ORIGINAL ARTICLE

Consumption of psychoactive substances and energy drinks among students of the University of Novi Sad

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ABSTRACT

Aim To determine the extent of illegal psychoactive substances (PAS) and energy drinks consumption among students in Novi Sad.

Method This research was conducted among students of the University of Novi Sad in the period from October 2010 until April 2011. The study involved 800 students from the first and final study years (aged 20 to 24, both sexes were equally represented). A special questionnaire was designed for this study. Statistical analysis was performed in Statistical Package for the Social Science 17.0, and $p<0.05$ was statistically significant.

Results A contact with an illegal PAS was made by 143 (17.9%) students, 100 (12.5%) males and 43 (5.4%) females ($p<0.05$). Male students, 18 of them, most often (21.4%) had the first contact with PAS at the age of 16. The same percentage (15%), was found in 6 female students in all three age groups of 16, 17 and 21. Psychoactive substances are used several times a week by 9 (11%) students. Most frequently used are marijuana, in 132 (16.5%) cases, a combination of pills and alcohol in 45 (5.53%) cases and cocaine in 20 (2.5%) cases. Energy drinks are occasionally used by 464 (58%) males, while 142 (17.7%) drink them several times a month.

Conclusion These results indicate the necessity of primary prevention and organization, comprehensive and preventive activities with adolescents.

Key words: marijuana abuse, amphetamine, young/adult, questionnaire

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INTRODUCION

During the last couple of years usage of illegal psychoactive substances (PAS) has got epidemic proportions, with tendency of increasing a number of users (1). The term ''illegal drugs" includes marijuana, cocaine, crack, heroin, LSD, amphetamines and ecstasy (2). Marijuana is the most used illegal substance; 162 million people in the world, and 83 million US citizens consumed marijuana at least once (3), which is followed by amphetamines with 29.2 million of users, cocaine 13.3 million and ecstasy – 8.3 million (4). Among citizens, consumption of stimulants like amphetamines grows fast across Europe and Asia (5), with evident increase in a number of cocaine and crack addicts in Europe (6), South Africa (7) and the United States (8).

Data on the frequency of consumption of PAS are very diverse and difficult to follow because of different research methods (9). In Europe, since 1995, every fourth year ESPAD study (European School Survey Project on Alcohol and Other Drugs) has been implemented in 35 European countries, and it follows the frequency of using cigarettes, alcohol and other PAS. It is coordinated by Swedish Council for Information on alcohol and other psychoactive substances (10). Serbia participated in the research for the first time in 2005 (10). In the United States the incidence of PAS users among younger population is regularly monitored, and every two years reports submitted to the National Centre for Education Statistics, CDC (11,12).

Investigations have shown that the use of illegal PAS in Europe has increased significantly over the past few decades (6). Substance abuse is moving towards increasingly younger age categories, and the addiction on psychoactive substances is growing (1). It is therefore important to conduct comprehensive epidemiological studies that would give guidelines for an organized and effective prevention.

In recent years, a significant increase of using energy drinks is also recorded, although many of the ingredients are not well understood (13). The various ingredients of energy drinks, in combination with PAS and alcohol, can lead to serious health problems such as arrhythmias, tachycardia, hypertension, and liver and kidneys malfunction (14). In the United States, 30-50% of the population consumed energy drinks, and most of them are adolescents (12-18 years) and young adults (19-25 years) (14).

The fact that in our region a comprehensive study has not been implemented yet in order to provide a true epidemiological picture of the use of PAS, particularly energy drinks, prompted us to investigate the extent of taking illegal psychoactive substances and energy drinks among students in Novi Sad.

EXAMINEES AND METHODS

The research was a cross-sectional study, and it was conducted in the period between October 2010 and April 2011.

A sample was randomly selected, and the study included 800 students, of which 400 in the first year (born in 1991), and 400 students from the last year at the University (born in 1988 and 1987). The sample represents 5% of all students of the University of Novi Sad, mostly students of the School of Medicine, Mathematics, Agriculture, School of Economics, School of Engineering, and the School of Sport and Physical Education. In both age groups there were 200 males and 200 females.

The original questionnaire was designed for collecting the research data. The research was approved by the Ethical Committee of the University of Medicine in Novi Sad. All participants were read and signed informed consent about the purpose of the study (participation was voluntary and anonymous).

Each survey respondent was approached with a possibility of voluntary withdrawal at any time. Improper and under-staffed polls were not taken into account. Each survey had its own identification number, from 1 to 800.

The survey contained the following questions: year of birth, gender, and use of the related substances and energy drinks.

The survey was conducted by using personal contact with respondents and thus avoided occurrence of logic errors. Then the data were computer processed.

For the statistical analyses absolute numbers and percentages, measures of central tendency (arithmetic mean, median, standard deviation

and minimum and maximum distance values), a Pearson Chi-Square test and correlation test (SPSS 17.0) were used ($p<0.05$ was statistically significant).

RESULTS

A total number of 657 (82.1%) out of 800 examinees has not consumed PAS.

Seventy interviewees (8.8%) have consumed PAS one to three times in a lifetime, and 37 (4.6%) more than ten times.

Males consumed PAS more frequently than females ($p<0.05$). There was a large percentage of male respondents 30 (7.5%) that used PAS more than 10 times (Table 1).

Students often had the first contact with PAS at the age of 16 and 17, and there were no statistically significant differences between genders. In the 21-year old student population, larger number of female respondents made first contact with PAS ($p<0.01$) (Figure 1).

The highest number of respondents, 51 (62.2%) cases, have been using PAS occasionally; eight (9.8%) used them once a week. Males have been using PAS more frequently than females, in seven cases (11.7%) and one (4.5%) case, respectively. ($p<0.05$) (Table 2).

Fifty (60.98%) final-year students used PAS, and 32 (39.02%) younger students ($p<0.05$) (Figure 2).

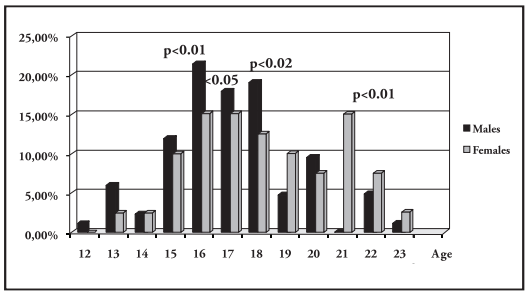

Figure 1 Distribution of respondents by gender and age in which they tried psychoactive substances

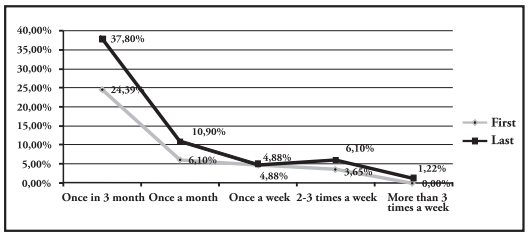

Figure 2 Distribution of respondents by year of study and frequency of use of psychoactive substances

Table 1. Distribution of psychoactive substances usage according to gender

	No (%) of respondents consuming psychoactive substances				
	No consumption*	**1-3 times***	**4-10 times***	**More than 10 times***	**Total**
Males	300 (75)	45 (11.3)	25 (6.3)	30 (7.5)	400
Females	357 (89.3)	25 (6.3)	11 (2.8)	7 (1.8)	400
Total	657 (82.1)	70 (8.8)	36 (4.5)	37 (4.6)	800

*statistically significant difference

Table 2. Distribution of psychoactive substances usage by frequency according to gender

	No (%) of respondents by frequency of psychoactive substances use					
	Once in 3 months*	**Once a month**	**Once a week***	**2-3 times a week**	**More than 3 times a week**	**Total***
Males	37 (61.7)	9 (15)	7 (11.7)	6 (10)	1 (1.7)	60
Females	14 (63.6)	5 (22.7)	1 (4.5)	2 (9.1)	0 (0)	22
Total	51 (62.2)	14 (17.1)	8 (9.8)	8 (9.8)	1 (1.2)	82

*statistically significant difference

Table 3. Distribution of energy drinks usage according to gender

	No (%) of respondents consuming energy drinks					
	Very rarely	**Once a month**	**Every weekend with alcohol***	**3-5 times a week**	**Everyday***	**Total**
Males	158 (67.4)	35 (15)	17 (7.3)	17 (7.3)	7 (3)	234
Females	164 (71.4)	41 (17.8)	6 (2.6)	18 (7.8)	1 (0.4)	230
Total	322 (69.4)	76 (16.4)	23 (5)	35 (7.5)	8 (1.7)	464

*statistically significant difference

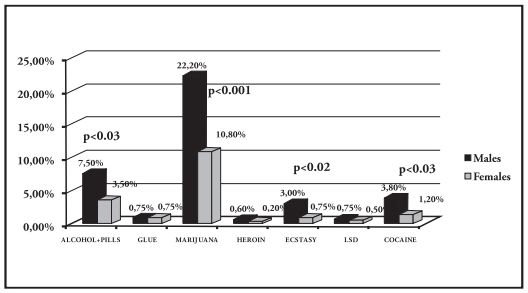

Figure 3 Distribution of respondents by gender and type of substances

Observed by types of PAS, students have been using mostly marijuana, in 132 (16.5%) cases, followed by a combination of pills and alcohol, cocaine and ecstasy. Males more frequently consumed PAS than females, but statistical significance was noted only for marijuana and ecstasy (Figure 3).

The highest percentage of students, 464 (58%), consumed energy drinks occasionally, and 142 (17.7%) several times per month. There was a larger number of males than females who consumed energy drinks every weekend with alcohol, 17 (7.3%) and 6 (2.6%), respectively ($p<0.05$) (Table 3).

A total number of 336 (42.0%) out of 800 examinees have not consumed energy drinks at all,

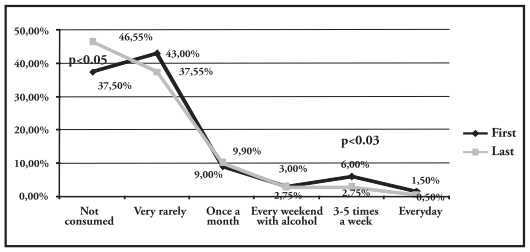

Figure 4 Distribution of respondents according to frequency of consumption of energy drinks and year of study

Table 4. Correlation of use of energy drinks and combination of alcohol and pills

		Energy drinks	Alcohol and pills
Energy drinks	**Pearson Correlation**	1	.492*
	Sig. (2-tailed)		.008
	N	464	28
Alcohol and pills	**Pearson Correlation**	.492*	1
	Sig. (2-tailed)	.008	
	N	28	45

* significant correlation

and there was a higher number of final-year students, compared to younger students ($p<0.05$).

There was a higher number of first-year students who consumed energy drinks more than three times a week, compared to final-year students ($p<0.01$) (Figure 4).

Positive correlation between the consumption of energy drinks and the use of a combination of pills and alcohol was obtained (Table 4).

DISCUSSION

The widespread abuse of PAS represents a very serious and socio-pathological problem of the modern society, present earlier in western and more recently in transition countries (10). According to the WHO (World Health Organization) recommendations by 2020, young people in the European Region should responsibly fulfill their role in society, and prevalence of taking illicit PAS should be reduced by 25% and mortality by 50% (15).

According to ESPAD study in 35 participating countries, the Czech Republic is the country with the highest prevalence of using PAS (46%) in Europe (10). The results of this study have shown that the prevalence of PAS usage among students in Novi Sad (18%) is very similar to the studies from Germany and Croatia (10). According to WHO data on drug usage in 13 countries, about 20% of adolescents try marijuana at the age of 18 (15), while in Serbia the highest percentage of respondents had first contact with it at the age of 13 to 17 (16), which is very similar to our research. Also, according to the ESPAD study and our study as well, adolescents experimented mostly with marijuana, and males more often than females (10). European average prevalence of marijuana consumption is lower than the prevalence of marijuana usage in the population investigated. The highest prevalence of marijuana usage has been noted in the Czech Republic, and the lowest is in Greece and Romania (10). Males use marijuana more often, but differences among gender are decreasing, especially in Russia (10). According to the Youth Risk Behavior Survey (YRBS) data, about 36% of adolescents have tried marijuana during 2009 (17), which is far highest compared to our results. In the city of Novi Sad in the 1995-2008 period a trend of significant increase of marijuana use among adolescents has been noted, from

12.1% to 42.7% (18,19). A high prevalence of road traffic accidents that was associated with the use of marijuana was found among the motorcyclists (20).

After marijuana, most respondents from this research used alcohol in combination with pills (5.63%), which is similar to the results from Croatia (8%) (10). As for the consumption of amphetamines, our results are similar to the European average of 7% (10), and as for the consumption of cocaine with the US average of 6% (12). A high percentage of males influenced by psychoactive substances was involved in aggressive fights with peers and demonstrated bad assessments and serious learning problems, and women were more likely to report an affective disorder or a post-traumatic stress disorder (21,22). Also, the incidence of some risk factors of minor brain injuries or dysfunction, suicide attempts, and headache was higher among psychoactive substance users than among nonusers (23).

The number of illegal laboratories for production of synthetic substances is growing in the world, and the production is simple, inexpensive and widely available (24), so possibility of an increasing number of addicts exists, and should be taken into account when planning prevention programs (10). The results of this study have shown that every second student consumed energy drinks occasionally, and every fifth several times a month, which is similar to the USA results (14).

Comparative analysis of our and European research of use of PAS suggests lower prevalence rates in our country, but it is still significantly higher than those in the past years. Therefore, it is important to implement integrated prevention and control measures.

In conclusion, a high incidence of PAS and energy drinks consumption was observed among students in Novi Sad. Frequency of use of PAS shows an upward trend compared to the previous period. Male students were more frequent consumers. Frequently abused PAS were marijuana, pills and alcohol in combination, cocaine and amphetamines.

These results suggest the necessity of the intensive implementation of primary prevention with organized, comprehensive prevention activities.

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Competing interests: none to declare.

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Konzumiranje psihoaktivnih supstanci i energetskih napitaka među studentima Univerziteta u Novom Sadu

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SAŽETAK

Cilj Istražiti rasprostranjenost uzimanja ilegalnih psihoaktivnih supstanci i energetskih napitaka kod studenata Univerziteta u Novom Sadu.

Metode Istraživanje je sprovedeno među studentima Univerziteta u Novom Sadu, u periodu od oktobra 2010. do aprila 2011. godine. Ispitivanje je uključilo 800 studenata prve i završne godine studija (uzrasta 20-24 godine); polna struktura bila je podjednako zastupljena. Kao instrument je korišćen anketni upitnik specijalno sastavljen za potrebe ovog istraživanja. Statistička obrada vršena je u SPSS 17.0, a vrednost $p<0,05$ je korišćena kao statistički značajna.

Rezultati Kontakt s ilegalnim PAS-om imalo je 143 (17,9%) studenata, 100 (12,5%) muških i 43 (5,4%) ženskih ($p<0,05$). Studenti su u najvećem broju prvi kontakt imali sa 16 godina, 18 (21,4%) ispitanika. Prvi kontakt s PAS-om zabeležen je kod po šest (15%) studentkinja u sve tri starosne grupe, 16, 17 i 21 godini. Više puta nedeljno PAS je koristilo devet (11%) studenata. Najčešće su korišćeni marihuana, u 132 (16,5%), kombinacija tableta i alkohola, u 45 (5,63%) i kokain u 20 (2,5%) slučajeva. Energetske napitke povremeno je koristilo 464 (58%), a više puta u toku meseca 142 (17,7%) studenata.

Zaključak Kontakt s psihoaktivnim supstancama ustanovljen je kod svakog petog studenta, najčešće s marihuanom, kombinacijom tableta i alkohola, te kokainom. Ovi podaci ukazuju na neophodnost sprovođenja primarne prevencije, organizovanim, sveobuhvatnim preventivnim aktivnostima kod mladih.

Ključne reči: marihuana, amfetamini, mladi, upitnik.