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The prevalence of substance use among adolescents and its correlation with social and demographic factors

Rasprostranjenost upotrebe psihoaktivnih supstanci kod adolescenata i njena povezanost sa sociodemografskim faktorima

Dušica B. Rakić*, Branislava Rakić*, Zoran Milošević†, Ivan Nedeljković‡

***Faculty of Medicine, †Faculty of Sport and Physical Education, University of Novi Sad, Novi Sad, Serbia; ‡Health center "Dr Cvjetković", Novi Sad, Serbia**

Abstract

Backround/Aim. Adolescence is the period of greatest risk of starting to use substances: cigarette smoking, alcohol and illicit drugs. In the first decade of this millennium substance use among adolescents has increased. The aim of this study was to explore the prevalence of substances use among adolescents and its correlation with social and demographic factors. **Methods.** The study was conducted among adolescents in Novi Sad during 2010–2011 and included 594 conveniently selected adolescents (275 male and 319 female), aged 15–19 years. A special questionnaire was used and statistical analysis performed in SPSS17. The correlation between parameters was evaluated by the Pearson correlation method and frequency differences were analysed using χ^2 test and starting level was $p < 0.05$. **Results.** The prevalence of substance use was statistically higher in males. Cigarettes were smoked daily by 21.45% males and 15.67% females ($p < 0.01$), alcohol was consumed by 81.6% males and 69.11% females ($p < 0.001$) and illicit drugs were used by 13.65% males and 8.30% females ($p < 0.05$). There was a positive correlation between smoking cigarettes and alcohol consumption, but negative between smoking cigarettes and the use of illicit drugs ($p < 0.01$). The prevalence of substance use was statistically higher among adolescents with poor achievement in school ($p < 0.01$), who lived in a broken home (illicit drugs $p < 0.01$) and who had more pocket money (cigarette smoking $p < 0.01$, and alcohol consumption $p < 0.5$). **Conclusion.** Stable family, lower amount of pocket money weekly and good school performance are protective factors in prevention of substances use among adolescents.

Key words:
substance related disorders; adolescent; smoking; alcohol drinking; street drugs; risk factors.

Apstrakt

Uvod/Cilj. Adolescencija je period najvećeg rizika za početak upotrebe psihoaktivnih supstanci: pušenje cigareta, konzumacije alkohola i nezakonitih droga. U prvoj deceniji novog milenijuma zapažen je porast upotrebe psihoaktivnih supstanci kod adolescenata. Cilj rada bio je utvrđivanje prevalencije upotrebe psihoaktivnih supstanci kod adolescenata i povezanost sa sociodemografskim faktorima. **Metode.** Istraživanje je sprovedeno među adolescentima u Novom Sadu, tokom 2010–2011. godine, i uključilo je 594 adolescenta (275 muških i 319 ženskih), uzrasta 15–19 godina. Korišćen je anketni upitnik, specijalno sastavljen za ovo istraživanje. Statistička obrada rađena je u SPSS17. Povezanost parametara procenjivana je metodama korelacije po Pirsonu, a razlike frekvencija ispitane su pomoću χ^2-testa. Početni stepen statističke značajnosti bio je $p < 0,05$. **Rezultati.** Rasprostranjenost upotrebe psihoaktivnih supstanci bila je statistički veća kod muškog pola. Cigarete je pušilo 21,45% muških i 15,67% ženskih ($p < 0,01$), alkohol konzumiralo 81,6% muških i 69,11% ženskih ($p < 0,001$) i nezakonite droge koristilo 13,65% muških i 8,30% ženskih ispitanika ($p < 0,05$). Postojala je pozitivna korelacija između pušenja cigareta i konzumiranja alkohola, a negativna kod korišćenja nezakonitih droga ($p < 0,01$). Učestalost upotrebe psihoaktivnih supstanci bila je statistički veća kod adolescenata koji imaju lošiji uspeh u školi ($p < 0,01$), žive u poremećenim porodicama (pušenje cigareta $p < 0,5$, nezakonite droge $p < 0,01$) i imaju veći nedeljni džeparac (pušenje cigareta $p < 0,5$; konzumiranja alkohola $p < 0,01$). **Zaključak.** Stabilna porodica, mali nedeljni džeparac i odličan uspeh u školi su protektivni faktori u prevenciji upotrebe psihoaktivnih supstanci kod adolescenata.

Ključne reči:
poremećaji izazvani supstancama; adolescenti; pušenje; alkohol, pijenje; ulični lekovi; faktori rizika.

Correspondence to: Dušica Rakić, Faculty of Medicine, University of Novi Sad, 21 000 Novi Sad, Serbia. Phone: +381 64 125 8384.
E-mail: rakic.dusica@gmail.com

Introduction

Adolescence is a transition from childhood to adulthood. This is a period of intensive biological growth and sexual, emotional and psychosocial maturation. In this period they want to identify themselves, to experiment, to try out certain behaviours, because of curiosity, desire to imitate someone or self-assertion. Vast majority of adolescents consider starting smoking and drinking alcohol as a reflection of maturity [1–4]. In this period adolescents are prone to risky behaviour. The most common risky behaviour among adolescents is substance use: smoking cigarettes, alcohol consumption and illicit drugs use.

Numerous international studies direct attention to the significant prevalence of substance use: smoking, alcohol consumption and illicit drugs use among adolescents in the first decade of this millennium [5, 6].

Data on the prevalence of substance use among adolescents is very diverse and difficult to follow because of the different research methodologies.

In Europe, the European School Survey Project on Alcohol and Other Drugs (ESPAD) study has been conducted every four years since 1995 in 39 European countries. The ESPAD study controls the frequency of smoking, alcohol and illicit drugs use. Serbia was included in this study in 2005, which is understandable because of political and social events proceeding that period [7, 8]. Monitoring of the incidence of substance use among adolescents has been carried out in the United States of America (USA) since 1975 using the long-term and comprehensive Monitoring the Future (MTF) [9] study, supported by the U.S. National Institutes (NIDA). Another national study Young Risk Behaviour Survey (YRBS) has been conducted since 1991 in the USA [10].

The researches have shown that the trend of prevalence of cigarette smoking is decreasing among adolescents since 1999. It is significantly lower nowadays than in the past. The studies of alcohol use among young people have shown that alcohol use is increasing, especially in developing countries [7, 9, 10]. The prevalence of illicit drug use had an increasing trend from 1991 to 2003 and was followed by a slight decline from 2007 to 2011 in many European countries[7]. However, in the USA the prevalence of illicit drug use is still slightly increasing [9].

Complete and stable families can play a positive role in terms of prevention of risky behaviour among young people [1]. Alienation and non-communication in the family have a great impact on the occurrence of risky behaviour among adolescents. The families are usually unaware of the presence of a problem related to risky behaviour, whether it is connected with alcohol consumption, smoking or use of illicit drugs, until a conflict occurs at school or with the police [2].

Social and economic changes occurring after the collapse of former Yugoslavia resulted in the appearance of social pathology. The appearance of substance use is increasing, especially the consumption of illicit drugs during the last few decades. The researches have shown that the use of illicit drugs increased dramatically over the last decade [1, 8, 11].

Substance abuse moves towards younger ages, and the addiction increases. Because of that, it would be very important to conduct a comprehensive epidemiological study which would provide guidelines for organized and efficient prevention.

The fact that this issue has not been sufficiently explored either in the foreign or in domestic literature encouraged us to explore the prevalence of risky behaviour and its connection with social and demographic conditions. Thus, the aim of this study was to explore the prevalence of substance use among adolescents and its correlation with social and demographic factors.

Methods

This cross-sectional survey was conducted in the period from 2010 to 2011, approved by the Ethical Committee of the University of Medicine in Novi Sad.

The study included adolescents aged 15–19 years, conveniently selected in three secondary schools in Novi Sad during one regular school class period. All the participants were informed about the purpose of the survey (participation was voluntary and anonymous). The survey was administrated through personal contact with respondents and, thus, the occurrence of logic errors was avoided.

The original questionnaire designed for collecting the research data was modelled on a questionnaire about the substance use among adolescents in the Countrywide Integrated Noncommunicable Diseases Intervention Programme (CINDI), which was used in earlier studies in Novi Sad [12, 13].

Each questionnaire had an identification number, ranging from 1 to 600. Improper and under-staffed polls were not taken into account. The response rate to questionnaires distributed was 98.9% (594–275 male and 319 female), with only 1.01% (6) rejected.

The questionnaire contained 15 questions divided into three parts. The first part of the questionnaire contained general questions: year of birth and gender.

The second part contained questions that assessed the social and demographic factors: success in school, place of residence (city, village and suburbs), the family status (living with parents, with single father, with single mother, with relatives or in a boarding school), the economic status (the amount of pocket money weekly). The third part of the questionnaire contained questions related to the assessment of the prevalence of substance use: smoking cigarettes, drinking alcohol and using illicit drugs.

For cigarette smoking, the respondents were asked if they smoke (never, sometimes, every day) and how many cigarettes they smoke daily (0, 1–5, 6–14 or more than 15).

On alcohol, the respondents were also asked two questions. In the first question, they were asked if they drink alcohol, and the answers given were never, sometimes, 3–4 times a month or every day. They were also asked about the type of alcohol they drink the most (wine, beer, etc.).

On drugs, the respondents were asked five questions. Firstly, the respondents were asked whether or not they have tried it at least once during their lifetime. It was examined

how many types of drugs they have tried (the answers given were one, two or three or more). The frequency of illicit drug consumption was measured (once, not more than 7, more than 7). The respondents were asked about first-time use of illicit drug (they were to write the answer on their own). The adolescents were instructed that the illicit drugs include: marijuana or hashish, inhalants (glue), ecstasy, amphetamines (LSD), cocaine, heroin and a combination of pills (sedatives and analgesics, without doctor`s prescription) with alcohol.

The data was computer processed. Statistical analysis was performed in SPSS17. For statistical analyses absolute numbers and percentages, a Pearson χ^2 test and correlation test were used ($p < 0.05$ was statistically significant).

Results

The prevalence of smoking cigarettes among adolescents in Novi Sad is shown in Table 1. There was a statistically significant difference, in terms of daily smoking, between boys and girls ($\chi^2 = 10.55$ $p < 0.01$).

In relation to the number of cigarettes smoked *per* day most girls (41.33%) smoked 6 to 14 cigarettes a day, while the highest percentage of boys (39.47%) smoked over 15 cigarettes, which represents a significant risk for cardiovascular diseases.

Consumption of alcohol was the most common risky behaviour in adolescents, because 74% consumed alcohol occasionally or frequently. Boys consumed alcohol more frequently, and the differences between genders were statistically significant ($\chi^2 = 23.84$, $p = 0.000$) (Table 1).

Girls usually drunk wine (31.69%) and boys usually drunk beer (37.37%). Both genders drunk hard liquor in the same percentage (27.6%).

Male respondents used illicit drugs more often than female and the differences by gender were statistically significant ($\chi^2 = 7.545$, $p = 0.006$) (Table 1).

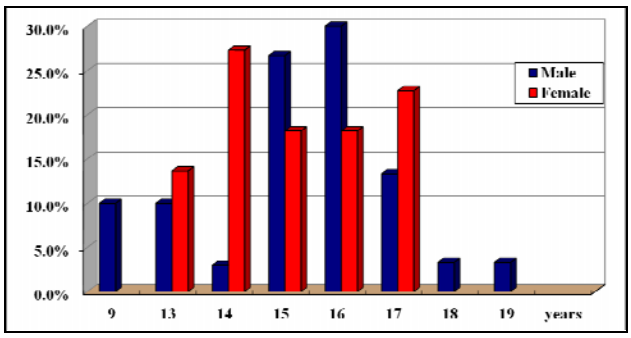

Fig. 1 – Distribution of illicit drugs first-time use according to age and gender.

Observed by the types of illicit drugs, adolescents used mostly marijuana or hashish in 9%, followed by a combination of pills and alcohol, cocaine, LSD and ecstasy. There was no statistically significant difference in types of illegal PAS by gender (Table 2).

Table 2

Distribution of the types of illicit drugs used among adolescents by gender

Substance of abuse	Patients (%)	
	male	female
Marijuana, hashish	12.7	5.9
Pils+alcohol	2.5	1.3
Ectasy	1.5	0.6
LSD	1.5	0.6
Inhalats-glue	1.1	0.0
Heroine	0.7	0.3

Adolescents usually used one type of illicit drugs (59.18%), 18.37% used two types of illicit drugs, but it was a very disturbing fact that 22.45% used more than three illicit drugs.

Table 1

The prevalence of smoking cigarettes, alcohol consumption and lifetime use of illicit drugs

Gender	Male	Female	Total
	n (%)	n (%)	n (%)
Smoking cigarette			
never	200 (72.72)	228 (5.82)	428 (72.05)
sometimes	16 (5.82)	41 (12.85)	57 (9.95)
every day	59 (21.45)**	50 (15.67)	109 (18.35)
Alcohol consumption			
never	46 (18.78)	97 (30.99)	143 (25.63)
sometimes	152 (62.04)	194 (61.98)	345 (62.01)
3–4 times a month	31 (12.65)**	18 (5.75)	49 (8.78)
every day	16 (6.53)**	4 (1.28)	20 (3.58)
Lifetime used illicit drugs			
never	215 (86.34)	287 (91.69)	502 (89.32)
yes	34 (13.65)*	26 (8.30)	60 (10.67)

****$p < 0.01$; *$p < 0.05$.**

A great majority of girls used illicit drugs for the first time at the age of 14 (27.27%). Some boys used illicit drugs for the first time at the age of 9 (10%) but a great majority of boys did that later, at the age of 16 (30.00%) (Figure 1).

The highest percentage of respondents used illicit drugs only once (48.33%), but 25% used them more than 7 times. There were no statistically significant differences between genders ($\chi^2 = 2.41$, $p > 0.05$).

Considering the number of substance used, one in four adolescents (24.77%) used none of the substances that were a health risk (never smoked cigarettes, never consumed alcohol, and never tried illicit drugs). Among them there was a statistically significant prevalence of females ($\chi^2 = 5.94$, $p < 0.05$). Every second adolescent (48.30%) used at least one substance (either smoked cigarettes, or consumed alcohol, or used illicit drugs), with males having statistically significant higher frequency of one substance used than females ($\chi^2 = 4.41$, $p < 0.05$). There were 19.96% respondents using two substances, and 6.95% using all the three substances (smoking cigarettes, consuming alcohol and using illicit drugs). The differences between genders were not statistically significant (Figure 2).

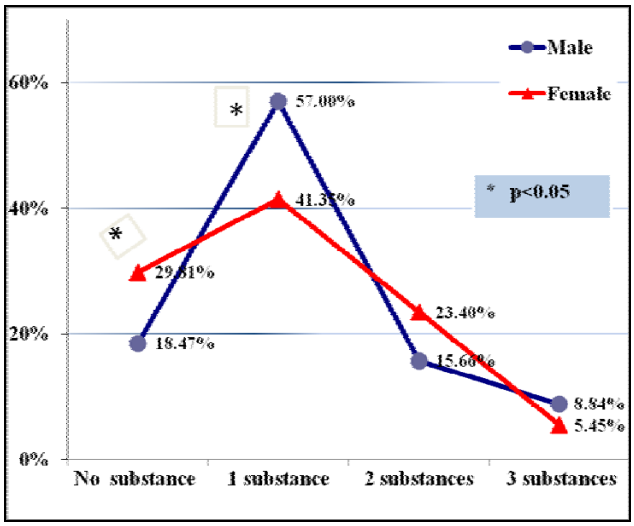

Fig. 2 – Distribution of adolescents according to the number of substances used by gender.

There was a positive correlation between smoking cigarettes, alcohol consumption, and smoking marijuana, but negative between those three and use of other illicit drugs. Those adolescents who smoked cigarettes drunk more alcohol and smoked marijuana frequently. The adolescents who took illicit drugs (except marijuana) smoked and drunk alcohol less frequently (Table 3).

We analysed the correlation between substances use: smoking cigarettes, alcohol consumption, and lifetime use of illicit drugs in adolescents and some social and demographic factors. There was a statistically significant correlation between success at school and the prevalence of substance use. The frequency of substance use was statistically higher in children with poor success at school, so that excellent success at school was a good protective factor for the prevention of substance use. Place of residence (city, village, suburbs) had no effect on the development of substance use. There was a correlation between the family status and smoking of cigarettes, alcohol consumption and lifetime use of illicit drugs. Children who lived in broken homes were more prone to substance use. In relation to the higher economic status there was a statistically significant association with smoking cigarettes and consumption of alcohol, but not with lifetime use of illicit drugs. Significantly more smokers and drinkers were found among those who had much pocket money. Within our respondents the use of illicit drugs was not dependent on the amount of weekly pocket money (Table 4).

Discussion

From all the forms of risky behaviour in adolescence, smoking cigarettes, consumption of alcohol and use of illicit drugs particularly stand out, because of the frequency and the degree of prevalence of use, and because of their impact on youth development in this sensitive stage of growing up [14].

Our results of the prevalence of smoking among adolescents are higher than in the previous studies (2008) in the regional centres in Serbia: Novi Sad (25%), Belgrade (22%), Niš (18.9%) [8] and Kragujevac (21%) [15].

Prevention of smoking among adolescents is a key factor for reducing morbidity and mortality caused by (or associated with) smoking [1, 16, 17], and in many developed countries it has a very important place.

The trend of decreasing prevalence of smoking was been reported in Serbia in the period 2006–2012 from 25.5% [18] to 20% [7]. This trend is a result of implementation of

Table 3

Correlation of lifetime use of illicit drugs with smoking of cigarettes and alcohol consumption

The investigated parameters	Smoked cigarettes	Drinks alcohol
Smoked cigarettes		371**
Drinks alcohol	371**	
Lifetime use of marijuana	0.473**	0.720**
Lifetime use of illicit drugs	-0.415	-0.423**

****Correlation significant at the 0.01 level (Pearson correlation).**

Table 4

Correlation between smoking, alcohol consumption, lifetime use of illicit drugs and social and demographic factors

The investigated parameters	Smoking of cigarettes	Alcohol consumption	Use of illicit drugs
Success in school	-0.236**	-0.211**	0.237**
Place of residence	0.019	0.064	-0.002
Family status	0.094*	0.072	-0.138**
Economic status	0.154**	0.098*	-0.063

*** $p < 0.05$ level**; $p < 0.01$ level (Pearson correlation).**

intensive measures to prevent smoking, including the introduction of statutory ban on smoking in public places [19].

The European average prevalence of smoking among adolescents is 28% (ESPAD study, 2011), which is the same as in our results. A higher prevalence of smokers has been reported in Croatia, Austria, Bulgaria, Czech Republic and Lithuania (38–45%). Bosnia and Herzegovina, Norway, Albania, Montenegro, and Iceland have a lower prevalence of smokers (10–19%) [7].

The ESPAD study shows that the prevalence of cigarette smoking is increasing in many developing countries, while it is declining in developed countries [7].

The trend of decreasing prevalence of smoking was also reported in the USA (MTF study and YRBS study) in the period between 1999 and 2011 from 35% to 18% [9, 10].

The Global Youth Tobacco Survey (GYTS) [20] has shown that the prevalence of smoking among adolescents is higher for boys (28%) than for girls (18%). Our results show that more boys than girls smoke cigarettes daily, while occasional smoking has no significant difference by sex. In many developed European countries the prevalence of smoking among girls exceeds that among boys, but in underdeveloped countries the prevalence is higher among boys than among girls [7, 20].

Alcoholism is one of the most common diseases in modern population. Consumption of alcohol represents one of the most widespread types of risky behaviour among adolescents in our country and in many countries around the world with increasing character.

According to the earlier survey for Serbia, the percentage of adolescents who consume alcohol in the regional centres: Novi Sad (90.7%), Belgrade (90.6%), Niš (87.9%) [8] was significantly higher than in our study.

The results of YUSAD study in Novi Sad (1995–2008) indicated an increasing trend of prevalence of alcohol consumption among adolescents, from 65% to 74% [16] and our results are similar.

Our results show a lower prevalence of occasional alcohol consumption than the one in Europe (average in Europe is 79%). Our prevalence is similar to those in Sweden, Romania (71–74%) [7] and the USA (71%) [9, 10]. A higher prevalence has been noted in two thirds of ESPAD countries (82–93%). A lower percentage of adolescents who consume alcohol have been noted in Sweden, Montenegro Norway, Albania, and Iceland (65–43%) [7].

In comparison to gender structure in most European countries, where the research was made, boys more frequently consume alcohol than girls, which is the same as in our results, but different from three countries in Europe (Iceland, Latvia and Sweden) [7] and also different from studies in the USA where girls consume alcohol more frequently [10].

Many of the adolescents have lifetime use of illicit drugs only once or twice, while others use such drugs more often. In the previous survey in the regional centres in Serbia (2008) [8], 15.1% of adolescents (age 15–19) used illicit drugs at least once in their lifetime (17.2% in Belgrade, 15.8% in Novi Sad and 14% in Niš). Our results show a significantly lower prevalence of lifetime use of illicit drugs among adolescents.

The European average in lifetime use of illicit drugs (18%) [7] is higher than the prevalence in our research. A significantly higher prevalence was found in two-thirds of the ESPAD countries (19–43%) [7] and in the USA (43%) [9, 10]. Serbia (on average, 8%) is among the European countries with the lowest prevalence of lifetime use of illicit drugs (5–9%) [7].

In more than two-thirds of the ESPAD countries significantly more boys than girls (21% boys and 15% girls) try illicit drugs at least once in their lifetime [7].

The adolescents usually experiment with marijuana (boys more often than girls) [7, 8, 21], as well as in our study. In the earlier studies in Serbia there was a reduction in lifetime prevalence of marijuana among adolescents from regional centres (Belgrade, Niš, Novi Sad) from 12.9% to 7.3% in 2008 [21]. Our results show a slightly higher prevalence in lifetime use of marijuana (9%).

The average European prevalence of marijuana consumption is 17% [7] and it is higher than the prevalence of marijuana use in our research and in Serbia [7] (average 7%). The lowest prevalence of marijuana use is in Montenegro, Norway, Bosnia and Herzegovina, Albania (4–5%) and the highest prevalence is in the Czech Republic, France, Monaco (39–40%) [7] and the USA (40%) [9, 10].

Our results show that the highest percentage of adolescents used illicit drugs for the first time between 14 and 16 years, which is similar to the results of Backović et al. [2], Kosić et al. [21].

Our respondents use cocaine, LSD and ecstasy which is similar to the results of the earlier study in Serbia (1.5%) [21], but is lower than the European average which is 3% [7] .The higher prevalence is reported in the USA (4.1%) [9, 10].

Our results indicate that adolescents usually try only one type of illicit drugs (60%), which is more than the European average (18%) [7] but the fact that 22% of adolescents try more than three illegal drugs is not insignificant. In the Czech Republic, France and Monaco, 10% adolescents use illicit drugs 20 times or more [7].

One of the new trends is combining alcohol with different illicit drugs. It is observed that the most common combination is alcohol with pills (sedatives and analgesics without doctor's prescription) or with marijuana among the young people [2]. In an earlier survey in Serbia prevalence of using alcohol with pills was 2.7% [8]. The our respondents use alcohol with pills in 3.36%, which is slightly lower than the European average (5%). The higher prevalence exists in the Czech Republic (16%), and relatively large rates (10%) are also found in Croatia, Hungary, while only 1–2% is found in Belgium, Bosnia and Herzegovina, Iceland, Montenegro, Norway and Ukraine [7].

The results of the ESPAD [7] study in Serbia show a lower prevalence of substance use than indicated by our results, because they covered only adolescents aged 15–16 years.

Cigarette smoking is often associated with the use of other substances, so it is estimated that young people who smoke, consume alcohol three times more and consume

marijuana eight times more than the ones who are non-smokers [2, 11, 22, 23].

Some recent studies confirm that alcohol, marijuana and illicit drugs consumption among young people are connected [24]. Our research demonstrates a connection between smoking and alcohol consumption and using marijuana. Specifically, it was shown that adolescents who consume alcohol and smoke cigarettes more frequently use marijuana. This data is consistent with the results of Slater et al. [25] and Faeha et al. [26] who showed that young people usually use different types of substances.

The results of a meta-analyse [27, 28] indicate that the effect of quitting smoking increases the likelihood of abstinence from alcohol and illicit drugs on average to 25%.

Our results indicate that the adolescents are endangered by the substance use, because 7% of respondents use three substances (smoking cigarettes, drinking alcohol and consuming illicit drugs). One in five adolescents use two substances, regardless of gender and every second adolescent (more boys) uses one substance. Only one quarter of adolescents (more girls) do not use any substance. Due to the lack of data available in the literature, which would include three substances used by adolescents comparisons were not carried out.

The prevalence of substance use among adolescents is associated with several social and demographic factors. The frequency of substance use is higher in adolescents with poor scholarly success. Success at school represents a good protective factor in the prevention of substance use as shown also in the previous research which has been done in this area [4, 12].

Our results show a positive correlation between family status and the use of substances. This implies that stable families are a protective factor in prevention of substance use among young people which is similar to the results of the other authors. Problems in the family, a single parent, divorced parents or living in a foster family represent significant predictors of drug abuse among young people. Adolescents from dysfunctional families tend to start consuming illicit drugs and alcoholic beverages and to drink at earlier age in comparison to adolescents from functional families. Children who grow up in foster families use marijuana more often (38.8%), compared to children from biological families (8.6%) and their first-time-used was earlier (aged between 11 and 14) [29–31]. In contrast, positive, intimate relationships between parents and adolescents are associated with decreased risk of smoking cigarette and alcohol consumption [32].

Our results indicate a statistically significant correlation between the amount of pocket money that adolescents get weekly and smoking cigarettes and alcohol consumption, just as in previous surveys (1995) made in these areas [12]. Low social and economic status is also a significant predictor of illicit drugs abuse among young people [33].

Substance abuse is going towards younger ages and addiction to substance use increases. Therefore it is very important to conduct a comprehensive epidemiological study which would give guidelines for organized and efficient prevention. Measures to prevent and control risk have to be organized and synchronized, and they need to include individuals, families, schools, health services and society. It is particularly important to find a solution for those problems.

Education is proved to be the best way to encourage young people to resist the risky behaviour and to adopt positive lifestyle behaviour. Education is an important prerequisite for the promotion and preservation of health among young people [10, 11, 16].

Prevention activities should be carried out from the early childhood, at all levels of society, simultaneously and continuously. This is the only way to stop spreading of the epidemic of the new century, and of all health and social consequences that it brings.

Conclusion

The prevalence of substances use among adolescents is very high. One third of adolescents smoke cigarettes, two thirds drink alcohol occasionally, and one in ten uses illicit drugs.

Stable family, lower amount of pocket money weekly and good school performance are protective factors in the prevention of substance use among adolescents.

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