

MEDICAL USE, NONMEDICAL USE OF PRESCRIPTION MEDICATION AND RISK BEHAVIOUR AMONG CROATIAN ADOLESCENTS

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SUMMARY

Background: At the drug scene some major shifts were observed, more and more reports highlighted the abuse of prescription medication. Despite the importance of controlled medication in treatment child and adolescent disorders, this increase may be a factor which influence misuse and nonmedical use of prescribed drugs among adolescents.

Subject and methods: Croatian data from ESPAD survey in 2003, 2007 and 2011 were used, and variables selected from the international ESPAD questionnaire. Dependent variable was taking tranquilizers or sedatives prescribed by doctor in the past 12 months. Independent variables were nonmedical use of tranquilizers/sedatives, use of other psychoactive substances, school performance, truancy, delinquent behaviour, satisfaction with relationships with parents, friends, health, self-perception, financial situation and symptoms of depression. The respondents were 8849 students (4393 boys and 4456 girls) in three consecutive ESPAD surveys (2003, 2007 and 2011).

Results: In multivariate analysis for all three survey years the strongest predictor for prescription medication use was use of sedatives/tranquilizers without prescription (OR 6.14; CI 4.08-9.23; OR 8.16; CI 4.65-14.32; OR 9.77; CI 5.92-15.13). Frequent drinking and excessive drinking or drunkenness also predicted prescription medication use, (OR 1.85; CI 1.10-3.10; OR 2.01; CI 1.20-3.39). Among other problem behaviours lower school performance (OR 2.92; CI 1.41-6.05; OR 2.56; CI 1.12-5.87), missed school days OR 1.59; OR 1.01-2.51; OR 1.72; CI 1.03-2.87), aggressive behaviour (OR 1.532; CI 1.01-2.28; OR 1.65; CI 1.04-2.62), depressive symptoms (OR 2.19; CI 1.24-3.85) and poorer financial situation were connected with prescription medication use.

Conclusion: Prescription use of tranquilizers/sedatives was predicted by nonmedical tranquilizers/sedatives use, alcohol abuse, symptoms of depression and variables indicating maladjusted behaviour. Although there is sufficient evidence that prescription medication abuse might went unobserved, the further analysis which could better explain its' role and impact is still needed.

Key words: prescription medication use - substance abuse- depression - aggressive behaviour - adolescence

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INTRODUCTION

Drug abuse among adolescents is still a constant and great worry for parents, schools and society. Over 80 million adults, or almost a quarter of the adult population in the European Union, are estimated to have tried illicit drugs at some point in their lives. The most commonly used drug is cannabis (78.9 million), with lower estimates reported for the lifetime use of cocaine (15.6 million), amphetamines (12.0 million) and MDMA (12.3 million). Levels of lifetime use differ considerably between countries, ranging from around one-third of adults in Denmark, France and the United Kingdom, to 8% or less than one in 10 in Bulgaria, Romania and Turkey (EMCDDA 2015).

The trend in prevalence of substance use among adolescents is going upward, especially observed in the past decade. Young people have access to an increasingly wide range of substances and are using them in combination with alcohol. New and changing patterns of psychoactive substance use present a particular challenge for policymakers to develop an appropriately wide and timely range of responses for effective action (Poulin & Elliot 1997).

The majority of young people in the EU have never used illicit drugs but, among those who have, cannabis is the most frequently used drug. In general, the likelihood of young people getting drunk or being offered cannabis, or other illicit drugs, as well as their willingness to try drugs, increases sharply with age. 'Curiosity' is usually given as the main reason for trying drugs. On the whole, males generally use more drugs and alcohol than females but the gap is narrowing for binge alcohol consumption (EMCDDA 2008).

At the drug scene in the developed countries, some major shifts are observed. More and more reports are highlighting the abuse of prescription medications. It is important to stress that pharmaceuticals are often more available to young people than illicit drugs, because they can be obtained from the medicine cabinet at home, very often just within reach. In addition, prescription drugs are perceived as safe when compared with street drugs – they are legal, prescribed by doctor and approved by the agencies. The unsupervised accessibility of the prescribed drugs for adolescents at home is, according to Ross-Durow's findings, surprisingly high. The investigation within a cohort of 500 adolescents revealed that 73.7% of adolescents, whom the medications were

recently prescribed, report unsupervised access to them at home (Ross-Durrow et al. 2013). Over the past decades the prescribing of controlled medication (sleeping, pain, anxiety, stimulant) has been increasing in United States. These medications are considered medically sound and efficacious in treating wide range of childhood and adolescent disorders (Wong et al. 2004).

In Europe, among 15- to 16-year-old school students, lifetime prevalence of the use of 'tranquillisers or sedatives without a doctor's prescription' ranged from 2% to 15% in the 24 EU Member States and Norway in ESPAD surveys in 2011, with six countries reporting prevalence levels of 10% or more (Hibell et al. 2012). Study published in 2008 revealed that more than 8 million American children and adolescents take one or more psychotropic drugs to treat some mental issues as bipolar disorder, ADHD or behavioural problems without clear diagnosis (Parens & Johnson 2008).

Many of the drugs may have short- and long-term negative effects on physical growth, brain development, behaviour, mood and cognitive function, of what the researcher just do not know enough (Tishler & Reiss 2012). Despite the importance of controlled medication in treatment child and adolescent disorders, adverse effect of this increase may be a rise in the misuse and nonmedical use of controlled medications among adolescents. McCabe found that the past-year medical use prevalence for at least one of four prescribed controlled medication classes (stimulants, pain, sleeping and anxiety) was 18% and was higher among females than males. Medical misusers were significantly more likely to report other substance abuse behaviour and to be engaged in binge drinking, cigarette smoking and marijuana use, compared with medical users who took their medications properly (McCabe et al. 2011).

According to the NIDA report from 2013, 24% of teens reported having abused or misused a prescription drug at least once in their lives (abuse of the prescription drugs being defined as the intentional use of a medication without prescription, in a way other than prescribed or for the experience of feeling it causes). In addition, another study indicates that 15% of high school seniors reported using a prescription drugs for purpose other than it was prescribed for (NIDA 2014).

Poulin found that actively giving or selling prescribed medications was observed among students, so it could be assumed that students who do not have a prescription for the psychoactive drugs might obtain the substance from students who reported medical use. Of the students who reported medical stimulant use in the year before the survey, 14.7% reported having given and 7.3% having sold, some of their prescribed stimulants (Poulin 2001). The motivation for nonmedical use of prescribed medication varies by drug classification. Boyd found that out of 12% of the respondents who engaged in nonmedical use of opioid pain medication in the past year 3% used them for sleeping, 2% as a

sedative and/or for anxiety and 2% as stimulants. Those students who had multiple motives for use were significantly more likely to engage in marijuana and alcohol use (Boyd et al. 2006).

Characteristics and health effects of adolescent prescription drug abuse was described and analysed by Zosel et al. (2013). They reported that intentional adolescent exposures to prescription drugs were to opioids (68%) and to stimulants (32%). They conclude that prescription drug abuse and misuse poses an important health problem and substantial economic, social and health effects.

Adolescents are particularly vulnerable group, and it is important to have an insight in the controlled medications, as well as other risk behaviour among the young people who are taking prescription drugs.

The aim of the study was to examine whether students who used tranquilizers/sedatives on doctors' order were at greater risk for (1) nonmedical use of tranquilizers/sedatives (2) abuse of other psychoactive substances, (3) other problem behaviour and (3) whether these risks have been changing in the nine-year period.

SUBJECTS AND METHODS

ESPAD (European School Survey on Alcohol and Other Drugs) is one of the main sources of information about the substance use and misuse, but also about other behaviours and social context for young people aged 15-16 in Europe (www.espad.org). For this study Croatian ESPAD national data from three consecutive ESPAD surveys were analysed (2003, 2007 and 2011). Respondents were, according to ESPAD rules, selected using random probability method, taking into account the structure of the secondary schooling (gymnasiums, vocational and industrial schools). As the birth cohort in Croatia is split between two grades, the sample was drawn from the first and secondary class official list provided by the Ministry of science, education and sports. Only pupils born in the specific year (1987, 1991 and 1995) were extracted. The details on sample method available elsewhere (www.espad.org).

ESPAD questionnaire was used as the survey instrument and specific variables selected.

Dependent variable was taking tranquilizers or sedatives prescribed by doctor in the lifetime. Independent variables were use of tranquilizers/sedatives without doctor's prescription, use other psychoactive substances, and other problem behaviours. Use of tranquilizers/sedatives without doctor's prescription was measured as taking them in the lifetime (yes; no); use of other substances was measured as: cannabis use in the last 12 months (yes; no), lifetime use of any other illegal substances (yes; no), alcohol use in the last 12 months (number of occasions: none; 1-2; 3-5; 6-9; 10-19; 20-39; 40+), getting drunk in the last 12 months (number of occasions: none; 1-2; 3-5); "binge drinking" (defined as

having five or more drinks or more in one occasion, unit “drink” defined as bottle/can of beer – ca 50 cl, glass of wine – ca 15 cl or a glass of spirit – ca 5cl) in the last 30 days (number of occasions: none, 1; 2; 3-5; 6-9; 10+). School performance was assessed by the grades at the end of the previous term (from 1 - very poor to 5 - excellent); school attendance by the number of missed school days in the last month because of illness, truancy or other reasons (not once, 1 day, 2 days, 3+ days) Problem behaviour was measured with being involved in the past 12 months at least once in the following situations: hit the teacher, fight/group fight, hurting somebody, using a weapon, steal something, shoplifting, arson, damaging school property, getting in trouble with the police. Students’ satisfaction was measured with Likert’s scale from “1 - very satisfied to 5 -not at all satisfied” for the questions on relationships with mother, father, friends, financial situation of the family, health and themselves; parental control was measured with question whether parents know where they spend Friday/Saturday nights ranging from “always” to “never”. Symptoms of depression were assessed with the short depression scale (items: losing appetite, having difficulty in concentrating, felt depressed, getting trouble for everyday activities, feeling sad, couldn’t cope with the work), used by Kokkevi and recommended by Radloff (Kokkevi et al. 2010, 2008, 2007a, Radloff 1997). Students who scored more than 2 standard deviation from the average, were considered as having symptoms of depression.

Binary logistic regression and multivariate analysis for each year separately were employed using IBM SPSS22 statistics program, CI 95% and level of significance at $p < 0.05$.

RESULTS

All together data for 8849 students who participated in the survey were analysed. The proportion of students who answered positively to the question “have you in your lifetime used the tranquilizers or sedatives prescribed by doctor” was 15.1% in 2003, 9.7% in 2007 and 9.64% in 2011 (Table 1). Original answers “yes, but less than for three weeks” and “yes, for three weeks or more” for further analysis were merged in the same category. Variables are correlated ($\chi^2=55.959$, $df=2$, $p < 0.001$).

Bivariate analysis was done for each year separately for all independent variables. The probability of use of tranquilizers/sedatives prescribed by doctor was in all three years the highest for students who abuse tranquilizers/sedatives without doctor’s prescription in the lifetime (OR 8.49; CI 6.21-11.60, OR 12.71; CI 9.02-17.92, and OR 12.50; CI 8.67-17.62).

Students who used marijuana in the last 12 months also had greater probability of using prescription drugs, with the rising and highest association in 2011 (OR 3.27; CI 2.46-4.35). The abuse of other “hard” illicit drugs (cocaine, heroin, amphetamines, hallucinogens) was associated with the use of prescribed tranquilizers/sedatives and those who abuse any of these substances had at least four times higher probability of use prescription medications in the lifetime. Those students who used alcohol with pills in the lifetime had higher probability of prescription medication use, with the highest odds in 2007. Alcohol drinking is widely spread among adolescents, and the results revealed that those who drank more often, drunk greater quantities of alcohol or who were getting inebriated had higher probability of prescription medications use. The results for the frequencies were for 2003 and 2011 similar - those students who drank 6 times or more in the last 12 months had two times higher probability for prescription medications use. In 2007 the risk had been for those who drank very often – 40 times or more in the last 12 months. Being drunk at least two times in the last 12 months was associated with probability of prescription medications use, as well as having had five drinks or more in one drinking occasion at least two times in the last 30 days (Table 2).

Lower school performance was associated with prescription medications use in 2007 (for those students who had grades 2 or less) and in 2011 for students whose grades were 3 or less (Table 3). Missing school days because of truancy was associated with prescription medications use and probability was rising with the number of missing days. Missing school days for other - two days or more - was also connected with higher use of prescription drugs. Illness as a reason for missed school was not associated with prescription drug use. Sex was not significant predictor for prescription drug use in 2003 and 2007, although the probability for girls was a little lower than for boys. In 2011 the probability was significantly lower for girls (OR 0.72; 0.57-0.93).

Table 1. Prescription sedatives/tranquilizers use 2003, 2007 and 2011

	2003		Year 2007		2011		Total	
	n	(%)	n	(%)	n	(%)	n	(%)
No, never	2422	85.0	2721	90.3	2701	90.40	7844	88.6
Yes, but for less than three weeks	392	13.8	249	8.3	242	8.10	883	10.0
Yes, for three weeks or more	36	1.3	42	1.4	44	1.50	122	1.4
Total	2850	100.0	3012	100.0	2987	100.0	8849	100.0

Table 2. Prescription use of tranquilizers/sedatives, nonmedical use of tranquilizers/sedatives, psychoactive substance abuse and alcohol use in 2003, 2007 and 2011

Year		2003	2007	2011
Logistic regression OR (95 CI) p*, bivariate analysis				
Tranquilizers/sedatives: Lifetime	No	1	1	1
	Yes	8.49 (6.21-11.60) <0.001	12.71 (9.02-17.92) <0.001	12.50 (8.67-17.62) <0.001
Marijuana: Last 12 months	No	1	1	1
	Yes	1.94 (1.52-2.49) <0.001	2.13 (1.59-2.85) <0.001	3.27 (2.46-4.35) <0.001
Amphetamines: Lifetime	No	1	1	1
	Yes	4.34 (2.61-7.21) <0.001	9.86 (6.02-16.13) <0.001	9.38 (5.54-15.89) <0.001
Hallucinogens: Lifetime	No	1	1	1
	Yes	3.69 (1.87-7.27) <0.001	6.69 (3.98-11.26) <0.001	5.84 (3.48-9.80) <0.001
Crack: Lifetime	No	1	1	1
	Yes	3.96 (1.94-8.08) <0.001	9.96 (5.89-16.86) <0.001	6.29 (3.18-12.43) <0.001
Cocaine: Lifetime	No	1	1	1
	Yes	4.59 (2.32-9.11) <0.001	6.69 (3.98-11.26) <0.001	9.39 (5.26-16.78) <0.001
Heroin: Lifetime	No	1	1	1
	Yes	5.02 (1.81-13.91) 0.002	7.27 (3.97-13.30) <0.001	9.97 (4.93-20.16) <0.001
Anabolic steroids: Lifetime	No	1	1	1
	Yes	5.23 (2.47-9.25) <0.001	5.60 (3.41-9.20) <0.001	5.76 (3.23-10.27) <0.001
Alcohol with pills: Lifetime	No	1	1	1
	Yes	3.86 (2.93-5.08) <0.001	4.41 (3.24-6.01) <0.001	2.98 (2.18-4.08) <0.001
Alcohol: Last 12 months	0	1	1	1
	1-2	1.25 (0.84-1.85) 0.270	0.66 (0.40-1.07) 0.092	1.93 (1.11-3.36) 0.020
	3-5	1.58 (1.06-2.36) 0.024	0.71 (0.43-1.18) 0.189	1.24 (0.67-2.28) 0.491
	6-9	1.86 (1.23-2.80) 0.003	1.33 (0.85-2.09) 0.208	2.30 (1.32-4.01) 0.003
	10-19	1.65 (1.10-2.47) 0.016	0.97 (0.62-1.53) 0.900	1.92 (1.10-3.35) 0.021
	20-39	2.36 (1.55-3.59) <0.001	1.54 (0.97-2.43) 0.067	3.53 (1.05-6.08) <0.001
	40+	3.38 (2.29-4.99) <0.001	2.09 (1.38-3.18) 0.001	4.47 (2.67-7.48) <0.001
Drunk: Last 12 months	0	1	1	1
	1-2	1.53 (1.19-1.97) 0.001	1.27 (0.93-1.74) 0.131	1.50 (1.10-2.05) 0.010
	3-5	1.68 (1.19-2.37) 0.003	2.43 (1.66-3.56) <0.001	1.82 (1.20-2.77) 0.005
	6+	2.25 (1.68-3.00) <0.001	2.60 (1.84-3.68) <0.001	4.70 (3.34-6.61) <0.001
	„Binge drinking“: Last 30 days	0	1	1
	1	1.32(0.95-1.83) 0.097	1.29(0.87-1.91) 0.207	1.40(0.90-2.11) 0.114
	2	1.89(1.35-2.65) <0.001	1.83(1.26-2.67) 0.002	2.13(1.44-3.15) <0.001
	3-5	2.71(1.96-3.75) <0.001	1.84(1.30-2.61) 0.001	3.02(2.13-4.29) <0.001
	6-9	2.65(1.68-4.17) <0.001	2.08(1.22-3.56) 0.007	4.77(3.09-7.37) <0.001
	10+	2.76(1.68-4.54) <0.001	4.09(2.66-6.27) <0.001	3.81(2.40-6.06) <0.001

*OR – odds ratio; CI – confidence interval; p – asymptomatic two-way statistical significance

The association between aggressive or delinquent behaviour at least once in the past 12 months and prescription medications use was measured with ten statements (Table 4). In 2007 and 2011 all students who admitted any of listed risk behaviour involving hitting teacher, being involved in fight, weapon use, stealing or shoplifting, damaging school property, arson or being involved in the trouble with the police, had higher probability for prescription medications use. In 2003 hitting the teacher and arson were not connected to prescription medications use.

Satisfaction with relationships with parents, friends, family financial situation, health and themselves was associated with the probability for prescription medications use in the respective years. In all three years

probability was higher for students who reported very low satisfaction with relationship with mother, in 2007 also for students who reported low/very low satisfaction. Low/very low satisfaction with relationships with father was also associated with probability of prescription medication use. Relationship with friends had no influence. Students who were not at all satisfied with family financial situation had more than twice higher probability of prescription medication use in all three years. Dissatisfaction with own health was predictor for higher probability of prescription medication use, even for those who were ambivalent about their own health. Those students who were not at all satisfied with themselves had two to three time higher probability of prescription medication use (Table 5).

Table 3. Prescription use of tranquilizers/sedatives, school performance and missed school days in 2003, 2007 and 2011

Year		2003	2007	2011
Logistic regression OR (95 CI) p*, bivariate analysis				
Grades	5	1	1	1
	4	1.21 (0.93-1.58) 0.156	1.19 (0.86-1.64) 0.301	1.71 (1.19-2.44) 0.003
	3	1.28 (0.97-1.70) 0.083	1.17 (0.83-1.66) 0.377	2.33 (1.62-3.35) <0.001
	2	1.15 (0.58-2.25) 0.693	2.97 (1.77-4.98) <0.001	3.06 (1.57-5.95) 0.001
	1	1.67 (0.81-3.44) 0.168	1.92 (1.01-3.65) 0.046	1.68 (0.69-4.10) 0.254
Missed school: Illness	Not once	1	1	1
	1 day	1.15 (0.81-1.61) 0.432	1.40 (0.96-2.04) 0.078	0.96 (0.65-1.44) 0.863
	2 days	1.05 (0.73-1.53) 0.785	1.33 (0.86-2.04) 0.197	0.89 (0.57-1.39) 0.619
	3+ days	1.08 (0.85-1.38) 0.512	1.64 (1.22-2.20) 0.001	1.76 (1.32-2.35) <0.001
Missed school: Skipped	Not once	1	1	1
	1 day	1.55 (1.17-2.06) 0.002	1.45 (1.06-1.98) 0.019	1.71 (1.25-2.36) 0.001
	2 days	1.62 (1.06-2.48) 0.027	0.81 (0.43-1.53) 0.519	0.49 (0.88-2.53) 0.142
	3+ days	2.46 (1.78-3.39) <0.001	2.23 (1.53-3.26) <0.001	3.17 (2.16-4.66) <0.001
Missed school: Other reasons	Not once	1	1	1
	1 day	1.43 (1.07-1.89) 0.015	1.27 (0.92-1.76) 0.153	1.57 (1.15-2.16) 0.005
	2 days	1.70 (1.16-2.49) 0.007	1.11 (0.65-1.90) 0.712	1.25 (0.76-2.03) 0.379
	3+ days	2.17 (1.53-3.09) <0.001	1.94 (1.29-2.92) 0.002	2.54 (1.72-3.76) <0.001
Sex	Male	1	1	1
	Female	0.99 (0.81-1.22) 0.916	0.93 (0.73-1.19) 0.581	0.72 (0.57- 0.93) 0.011

*OR – odds ratio; CI – confidence interval; p – asymptomatic two-way statistical significance

Table 4. Prescription use of tranquilizers/sedatives and aggressive behaviour in 2003, 2007 and 2011

Year		2003	2007	2011
Logistic regression OR (95 CI) p*, bivariate analysis				
Hit teacher	No	1	1	1
	Yes	1.23 (0.69-2.22) 0.485	3.72 (2.19-6.32) <0.001	2.17 (1.20-3.93) 0.010
Involved in fight	No	1	1	1
	Yes	1.51 (1.16-1.96) 0.002	2.28 (1.74-3.00) <0.001	2.18 (1.67-2.85) <0.001
Group fight	No	1	1	1
	Yes	2.26 (1.77-2.89) <0.001	2.11 (1.60-2.77) <0.001	2.74 (2.10-3.59) <0.001
Hurt somebody	No	1	1	1
	Yes	2.14 (1.53-2.99) <0.001	2.66 (1.90-3.73) <0.001	2.19 (1.56-3.07) <0.001
Weapon use	No	1	1	1
	Yes	2.04 (1.18-2.53) 0.010	3.36 (2.17-5.21) <0.001	3.62 (2.41-5.43) <0.001
Steel something	No	1	1	1
	Yes	2.29 (1.68-3.12) <0.001	2.28 (1.62-3.20) <0.001	2.31 (1.70-3.14) <0.001
Shoplift	No	1	1	1
	Yes	1.47 (1.12-1.92) 0.006	1.69 (1.25-2.30) 0.001	2.19 (1.66-2.90) <0.001
Arson	No	1	1	1
	Yes	1.44 (0.88-2.35) 0.143	2.77 (1.77-4.32) <0.001	3.05 (2.10-4.45) <0.001
Damage school property	No	1	1	1
	Yes	1.61 (1.24-2.08) <0.001	1.91 (1.45-2.52) <0.001	2.23 (1.70-2.93) <0.001
Trouble with the police	No	1	1	1
	Yes	1.94 (1.44-2.61) <0.001	2.16 (1.57-2.99) <0.001	2.47 (1.85-3.29) <0.001

*OR – odds ratio; CI – confidence interval; p – asymptomatic two-way statistical significance

Parental control was measured by only available variable – being informed on the way students spent Saturday nights. For those students whose parents usually did not know about spending Saturday nights the probability of prescription medication use was higher in all three years. The risk was higher in 2003 and 2011 even for those students whose parents sometimes or even often were informed about way of spending Saturday nights.

Symptoms of depression were assessed using 6-items depression scale and students who scored more than 2 SD from average were considered as having depression symptoms. In all three analysed years those who had more symptoms of depression had two to three time higher probability of prescription drugs use (OR 2.11; CI 1.49-2.98; OR 3.16; CI 2.19-4.56; OR 2.16; CI 1.42-3.27).

Table 5. Relationships, satisfaction, symptoms of depression and prescription use of tranquilizers/sedatives in 2003, 2007 and 2011

Year		2003	2007	2011
Logistic regression OR (95 CI) p*, bivariate analysis				
Relationship: Mother	1	1	1	1
	2	1.34 (1.06-1.70) 0.015	0.86 (0.64-1.15) 0.301	1.10 (0.82-1.48) 0.513
	3	1.62 (1.15-2.29) 0.006	0.92 (0.59-1.42) 0.697	1.41 (0.92-2.14) 0.112
	4	1.36 (0.74-2.51) 0.326	1.84 (1.03-3.27) 0.039	1.65 (0.83-3.28) 0.154
	5	1.54 (0.79-3.02) 0.206	2.37 (1.26-4.45) 0.007	1.81 (0.96-3.40) 0.068
Relationship: Father	1	1	1	1
	2	1.19 (0.94-1.52) 0.153	0.74 (0.55-1.01) 0.056	0.98 (0.72-1.34) 0.919
	3	1.46 (1.04-2.05) 0.028	1.02 (0.68-1.51) 0.942	1.40 (0.96-2.05) 0.083
	4	2.15 (1.37-3.39) 0.001	0.95 (0.53-1.73) 0.877	2.07 (1.20-3.60) 0.009
	5	1.60 (0.99-2.59) 0.055	1.83 (1.10-3.05) 0.021	2.30 (1.39-3.81) 0.001
Relationship: Friends	1	1	1	1
	2	0.96 (0.77-1.20) 0.736	1.00 (0.77-1.30) 0.999	0.89 (0.67-1.17) 0.395
	3	1.17 (0.75-1.83) 0.478	1.08 (0.62-1.89) 0.785	0.78 (0.42-1.43) 0.415
	4	0.85 (0.33-2.20) 0.735	0.63 (0.15-2.68) 0.535	0.97 (0.38-2.47) 0.950
	5	0.72 (0.25-2.07) 0.544	2.21 (0.97-4.62) 0.544	1.42 (0.63-3.19) 0.398
Parents know Saturday nights	Always	1	1	1
	Quite often	1.32 (1.03-1.69) 0.029	1.15 (0.86-1.53) 0.361	1.39 (1.03-1.88) 0.030
	Sometimes	1.83 (1.36-2.46) <0.001	1.28 (0.91-1.80) 0.162	1.78 (1.27-2.51) 0.001
	Ususally don't	3.60 (2.44-5.31) <0.001	2.51 (1.66-3.81) <0.001	3.88 (2.54-5.94) <0.001
Family financial situation	1	1	1	1
	2	1.29 (0.98-1.68) 0.069	0.65 (0.49-0.86) 0.003	0.97 (0.71-1.32) 0.846
	3	1.26 (0.91-1.73) 0.165	0.91 (0.64-1.29) 0.589	0.86 (0.59-1.26) 0.445
	4	1.25 (0.83-1.86) 0.284	0.78 (0.47-1.30) 0.340	1.13 (0.73-1.76) 0.586
	5	2.03 (1.13-3.64) 0.018	2.04 (0.97-4.22) 0.055	2.57 (1.45-4.56) 0.001
Health satisfaction	1	1	1	1
	2	1.22 (0.97-1.53) 0.098	1.00 (0.76-1.31) 0.986	1.18 (0.89-1.56) 0.247
	3	1.40 (0.97-2.02) 0.072	1.76 (1.15-2.69) 0.009	1.77 (1.18-2.66) 0.006
	4	2.10 (1.36-3.23) 0.001	3.14 (1.95-5.06) <0.001	2.22 (1.35-3.64) 0.002
	5	2.70 (1.17-6.24) 0.020	2.12 (0.87-5.21) 0.100	3.37 (1.72-6.61) <0.001
Yourself satisfaction	1	1	1	1
	2	1.27 (0.99-1.63) 0.057	0.90 (0.68-1.20) 0.469	1.02 (0.76-1.34) 0.901
	3	1.30 (0.92-1.82) 0.133	1.12 (0.75-1.68) 0.571	1.32 (0.91-1.92) 0.141
	4	1.38 (0.91-2.01) 0.132	1.29 (0.80-2.11) 0.300	1.11 (0.67-1.85) 0.658
	5	2.38 (1.48-3.83) <0.001	3.42 (2.05-5.73) <0.001	2.52 (1.49-4.26) <0.001
Depression	No	1	1	1
	Yes	2.11 (1.49-2.98) <0.001	3.16 (2.19-4.56) <0.001	2.16 (1.42-3.27) <0.001

1 - very satisfied; 2 - satisfied; 3 - neither satisfied nor unsatisfied; 4 - not so satisfied; 5 - not at all satisfied;

*OR – odds ratio; CI – confidence interval; p – asymptomatic two-way statistical significance

Multivariate analysis for 2003, 2007 and 2011 revealed variables that were significant in all three years for rising probability of prescription medications use. Abuse of tranquilizers/sedatives not prescribed by doctor was the most prominent variable associated with use of prescription medications. Those who were taking tranquilizers/sedatives for nonmedical reasons had six to ten time higher probability of prescription medications use and the risk was rising from 2003 to 2011 (OR 6.14: CI 4.08-9.23; OR 9.77; CI 5.92-16.13). Variables on alcohol abuse were associated with probability to prescription medications use in all three years. Excessive drinking in the past 30 days was rising probability of prescription medication use in 2007 and 2011. Other variables that were rising risk for prescription medi-

cation use were drunkenness 6 times or more in the past 12 months in 2011 and taking alcohol with pills in 2003. Moderate use of alcohol in the past 12 months (up to 5 times) lowered for 50% the probability of prescription drugs use in 2007.

Other variables were not consistent in all three years of the survey. Missing school days, in 2003 and 2011 for other reasons or for illness increased for 50% the probability of prescription medications use. Lower school performance in 2007 and 2011 increased more than twice probability for prescription medications use.

Out of the variables on delinquent behaviour being involved in group fight or fight was associated with prescription medications use in 2003 and 2007.

Table 6. Predictors of prescription use of tranquilizers/sedatives in 2003, 2007 and 2011

Statistically significant predictors*	Category	OR**	(95% CI)	p
<i>Year 2003</i>				
Tranquilizers/sedatives	Lifetime	6.14	(4.08-9.23)	<0.001
Alcohol with pills:	Lifetime	1.57	(1.01-2.43)	0.043
Missed school: Other reasons	2 days	1.59	(1.01-2.51)	0.044
Delinquent: Group fight		1.52	(1.01-2.28)	0.044
<i>Year 2007</i>				
Tranquilizers/sedatives	Lifetime	8.16	(4.65-14.32)	<0.001
Alcohol: Last 12 months	1-2 times	0.52	(0.29-0.92)	0.023
	3-5 times	0.53	(0.29-0.99)	0.045
„Binge drinking“ (5+ drinks): Last 30 days	2 times	1.85	(1.10-3.10)	0.020
Grades	2	2.92	(1.41-6.05)	0.004
Delinquent: Fight		1.65	(1.04-2.62)	0.035
Depression		2.19	(1.24-3.85)	0.007
Family financial situation	Satisfied	0.66	(0.44-0.99)	0.047
Health satisfaction	Not so satisfied	2.81	(1.39-5.69)	0.004
<i>Year 2011</i>				
Tranquilizers/sedatives	Lifetime	9.77	(5.92-16.13)	<0.001
Drunk: Last 12 months	6+ times	2.13	(1.21-3.72)	0.008
„Binge drinking“ (5+ drinks): Last 30 days	3-5 times	2.01	(1.20-3.39)	0.008
Missed school: Illness	3+ days	1.56	(1.10-2.29)	0.013
Missed school: Other reasons	1 day	1.66	(1.12-2.43)	0.010
	3+ days	1.72	(1.03-2.87)	0.038
Grades	3	1.77	(1.12-2.78)	0.014
	2	2.56	(1.12-5.87)	0.026
Health satisfaction	Satisfied	1.57	(1.07-2.33)	0.022
	Niether nor	1.79	(1.01-3.19)	0.048

*Analysis: Multivariate Logistic Regression;

***OR – odds ratio; CI – confidence interval; p – asymptomatic two-way statistical significance

Those who were satisfied with family financial situation had lower probability for prescription medications use in 2007. Satisfaction with health showed inconsistent pattern in multivariate analysis. In 2007 students who were not satisfied with health were 2.8 times at higher risk for prescription medication use, and in 2011 risk for prescription drugs use was higher for students who were satisfied with their health or ambivalent about health satisfaction.

Although symptoms of depression were connected with prescription medication use in binary logistic regression in all three analysed years, in multivariate model depression increased two times the probability of prescription drugs use in 2007 only (Table 6).

In 2003 Cox & Snell R Square in multivariate analysis was 8.7, meaning that 8.7 of the dependent variable could be explained through this logistic model. Nagelkerke R Square was 15.5% which means relatively weak relationship between dependent variable and independent variables. Model was consistent with observed data, meaning that model predictions were not significantly different from observed results ($\chi^2=6.40$; $df=8$; $p=0.603$).

In 2007 Cox & Snell R Square in multivariate analysis was 9.1%, explaining 9.1 of the dependent variable, and Nagelkerke R Square was 19.8%. In 2011 Cox

& Snell R Square was 10.8%, explaining 10.8 of the dependent variable. In 2007 model proved to be consistent with the observations ($\chi^2=9.72$; $df=8$; $p=0.285$), as well as in 2011 being not different from observed results ($\chi^2=8.05$; $df=8$; $p=0.428$).

DISCUSSION

The proportion of Croatian students aged 15-16 years who used prescription medication seems stable across the analysed period. We were not able to prove the increase in proportion of students who obtained sedatives/tranquilizers on doctor's prescription in the nine-year period (2003-2011). Majority of students have done it for the short period of time – less than three weeks, and for more than three weeks medication was prescribed for the small proportion of the respondents. It is quite reasonable to assume that the medications were prescribed for some acute indication or mild disturbances, and not for the serious chronic illness. Abuse of the prescription medications is being defined as the intentional use of a medication without prescription, in a way other than prescribed or for the experience of feeling it causes (NIDA 2014). According to our findings, students who used tranquilizers/sedatives without doctor's prescription in the lifetime were much more likely

to obtain these medications on doctor's prescription as well. In bivariate and multivariate analysis in all three survey waves the probability for prescription medications use was the highest for adolescents who used tranquilizers/sedatives without doctors' prescription. It supported the findings of other authors that nonmedical use of prescription drugs represents a problem behaviour among secondary school students (McCabe et al. 2007, King et al. 2013).

In ESPAD survey questionnaire was not possible to have an insight in reasons for medications prescription neither from doctors' nor from students' side. One of the reasons for abuse of medications that may be prescribed, could be the perception that they are more available and are relative harmless, which is a great risk for teens. McCabe found that despite the importance of controlled medications for the treatment of child/adolescent disorders, a consequence of the greater availability of those medications may result in the increase in their nonmedical use (McCabe et al. 2011). Adolescents are quite likely to divert their controlled medication to peers, and they could serve as additional access to controlled medications for those without the prescription (McCabe et al. 2005). In our research was not possible to determine the source of sedatives/tranquilizers used without prescription, or to assess whether some of prescribed medications were diverted to other students. Nevertheless, it seems important to bear in mind possible diversion of prescription medication and try to have an insight in the context and assess the possible of misuse.

Probability of prescription medications use was in bivariate analysis strongly associated with use of alcohol and other illicit drugs as marijuana, crack, cocaine or heroin in all respective years. In multivariate analysis use of other psychoactive substances was not prominent and was surpassed by other variables. The frequencies and patterns of drinking alcohol proved to be risk factors for the prescription medication. Drunkenness and excessive drinking ("binge") increased the probability of prescription drugs use, and moderate use of alcohol lowered the probability. Drinking alcohol was assessed as risk factor for prescription medication use in other research. McCabe stated that it would be important, based on the high prevalence and increased risk for consequences associated with simultaneous use of alcohol and prescription drugs, in activities aiming at reducing substance abuse, clearly focus on co-ingestion of alcohol and prescription drugs (McCabe et al. 2006). Schepis and Krishnan-Sarin examined risk factors associated with adolescent psychoactive drug abuse and found that the predictors were past year use of alcohol, cigarettes, marijuana, cocaine or an inhalant (Schepis & Krishnan-Sarin 2008). They also found that poorer academic performance and past year major depression were connected with higher risk of psychoactive drug abuse. Netemeyer et al. found that restricted substance

usage as alcohol and marijuana and psychological states as anxiety, need to be popular and other are linearly related to prescription drug abuse (Netemeyer et al. 2015).

The association of risk behaviours as alcohol and drug consumption and the devastating consequences for youth, including lower school performance was reported by Miller and Aspy (Miller et al. 2007, Aspy et al. 2012). School performance was in our study connected with the probability of prescription medication use, but the pattern was not so clear. In multivariate analysis it was risk predictor in 2011 only. Although school performance depends on many factors and not on possible risk taking exclusively, the poor school achievement should not be neglected neither by parents nor by teachers, meaning that possible reasons should always be carefully examined. Gruber & Machamer (2000) examined the relationship between educational risks as skipping school and risks as alcohol or marijuana use with delinquency and sexual activity. Kokkevi found that the strongest predictors for adolescent substance abuse were peer and older sibling models of use, peer-oriented lifestyle, followed by patterns of antisocial behaviour and truancy (Kokkevi et al. 2007b). The findings suggest that educational risk behaviour are a significant predictor of other health risk behaviour. This proved that an important 'window of opportunity' may exist in the school setting facilitating early identification and intervention for youth at risk.

The respondents in our survey who reported violent behaviour had higher probability for prescription drug use in all three survey waves and for all listed behaviours. It was not possible to determine the causal relationship or to investigate whether drugs were prescribed for any of the behavioural problems, but the population of violent youth have had more needs for the prescribed drugs. Moreover, in multivariate analysis group fight in the 2003 and fight in 2007 remained statistically significant variables in predicting prescription drug use.

Violence and other risk behaviour including drug taking was examined by many authors. There is no solid empirical support for a direct relationship between drugs and violence. It may be that violent people are attracted to drugs, but the inter-relation between drugs and violence is complicated and the studies do not support any clear links (Thuomi et al. 2010, Hoaken & Stewart 2003). Ellickson et al. found in their work that violent youth were more likely than their peers to have poor mental health, use drugs, drop out of school, and be delinquent (Ellickson et al. 1997). Moore et al. investigated which of the commonly prescribed drugs could have provoke violent behavior among users, focusing on side effects of prescription medications. The vast majority of prescription medication users reported no risk of violent side effects, meaning that the general violent risk of most drugs is minimal (Moore et al. 2010).

Satisfaction with relationship with mother and father was protective factor decreasing the probability for prescription medications use in bivariate analysis in all three years. Kokkevi et al. analysed the ESPAD results at the European level and found that nonmedical tranquilizer or sedative use was associated with the use of tobacco, alcohol and illicit drugs, truancy, tranquilizer or sedative use by friends and siblings, and dissatisfaction with relationships with parents (Kokkevi et al. 2008). King et al. stated that much research has examined factors associated with overall substance use among youth, but relatively few studies have specifically investigated risk factors and protective factors for youth involvement in nonmedical prescription drug use. The study also found that pro-social behaviours, including strong connections with parents reduced the students' odds of abusing prescription drugs (King et al. 2013).

In our survey three variables of overall satisfaction were used – family financial situation, health and perception of self-satisfaction. In bivariate analysis low satisfaction with financial situation and low self-satisfaction were connected to prescription medications use. In multivariate analysis dissatisfaction with the financial situation in 2007 was significantly connected to prescription medications use. Health satisfaction showed ambivalent picture and the association with the prescription medications use remained unclear. Those respondents who were satisfied with their health or had non-determined feeling about it were more prone to prescription drug use. The pattern is so ambiguous that is not possible to indicate the connection or determine whether this variables were caused or provoked by prescription drug use.

Life or health dissatisfaction were found as possible predictors or factors that may contribute to the adolescent' substance abuse. Zullig et al. stated that longitudinal studies are needed to determine whether dissatisfaction with life is a consequence or determinant of substance abuse behavior for adolescents (Zullig et al. 2001). Life satisfaction correlates with adolescent risk taking behavior and their outcomes in adulthood. Huang et al. showed that self-esteem and perceived peer support significantly predicted higher life satisfaction and that peer support and adolescents' self-concept are strongly correlated with adolescents' subjective well-being (Huang et al. 2015). Supporting the bias of whether life dissatisfaction should be considered as predictor or determinant, Bogart et al. showed that some forms of adolescent substance use limit socio-economic opportunities, and have a lasting effect on health, consequently decreasing life-satisfaction. Continued use of substances may also lead to lower subjective well-being over time (Bogart et al. 2007).

Poor parental monitoring in bivariate analysis was a predictor of prescription drug use in 2003 and 2011, with the weaker relation in 2007. In multivariate analysis other variables had higher influence and parental

monitoring was not found as a significant predictor. The similar findings showed Pejnovic Fanelic et al. regarding marijuana use among adolescents in 11 European countries. It seems that parental monitoring has weaker impact than peers' behaviour and substances availability, although it was considered as important factor that influences problem behaviour in adolescence (Pejnovic Fanelic et al. 2011).

Depression and substance use disorders are highly prevalent in the general population and often co-occur within the same individual. This association is most commonly explained either by a causal relationship or a shared etiologic factor underlying both disorders (Swendsen & Merikangas 2000). Drug use to relieve depressive symptoms was far more likely in men if they had major depression, but was equally common in women with and without major depression (Weiss et al. 1992) The self-medication hypothesis of addictive disorders has been widely investigated. Studies derived primarily from clinical observations of patients with substance use disorders. Persons with substance use disorders suffer in the extreme with their feelings, either being overwhelmed with painful affects or seeming not to feel their emotions at all. Substances of abuse help such individuals to relieve painful affects or to experience or control emotions when they are absent or confusing (Khantzian 1997).

In our research adolescents who had more symptoms of depression had higher probability of prescription drug use in univariate analysis for all three years. That depression among young people is not uncommon problem, was found by Seweryn et al, who conducted the survey in three European countries (Seweryn et al. 2015). The epidemiological data vary according to the used instrument and differ between educational programs. The prescription drugs could have been used to treat the depression itself, as a mental health disorder. Majority of our respondents reported having used prescribed drugs less than three weeks, so this assumption could have only limited influence. In multivariate analysis only in 2007 symptoms of depression remain significant predictor. According to Kokkevi et al. anomie and antisocial behaviour were among adolescent more strongly associated with substance abuse than depression (Kokkevi et al. 2007a).

Prescription drugs in our study were used by the majority of students for the limited period of time, therefore it could be assumed that the prescription had not been connected to the psychiatric diseases. Taking into account great variations of problem behaviour which reflected poor mental health and life dissatisfaction, it seems reasonable to assume that availability and accessibility of support services could have be helpful in this period of young peoples' life. Counselling services or school coaches could be a professional necessary support and help to overcome possible problems in adolescence (Gale 2015, Corrieri 2014, Kuzman 2014).

Limitations of the study

The data from three consecutive ESPAD surveys were extracted for the study purpose. The questionnaire was aiming at the epidemiological data on smoking, alcohol drinking and substance use/abuse among adolescents at the national level in participating countries. It was not possible to have more precise description of the prescribed medication or those taken without doctor's prescription, and the possible reasons for medication also remained unknown.

CONCLUSIONS

Prescription use of sedatives/tranquilizers was predicted by nonmedical use of respective medications, indicating that there is a specific need to take this possibility into consideration either in prevention activities or treatment process. The findings suggest that there is a need for development the focused interventions and educational programs to prevent prescription medication abuse and misuse by adolescents. The abuse of alcohol, maladjusted behaviour and symptoms of depression indicated the possible contextual influences. The model showed that dependent variable had quite weak relationship with independent variables. Although analysed variables in all three survey years explained part of the observed behaviour, other factors, not analysed in this study, could have impact on prescription medication use. There is sufficient evidence that further analysis which could better explain misuse of prescription medications is still needed.

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Both authors contributed to the conception of the work. Marina Kuzman was writing and drafting the work for intellectual content. Marija Posavec made literature search. All authors gave final approval of the version to be published.

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