

Volume 7 / Number 1 / 2013

ISSN 1840-2291

# HealthMED

Journal of Society for development in new net environment in B&H

HealthMED journal with impact factor indexed in:

Thomson Reuters ISI web of Science,  
Science Citation Index-Expanded, Scopus, Embase  
EBSCO Academic Search Premier, Index Copernicus, getCITED





# HealthMED

Journal of Society for development in new net environment in B&H

## EDITORIAL BOARD

Editor-in-chief *Mensura Kudumovic*  
Execute Editor *Mostafa Nejati*  
Associate Editor *Azra Kudumovic*  
Technical Editor *Eldin Huremovic*

## Members

*Paul Andrew Bourne (Jamaica)*  
*Xiuxiang Liu (China)*  
*Nicolas Zdanowicz (Belgique)*  
*Farah Mustafa (Pakistan)*  
*Yann Meunier (USA)*  
*Suresh Vatsyayann (New Zealand)*  
*Maizirwan Mel (Malaysia)*  
*Budimka Novakovic (Serbia)*  
*Diaa Eldin Abdel Hameed Mohamad (Egypt)*  
*Zmago Turk (Slovenia)*  
*Edvin Dervisevic (Slovenia)*  
*Chao Chen (Canada)*  
*Farid Ljuca (Bosnia & Herzegovina)*  
*Sukrija Zvizdic (Bosnia & Herzegovina)*  
*Damir Marjanovic (Bosnia & Herzegovina)*  
*Bozo Banjanin (Bosnia & Herzegovina)*  
*Gordana Manic (Bosnia & Herzegovina)*

Address Sarajevo,  
Hamdije Kresevljakovica 7A  
Editorial Board healthmedjournal@gmail.com  
http://www.healthmedjournal.com

Published by DRUNPP, Sarajevo  
Volume 7 Number 1, 2013  
ISSN 1840-2291

## Sadržaj / Table of Contents

<b>Alarmingly high metabolic syndrome prevalence in Hatay region of Turkey</b> .....	4
<i>Ihsan Ustun, Cumali Gokce, Kursat Gundogan, Vedia Tonyukuk Gedik, Ahmet Kaya, Fahri Bayram, Nazan Savas</i>	
<b>Evaluation of two molecular methods for the detection of Beijing strains of Mycobacterium tuberculosis in pulmonary tuberculosis patients</b> .....	12
<i>Somayeh Jahani Sherafat, Hossein Goudarzi, Parisa Farnia, Mohammad Rostami Nejad</i>	
<b>A comparison of critical thinking disposition among nurses in Turkey</b> .....	17
<i>Oznur Sarioglu, Yasemin Yildirim Usta, Yurdanur Dikmen, Frank D. Hicks, Medet Korkmaz</i>	
<b>Amphetamine poisoning and stereotypic behaviors in a 18 months infant: The first case report from Iran</b> .....	26
<i>Nader Mostafavi, Reza Bidaki, Seyyed Mohammad Mahdy Mirhosseini, Hamid Ostadebrahimi</i>	
<b>Effect of low level laser therapy on managing oral mucositis in rats</b> .....	29
<i>Ufuk Sezer, Tuncer Demir, Suna Erkilic, Mutan Hamdi Aras, Saim Yanik</i>	
<b>The model of computer medical system for the collection of scientific information in the Serbian health care system</b> .....	35
<i>Milan Miladinovic, Branko Mihailovic, Nebojsa Kavacic</i>	
<b>Evaluation of the sexual and reproductive health problems of University students attending the youth friendly center and the importance of counseling: Cross sectional and case management techniques</b> .....	41
<i>Sinan S. Ozalp, Ozgul Orsal, Ozlem Orsal</i>	
<b>Anthropometrical and physiological profiles of the sportsmen from Vojvodina</b> .....	47
<i>Miodrag Drapsin, Nebojsa Vujkov, Sandra Vujkov, Slavko Molnar, Patrik Drid, Izet Radjo</i>	
<b>Adult dental anxiety and its relationship to demographic and sociocultural characteristics</b> .....	56
<i>Servet Kesim, Demet Unalan, Ferhan Elmali, Cagri Esen</i>	

HealthMED journal with impact factor indexed in:

- Thomson Reuters ISI web of Science,
- Science Citation Index-Expanded,
- Scopus,
- EBSCO Academic Search Premier,
- EMBASE
- Index Copernicus,
- getCITED, and etc.



# Sadržaj / Table of Contents

<b>Frequency and changes in trends in use of illegal drugs among students in Novi Sad ..... 61</b> <i>Dusica Rakic, Branislava Rakic, Milena Mikalacki, Branka Protic Gava, Damjan Jaksic, Izet Radjo</i>	<b>Effects of the Ramadan fast on trauma ..... 131</b> <i>Cemil Kavalcı, Tamer Durdu, Fevzi Yılmaz, Deniz Arslan Engin, Turan Turhan, Serkan Yılmaz Muhittin</i>
<b>Endotracheal tube cuff pressure as a risk factor for laryngotracheal sequelae: A 5-years multicenter study..... 67</b> <i>Ebrahim Alijanpour, Novin Nikbakhsh, Ali Jabbari, Fatemeh Adabi</i>	<b>Pulmonary manifestation of the lymphoma CT characteristic ..... 135</b> <i>Obrad Jovic, Sasa Vujnovic, Mirjana Cadjo, Dragana Roganovic, Tatjana Sladojevic</i>
<b>Evaluation of oxidative status and trace elements in patients with benign paroxysmal positional vertigo ..... 72</b> <i>Halil Kaya, Mehmet Tahir Gokdemir, Ozgur Sogut, Murat Ayan, Ferhat Bozkus, Ismail Iylen, Abdurrahim Kocyyigit</i>	<b>Therapy resistant depression or inadequately treated delusional depression: Case report and literature overview..... 139</b> <i>Mina Cvjetkovic-Bosnjak, Aleksandra Nedic, Gordana Misic-Pavkov, Zoran Gajic</i>
<b>Bcl-2 expression correlates inversely to the number of apoptotic cells in the samples of goiter thyroid gland ..... 80</b> <i>Ljiljana Markovic, Ruzica Nedeljkov-Jancic, Jelena Aritonovic, Gordana Basta-Jovanovic</i>	<b>Determination of nursing students' moral judgment: A city in west region of Turkey ..... 142</b> <i>Fatma Basalan Iz, Suheyla Altug Ozsoy</i>
<b>Domestic violence and the experience of health services..... 87</b> <i>Maria de Fatima Bezerra de Alencar, Modesto Leite Rolim-Neto, Henrique Cesar Nascimento Ramalho-Filho, Nádia Nara Rolim Lima, Uilna Natércia Soares Feitosa, Alberto Olavo Advincola Reis</i>	<b>The relationship between mental health and self-esteem in students of medical sciences ..... 150</b> <i>Abdullah Mahdavi, Maryam Ahmadi, Mehrdad Nadermohamadi, Davoud Adham</i>
<b>Comparative studies on the hypocholestrimic effect of branded and conventional yoghurt ..... 92</b> <i>Shabnam Javed, Rauf Ahmad, Shaista Nawaz, Salman Saeed</i>	<b><sup>99m</sup>Tc (V)-dimercaptosuccinic acid scintigraphy is useful imaging method for primary detection and follow-up of patients with medullary thyroid carcinoma ..... 158</b> <i>Milena P. Rajic, Marina Vlajkovic, Slobodan Ilic, Milos Stevic, Vladan Sekulic, Aleksandar Karanikolic</i>
<b>Clinical application of continuous antegrade perfusion by paracalculeous ureteral catheter in ureteroscopic holmium laser lithotripsy..... 98</b> <i>You-qiang Fang, Dejuan Wang, Jian-guang Qiu, Jieying Wu, Hailun Zhan</i>	<b>Investigation of the nursing students' opinions on the clinical practice of the psychiatry nursing lecture, the care plan and interaction process forms in Turkey ..... 166</b> <i>Gul Unsal Barlas, Nevin Onan, Semra Karaca</i>
<b>Quantitative characteristics of digito-palmar dermatoglyphic complex among men with schizophrenia in Serbia..... 104</b> <i>Miodrag Stosljevic, Milosav Adamovic, Fadilj Eminovic, Aleksandar Damjanovic, Gerin Ahmo</i>	<b>Effective factors in prevention of self-medication based on Health Belief Model in women referring to the health homes in Tehran's 3rd district, 2012 ..... 174</b> <i>Negin Niksadat, Mahnaz Solhi, Davood Shojae Zadeh, Mahmood Reza Gohari</i>
<b>Nucleoside reverse transcriptase inhibitors alter preadipocyte and adipocyte in vitro..... 110</b> <i>Meimei Tao, Jiqiu Kuang, Ming Li, Taisheng Li</i>	<b>The factors related to prevalence of urinary stress incontinence in women inhabiting in Primer Health Center, Turkey ..... 182</b> <i>Hatice Bektas, Ozgur Alparslan</i>
<b>P wave dispersion can help to identify infarct related artery in Acute inferior myocardial infarction ..... 118</b> <i>Mustafa Yılmaz, Muhammed Karadeniz, F. Ozlem Arican Ozluk, Kemal Karaagac, Mustafa Kuzeytemiz, Tezcan Peker</i>	<b>Use of the first-trimester biochemical markers to predict intrauterine growth retardation..... 190</b> <i>Slavica Vujovic, Alessandro Pala, Aleksandra Isakovic, Milan Terzic</i>
<b>Serum Zn concentration, IgA and IgG Immunoglobulin levels and middle-aged Iranian females ..... 125</b> <i>Mehri Aliasgharpour, Mahnaz Mohammadlo</i>	<b>The effect of asthma education on the clinical condition of children with asthma ..... 198</b> <i>Gulcin Bozkurt, Suzan Yildiz, Sevim Ulupinar, Besey Gunes Oren</i>
<b>Huntington's disease - gene anticipation..... 128</b> <i>Sanja S. Plestic, Ana R. Markovic, Elena A. Suhanek</i>	<b>Study of metabolic profiling Parkinson's disease ..... 204</b> <i>Fariba Fathi, Mohsen Tafazzoli, Masoud Mehrpour, Gholamali Shahidi</i>
	<b>Yoga after coronary artery bypass graft surgery: its effect on anxiety and self-care agency ..... 211</b> <i>Aysel Gurkan, Bilgi Gulseven, Aygen Eren</i>

# Sadržaj / Table of Contents

<b>Prevalence of HIV, Hepatitis B and C infections among inmates in prisons in the Republic of Macedonia</b> ..... 217 <i>Tanja Jovanovska, Biljana Kocic, Viktorija Prodanovska-Stojcevska, Rozalinda Isjanovska</i>	<b>Factors associated with burnout syndrome in physiotherapy staff: A questionnaire study</b> ..... 304 <i>Maghsoud Eivazi Gh, Amin Alilou, Sara Fereidounnia, Zohre Zaki</i>
<b>Analysis of pedal kinematics and surface EMG parameters during WAT</b> ..... 224 <i>Murat Cilli</i>	<b>Exploring european doctors' well-being by applying a neural network</b> ..... 313 <i>Ana Maria Lucia-Casademunt, Jose Antonio Ariza-Montes, Alfonso Carlos Morales-Gutierrez</i>
<b>Evaluation of daily living activities and dependence levels of elderly with chronic obstructive pulmonary disease: A pilot study in Turkey</b> ..... 233 <i>Sevilay Hintistan, Nesrin Nural, Nermin Birinci</i>	<b>Stress research among employees in the agricultural sector</b> ..... 321 <i>Leposava Grubic-Nesic, Slavica Mitrovic, Boban Melovic, Stevan Milisavljevic</i>
<b>Integrins and multidrug resistance among E. coli and Klebsiella pneumoniae isolated from children with urinary tract infections</b> ..... 243 <i>Sima Sadat Seyedjavadi, Gita Eslami, Mehdi Goudarzi, Hosein Goudarzi, Fateme Fallah</i>	<b>Narratives across childhood depression: The focus on family relationships</b> ..... 327 <i>Maria de Fatima Bezerra de Alencar, Modesto Leite Rolim-Neto, Alberto Olavo Advincula Reis, Marina Lucena de Aguiar Ferreira, Saulo Araújo Teixeira, Nadia Nara Rolim Lima</i>
<b>Evaluation of the blood parameters of stroke patients referring to emergency department</b> ..... 250 <i>Mustafa Sahin, Sevdegul Karadas, Aysel Milanlioglu, Hayriye Gonullu</i>	<b>Effect of Nigella Sativa and Fumaria Parviflora on serum protein profiles of naturally infected buffaloes (Bubalus Bubalis) with Fasciola Sp.</b> ..... 333 <i>Asma Waheed Qureshi, Tanveer Akhtar, Nadeem Sheikh</i>
<b>Power Balance® bands, do they work? Short-term effects on postural stability, flexibility, and grip strength</b> ..... 254 <i>Shereen C Currie, Stuart J Semple, Jeanne M Grace</i>	<b>Intra-amniotic administration of exogenous pulmonary surfactant for improving the expression of SP-A in fetal rabbit lung tissues with intrauterine infection related to premature rupture of membranes</b> ..... 338 <i>Jing Liu, Jing Wu, Xiao-Feng Wang, Zhi-Chun Feng, Xiao Xiao</i>
<b>Investigation of the effect of different aerobic exercise on health and anaerobic power for sedantary women</b> ..... 259 <i>Esin Gulu, Guner Cicek, Abdullah Gulu, Kursat Karacabey, Faruk Yamaner, Tarik Sevindi</i>	<b>Instructions for the authors</b> ..... 344 <i>First Author, Second Author, Third Author</i>
<b>Physiological profiles of cadet Serbian judokas</b> ..... 265 <i>Patrik Drid, Svetlana Vajnberger-Mihelcic, Slavko Obadov, Ivan Todorov, Miodrag Drapsin, Izet Radjo</i>	
<b>Comparison of the efficacy on flexibility and body mass index of salat: prayer versus non-prayer healthy females</b> ..... 273 <i>F. Filiz Colakoglu, Selma Karacan, Nevin Atalay Guzel, Gul Baltaci</i>	
<b>Characteristics of speed endurance measured by modified 7x35 meters test and differences between the elite and amateur footballers</b> ..... 280 <i>Slobodan Andrasic, Nenad Zivanovic, Zoran Milosevic, Veroljub Stankovic, Nebojsa Randjelovic, Momir Ciric</i>	
<b>Predictors of academic achievement of nursing students: A survey of nursing student in Turkey</b> ..... 287 <i>Yurdanur Dikmen, Bedriye Ak, Yasemin Yildirim Usta, Sema Kuguoglu</i>	
<b>Decreasing of functional fitness among elderly men and women</b> ..... 296 <i>Bojan Jorgic, Sasa Pantelic, Zoran Milanovic, Marko Aleksandrovic, Radmila Kostic</i>	



# Frequency and changes in trends in use of illegal drugs among students in Novi Sad

Dusica Rakic<sup>1</sup>, Branislava Rakic<sup>1</sup>, Milena Mikalacki<sup>2</sup>, Branka Protic Gava<sup>2</sup>, Damjan Jaksic<sup>2</sup>, Izet Radjo<sup>3</sup>

<sup>1</sup> Faculty of Medicine, University of Novi Sad, Novi Sad, Serbia,

<sup>2</sup> Faculty of Sport and Physical Education, University of Novi Sad, Novi Sad, Serbia,

<sup>3</sup> Faculty of Sport and Physical Education, University of Sarajevo, Sarajevo, Bosnia and Hercegovina.

## Abstract

**Aim:** The aim is to determine the frequency and changes in trends and extent of the use of illegal drugs among students in Novi Sad during period 2008-2012.

**Method:** This research has been conducted among students of the University of Novi Sad between 2008 and the end of 2012. The study included 383 students in 2008 and 373 students in 2012 (aged from 19 to 20) with both genders equally represented. Anonymous special questionnaire was used and a statistical analysis was performed in SPSS17. Correlation between parameters was evaluated by Pearson Chi-Square test, Wilcoxon Signed Ranks and Spearman's correlation method. Statistical significance was analysed by  $\chi^2$  test and starting level was  $p < 0,05$ .

**Results:** The results have shown that the prevalence of the usage of illegal drugs has an increasing character (from 24% to 26%) and students frequently use them (from 9,50% to 15,10%). In both surveys the incidence of was statistically higher in males ( $p < 0,000$ ). The students had the first contact with illegal drugs later, from the age of 16 (2008) to the age of 19 (2012). Marijuana is most frequently used (86,5%). The prevalence of using illegal drugs was statistically higher among adolescents who live in disturbed families ( $p < 0,05$ ), have poor achievement in school and have best friends who use illegal drugs ( $p < 0,01$ ).

**Conclusion:** The frequency of use of illegal drugs shows an upward trend compared to the previous period. These results indicate the necessity of primary prevention and organized, comprehensive and preventive activities at adolescents and students.

**Key words:** Illegal drugs, marijuana, students.

## Introduction

Marijuana, cocaine, crack, heroin, LSD, amphetamines and ecstasy stand under the term "illegal drugs". In most countries the use of illegal drugs is a serious public health challenge, and usually begins during adolescence. Thus, in all countries it is a public health imperative to assess the population rates of illegal drug use among adolescents. In addition, monitoring trends over time may reflect the net effects of activities and programs carried out to prevent adolescent from using these substances. (1).

The widespread abuse of illegal drugs represents very serious and socio-pathological problem of modern society, present from earlier in western, and more recently in the countries in transition (1,2,3).

During the last couple of years the usage of illegal drugs has got epidemic proportions, with tendency of increasing in the number of users (1).

Marijuana is the most used illegal drugs (2,3). According to World Health Organization (WHO) data on the use of illegal drugs, 20% adolescents try marijuana about the age of 18 (2). Among citizens, consumption of stimulants like amphetamines grows fast across Europe and Asia (4), with evident increase in the number of cocaine and crack addicts in Europe (5), South Africa (6) and the United States (7).

The data on the frequency of consumption of illegal drugs are very diverse and difficult to follow because of different research methods (8).

In the USA, the monitoring of the incidence of illegal drugs among younger population has been carried out since 1991, in the national study YRBS (Young Risk Behavior Survey) in 50 countries and every two years reports submitted to National Centre for Education Statistics, CDC (7).

Since 1995, every fourth year ESPAD study (European School Survey Project on Alcohol and Other Drugs) has been implemented in 35 Europe-

an countries, and it follows the frequency of using illegal drugs (8). Serbia participated in the research in 2005 for the first time (9).

One part of the Yugoslav study of atherosclerosis precursors (YUSAD studies) in young populations, was about the consumption of illegal drugs among adolescents from 1995 to 2008 year (10).

The investigations have shown that the use of illegal drugs in Europe has increased significantly over the past few decades (1,2,8). The substance abuse is moving towards increasingly younger age categories, and the addiction to illegal drugs is growing (1,2). Therefore it is important to conduct the comprehensive epidemiological studies that would give the guidelines for an organized and effective prevention.

The fact that in our region the comprehensive study (that would provide a true epidemiological picture of the use of illegal drugs has not been implemented yet, prompted us to investigate the extent of taking illegal drugs in Novi Sad.

The purpose of this study was to determine the frequency and changes in trends and the extent of the use of illegal drugs among students in Novi Sad during the period 2008-2012, following the adoption of strategies to combat drugs in Serbia.

### Method and material

The research was planned as the prospective study, and has been conducted in the period from 2008 to 2012. The first survey was in 2008. The sample has been randomly selected, and the study included 383 students (male 198 or 51,75% and female 185 or 48,3%), with the average age of 19,82.

The second survey was in 2012. The sample was randomly selected, and the study included 373 students with the average age of 20,18. Both genders were equally represented (male 192 or 51,5% and female 181 or 48,5%).

The sample represents 5% of the students at the first year of studies of University of Novi Sad, mostly students of medicine, mathematics, technology, agriculture, economy, engineering and students of sport and physical education.

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

Each survey respondent was approached with possibility of voluntary withdrawal at any time. The improper and under-staffed polls were not taken into account. The survey contained the following questions: year of birth, gender, success in school, place of residence (city, village and suburbs), the family status (both parents, father, mother, with relatives and in boarding school), the economic status, and then the habit of the using of illegal drugs. The students explained that the illegal drugs include: marijuana, ecstasy, amphetamines (LSD), cocaine, heroin, glue and a combination of pills and alcohol.

The survey was conducted by using personal contact with respondents and thus the occurrence of logical errors was avoided. Then the data were computer processed. Statistical analysis was performed in SPSS17. For the statistical analyses absolute numbers and percentages, a Pearson Chi-Square test, Wilcoxon Signed Ranks test and Spearman's correlation test were used ( $p < 0,05$  was statistically significant).

### Results

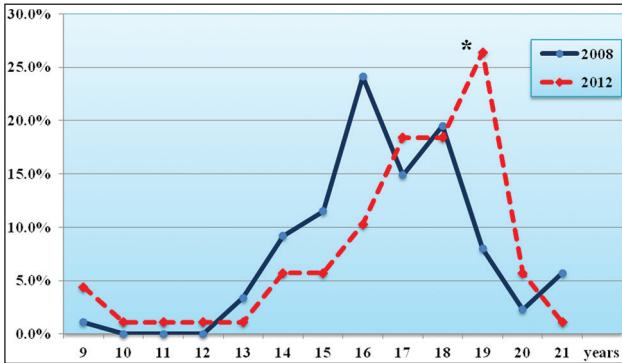
The prevalence of used illegal drugs among students in Novi Sad in both surveys is shown in the Table 1. In both surveys, the males have been using illegal drugs in higher percentage than females, and there was a statistically significant difference between gender ( $p < 0,000$ ).

Table 1. The distribution of illegal drugs usage among students by age

	Yes	Not	Yes	Not
Gender	n %	n %	n %	n %
Males	65 (32,8)*	133(67,2)	68 (35,4)*	124 (64,6)
Females	28 (15,1)	157 (84,9)	29 (16,0)	152 (84,0)
Total	93 (24,3)	290 (75,7)	97 (26,0)	276 (74,0)

\*statistically significant difference of the gender  $p < 0,05$

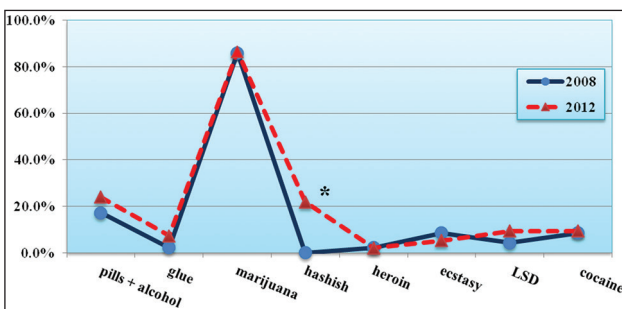
In the first survey, the students often had the first contact with illegal drugs at the age of 16 (24,1%), but in the second survey larger number of respondents made its first contact later, at the age of 19 (26,4%), and there was a statistically significant difference (Figure 1).



Wilcoxon Signed Ranks test \*statistically significant difference  $p < 0,042$

Figure 1. The distribution of the usage of illegal drugs among students by age

Looking at types of illegal drugs, students have been using mostly marijuana, in 86%, and then by combination of pills and alcohol, hashish, LSD, ecstasy, heroin and cocaine. The similar situation **was in** the study in 2012, but in addition to other types of illegal drugs marijuana has been used in a larger percentage. There was statistically significance difference for using hashish between surveys (Figure 2).



Wilcoxon Signed Ranks test \*statistically significant difference  $p < 0,03$

Figure 2. The distribution of consumption of the types of illegal drugs among students

Students usually have used one type of illegal drugs. In the second survey, there were higher prevalence rates of students who have used more than 3 types of illegal drugs and this is a very serious problem (Figure 3).

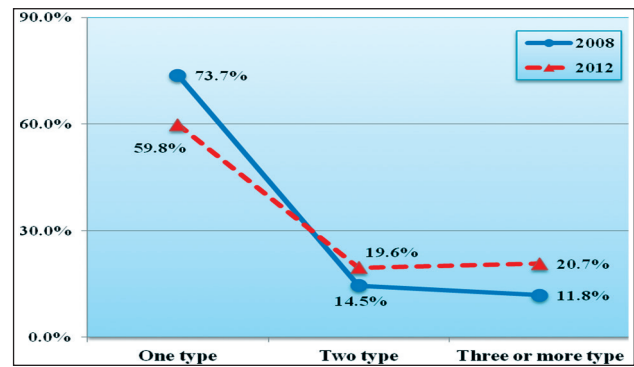
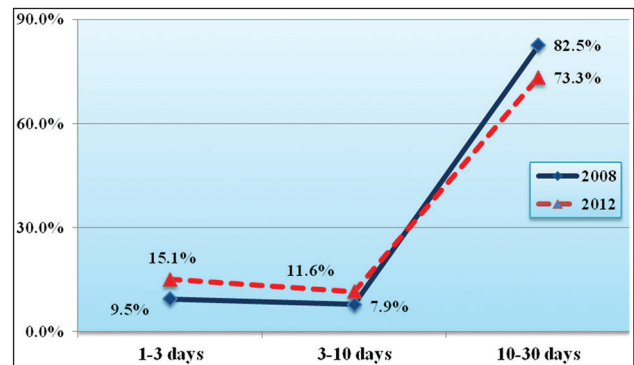


Figure 3. The distribution of respondents by number of types of used illegal drugs

The results of this study show the increase in the prevalence of respondents who have used illegal drugs more than 7 times (from 28% in 2008 to 42% in 2012) and there were statistically significant differences (Figure 4).



Wilcoxon Signed Ranks test \*statistically significant difference  $p < 0,05$

Figure 4. The frequency of usage of illegal drugs among the students

The results of this study show the increase in the prevalence of students who frequently consumed illegal drugs (from 9,5% in 2008 to 15,1% in 2012) (Figure 5).

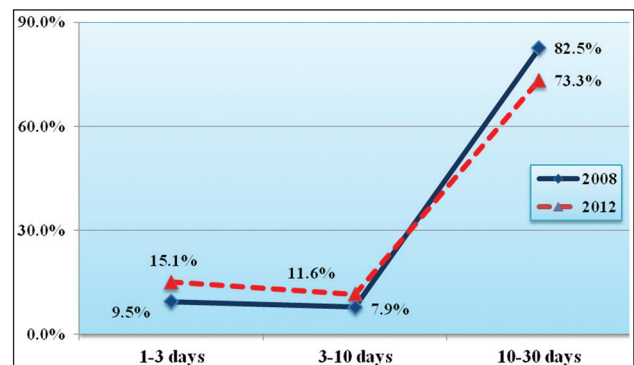


Figure 5. The distribution of respondents according to the last times of using of illegal drugs

The respondents have used illegal drugs in the street (57,1%), in the disco (15,5%), or in the other houses (11,9%), on the travelling (8,3%), at home (7,1%). It was the same in both studies.

We analysed the correlation between the usage of illegal drugs in students and some socio-economic parameters, in both studies. There was a statistically significant correlation between success in school and the usage of illegal drugs. The frequency of the usage of illegal drugs was statistically higher in respondents with poor success at school, so the excellent success is a good protective factor for the prevention of usage of the illegal drugs. There is a negative correlation between family status and the usage of the illegal drugs, so the respondents who live in disturbed families use drugs more frequently.

Students frequently used illegal drugs if they had the best friends who used illegal drugs. There was no statistically significant correlation between economic status and the usage of illegal drugs (Table 2).

*Table 2. Correlation between used illegal drugs and some socio-economic the parameters*

The investigated parameters	Tried illegal drugs	
	2008.	2012.
Success in school	,222**	,204**
Sig.(2-tailed)	,000	,000
Family status	-,104*	-,065
Sig.(2-tailed)	,042	,209
Best friends used illegal PAS	,301**	,333**
Sig.(2-tailed)	,000	,005
Economic status	-,032	,044
Sig.(2-tailed)	,535	,401

**Pearson Correlation;**

\*\* Correlation is significant at the 0,01 level,

\* Correlation is significant at the 0,05 level

## Discussion

In the first decade of the new millennium, an increasing prevalence of using illegal drugs among young people has gained epidemic proportions, with a tendency to increase in the next few years (1,11,12).

Our study shows that illegal drug usage is a widespread and probably expanding epidemic among students in Novi Sad. Boys are more vulnerable in comparison with girl's drug usage. The similar situation is in Italy (11,12).

According to the ESPAD studies (8) male students experiment more often with the illegal drugs than female students, which is the same as in our study. The results of this study have shown that the prevalence of illegal drugs usage among students in Novi Sad has an increasing character (from 24% to 26%) and it is very similar to the studies from Germany (23%). The abuse of illegal drugs is the most frequent in Czech Republic (46%) and lower than in our study is in Croatia (19%), Great Britain (18%) and in Ireland (14%).

We have noticed that students start using illegal drugs later between the age of 16 and the age of 19. According to WHO (2,3) the first data of illegal drugs usage in adolescents appear around the age of 18, which is very similar to our research.

In our study the students usually experiment with marijuana, but there was not difference between genders. Our results are very similar to the results in Russia, Bulgaria, Croatia, Slovakia and Slovenia (8). In the last seventeen years the consumption of marijuana in Novi Sad has an increasing character (from 12% in 1995 (14) to 47% in 2008(10) and now is 80% among students). The average European prevalence of marijuana consumption is 19% (boys more than girls)(8) and it is lower than the prevalence of marijuana usage in Novi Sad. The prevalence of marijuana consumption in Novi Sad is higher than the prevalence of marijuana consumption in Czech Republic 46%, France, Ireland, Swiss and Great Britain 38-40% (8) and in USA (7,15).

On the second place, the most commonly used illegal drugs are amphetamines (LSD) and ecstasy. Young people in Estonia, Germany and Ireland use amphetamines most, but in Czech Republic, Croatia, Estonia, Ireland and Great Britain they use ecstasy most. Our results for ecstasy and LSD consumption are similar to European average, which is 7% (8). Slightly lower prevalence of ecstasy and LSD usage is in USA (4.1%) (7,15). The number of illegal laboratories for production of synthetic substances is growing in the world, because the production is simple and cheap. There is a danger not only of the respective substance, but also of the synthesis and uncontrolled contamination of drugs (11,15). This makes production of synthetic substances relatively cheap and widely available, so possibility of increasing number of



addicts exists, and should be taken into account when planning prevention programs (7).

One of the new trends is combining illegal drugs. It was observed that the mostly used combination is alcohol with medicaments or with marijuana among the young people (17). In the last four years in Novi Sad the prevalence of using more types of illegal drugs has increased (from 12% to 21%) among students.

After using marijuana, most of our respondents used alcohol with pills (24%), which is higher than in the Czech Republic (18%). Significantly lower prevalence (8%) was in neighbouring Croatia (8).

The usage of illegal drugs among students is associated with several factors. The prevalence of using illegal drugs was statistically higher among students whose best friends consume illegal drugs, have poor achievement in school and live in disturbed families. The excellent success presents a good protective factor in the prevention of using illegal drugs as previous research which has been done in this area shows (12,14,18).

Students from disrupted families tend to start consuming illegal drugs later in comparison with students from undisturbed families. Backović mentions that marijuana abuse is more frequent in foster families (38,8%), compared with children from biological families (8,6%) and their first contact was earlier (aged from 11 to 14). Completed families are a protective factor in risky behaviour among young people (17).

Our results have not indicated a statistically significant correlation between the economic status and usage illegal drugs among students, as well as in previous studies (Rakić, 1995) made in these areas (14). The low socio-economic status is also significant predictor of illegal drugs abuse among young people (12,19).

The comparative analysis of our and European research of the usage of illegal drugs suggests that the prevalence rates in our country is similar to many countries in Europe but it is still significantly higher than those in the past.

During the period 2008-2012, following the adoption of strategies of Ministry of Health to combat illegal drugs in Serbia, the expected result was not obtained. The prevalence and frequency of usage illegal drugs is still significantly higher than those in the past.

There is an increasing concern about illegal drugs usage during adolescence, since the brain development during this period is more vulnerable to drug-related deficits (8). At the public health level, the large proportion of adolescents who misuse illegal drugs calls for more effective intervention strategies as well as better perception by politicians and decision makers of the seriousness and complexity of this issue (1,20,21,22,23).

Therefore it is important to implement integrated prevention and control measures. The measures in prevention and controlling must be organized and synchronized, and need to be participated by individuals, families, schools, health services and the society. Education is an important prerequisite for the promotion and preservation of health among young people (10,14).

### Conclusion

A high incidence of illegal drugs was observed among students in Novi Sad. The frequency of usage of illegal drugs shows an upward trend compared with the previous period. Male students were more frequent consumers. Frequently abused illegal drugs were marijuana, pills and alcohol in combination, cocaine and amphetamines. These results indicate the necessity of primary prevention and organized, comprehensive and preventive activities among adolescents and students.

### Acknowledgements

We are grateful to all the students who participated in this study. The authors have no conflicts of interest that are directly relevant to the content of this manuscript

## References

1. Michaud PA, Berchtold A, Jeannin A, Chossis I, Suris JC. Secular trends in legal and illegal substance use among 16–20-year-old adolescents in Switzerland. *Swiss Med Wkly*.2006; 136: 318–326.
2. HEALTH 21. *The health for all policy framework for the WHO European Region*. WHO Regional Office for Europe, Copenhagen, *European Health for All Series No.6*. 1999.
3. Rakić D, Petrović Đ. *Health of Children and Adolescents - A Handbook for health monitoring and improving the health of children and adolescents*. Novi Sad: 2006. p.11-50; p. 57-151.(Serbian)
4. Hall W, Doran C, Degenhardt L, Shepard D. *Illicit opiate abuse*. In: *Disease Control Priorities in Developing Countries*. 2nd edition. New York: Oxford University Press, 2006.
5. Vicente J, Wiessing L. *European Monitoring Centre for Drugs and Drug Addiction annual report 2007: positive assessment of HIV in IDUs though hepatitis C still very high*. *Euro Surveill*. 2007; 12(47).
6. Parry CDH, Plüddemann A, Myers BJ. *Cocaine treatment admissions at three sentinel sites in South Africa: findings and implications for policy, practice and research*. *Subst Abuse Treat Pr*. 2007; 2(32): 2-8.
7. Danice K, Eaton, Laura Kann, Steve Kinchen, Shari Shanklin, James Ross, Joseph Hawkins. *Youth Risk Behavior Surveillance-United States, 2009*. *MMWR, Surveillance Summaries 2010; Vol. 59. No. SS-5*.
8. Hibell B, Guttormsson U, Ahlström S, Balakireva O, Bjarnason T, Kokkevi A, et al. *Substance Use Among Students in 35 European Countries. The 2007. ESPAD Report; 2009*.
9. *Serbian Ministry of Health and Public Health Institute of Serbia "Dr Milan Jovanović Batut"*. *European research on the use of alcohol and other drug use among young people in Serbia*. Beograd: 2009 (Serbian).
10. Rakić D, Rakić B, Stojšić Đ, Jakovljević Đ. *Risky behaviour among youth in Novi Sad and the world*. Nedeljković SI, editor. *The Yugoslav Study of the Precursors of Atherosclerosis in School Children*; Beograd: Faculty of Medicine; 2011. p.1062-72. (Serbian).
11. Molinaro S, Siciliano V, Curzio O, Denoth F, Salvadori S, et al. *Illegal Substance Use among Italian High School Students: Trends over 11 Years (1999–2009)*. *PLoS ONE*. 2011; 6(6):e 20482.
12. Pavlović Z, Jakovljević B. *Frequency and risk factors of the use of psychoactive substances among the young*. *Vojnosanit. Pregl*. 2008; 65(6): 441–448. (Serbian)
13. Dimitrijević I. *Synthetic drugs*. Niš: Galeb; 2003. (Serbian)
14. Rakić Dušica. *Smoking, alcohol drinking and physical activity among school children and adolescents (dissertation)*. Novi Sad: Faculty of Medicine;1996. (Serbian)
15. CDC. *Youth Risk Behavior Surveillance-United States, 2009*. *MMWR June 4, 2010; 59 (No.SS-5): 1-142*.
16. Bokan D, Bokan D, Rakić D, Budakov N. *Consumption of psychoactive substances and energy drinks among students of the University of Novi Sad*. *South Eastern Europe Health Sciences Journal (SEEHSJ)*. May 2012; Vol. 2, Number 1,:38-43
17. Dušan Backović, Miloš Maksimović, Dejan Stevanović. *Psychosocial risk factors and substance abuse in adolescents*. *Vojnosanit. Pregl*. 2007;64(5):331–336. (Serbian).
18. Stojadinović A. *Protective and risk factors for engagement of adolescents in risky behaviors: smoking, drinking and drugs use (dissertation)*. Novi Sad: Faculty of Medicine; 2004.(Serbian)
19. Galea S, Nandi A, Vlahov D. *The social epidemiology of substance use*. *Epidemiol Rev* 2004; 26: 36–52.
20. Beauvais F, Jumper-Thurman P, Helm H, Plested B, Burnside M. *Surveillance of drug use among American Indian adolescents: patterns over 25 years*. *Journal of Adolescent Health*.2004; 34: 493–500.
21. De Preux E, Dubois-Arber F, Zobel F. *Current trends in illegal drug use and drug related health problems in Switzerland*. *Swiss Med Wkly*.2004; 134: 313–321
22. Turnbull PJ. *The great cannabis classification debacle: what are the likely consequences for policing cannabis possession offences in England and Wales?* *Drug Alcohol Rev*. 2009; 28: 202–209.
23. De Preux E, Dubois-Arber F, Zobel F. *Current trends in illegal drug use and drug related health problems in Switzerland*. *Swiss Med Wkly*.2004; 134: 313–321.

Corresponding Author  
Milena Mikalacki,  
Faculty of Sport and Physical Education,  
University of Novi Sad,  
Novi Sad,  
Serbia,  
E-mail: