

# Risk Behaviors for Getting HIV Infection among University Students in Serbia

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## ABSTRACT

*The objective of this study was to determine risk-taking behaviors for getting HIV infection among university students in Serbia. The study is based on a cross-sectional survey. Five hundred forty four undergraduate, first year students from two Belgrade universities were selected through random sampling, to answer a self-administrated anonymous questionnaire. Data were collected from 252 students from the Faculties of Medical Sciences, University of Belgrade (FMS) and 292 students from the Faculties of Arts, University of Arts Belgrade (FA). The differences between two groups of students and between students with risk and non-risk behavior were assessed by the  $\chi^2$  and *t*-test. Besides that, multivariate techniques such as factor analysis and multivariate logistic regression were used in statistical analysis. Smoking (Odds Ratio – OR=5.05, 95% Confidence Interval – CI=3.10–8.24), studying FA, (OR=4.17, 95%CI=2.69–6.46), male sex (OR=3.85, 95% CI=2.38–6.25), committing offences (OR=1.51, 95%CI=1.09–2.08) and older age (OR=1.31, 95%CI=1.10–1.55) were the most significant factors connected with the risk-taking behaviors for HIV transmission among the students. In conclusion, HIV prevention efforts must be sustained and designed to reach young people and to prevent patterns of risky behaviors before they start.*

**Key words:** students' behavior, cross-sectional study, risk-taking, HIV, Serbia

## Introduction

The most common and most frequent forms of risk-taking behavior of the young include: abuse of psychoactive substances (tobacco, alcohol, drugs), premature sexual intercourse, sexual behavior resulting in sexual transmitted infections (STIs), as well as unwanted pregnancy, promiscuity, physical inactivity and violence<sup>1,2</sup>. Each of these forms of behavior by itself leads to unwanted health consequences, but several of them together, grouped in clusters, with mutual correlation, pose a serious threat to health, with a tendency of growing into an »epidemics of risk behavior of the young«<sup>3</sup>.

Because sexual activity and some forms of risk-taking behavior are typically initiated in adolescence or early adulthood and because that period for many young people is characterized by greater amounts of experimentation, partner change, and risk-taking, than in later years,

research programs with a focus on the behavior of adolescents and young adults are of particular importance<sup>4</sup>.

The aim of this study was to find out which factors are the most significant ones for determining risk-taking behavior of the young university students in Serbia, as a basis for the possible HIV transmission.

## Subjects and Methods

### Participants

The group of students from the Faculties of Medical Sciences, University of Belgrade (FMS) consisted of a 10% random sample of the first year students (the total of 252 students) at the following four faculties: Faculty of Medicine (107 students), Faculty of Pharmacy (50 stu-

dents), Faculty of Dental Medicine (53 students) and Faculty of Veterinary Medicine (42 students).

The group of students from the Faculties of Arts, University of Arts Belgrade (FA) consisted of almost all first year students (the total of 292 students), from the following four faculties: Faculty of Music Arts (117 students), Faculty of Applied Arts (108 students), Faculty of Fine Arts (58 students) and Faculty of Dramatic Arts (9 students).

We used a cross sectional study design. All students have been questioned by linguistically validated Serbian version of the international questionnaire developed by HBSC (Health Behavior in School-Aged Children) research network<sup>5</sup>. Since the questionnaire was primarily intended to be answered by the school-aged children it has been slightly modified with permission of developers. The questionnaire consisted of questions relating to the following: basic socio-demographic characteristics of examinees, smoking habits (current smokers were those who had smoked at least one cigarette per day), alcohol consumption (those who had drunk alcohol beverage at least once a week were considered as current alcohol users), ways of communicating with close persons, socializing and friendship, planning of the free time, physical activity, sexual behavior, consumption of drugs, and violent behavior. The special emphasis was put on the questions referring to the behavior which may, directly or indirectly, cause a HIV transmission. The questionnaire was administered at the beginning of 2007/2008 school year by trained interviewers. In order to avoid selection bias, all students were questioned immediately upon completion of mandatory lectures or exercises, because the optional lectures are usually attended only by responsible and hard-working students. Written informed consent was obtained from the Faculties' principals and all participants.

#### *Statistical analysis*

Categorical variables were expressed as counts and percentages. Continuous variables were presented as mean  $\pm$  standard deviation ( $\bar{X} \pm SD$ ). The differences between groups of students were assessed by using  $\chi^2$  and t-test. After that the factor analysis was done. The next fourteen variables, representing risk factors for transmission of HIV, were included in the principal components analysis: non-use of condoms during sexual intercourse, number of sexual partners in the last year (4 and more), total number of sexual partners (5 and more), sexual intercourse under the influence of alcohol, early sexual intercourse (15 years of age or less), promiscuity – existence of parallel relationships, frequent drunkenness (4 times or more in a life), the existence of amnesia for the events and behavior during drunkenness, consumption of marijuana, hashish, ecstasy, alcohol with sedatives, cocaine and heroin. Varimax orthogonal rotation was used. The only one factor has been extracted explaining 65.9% of the cumulative variance. Values smaller than  $-0.42$  (the median of the factor scores, i.e. the cut-off value) indicate that students do not have a risk-taking behavior, while the scores bigger than  $-0.42$  mean that

they have a high risk-taking behavior. The factor scores have been divided into two groups, so that a group marked with code 0 consists of 237 students (43.6%), while the other group, marked with code 1 consists of 296 students (54.4%); where 0 denotes persons without or with minimum risk, and 1 denotes persons with greater or big risk. This produced a new dichotomous dependent variable – »risk/non-risk behavior« which we used in the multivariate logistic regression analyses.

The next independent variables related to demographic and socioeconomic characteristics of students were entered into the first model of multivariate logistic regression: sex, age, place of permanent residence before the studies (Belgrade or outside of Belgrade), the chosen group of faculties (FMS or FA), the family type during the studies, having own room, financial status of the family, satisfaction with the chosen faculty, and opinion on the excessive expectations of professors. The second multivariate logistic regression model included independent variables related to the students' habits and behavior: smoking, visiting »rave« parties, going to sleep after 2 am, feeling about life at present, going out with friends 3 and more times per week, attending 8 and more annual concerts, attending sport events, bitter quarrel with others, and committing offences. All significant variables from both models were entered into the final multivariate logistic method.

A two-tailed probability value of 0.05 or less was considered significant. Analysis was performed with the Statistical Package for the Social Sciences, SPSS, version 17.0 for Windows (SPSS Inc., Chicago, IL, USA).

## **Results**

The main characteristics of the study population, including risky sexual behavior are presented at Table 1. The students from the FA were older, more frequently from Belgrade, and more frequently smokers and alcohol drinkers. Two groups also differed according to a sexual behavior. The FA students were somewhat more likely to start their sexual career early than MFS students were, had more sexual partners, parallel relationships and sexual intercourse in drunkenness, while the MFS students used condom during sexual intercourse more often. Two groups did not differ according to sex.

Tables 2 and 3 show the differences between HIV risk-taking behavior and non-risk behavior of university students according to their demographic, socio-economic, and life style characteristics.

HIV risk-taking behavior was associated with male sex, Belgrade as a place of residence, studying FA, living with girlfriend/boyfriend or spouse, and with poor financial status of a family. In addition, those who were unsatisfied with the choice of the Faculty, and who did not think that professors expect too much from them had a greater risk of getting HIV/AIDS and other STIs (Table 2).

Some life style characteristics, such as smoking cigarettes, visiting rave parties, going to sleep after 2 am, go-

**TABLE 1**  
DEMOGRAPHIC CHARACTERISTICS, SMOKING AND DRINKING HABITS, AND RISKY SEXUAL BEHAVIORS OF THE STUDY POPULATION

Characteristic	Students from FMS	Students from FA	p value
Age ( $\bar{X}\pm SD$ )	19.04 $\pm$ 1.14	19.83 $\pm$ 2.14	
Age (range)	18–21	16–24	<0.001*
Sex (No, %)			
Males	74 (29.4)	108 (37.0)	
Females	178 (70.6)	184 (63.0)	0.068**
Place of residence (No, %)			
Belgrade	88 (34.9)	185 (63.4)	
Other	164 (65.1)	107 (36.6)	<0.001**
Smoking (No, %)			
Current smokers	63 (25.0)	116 (39.7)	
Nonsmokers	189 (75.0)	176 (60.3)	<0.001**
Alcohol consumption (No, %)			
Current alcohol users	39 (15.5)	103 (35.3)	
Non current alcohol users	213 (84.5)	189 (64.7)	0.007**
Age at first sexual intercourse ( $X\pm SD$ )	17.4 $\pm$ 1.1	17.0 $\pm$ 1.7	0.025*
No of lifetime sexual partners ( $X\pm SD$ )	2.5 $\pm$ 2.44	4.3 $\pm$ 6.11	0.002*
Sexual intercourse in drunkenness (No, %)			
Yes	27 (22.7)	95 (46.6)	
No	84 (70.6)	101 (49.5)	<0.001**
Condom use (No, %)			
Users	81 (68.1)	78 (38.8)	
Nonusers	38 (31.9)	123 (61.2)	<0.001**
$\geq 2$ sexual partners at the same time (No, %)			
Yes	16 (13.3)	49 (24.1)	
No	104 (86.7)	154 (75.9)	0.019**

FMS – Faculties of Medical Sciences, FA – Faculties of Arts, \*t-test, \*\* $\chi^2$ -test

ing out with friends 3 and more times per week, attending concerts 8 and more time annually, quarrel with others and committing offences were more frequent in the group with risk behavior (Table 3).

The results of the multivariate logistic regression (Table 4) show that factors which independently contributed to HIV risk-taking behavior were smoking (Odds Ratio – OR=5.05, 95% Confidence Interval – CI=3.10–8.24), studying FA (OR=4.17, 95%CI=2.69–6.46), male sex (OR=3.85, 95%CI=2.38–6.25), inclination towards criminal offences (OR=1.51 95%CI=1.09–2.08) and older age (OR=1.31, 95%CI=1.10–1.55). Smoking and studying FA bear the greatest risk.

## Discussion

The distribution of participants according to the sex shows that there were almost twice as many females among the examinees than males in our study (362 females and 182 males). This is in accordance with the data on the number of enrolled female and male students in

the 2007/2008 academic year at the FA and the MFS. The median age of our participants was 19.4 $\pm$ 1.6 years. According to the data from the literature, this particular age is attractive for researches connected with the risk-taking behavior<sup>1,2</sup>.

Adolescents and young adults are at an elevated risk for HIV infection and the other STIs because of their sexual behavior. They tend to practice multiple sexual partnerships and are at best inconsistent condom users<sup>6,7</sup>. Also they feel less susceptible to adverse outcomes associated with risk behaviors and are therefore at greater risk for HIV infection because they engage in unprotected sex, sex with multiple partners, injected drug users and in alcohol abuse. The nature of the partner and the partnership influence not just whether young person uses a condom but sexual behavior in general<sup>8</sup>.

Having multiple sexual partners (lifetime or over a recent time period) is significant behavioral risk factor for HIV infection<sup>1,9,10</sup>.

Multiple sex partner behavior is not uncommon among students. Usually males have more sexual partners than

**TABLE 2**  
HIV RISK-TAKING AND NON-RISK BEHAVIOR AMONG UNIVERSITY STUDENTS ACCORDING TO THEIR DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS

Characteristics		Non-risk behavior	Risk behavior	p value
Age		18.95 ± 1.19	19.83 ± 2.07	<0.001*
Sex	Males	42 (24.0%)	133 (76.0%)	<0.001**
	Females	195 (54.5%)	163 (45.5%)	
Place of residence	Belgrade	99 (37.1%)	168 (62.9%)	0.001**
	Others	138 (51.9%)	128 (48.1%)	
Faculty	FMS	159 (63.3%)	92 (36.7%)	<0.001**
	FA	78 (27.7%)	204 (72.3%)	
Live with	Parents	124 (41.3%)	176 (58.7%)	0.022**
	Girlfriend/boyfriend	2 (20.0%)	8 (80.0%)	
	Friend	41 (52.6%)	37 (47.4%)	
	Spouse	0	5 (100.0%)	
Having own room	Relative	30 (53.6%)	26 (46.4%)	0.093**
	Alone	38 (52.1%)	35 (47.9%)	
Financial status of the family	Yes	198 (84.3%)	230 (78.5%)	<0.001**
	No	37 (15.7%)	63 (21.5%)	
Satisfied with Faculty	Good	216 (91.9%)	19 (8.1%)	<0.001**
	Poor	230 (79.3%)	60 (20.7%)	
Professors expected to much	Yes	233 (45.7%)	277 (54.3%)	0.022**
	No	3 (17.6%)	14 (82.4%)	
	Yes	64 (64.0%)	36 (36.0%)	<0.001**
	No	61 (35.7%)	110 (64.3%)	

FMS – Faculties of Medical Sciences, FA – Faculties of Arts, \*t-test, \*\* $\chi^2$ -test

females and in general they are more sexually active than females<sup>11–13</sup>. Engaging in multiple partnerships may be a main way that young men try to validate themselves and negotiate their identity among their peers<sup>14</sup>. Nshindano and Maharaj<sup>15</sup> reported that between 10% and 30% of sexually active young university students in Lusaka, Zambia have more than one sexual partner at a given time, with men being more likely than women to engage in concurrent multiple partnerships. Our research showed an association between HIV risk-taking behavior and male sex.

Older students are more exposed to the risk of HIV infection due to increased number of sexual partners and consequently more sexual experience and more sexual freedom. This is particularly widespread among the FA students as they are in average older than their colleagues from the other faculties. This could be mostly explained by the fact that they manage to enrol in the faculty after second, third or fourth attempt as the enrol quota for the FA is usually very small (meaning that quite often it takes several years before they become freshmen), and also by their casual, extravagant and free life style.

According to our results smokers had a greater risk of getting HIV infection. In addition to the negative, direct consequences of cigarette smoking, literature data have shown that young smokers often engage in other risky

behaviors that put them at an increased risk for HIV infection<sup>16,17</sup>. When a young person starts to smoke it is an alarm that he or she may get involved in other risk taking behaviors (early initiation of sexual activity and multiple sexual partners, delinquency, poor academic performance, violence, drug use)<sup>18</sup>.

Tobacco is considered a »gateway drug« because young people who smoke will often experiment with other drugs thereafter<sup>19</sup>. The results of the Bolivian study<sup>18</sup> have shown that students who had smoked were significantly more likely to have used alcohol, steroids, ecstasy, methamphetamines, heroin, cocaine, and/or marijuana than those who had not smoked. In the same study cigarette smoking was consistently higher among those who had experimented with drugs or alcohol at least once.

Such findings reflect those of numerous other studies that document an association between cigarette smoking and substance abuse among adolescents<sup>20–22</sup>. The link between drug abuse and risk of getting HIV infection is well known<sup>23,24</sup>.

Findings also indicate that adolescents who smoke are at an increased risk for early initiation of sexual activity<sup>25,26</sup>, which can lead to elevated risk for HIV infection<sup>27</sup>.

Alcohol use among youths is prevalent worldwide and it is usually associated with other risk behaviors<sup>28,29</sup>. The habit of a frequent and excessive consumption of alco-

**TABLE 3**  
HIV RISK-TAKING AND NON-RISK BEHAVIOR AMONG UNIVERSITY STUDENTS ACCORDING TO THEIR LIFE STYLE

Behavior		Non-risk behavior	Risk behavior	p value*
		N (%)	N (%)	
Smoking (duration)	≥ 2 years	16 (13.6)	102 (86.4)	0.003
	≤ 2 years	20 (32.3)	42 (67.7)	
Smoking (no. of cigarettes)	≥ 20/day	0	29 (100)	0.009
	≤ 20/day	33 (22.9)	111 (77.1)	
Visiting rave parties	Yes	56 (29.8)	132 (70.2)	<0.001
	No	179 (53.1)	158 (46.9)	
Going to sleep after 2 am	Yes	11 (25.0)	33 (75.0)	<0.001
	No	280 (57.3)	209 (42.7)	
Feeling about his/her own life	Very happy	34 (14.5)	59 (20.6)	0.080
	Mostly happy	183 (77.8)	195 (67.9)	
	Unhappy	15 (6.4)	25 (8.7)	
Going out with friends 3 and more times per week	Very unhappy	3 (1.3)	8 (2.8)	<0.001
	Yes	47 (29.7)	111 (70.3)	
Attending 8 and more concerts annually	No	210 (57.8)	153 (42.2)	<0.000
	Yes	37 (30.6)	83 (69.4)	
Attending sport events in the last 3 months	No	221 (54.2)	187 (45.8)	<0.001
	Yes	135 (60.3)	89 (39.7)	
Quarrel with others	No	125 (40.5)	184 (59.5)	<0.001
	Yes	83 (35.5)	151 (64.5)	
Committing offences	No	130 (55.8)	103 (44.2)	<0.001
	Yes	33 (23.4)	108 (76.6)	
	No	152 (54.9)	125 (45.1)	<0.001

\* $\chi^2$ -test

**TABLE 4**  
FACTORS THAT CONTRIBUTE TO THE STUDENTS HIV RISK-TAKING BEHAVIORS – RESULTS OF THE MULTIVARIATE LOGISTIC REGRESSION ANALYSIS

Variable	OR	95% CI	p value
Sex	3.85	2.38–6.25	<0.001
Age	1.31	1.10–1.55	0.002
Type of Faculty	4.17	2.69–6.46	<0.001
Smoking (no, yes)	5.05	3.10–8.24	<0.001
Committing offences (no, yes)	1.51	1.09–2.08	0.011

OR – Odds Ratio, CI – Confidence Interval

hol increases the probability of risk-taking behavior, and leads to abuse of alcohol, loss of control, non-critical and deviant behavior, drug use and irresponsible sexual behavior<sup>30,31</sup>. Further it leads to higher risk for STIs including HIV infection<sup>32</sup>.

Several studies have identified an association between drug and alcohol abuse<sup>33,34</sup>. Youth may unintentionally put themselves at risk of acquiring HIV infection by engaging in sexual activity while under the influence of drugs or alcohol. In this scenario, youth may fail to use condoms and perhaps select particularly high-risk sexual

partners<sup>35</sup>. There is also a direct risk of HIV transmission associated with sharing needles that are used to inject intravenous drugs<sup>36,37</sup>.

According to CDC results 22% of high school students who had sexual intercourse during the past three months drank alcohol or used drugs before last sexual intercourse<sup>3</sup>.

Mataure et al.<sup>38</sup> examined alcohol use and sexual risk behavior among adolescents and young adults intercepted at drinking venues in Harare, Zimbabwe. According to the results of their study 42% of females and 32% of males reported having had sex under the influence of alcohol.

The results of Ethiopian study of alcohol use among a national sample of in-school and out-of-school youth have shown that there was a significant association between alcohol intake and unprotected sex, with those using alcohol daily having a three fold increased risk compared to those not using it<sup>39</sup>.

The results of Chilean study conducted among health sciences students have shown that 61% participants having had unsafe sex after alcohol or drug use<sup>40</sup>.

In our study, questions on sexual intercourse under the influence of alcohol, frequent drunkenness (4 and more times) and existence of amnesia for the events and

behavior during drunkenness were variables including in factor analysis and influencing the cut-off value of the »factor score« for ranking students into two groups: risk-taking behavior and non risk behavior.

Our research also showed that visiting concerts 8 and more times annually is significantly associated with risk behavior among students. This could be explained by the fact that young people significantly abuse alcohol and drugs during concerts, especially during rock concerts<sup>41</sup>, and hence are more likely to engage in behaviors that place them at risk for contracting HIV.

According to the results of our study, an inclination towards criminal offences is significantly connected with the risk behavior of students. Also, each third participant in our study has tried some kind of drugs, and almost one half of those who have tried them once, have been continually using them. Since it is a fact that those who abuse drugs very often, due to the need for drugs, commit criminal offences in order to get money to buy drugs, it could explain the significance of these offences and their connection with risk-taking behavior for the HIV transmission among our examinees.

There are several limitations of this study. First, we cannot establish a cause-and-effect association from the cross-sectional data gathered. Other limitation was the possibility of recall bias when students responded to questions such as age at first intercourse, number of sexual partners etc. Finally, a sample size in our study was small as compared to the total number of Belgrade students and our finding cannot be generalized to the whole students' population. Nevertheless, this study provides

relevant information for a better understanding of risk-taking behaviors for HIV among Belgrade university students.

The results of this study have shown that there are seldom isolated forms of risk-taking behaviors among the students and that much more often we face a mixture of them, which increase the risk of getting HIV/AIDS and other STIs. Smoking, studying at the FA and male sex have turned out to be the most significant factors connected with the risk-taking behavior for the HIV transmission among the student population.

The fact that treatment and rehabilitation of the HIV positive persons are laborious and complex processes with limited possibilities, emphasizes even stronger the necessity to turn to primary prevention programs with more zest, in order to include the young people before they adopt certain forms of risk-taking behavior.

Understanding and addressing the relationships between different risk behaviors and HIV infection is critical in protecting the health of adolescents and in improving the health outcomes of the whole population. Students like other young people need information, life skills based health education and access to »youth friendly« services, still lacking in Serbia, to assist them in healthy transition to adulthood.

## Acknowledgements

This work was supported by the Ministry of Education, Science and Technological Development of Serbia, through Project No 175025.

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## RIZIČNO PONAŠANJE KOD DOBIVANJA HIV INFEKCIJE MEĐU STUDENTIMA U SRBIJI

### SAŽETAK

Cilj ovog istraživanja bio je ustvrditi preuzimanje rizičnog ponašanja pri HIV infekciji među studentima u Srbiji. Istraživanje se temelji na cross-sectional anketi. Odabrano je 544 preddiplomskih studenata prve godine Beogradskog sveučilišta kroz nasumično uzorkovanje za odgovor samo-administrirajućeg anonimnog upitnika. Podaci su prikupljeni od 252 studenata Fakulteta medicinskih znanosti sveučilišta u Beogradu (FMS), 292 studenata Fakulteta likovnih umjetnosti (FA). Razlike između navedene dvije grupe studenata i između studenata sa rizičnim i ne-rizičnim ponašanjem su ocijenjeni pomoću  $\chi^2$  i t-testa. Osim toga, u statističkoj analizi korištene su multivarijante tehnike poput faktorske analize i multivarijantne logističke regresije. Pušenje (omjer izglednosti – OR=5,05, 95% interval pouzdanosti – CI= 3,10–8,24), studiranje FA, (OR=4,17, 95% CI=2,69–6,46), muški spol (OR=3,85, 95% CI=2,38–6,25), počinjena kažnjena djela (OR=1,51, 95% CI = 1,09 – 2,08) i starija dob (OR = 1,31, 95% CI = 1,10–1,55) pokazali su se kao najznačajniji čimbenici povezani sa preuzimanje rizičnog ponašanja za prijenos HIV-a među studentima. U zaključku, napori pri prevenciji HIV-a moraju biti kontinuirani i osmišljeni kako bi doprijeli do mladih ljudi i time spriječili obrascе rizičnog ponašanja prije nego što započnu.