

Substance use Pattern Analysis among Spanish Medical Students

Guillermo Pirez Mora¹, Maria Rodriguez Ramón²

1. Department of Psychiatry, Las Palmas de Gran Canaria, Spain;

2. Family Medicine, Complejo Hospitalario Universitario Insular Materno Infantil, Las Palmas de Gran Canaria, Spain*

ABSTRACT

Background and objectives

Substance use and the increasing consumption of energy drinks are currently severe social health problems, and medical students are not an exception.

The study's aims are to know the prevalence of different legal and illegal substances consumption among them (energy drinks included), and to evaluate different consequences and their aims for using them. Prevalence rates were compared to other national and international medical student samples and to general population of the same age range.

Methods

A cross-sectional descriptive study was carried out in 168 medicine students in Las Palmas de Gran Canaria who responded a survey on their substances use.

Results

Almost all of the study participants (162 (96.4%)) had ever tried/taken alcohol in their lifetime, 131 (78%) had consumed energy drinks, 109 (64.9%) had taken tobacco and 86 (51.2%) had taken cannabis. Main consequences included hangover 120 (71.4%), nausea or vomiting 100 (59.5%), and repenting of something done under the effect of substances 70 (41.7%). Looking for an improvement of their academic performance, 96 (57.1%) and 76 (45.2%) of medical students admitted having increased substance use and energy drinks consumption respectively.

Conclusions

The prevalence of alcohol, tobacco, cannabis, anxiolytics and amphetamines abuse is higher among medical students as compared to the general population. Energy drinks are widespread used (specifically higher for males). Almost half of medical students acknowledged having increased their consumption to improve test scores.

Keywords: Substance-related Disorders, Medical Student, Energy Drinks, Prevalence Rate, Health Impact

*See End Note for complete author details

INTRODUCTION

The use of alcohol, tobacco and other drugs remains a scourge for society, due to many people taking those substances and their harmful effects. The latest data published in Spain by the Survey on Alcohol and Other Drugs (Encuesta sobre Alcohol y otras Drogas en España: EDADES) considered population

between 15 and 34 years old, an age group which mostly consisted of university students. In the Spanish sample, 88% have ever tried alcohol in their lives, 62.3% tobacco (daily: up to 36.6% of men and 27.9% of women) and 42% tried cannabis.¹ Cannabis consumption has been reinforced during the last years in Spain;² as it has also happened in the rest of Europe.³

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Corresponding author:

Guillermo Pirez Mora, M.D. PhD. Child and Adolescent's Psychiatrist. Children & Adolescent Psychiatrist, Community Mental Health Team (CMHT) for Children and Adolescent of "Vecindario", Department of Psychiatry, Las Palmas de Gran Canaria, Spain. E-mail: guillermo.pirez@hotmail.es

Another substance whose consumption and market has consistently raised (especially among the youth) is energy drinks. The most important study about energy drink consumption in Europe (performed by 52,000 participants from 16 European countries (Spain included)) that was led by the European Food Safety Agency (EFSA), concluded that: 1) the European market for energy drinks increased by 45%, 2) its production in 2007 of energy drinks was valued at 3.8 trillion euros, and 3) 30% of European adults had consumed energy drinks during the last year.⁴

University students are particularly vulnerable to health consequences (acute and chronic problems, such as overdose infectious diseases respectively) as they live vital periods motivated for risk-taking behaviour and with a desire for new experiences including substance use.^{3,5} The most documented health consequences in Europe include overdose (an acute problem) and the dependence.

A total of 4,293 patients attended emergency care (excluding those individuals who died) in Spain during 2017, related to the non-medical use of psychoactive substances.⁶

Cannabis and cocaine were implicated in 50.3% and 50.2% of all these emergencies respectively while alcohol is in third place since it was only considered when emergencies were produced by alcohol and another substance together. The largest increase in such emergencies was related to cannabis use.⁷ Despite these data, in Spain the number of users do not decrease (remain stable), and cannabis consumption is even rising.¹

Medical students are not exception to this. A study conducted at 49 United States (U.S.) medical faculties analyzing substance use during the previous 12 months found that 25%, 17% and 6% had consumed cannabis, tobacco and amphetamines respectively. Different studies have shown high rates of alcohol consumption, binge drinking (defined as a pattern of drinking that brings a person's blood alcohol concentration to 0.08 g/dl or above). About 91.3% of future physicians from different U.S. faculties surveyed in 2017 had consumed alcohol in the year,⁷ and 68.4% of them met criteria for binge drinking.⁸ Studies highlighted the increased use of illicit drugs especially psychoactive substances among future physicians.⁹⁻¹¹

Although nowadays there is already an official program in Spain for collecting data about drug use among students (14 to 18 years old), there are no previous studies neither in Spain nor Europe on university students and also about students of any medical faculty.⁸ We conducted this study to *resolve above mentioned problem statement.

The primary aim of this study was to know the prevalence of consumption for different substances (legal and illegal) among medical students of the University of Las Palmas de

Gran Canaria (ULPGC). Energy drinks were also included. The secondary objective was to know nature and frequency of consequences associated with consumption of alcohol and other substances. We also aimed to study the relation between academic performance and substance abuse.

MATERIALS & METHODS

Study setting

This cross-sectional study was conducted in the ULPGC, the only public university for medical students in Las Palmas de Gran Canaria (Spain).

Sample size and sampling

Seven hundred and twenty medical students from the ULPGC were asked to answer our survey. Student representatives of the different courses of Medicine Degree sent the virtual invitation to all the students of each course. Informed consent form and information sheet (in which was explained that data would be anonymously used and ensured the confidentiality) were included. The inclusion criteria for our study were to be a student from ULPGC medical school, be studying in any stage from the first to sixth, to give informed consent, and to be over 18 years old. Students who were enrolled in the ULPGC Medicine degree through some exchange programs were also allowed to participate. Exclusion criteria were students at the medical school who were in an exchange program in other university, and students who did not give informed consent. All students had a period of time of two months to answer the survey. Although they were constantly encouraged to participate, unfortunately, just a total of 168 students participated in the study.

Ethics

The project approval to be conducted was obtained from by the regional Ethics Committee (<<Comité Ético de Investigación Clínica / Comité de Ética en la Investigación Clínica [C.E.I.C./C.E.I.M.] of the university hospital of Gran Canaria Dr. Negrín since the project was coordinated from the ULPGC.

The STROBE guidelines for cross-sectional studies were followed.¹²

Written informed consent was obtained from every student before data collection. Answering and sending (via email) the written informed consent was a previous condition to answer de survey.

Data Collection

The survey was conducted in Google Drive format (<https://docs.google.com/forms/d/e/1FAIpQLSfeCFnnBQvhkkZwe>

IL6LE8GQTeW_zWqnh5oLJNEdT-hiqQsNQ/viewform).¹³ All participants answered this structured self-administered questionnaire containing background information, sociodemographic data, and specific substance use pattern questions from two validated questionnaires.

ASSIST Survey

The Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST)¹⁴ was developed by World Health Organization (WHO), and is used as a tool to detect substance use rapidly in Primary Care setting.¹⁵

Core Alcohol and Drug Survey

Used in the U.S. to analyze alcohol and other drug use among university students.¹⁶ It was first used in a cohort study that included 58,625 participants from more than 800 universities in the country.¹⁷

In addition to those surveys and previously referred data, the consumption of energy drinks was also included as an important target of our study. Students were able to contact the researchers (email address was offered) to solve any doubt that would arise during their participation in the study.

Statistical Analysis

The Statistic Program Jamovi 1.1.9.0 was used. Quantitative variables were determined by mean and standard deviation and percentages. The Chi-square test and the student t-test were used for data comparison, and a value of $P < 0.05$ was taken as statistically significant with a confidence level of 95%.

RESULTS

Participants

A total of 168 students participated in the study, the majority were women with a mean age of 22 years (IQR 18 - 41, standard deviation of 2.62). The distribution of the participants was not homogeneous: the higher course was, the more they participated (characteristics of study participants and percentage of student's participation are shown in **(Table 1)**). Just only two students didn't officially belong to ULPGC: one was an ERASMUS (international exchange university program); and the other was a SICCUE (national exchange university program) student.

The prevalence of substances that ULPGC's medical students have used at least once in a lifetime is described in **(Figure 1)**. The only one statistically significant difference found between male and female students was the consumption of energy drinks ($p=0.002$): 120 (71.1%) of women surveyed

Table 1. Characteristics of Students Participants (n= 168)

Characteristic	Frequency (n)	Percentage (%)
Age		
18	6	3.6
19	7	4.2
20	11	6.5
21	18	10.7
22	50	29.8
23	72	42.9
24 or more	4	2.4
Sex		
Male	114	67.9
Female	54	32.1
Current year of Medicine degree		
1st year students	6	3.6
2nd year students	9	5.4
3rd year students	12	7.1
4th year students	19	11.3
5th year students	45	26.8
6th year students	77	45.8

recognized having consumed energy drinks during their life, compared to 156 (92.6%) of men.

Percentages of consumption among medical students once in their life, at least once a year, equal or more than once a month, and once or more per week, is also presented in **(Figure 2)**.

Results showed that medical students believe that their future colleagues use substances more frequently than they actually do.

The most common (social, academic or health) consequences reported due to alcohol and other drugs consumption over the past year were: 120 (71.4%) of the sample had hangover, 100 (59.5%) felt nausea or vomiting, 70 (41.7%) of respondents repented of something done under the effects of some substance and 66 (39.3%) of them had memory loss. Academic consequences throughout the year included: absence in classes or internships of 25 (14.9%) of students, and lower performance in an exam or work, shown by 6 (3.6%) of participants. In addition, 36 (21.4%) students admitted to having ever driven under the influence of alcohol or other drugs in this time of period; and 23 (13.7%) thought at some point that they might have a problem with any of the substances. The only statistically significant difference between male and female students was that male were found driving under the effects of alcohol and other drugs more than female medical students ($p=0.029$).

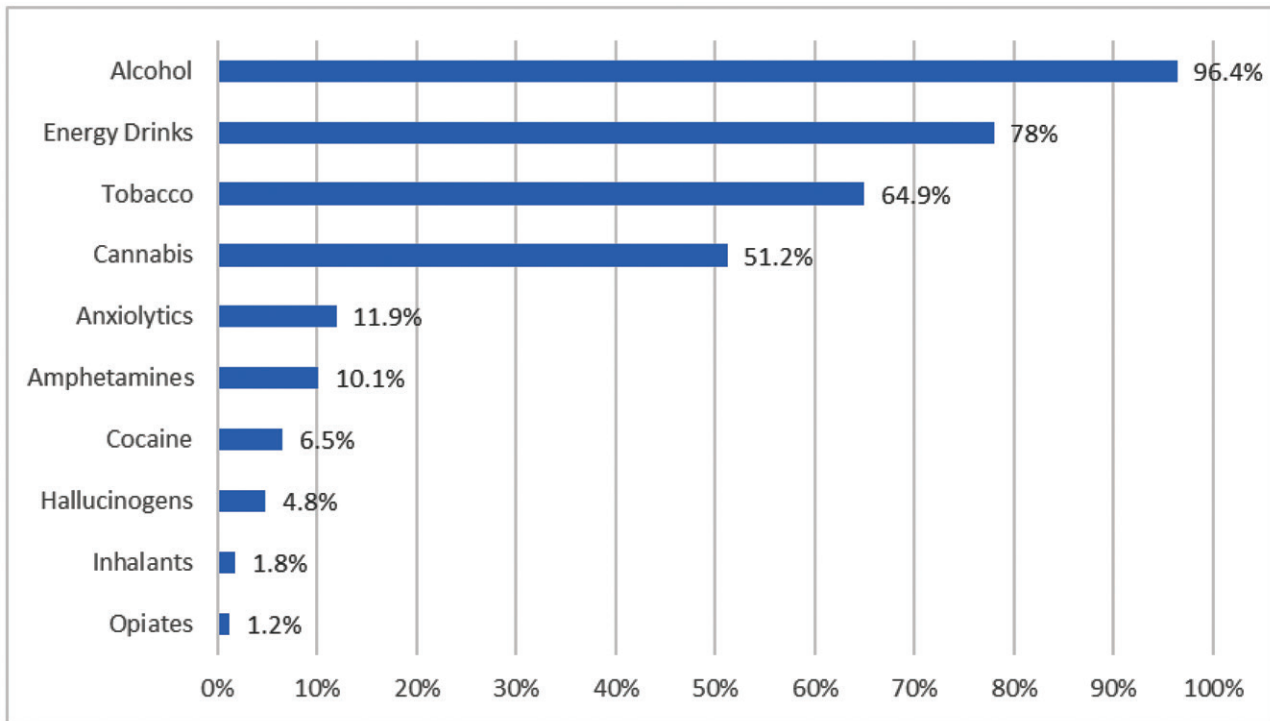


Figure 1. Prevalence of Consumption of Different Substances at UPLGC Medical Students

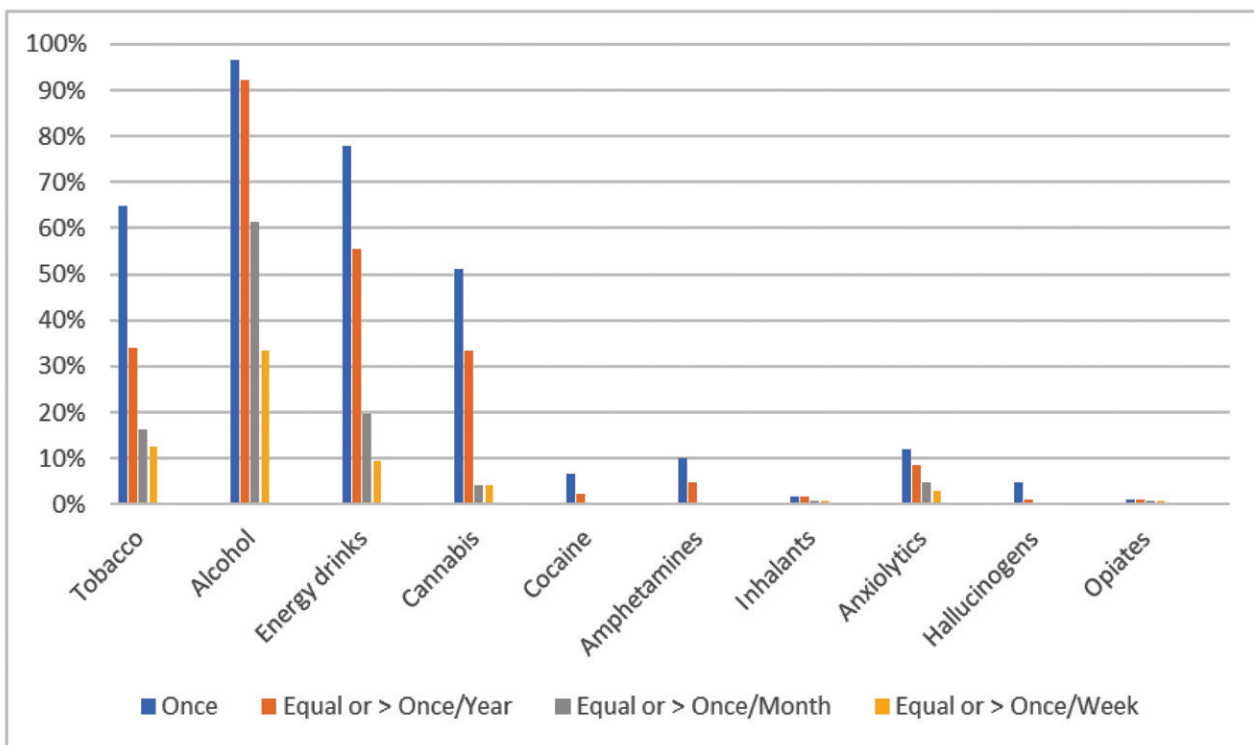


Figure 2. Prevalence and Frequency of Use of Different Substances at UPLGC Medical Students: once in their life (blue), equal or more than once a year (orange), month (grey) and week (yellow).

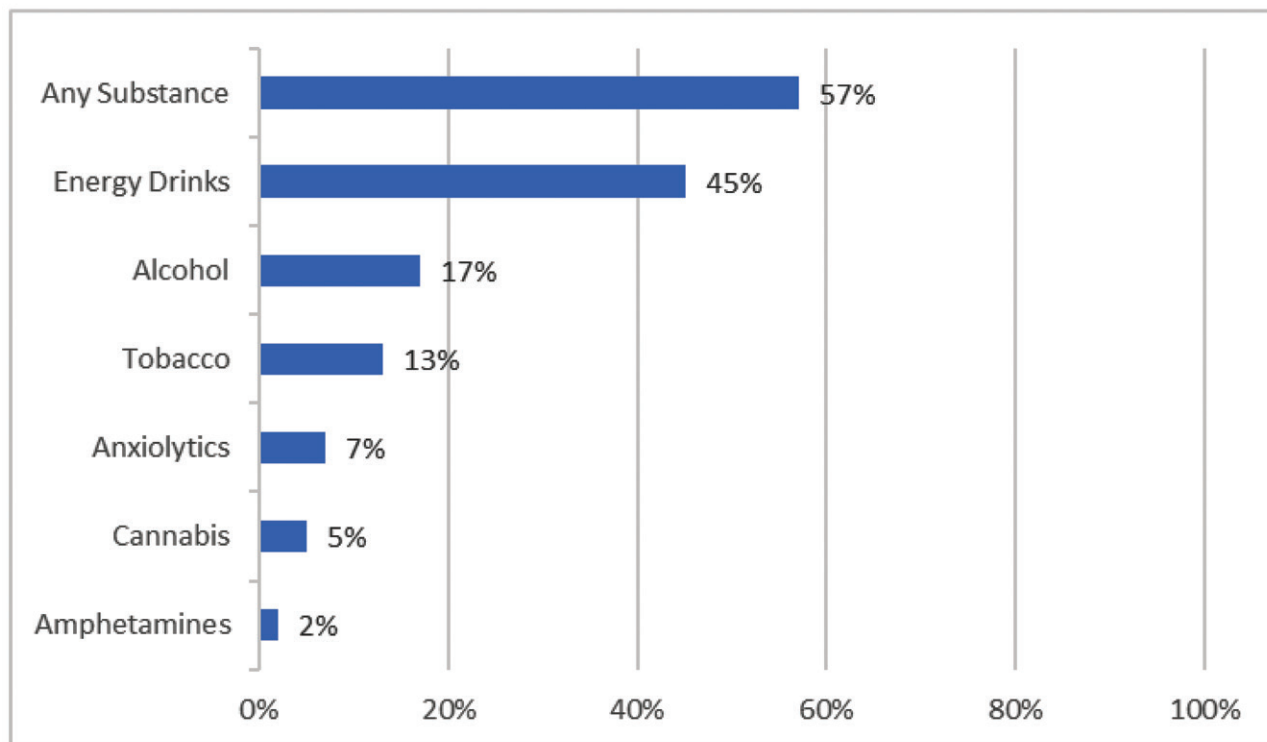


Figure 3. Percentage of Students Who Have Initiated or Increased the Use of Any Substance Directly Linked to Their Medical Studies

Another essential point of the study was whether future physicians believe they have started to consume or have increased the use of any substance directly related to their medical studies. More than half of them 96 (57.1%), recognized having done it (Figure 3). Furthermore, analyzing each substance, almost half of the respondents 76 (45.2%) admitted to having increased energy drink consumption linked to their medical studies. Also 29 (17.3%) of respondents admitted to having consumed alcohol, 22 (13.1%) tobacco, 12 (7.1%) anxiolytics, 9 (5.4%) cannabis and 4 (2.4%) anxiolytics (not prescribed). The reasons argued by students for this increased consumption in energy drinks were staying awake, increasing concentration and improving performance while studying.

DISCUSSION

On the one hand, the main possible reason for significant differences found in participation when comparing different academic levels could probably be that the students of higher courses are more sensitized to other students' collaboration in research. On the other hand, gender differences in participation (114 (67.9%) of respondents were women and 54 (32.1%) were men) would be probably explained by inequality of enrolment in medicine. In 2019, the year to which the last data published by the entity belonged,

only 29.86% of medicine students enrolled at ULPGC were male.¹⁸

When considering consumption of substances at least once in life, and comparing medicine students to general population, percentages are higher for the future physicians, but statistically significant differences were found only for alcohol (96.4% to 88.8%; $p < 0.001$) and cannabis (51.2% to 42%; $p = 0.019$), respectively. Such a high consumption rate had previously been described in a sample of US students of Medicine, whose percentages of alcohol and cannabis use over the past year were 91.3% and 26.2% respectively.⁷ Both U.S. and our results were quite similar for alcohol (91.3% and 92.3%) and the most consumed illegal substance (cannabis) (26.2% and 33.3%), correspondingly. In addition, when comparing our sample to Spaniards of the indicated range of age, future physicians at the ULPGC recognized having tried amphetamines and prescription-free anxiolytics more than the "average population".¹ This may be due to the greater knowledge of students, such as future doctors, psychopharmacologicals and their greater ease of acquiring substances that need prescriptions. Furthermore, amphetamines and anxiolytics are supposed improve your performance making you render more and decreasing anxiety, respectively. Moreover, cocaine was less prevalent in our sample of medical students than in the comparable group of the general population.¹ This could probably be because it is a substance

with only one target: enjoying; and none link to academic performance, directly helping to improve it as amphetamines do, or indirectly decreasing anxiety as anxiolytics do.

It is striking that, although the students in our study have tried tobacco more than general population, the percentage of daily consumption is much lower when compared to them. Only 4 (7.4%) of men and 5 (4.4%) of women of all our respondents consume it daily, while in the corresponding age group of the Spanish population, this percentage rises to 36.6% for male and 27.9% for female.¹ As Dr. Chandrashekhara T Sreeramareddy points out, this low prevalence of regular smokers among medical students can be related to the model of healthy behavior that could be expected of future health professionals.¹⁹

Analyzing personal and academic consequences due to alcohol and other substance use, we have reported a noticeably higher frequency in the percentage of students who have repented of their actions or have driven under the effects of some substance, compared to a similar study among U.S. medical students.⁷

Energy drinks are the second most commonly used substance 131 (78%) among our sample of medical students (even more than tobacco and cannabis). More studies are needed to analyze the way medical students vary the consumption of energy drinks according to the intensity of their degree (mainly increased during exams period) and, if there is a relationship between the time spent for studying and the quantity of energy drinks consumed.

Although there are some faculty studies analyzing students consumption of energy drinks, a comparison is not possible due to the use of different parameters.²⁰⁻²² It was noticeable that more than four-fifths (82.7%) of students at the University of La Laguna (the other public university at the Canary Islands), acknowledged having tried energy drinks.²³ Those results were quite similar to ours at the ULPGC. There were other research groups in which the possible relationship between substance use and studying medicine was analyzed. In an Italian university of Medicine, it was concluded that 22% of future doctors were regular users of energy drinks.²⁴ The prevalence of energy drink consumption once in the life was also analyzed in a medical school in Turkey, showing a prevalence of almost one-third (32.6%) of them. However, they considered that this percentage could be due to a more recent arrival of the substance in the country.²⁵ A study carried out in Pakistan showed that the number of medical students using energy drinks was more than one-third (43%).²⁶ Although the criteria used to measure the consumption of the different medical students were significantly different (and therefore the results in the various studies), all researchers concluded that the consumption of energy drinks of their

medical students was higher than other university students. The percentages of having ever tried energy drink students were respectively 40.6% and 52.5% in Italian and Turkish samples of university students, lower than 78% in our sample of medical students.²⁷⁻²⁸

Our study showed that men consume more energy drinks than women (with a statistically significant difference), as has already been previously reported.²⁴⁻²⁶ EDADES study also confirmed this sex difference, not only for energy drinks, moreover for all psychoactive substances (with the only one exception of hypno-sedatives).¹ The group of Bullut et al explain their hypothesis: this disparity in consumption of energy drinks between the sexes could be due to the advertising of energy drinks being aimed mainly at young men.²²

As previous studies had attempted to determine, we intended to know the reason why nearly half of our students increased energy drink for the desire to increase academic performance.²²⁻²⁴ Although medicine students are supposed to be more conscious about their potentially harmful health consequences, Aslam et al concluded that up to two-thirds of the future doctors surveyed in their study recognized using energy drinks to combat sleep and increase their energy level to study and finish projects on time.²⁵ All these data support the hypothesis that the high consumption of energy drinks among medical students could be related to the considerable quantitative and qualitative complexity of their degree and the significant effort required. Those reasons lead students to feel the need for extra energy contributions.

In conclusion, our results of high rates of alcohol and other substances use are similar to previous surveys at university students of the national territory.²⁹⁻³² According to Diaz-Castela et al, as there is scarcity of bibliographic references on this topic, we also consider necessary an effort to keep on analyzing the consumption pattern of different substances among university students.²⁹

Strengths

This is the first Spanish study which combines substance use and energy drinks analysis. The sample size is noticeable. Such an exhaustive analysis has not been previously done.

Limitations

Our study has some limitations. First of all, the low response rate 168 (23.3%). This could have probably introduced some nonresponse or voluntary response bias. For future studies, we suggest that: 1) direct communication with the participants via email, 2) refreshing the invitation at least two times, or 3) offering some benefits from participating; could improve low response rates. Secondly, although we

selected the most important and representative questions of two standardized questionnaires, mixing them could potentially produce some bias.

CONCLUSION

The prevalence of alcohol and other substances use (energy drinks included) in medical students at ULPGC is significantly high, and also the percentage of them have been repented of their actions or driving under the effects of some substance. Energy drinks are the second most commonly used substance in our sample and almost half of our medical students used them to increase their academic performance.

Those high prevalence rates are similar to previous surveys of university students in national and international territories.

Due to the high rates of substance use and their consequences, we point out that it remains a public health issue. Therefore, prevention and intervention strategies are needed to be developed to reduce the prevalence of substance use among Spanish university students.

END NOTE

Author Information

1. Guillermo Pirez Mora, M.D. PhD.
Children and Adolescent Psychiatrist.
Associate professor at ULPGC.
Community Mental Health Team (CMHT) for Children and Adolescent of "Vecindario".
Department of Psychiatry, Las Palmas de Gran Canaria, Spain.
2. Maria Rodriguez Ramón
MD, Family Medicine, Complejo Hospitalario
Universitario Insular Materno Infantil, Las Palmas de Gran Canaria, Spain

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