Assessment of Psychological and Social Factors in Adolescents Risk Behavior: Questionnaire Study

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Aim   To investigate the influence of psychological and social factors on health risk behaviors, such as smoking, alcohol and psychoactive drug consumption among adolescents and to determine the prevalence of consuming various psychoactive substances.

Methods   The survey was conducted among adolescents in the Primorsko-goranska County in Croatia in 2003. The prevalence of smokers, alcohol, and psychoactive drugs consumers and abstainers, with general and specific predictors for the development of risk behavior of 2,452 adolescents in Primorsko-goranska County was determined by means of valid self-reported questionnaires. The adolescents were stratified according to gender and type of secondary school.

Results   Every third student smoked cigarettes every day, and 73% consumed beer, wine, and alcoholic beverages occasionally. The percentage of illicit drugs consumption (experimental, occasional and regular) ranged from 2,3% for opiates to 35.6 for marihuana. Girls consumed more cigarettes, alcoholic beverages, and sedatives every day, whereas boys consumed more beer, wine, and marihuana. Consumption of all psychoactive substances was more prevalent among senior students. A moderate correlation was found between addictive resources consumption and negative peer influence and ways of spending free time.

Conclusion   Most adolescents had personal experience with psychoactive substance use, mostly tobacco, alcohol, and marihuana. The strongest predictors were negative peer influence and ways of spending free time. These findings may be useful for formulating strategies for prevention of addiction among adolescents.

Adolescence is characterized by rapid biological and psychological changes, intensive readjustment to the family, school, work, and social life, and an unrelenting process of preparation for adulthood. Despite the fact that it is a turbulent and vulnerable period of growth and development, there has been little recognition of special health care requirements of adolescents, and they continue to be neglected in comparison to other age groups (1).

Adolescence is popularly conceptualized as a period of good health. However, there is a small but significant number of young people for whom adolescence is associated with considerable morbidity and concern about medical issues. There are also those who are in jeopardy from their own risk-taking and health-compromising behavior. High-risk behavior, use and abuse of substances such as tobacco, illicit and prescription drugs, inhalants, and alcohol, is becoming more common (2). A study that was part of the international project ESPAD (European School Survey Project on Alcohol and Other Drugs) conducted in the 4-year period (1995-1999) reported an upward trend in the use of tobacco and illicit drugs for both genders but especially for girls. The study also

found less frequent use of sedatives in both genders and inhalants in girls (3). The immediate risks connected with substance use include accidents, violence, risky sexual behavior, and exposure to human immunodeficiency virus (HIV).

The age when boys have their first contact with particular substances is constantly decreasing and is lower in the Primorsko goranska County than on the national level. The literature shows that the proportion of adolescents who smoke increases with age (3-6). Also, adolescents who started smoking early are more likely to continue to smoke as adults. Even experimental smoking during adolescence increases the risk of adult smoking (2).

Addictive behavior is a major medical, psychological, and social problem, especially if we take into consideration the increasing consumption and availability of drugs (4). The causation of substance use disorder is probably multifactorial but there has been increasing evidence suggesting that it has a neurological basis (7). A number of factors has been consistently related to alcohol abuse among adolescents. They include gender, age, school grade, religious behavior, socioeconomic status, and involvement in extracurricular activities (8,9). Recent research has also addressed the connection between the likelihood of psychoactive substances abuse and certain psychological characteristics, psychopathological dimensions, motivation for illicit drug abuse and personal hierarchy of value (4). Substance use, on the other hand, is more related to peer influence (10,11), relationship with parents (12-15), and way of spending leisure time (16). Another possible approach to assessing risk factors is the ecological perspective, which is concerned with contexts of daily life environments, influenced by the variation and interactions of personal and situational variables, which afford either risk or opportunity (17-21).

Although there are numerous studies describing the predictors of adolescent smoking (22-25), only a few explored causation and tried to explain the nature of addictive behavior or possible predictive factors alone or together with other substances (3,4,26).

Development, implementation, and maintenance of accurate and reliable health risk-behavior information are essential for the effectiveness of prevention programs (27). In our study,

we aimed to assess psychological and social factors of risk behavior, and the prevalence of abuse of the most frequently consumed substances, tobacco, alcohol, and marihuana, among adolescents in Primorsko-goranska County in Croatia.

Subjects and Methods

Subjects

Primorsko-goranska County is one of 21 counties in Croatia, with 305,505 inhabitants and 13,147 high school students in 50 schools. Our study was conducted in 45 high schools with 12,676 students. We did not include art school and schools for children with special needs. The study was done in 2003 on a representative sample of 20% of students (n = 2,534) all four grades of high schools. In a sample stratified according to class and professional orientation, the examinees were selected from the lists of County Statistical Office. We used a table of random numbers to select students for general representation of a certain type of education (high school, 4-year vocational and 3-year vocational school). The sample consisted of 53.1% girls and 46.9% boys and was similar to gender distribution of high school students registered in County Statistical Office. Class structure of students was representative of the county's high school youth. Out of a total of 2,534 students in the selected classes, 2,452 filled out the questionnaire (96.8% response rate).

Questionnaire

The study was carried out with a valid self-reported questionnaire made by the Faculty of Philosophy, University of Rijeka. The metric characteristic of each item and the questionnaire as a whole were tested in a pilot study of about 150 examinees, covering the planned age span. The questionnaire was additionally adjusted contextually and terminologically, and administered to a whole sample of students in May 2003. For this analysis, 118 questions were chosen from the whole questionnaire.

Measures of substance abuse. We assessed the risk behavior by measuring the frequency of smoking cigarettes, consuming beer, wine, alcoholic beverages, sedatives, marihuana, cocaine, amphetamine, Lysergic acid diethylamide (LSD), opiates, and inhalants. We asked our subjects whether they had ever consumed a psychoactive substance and how often they had con-

sumed it. Possible answers were never, experimented, sometimes, and regularly. We also asked them to indicate the age of first contact with addiction resources. Possible usage frequency was grouped in 5 classes of age: <10 years, 11 to 12 years, 13 to 14, 15 to 16, 16 years and older.

The following variables were measured with a Likert-type scale.

Personal perception. This part of the questionnaire was comprised of 22 items on self-esteem ("I am well organized and practical person," "I can deal with the problems as successful as most of the other people"…), self-respect ("I can adjust to various kinds of people," "I alone decide how to behave"…), life content ("Life gives me lot of satisfaction," "I am happy and content with my life"…), feelings ("I am depressed and sad," "I feel like I don't belong to the world I live in"…), and personal system of values ("My life has a meaning and aim"). This aspect was assessed by a 4 point Likert scale (from 1 – never to 4 – very often).

Family relationship. Questions in this section aimed to estimate emotional relationship quality, harmonious relationships between parents and adolescents, parental concordance, family as a risk behavior model, and relationship with mother and father. Students graded these 15 items on a scale from 1 – never to 4 – very often. Family relationship was grouped into six parts: positive relationship, separately with mother and with father ("Frankly showing positive emotions and warmth," "Has understanding for my feelings"…), negative relationship with mother and with father ("Constantly criticizes my actions," "Doesn't allow me things that my peers are allowed to do"…), mother's and father's support of child's autonomy ("Supports me in making my own decisions," "Allows me to have a different opinion from him or her"…).

Peer relationship. We used a scale consisting of 38 items, which included positive and negative peer influence. Examinees answered by checking one of the four offered answers: never, rare, often, and very often. The scale with these four points was transformed, and the total sum was used as a measure of peer influence: negative peer influence ("My friends and I usually drink beer or some other alcoholic drinks", "When everybody drinks I drink too"…), and peer support ("I can turn

to my friends when I have problems", "I feel close and bonded with my friends"…).

Styles of spending free time. Examinees were asked to quantify their way of spending free time on 1-4 scale (never, rare, often, and very often) for 36 items. These measures were transformed to: organized entertainment ("I spend time in clubs, discotheques, etc.," "I go to rock concerts, rave-parties and so on"…), and hanging out with friends ("I go to solitary places with my friends", "I roam with my friends, explore around"…).

Subjective attitudes and self-health state assessment. This part of the questionnaire was composed of 8 items measuring health related problems ("Headache," "Fatigue"…), and on a four point scale: never, rare, often, and very often.

Students were asked to fill out the questionnaire during the time of two school classes. The questionnaire was anonymous and voluntary.

Statistical Analysis

Statistical analysis was performed with the SPSS Statistical Package for Windows, version 10.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics was done using percentages and frequencies. Chi-square test was used to test the differences in substance use. Correlation between predictive variables was calculated with the Spearman correlation coefficient. Forward stepwise regression analysis determined variables that had the largest contribution in explaining the consumption for each addiction resource. Particular predictors were excluded from the analysis successively one by one and the contribution of each of them was assessed separately. Adjusted R^2 was computed for each substance. The significance of determination coefficient was tested with Fisher test. Semipartial correlation (Sr) explained predictor-independent contribution to criterion variance explanation.

Results

Almost two thirds (61.4%) of the students smoked cigarettes (Table 1). Every third student smoked cigarettes every day and 934 (38.6%) students did not smoke. The majority of students consumed beer (72.9%) and wine (73.1%) mostly occasionally, whereas 15.8% of the students have never consumed beer or wine. It was similar with the consumption of alcoholic beverages. The per-

centage of those who used illicit drugs was much lower (Table 1). Less than 14% of students used sedatives occasionally (a few times per year, per month, or per week), whereas 79.6% have never used sedatives. More than half of the students did not use marihuana, every tenth had experimented with it, and 23.6% used marihuana occasionally. Most students (94.6%) have never used cocaine, and 87 (3.6%) used it occasionally, 88.2% have never used amphetamine but 182 (7.5%) used it occasionally, 95.0% of students never have used LSD, and 57 (2.4%) used it once. Inhalants were slightly more frequently used than opiates and LSD but more than 90.0% of students have never used inhalants.

Table 1. Psychoactive substances abuse among Croatian adolescents in Primorsko-goranska County

Psychoactive substance	No. (%)* of examinees			
	experimented	occasional	every day	total (n=2,452)
Cigarettes	205 (8.5)	474 (19.6)	807 (33.3)	1,486 (61.4)
Beer	160 (6.6)	1,768 (72.9)	114 (4.7)	2,042 (84.2)
Wine	178 (7.3)	1,774 (73.1)	42 (1.7)	1,994 (82.2)
Alcoholic beverages	138 (5.7)	1,843 (76.2)	30 (1.2)	2,011 (83.1)
Sedatives	158 (6.5)	333 (13.6)	8 (0.3)	499 (20.4)
Marihuana	224 (9.2)	574 (23.6)	66 (2.7)	864 (35.6)
Cocaine	38 (1.6)	87 (3.6)	5 (0.2)	130 (5.4)
Amphetamine	97 (4.0)	182 (7.5)	6 (0.2)	285 (11.8)
LSD	57 (2.4)	59 (2.4)	4 (0.2)	120 (5.0)
Opiates	26 (1.1)	26 (1.1)	4 (0.2)	56 (2.3)
Inhalants	112 (4.6)	76 (3.1)	5 (0.2)	193 (8.0)

*Percentages were calculated using the number of valid answers. The percentages of missing data for the whole sample varied between 1.1% for beer and 1.7% for marihuana.

Regarding the gender and class distribution, we analyzed the most frequently consumed substances: tobacco, alcohol (beer, wine, and alcoholic beverages), sedatives, and marihuana (Table 2). These were the only psychoactive substances for which the frequency was high enough to permit such an analysis. Girls consumed significantly more cigarettes every day whereas boys consumed significantly more beer (Table 2). It was similar with the consumption of wine. Occasional consumption of alcoholic beverages was more frequent among girls. Girls used sedatives statistically more than boys whereas boys consumed had higher frequency of occasional and regular marihuana use.

Students were divided in two groups: junior group (1st and 2nd grade) and senior group (3rd and 4th grade). There were 1,392 (56.8%) junior students and 1,060 (43.2%) senior students. Statistically more senior students smoked cigarettes every day (Table 2). Substance use was more prevalent among senior students and they more often consumed beer, wine, and alcoholic beverages. Most of junior students have never used sedatives. Senior students used marihuana more.

Among the 4th grade students, cigarettes, beer, and wine were consumed mostly for the first time at the age of 12-13 and 14-15 (Table 3). Only every tenth student tried it later, at the age of 16 or more. Also 21.0% tried beer for the first

Table 2. Consumption of psychoactive substances according to examinees' gender and class

Psychoactive substance	No. (%)* of boys	No. (%)* of girls	χ^2	No. (%) of junior classes	No. (%) of senior classes	χ^2
Cigarettes:						
experimented	97 (8.6)	108 (8.4)		125 (9.1)	80 (7.6)	
occasional	197 (17.4)	277 (21.5)	15.260†	279 (20.4)	195 (18.6)	29.276‡
every day	359 (31.6)	448 (34.8)		395 (28.9)	412 (39.2)	
Beer:						
experimented	37 (3.3)	123 (9.5)		102 (7.4)	58 (5.5)	
occasional	884 (78.0)	884 (68.5)	162.217‡	967 (70.4)	801 (76.3)	12.500†
every day	99 (8.7)	15 (1.2)		64 (4.7)	50 (4.8)	
Wine:						
experimented	71 (6.3)	170 (13.2)		124 (9.0)	54 (5.2)	
occasional	859 (75.7)	915 (70.8)	34.593‡	961 (69.7)	813 (77.6)	22.297‡
every day	34 (3.0)	8 (0.6)		28 (2.0)	14 (1.3)	
Alcoholic beverages:						
experimented	54 (4.8)	84 (6.5)		97 (7.1)	41 (3.9)	
occasional	844 (74.4)	999 (77.7)	24.039‡	957 (70.0)	886 (84.2)	66.560‡
every day	25 (2.2)	5 (0.4)		20 (1.5)	10 (0.9)	
Sedatives:						
experimented	58 (0.5)	100 (7.7)		68 (4.9)	90 (8.5)	
occasional	127 (11.1)	206 (15.8)	21.139‡	172 (12.4)	161 (15.2)	18.589‡
every day	5 (0.4)	3 (0.2)		5 (0.4)	3 (0.3)	
Marihuana:						
experimented	104 (9.2)	120 (9.3)		116 (8.4)	108 (10.3)	
occasional	273 (24.1)	301 (23.3)	21.462‡	249 (18.0)	325 (31.0)	68.535‡
every day	49 (4.3)	17 (1.3)		33 (2.4)	33 (3.1)	

*Calculated values using the total number of boys, girls, junior and senior classes in the sample.
†Statistically significant, P=0.002.
‡ Statistically significant, P<0.001.

Table 3. Percentage of 4th grade students according to age of their first consuming of psychoactive substance (n=388)

Psychoactive substance	No. (%)* of examinees					
	never tested	<10 years	10-11 years	12-13 years	14-15 years	16 and more years
Cigarettes	60 (15.7)	48 (12.6)	30 (7.9)	92 (24.1)	111 (29.1)	40 (10.5)
Beer	14 (3.7)	80 (21.0)	53 (13.9)	98 (25.7)	96 (25.2)	40 (10.5)
Wine	13 (3.4)	66 (17.3)	64 (16.8)	94 (24.6)	96 (25.1)	49 (12.8)
Alcoholic beverages	15 (3.9)	20 (5.2)	22 (5.8)	80 (21.0)	144 (37.8)	100 (26.2)
Sedatives	254 (67.2)	5 (1.3)	3 (0.8)	11 (2.9)	49 (13.0)	56 (14.8)
Marihuana	147 (38.8)	1 (0.3)	3 (0.8)	10 (2.6)	95 (25.1)	123 (32.5)
Amphetamines	297 (78.0)	1 (0.3)	2 (0.5)		13 (3.4)	68 (17.8)

*Percentages were calculated using the valid answers. The percentage of missing data for the whole sample varied between 1.5% for wine and 2.8% for cocaine.

time when they were younger than 10 years of the age. Alcoholic beverages were consumed for the first time predominantly at the age of 14-15. Every third 4th grade student tried marihuana at the age of 16 or more, but 25.1% of students consumed it for the first time earlier, at the age of 14-15. In the Croatian schooling system, this means that the first contact with alcohol and tobacco usually happened during elementary school, and with marihuana during the first year of high school.

Predicting Abuse of Psychoactive Substance among Adolescents

In assessing risk and protective factors, we started the analysis with several reductions. The criteria variables were the consumption of cigarettes, alcoholic beverages, and illicit drugs. For better results interpretation we summed beer and wine in a single variable because of their similar social connotation and percentage of alcohol, and also all drugs except marihuana. In correlation analysis we used the indexes of consumption, which were calculated as the sum of indicators of every day consumption of a particular substance. Similarly, we calculated a unified measure for the quality of family relationships, peer influence, styles of free time, health status assessment, and system of personal values. The distribution normality was assessed with the Kolmogorov-Smirnov test. Positive relationship with mother and father, their support of autonomy, peer support, and system of values showed statistically significant negative asymmetric deviation, whereas other variables showed deviation to positive asymmetry ($P<0.05$). Whereas this was the representative sample of mostly-well functioning youth, more positive parent characteristics and fewer negative relationships with parents, negative peer influence and health symptoms were expected. Negative asymmetric deviation was also found for the variables of spending free either time at home or

going out because they often spent time at home but also went out, what is a way of life at that age.

The reliability of the scales was satisfactory (Cronbach $\alpha=0.70-0.86$). Because of lower values of the Cronbach α coefficient for some variables of the styles of spending free time, only organized entertainment and hanging out with friends were used as predictors in the analysis.

Correlation between Abuse of Psychoactive Substances and Particular Groups of Predictive Variables

We calculated the Spearman correlation coefficient for each group of predictive factors (Table 4). There was minimal positive correlation between all addictive resources consumption and negative relationship with father and mother. We found very low positive correlation between cigarette and alcoholic beverages consumption and peer support and very low negative correlation between drug consumption and system of values. There was a moderate correlation of addictive resources consumption with negative peer influence and ways of spending free time.

Discussion

Results of our cross-sectional study reflected a high prevalence of psychoactive substance abuse among adolescents in Primorsko-

Table 4. Spearman's correlation coefficients of predictive factors with use of cigarettes, alcohol, marihuana and other drugs among Croatian adolescents (Primorsko-goranska County)

Predictive factors	Spearman's correlation coefficients*				
	cigarettes	beer and wine	spirituous beverage	marihuana	drugs
Health state	0.18[†]	0.02	0.15[†]	0.17[†]	0.23[†]
Peer influence	0.59[†]	0.56[†]	0.53[†]	0.63[†]	0.43[†]
Leisure time	0.44[†]	0.43[†]	0.49[†]	0.44[†]	0.35[†]
Hanging out with friends	0.17[†]	0.28[†]	0.21[†]	0.24[†]	0.18[†]

*Calculated as the sum of indicators of occasional and every day consumption of the particular substance. Higher value indicates a higher correlation.
†Statistically significant, $P<0.01$.

goranska County, who make up 10% of Croatian students. One-third of adolescents, mostly girls, smoked cigarettes daily. Most adolescents consumed alcohol occasionally. Beer was consumed more than wine and other alcoholic beverages. Nearly half of the students experimented with illicit drugs, usually marihuana.

The frequency of daily smokers among junior class students in Primorsko-goranska County was higher than that found at the national level four years ago (3) and very similar to recent findings on the prevalence of substance use among adolescents in the capital Zagreb (4). There were more regular and occasional smokers among young women than among their male peers. There may be many reasons for this, such as the acceleration of growth and development, especially in girls, who try to achieve equality among genders and make friends with older boys by acquiring some of their habits (5). Regular abuse of alcohol is still more common among young men (3-7,22,23). Our study found even grater prevalence of alcohol abuse than a previous study. At the national level, there were fewer 1st grade students consuming beer (3). It is possible, however, that these differences are partly due to differences in methodology, especially sampling. There is an increase in "binge drinking" among girls (3), defined as taking five or more drinks one by one as an introduction to the evening entertainment. The excessive drinking may be a result of adolescents' desire to look and behave as adults, strong herding instinct (10), and their inclination towards rebellious behavior because parental and social monitoring is still stricter for girls than boys (12). Marihuana consumption frequency, although not the same, was similar to that on the national level (3) and to the results of the adolescents in the capital of Zagreb (4). Taking into account the excessive drinking among girls, higher sedative consumption among them was not surprising. Whereas there was no difference in substance use between urban and rural environment, sedative consumption is more common in urban area.

Our results support the findings of other authors (3,6,27) that adolescents were more likely to use substances when they associated with peers who used substances, did not receive enough parental monitoring and had poor family relationships. The results also suggested that spending time in unstructured social settings predicted sub-

stances use. It is in the fertile social leisure context, away from direct parental control, where adolescents seem most likely to experiment with who they are and confront developmental tensions: being an individual or one of the crowd, participating in healthy leisure or engaging in health compromising behaviors (4). Many authors argue that adolescents who received more warmth and control from their parents and whose parents had greater knowledge of their activities were more likely to internalize parental values and have the qualities (e.g. orientation towards school and away from deviance) that allowed them to select and be selected into friendship groups supportive of adult values (3,28). The strongest predictor of substance abuse in our study was negative peer influence, common to all addiction resources. Second common predictor for consumption of cigarettes, beer, and wine was gender and going out for, and in case of marihuana, the predictor was hanging out with friends. According to our findings, girls were more often regular smokers which differs from other authors' findings (3,4,6), whereas male gender was the predictor of drinking. Gender was not a determinant for marihuana consumption. Styles of spending free time, especially hanging out with friends and going out, represent another common predictor for the use of all substances. The importance of leisure time context as a significant factor in adolescents' risk behavior is well documented (8,17,26, 29). The tensions between developing autonomy, responding to peer pressure, and living up to parental expectations and rules are often manifested in social leisure context (4). Peterson (30) suggested that examining how adults structure or control the leisure activities of adolescents in an attempt to decrease the likelihood of participation in problem behaviors appears to be a productive line of inquiry.

There are some limitations to our study. The data were collected by means of self-responding questionnaire, relaying on the examinees' truthfulness. Second, the survey was applied on students who attended school and did not include adolescents who were outside regular schooling system. We also excluded from the study all adolescents who attended art schools and schools with special programs. Still, our data on the common predictors of smoking, drinking alcoholic beverages and marihuana consumption, could be important for programs for prevention of addic-

tion. Such a program should address all types of substance abuse and promote healthy life stiles.

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