfermera. 2019 October; 22(8): 14-20.
- [6] Arias De la Torre J, Fernández-Villa T, Molina AJ, Amezcua-Prieto C, Mateus R, Cancela JM, et al. Drug use, family support and related factors in university students. A cross-sectional study based on data from the uniHcos Project. Gaceta Sanitaria Journal. 2019 Mar/Apr;33(2).
- [7] Martins HIV, Costa LM, Ferreira MM, Martins MT, Carneiro KM, Guerra-Martin MD. Consumption of addictive substances, tobacco, alcohol, and marijuana, in students from the North of Portugal[Internet]. 2019 October [accessed 7 October 2023]; 18(54).
- [8] Pavón O, Salas B, De San Jorge X, Cruz AA. Factors associated with drug use in Arts students. Rev. Nova Scientia. 2022; 14(1): 1-29.
- [9] Beverido P, Salas B, Gogearcochea MC, De San Jorge X. Psychosocial risks as predictors of drug use in Mexican university students of Health Sciences. Rev. Pensando Psicología. 2020; 16(2): 1-25.
- [10] Noroña D, Mosquera V, Laica V. Risk factors associated with drug use and consumption in students of the Instituto Superior Tecnológico Sucre. Ecuadorian Science Journal. 2021; 5(3): 12-26.
- [11] Government of Chile. First study of drugs in education. Main results. SENDA-Ministry of the Interior and Public Security; Santiago, 2019.
- [12] Cazenave A, Saavedra W, Huerta P, Mendoza C, Aguirre C. Marijuana use in young university students: peer perception. Rev. Ciencia y Enfermería. 2017; XXIII (1):15-24.
- [13] CAN/PRADICAN. II Andean epidemiological study on drug use in the university population. Peru Report, 2012. Lima: Andean Community/European Union/Devida/UNODC; 2013.

- [14] UNODC/PREDEM/DEVIDA III Andean epidemiological study on drug use in the university population. Peru Report, 2016. Lima: UNODC/PREDEM/DEVIDA; 2017.
- [15] American Psychiatric Association. DSM-5. Diagnostic and Statistical Manual of Mental Disorders. 5th ed. Madrid: Editorial Médica Panamericana; 2014.
- [16] Lorenzo P, Ladero JM. Tobacco dependence. Tobacco and nicotine. In: Lorenzo P, Ladero JM, Leza JC, Lizasoain I, coordinators, Drug addiction. Pharmacology. Pathology. Psychology. Legislation. 3rd ed. Madrid: Editorial Médica Panamericana; 2009. pp. 497-514.
- [17] Burns N, Grove SK. Nursing research. 3rd ed. Madrid: ELSEVIER-UNDERS, 2004.
- [18] Andean Community/European Union. PRADICAN Project: lessons learned. Lima: General Secretariat of the Andean Community, 2013.
- [19] DROSICAN Project. First Andean epidemiological study on synthetic drug use in the university population. Comparative report: Bolivia, Colombia, Ecuador and Peru, 2009. Lima: General Secretariat of the Andean Community; 2009.
- [20] Spanish Observatory on Drugs and Drug Addiction. 2021 Report. Alcohol, tobacco and illegal drugs in Spain. Survey on Alcohol and Drugs in Spain (EDADES) 1995-2019/2020. Madrid: Government of Spain/Ministry of Health; 2021.
- [21] Information and Education Center for the Prevention of Drug Abuse. Epidemiology of drugs in the Peruvian urban population. Household Survey 2017. Research Monograph No. 24. Lima: CEDRO, 2017.
- [22] Garrido-Gonzales I, Bugarin-Gonzales R, Machin-Fernandez A. Drug use in nursing students. Clinical Nursing. 2016; 26 (3): 174-180.
- [23] Merchan A, Ribeiro B, Alameda JR. Drug consumption habits and perception of the effects on health and academic performance in Psychology students at the University of Huelva. Rev. Española de Drogodependencias. 2014; 39(2):59-73.
- [24] Nieves Y. Leisure habits and drug use in the university population under 30 years of age. Madrid: Atenea Foundation/Ministry of Health and Social Policy; 2010.
- [25] De San Jorge-Cárdenas X, Montes-Mendoza M, Beverido-Sustaeta P, Salas-García B. Risk perception and consumption of legal drugs in psychology students from a Mexican university. Rev. de Investigación en Salud. 2016 Jan-Jun; 3(1):16-32.
- [26] Mantilla-Tolosa S, Villamizar C, Peltzer K. Alcohol consumption, smoking and sociodemographic characteristics in university students. Rev. Univ. Salud 99. 2016; 18(1): 7-15.
- [27] Paez AN, Solorio S, Duran M, Mancilla D, Suarez E, Melgarejo P, et al. Prevalence of psychoactive substance use in university students of health and social sciences. Rev. Cuidarte. 2012; 3(1): 334-341.
- [28] Sánchez-Rivas E, Sánchez-Vega E, Colomo-Magañas E, Guillén-Gámez F. Factors affecting the consumption of legal drugs in university students in Malaga (Spain): a descriptive study with inferential analysis. Rev. Health and Addictions. 2021; (2): 182-195.
- [29] Castaño-Castrillón JJ, García S, Luna J, Morán M, Ocampo D, Ortiz L. Study of associated factors and prevalence of consumption of illegal psychoactive substances in students of a Colombian university. Rev. Fac. Med. 2017; 65(1): 23-30.
- [30] Gonzales-Ospina A, Rodríguez-Restrepo A, Gonzales-Román MM, Espinoza-Chirivi Y, Martínez-Gómez ML, Agudelo-Suarez AA. Frequency and factors associated with alcohol, cigarette and psychoactive substance use in students at a public university in Colombia: a mixed study. Nac. Odonto Journal. 2020; 16(1), 1-19.
- [31] Betancourth-Zambrano S, Tacán-Bastidas L, Córdoba-Paz EG. Alcohol consumption in Colombian university students. Rev. University and Health. 2017; 19(1):37-50.
- [32] Licona TS, Arista JR, Díaz EL, Cantillano FM, Zacapaya. Characterization of drug use by university students of basic health sciences. Rev. Cient.Esc. Univ.Cienc. Salud. 2015; 2(2): 21-29.
- [33] Ponce CE, Reyes C. Alcohol consumption in students in three faculties of the National University of Chimborazo. Rev. Eugenio Espejo. 2018; Riobamba Jul-Dec 12(2): 1-6.
- [34] Patiño-Masó J, Gras-Pérez E, Font-Mayolas S, Baltasar-Bagué A. Cocaine use and polydrug use of psychoactive substances in young university students. Clinical Nursing. 2013; 23(2): 62-67.

- [35] Quimbayo-Diaz J, Olivella-Fernández M. Marijuana use in students at a Colombian university. *Rev. Public Health*. 2013 Jan-Feb; 15(1): 32-43.
- [36] Córdova-Paz EG, Betancurth-Zambrano S, Tacán-Bastidas LE. Consumption of psychoactive substances at a private university in Pasto, Colombia. *Psicogente*. 2017 Jul-Dec; 20 (38): 308-319.
- [37] Higüero D, What will become of you away from home? (consumption of toxic substances in Spanish university students and its relationship with the place of residence. UNITTES project) [Final Degree Thesis in Medicine]. University of Valladolid: Faculty of Medicine, Spain, 2018-2019.
- [38] Noroña DR, Mosquera VC, Laica VG. Analysis of drug use among university students in Quito (Ecuador). *Rev. Investig. Psicol*. 2022 Jan/Jun; 25(1):1-10.
- [39] Scoppetta O, Avendaño BL, Cassiani C. Individual factors associated with the consumption of illicit substances: a review of reviews. *Colombian Rev. of Psychiatry*. 2022 Jul-Sep; 51 (3): 1-13.
- [40] Sepúlveda MJ, Roa J, Muñoz M. Quantitative study of drug use and associated sociodemographic factors in students of a traditional Chilean university. *Rev. Méd. Chile*. 2011; 139(7): 856-863.
- [41] National Institute on Drug Abuse. Marijuana Abuse. Research Report Series. NIH. U.S. Department of Health and Human Services; 2013. Report No.: 13-3859(5).
- [42] National Institute on Drug Abuse. *Drugs, the Brain, and Behavior. The Science of Addiction*. USA: NIH/National Institute on Drug Abuse; 2014.
- [43] Lizasoain I, Moro MA. Cocaine (I): pharmacology. In: Lorenzo P, Ladero JM, Leza JC, Lizasoain I, eds. *Drug addiction. Pharmacology. Pathology. Psychology. Legislation*. 3rd ed. Spain: Editorial Médica Panamericana; 2009. pp.189-222.
- [44] Lorenzo P, Bobes J, Colado MI. Designer drugs (I). MDMA (Ecstasy). In: Lorenzo P, Ladero JM, Leza JC, Lizasoain I, eds. *Drug addiction. Pharmacology. Pathology. Psychology. Legislation*. 3rd ed. Madrid: Editorial Médica Panamericana; 2009. pp. 251-265.
- [45] Berrocal NE, Campo M, Herrera E. Social determinants in the consumption of psychoactive substances in university students 2016. *Nursing, Humanized Care*. 2018; 7(2):1-9.
- [46] Beverido P, Zacarias Y, Carmona-Avendaño Y, Salas-García B. Consumption of licit and illicit drugs in university students of medicine and nursing. *Journal of Health and Social Welfare*. 2020 January-June; 48(1):1-5.
- [47] Sánchez DL, Gachuzo MM, Gallegos RM. Drug use and stress in medical students in the city of Querétaro, Mexico. *European Scientific Journal, ESJ*. 2021 June, 17 (21): 366-380.
- [48] Lucena V, Ruiz-Olivares R, Pino J, Herruzo J. Alcohol, tobacco and psychotropic drug use in university and non-university youth. *Behavioral Psychology*. 2013; 21(1):123-136.
- [49] Pan-American Health Organization/World Health Organization. *Neuroscience of psychoactive substance use and dependence*. Washington, DC: PAHO; 2005.
- [50] Moro MA, Lizasoain I. Benzodiazepines, barbiturates, and other hypnotics. In: Lorenzo P, Ladero JM, Leza JC, Lizasoain I, eds. *Drug addiction. Pharmacology. Pathology. Psychology. Legislation*. 3rd ed. Madrid: Editorial Médica Panamericana; 2009. Pages 483-496.
- [51] Government of Spain. *Emerging drugs. Report of the Clinical Commission*. Spain: Ministry of Health, Social Policy and Equality; 2011.
- [52] Lizasoain I, Lorenzo P, Ladero JM. Amphetamines. In: Lorenzo P, Ladero JM, Leza JC, Lizasoain I, eds. *Drug addiction. Pharmacology. Pathology. Psychology. Legislation*. 3rd ed. Madrid: Editorial Médica Panamericana; 2009. p. 239-250.