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ORIGINAL ARTICLE / ОРИГИНАЛНИ РАД

Consumption of cigarettes, alcohol and energy drinks associated with academic performance and socioeconomic status of medical students

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SUMMARY

Introduction/Objective University students from low-income families may face many challenges during their studies, which may affect their academic experience and outcomes. The aims of this study were to assess some lifestyle characteristics and academic performance of medical students and their relationship to family income.

Methods A cross-sectional study included 2551 undergraduate medical students at the Faculty of Medicine, in Belgrade, Serbia.

Results According to multivariate analysis, in comparison with students from families with income lower than two national average salaries, students with higher family income significantly more frequently finished gymnasium before the Faculty of Medicine, more frequently were in emotional relationships, were more frequently smokers and alcohol and energy drink consumers, and less frequently reported academic pressure.

Conclusion The present study emphasizes that socioeconomic status is not associated with the academic success of undergraduate medical students. Students from higher status feel less academic pressure, they more often consume cigarettes, alcohol, and energy drinks, and they are more likely to have an urban background and have highly educated parents who work as private company employees, which can be indicators of the specific economic climate in Serbia. Further studies are needed to strengthen evidence-based decision-making.

Keywords: alcohol consumption; cigarette smoking; energy drinks; epidemiology; medical students

INTRODUCTION

The Sustainable Development Goals, a set of 17 global goals adopted by all United Nations member states in October 2015, include reducing poverty in all its forms, reducing inequalities within and between countries, and ensuring inclusive and equitable quality education for all [1]. According to the World Bank, the Republic of Serbia is classified as an upper-middle-income country [2].

Income inequality in Serbia is one of the highest in Europe and higher than in any other member of the European Union. Socioeconomic and cultural backgrounds are related to students' lifestyle habits, perceived stress, and academic performance [3–7]. University students from low-income families may face many challenges during their studies, which may affect their academic experience and outcomes. Furthermore, the quality of life of medical students from the University of Tabriz in Iran has a positive correlation with family income [8]. Past research has shown that students from higher socioeconomic status (SES) are more likely to have higher-educated parents, which can be correlated with better parental support during the education process [9]. Additionally, family income can influence career aspirations. People with low SES more often have doubts about attending a faculty of medicine [10]. Also, a study conducted among Australian medical students found that students with very low and very high SES have less intention to work in low SES or medically inaccessible areas [11]. In addition, SES can be associated with students' mental health issues and substance use [12, 13, 14].

The aim of this study was to examine some characteristics, lifestyle, and academic performance of medical students in Belgrade, and their relationship to family income.

METHODS

Study participants

A cross-sectional study was conducted among undergraduate students at the Faculty of Medicine, University of Belgrade, one of the largest schools for the training of physicians in

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Southeastern Europe, founded in 1920 in Belgrade, the capital of Serbia. It is part of the University of Belgrade, which was included among the top 500 universities according to the Academic Ranking of World Universities [15, 16]. The sample included 2551 medical students from all six study years with an overall response rate of 81.8%. The self-administered questionnaires were distributed during classes or practical sessions during clinical training. Students were asked to answer questions completely anonymously, after an explanation of the aim of the research. It took participants approximately 10 minutes to complete the questionnaire. We classified participants into two categories, depending on whether their family income was lower or higher than two average salaries in Serbia (88,000 RSD) or 2 × US$380 per month (adjusted net national income per capita) [17].

Data collection

The questionnaire

The questionnaire was constructed by the authors after a comprehensive literature search, and it contained questions about sociodemographic characteristics (gender, urban/rural background, family income, accommodation during the study, relationship status, parental education levels), lifestyle and personal characteristics (smoking, coffee, alcohol and energy drink consumption, average sleep duration, excessive spare time, academic achievement, and self-reported stress and pressure), and the Rosenberg self-esteem scale, a measurement test for self-esteem level widely used in behavioral and social research. The scale was designed by Morris Rosenberg, an American sociologist and social psychologist [18]. The questionnaire was composed of Likert-type scale questions.

The current smoker is defined as a person who has been smoking every day or several times a week, and who has smoked to date at least 100 cigarettes. Alcohol, coffee, and energy drink consumption, as well as self-reported stress, excessive spare time, and parental and academic pressure, were analyzed as yes/no variables.

Data analysis

Categorical variables (nominal and ordinal) were expressed as absolute and relative frequencies. For statistical analysis, we used SPSS version 17.0 for Windows. Univariate and multivariate logistic regression methods were applied to identify the independent variables associated with family income. Variables were selected for entry into the multivariate logistic regression model if they were significant in the univariate analysis with a $p \leq 0.1$. Results are expressed as an odds ratio (OR) with 95% confidence interval (CI) for the exponentiated regression coefficient (B).

Ethics: The study was reviewed and approved by the Ethics Committee of the Faculty of Medicine, University of Belgrade, Belgrade, Serbia (No. 1322/VII-45). Participants were recruited at the Faculty of Medicine, University of Belgrade.

RESULTS

The questionnaire was completed by 530 first-year students (response rate 93.1%), 470 second-year students (response rate 82.7%), 302 third-year students (response rate 61.7%), 459 fourth-year students (response rate 85.6%), 394 fifth-year students (response rate 75%), and 396 sixth-year students (response rate 91.9%). Some demographic and socioeconomic characteristics of the respondents are listed in Table 1. Female students made the majority of the sample (66.2%), as well as students who had an urban background (85.4%) and who had a grade point average (GPA) ≥ 8/10 (58.4%). Most of them came from families who had a monthly income lower than two national average salaries (61.8%) and whose parents worked as government employees (58.6%).

Table 1. Demographic and socioeconomic characteristics of medical students in Belgrade

Characteristics	Frequency	Percentage (%)
Gender		
Female	1690	66.2
Male	861	33.8
Class level		
First-year	530	20.8
Second-year	470	18.4
Third-year	302	11.8
Fourth-year	459	18
Fifth-year	394	15.4
Sixth-year	396	15.5
Original background		
Urban area	2179	85.4
Rural area	327	14.6
Average family income		
< Two national average salaries	1577	61.8
≥ Two national average salaries	944	38.2
The main source of family income		
Government employee	1494	58.6
Private company employee	828	32.5
Both	229	9

Table 2 displays differences between students from families who had a monthly income greater than the national average and students who came from a family with less income, which were analyzed by univariate logistic regression with $p \leq 0.1$ as the significance threshold. Students from higher-income families were significantly more likely to be male, to finish gymnasium before medical school, to have a GPA ≥ 8/10, to live in a private apartment during the academic term, and to be in a relationship. Furthermore, urban background, business or private company as major source of family income, and highly educated parents were significantly associated with descent from affluent families. Table 3 presents personal habits and perception of stress, pressure, and self-esteem. Being from higher-income families was significantly related to ≥ 6 hours average sleep duration, having too much spare time, and to consumption of cigarettes, alcohol, and energy drinks. Higher income was

Table 2. Characteristics of medical students in Belgrade according to socioeconomic status

Variable	Average monthly family income				p-value*
	< 88,000 RSD**		≥ 88,000 RSD†		
	Frequency	Percentage (%)	Frequency	Percentage (%)	
Gender					
Female	1080	68.5	610	62.6	0.002
Male	497	31.5	364	37.4	
High school					
Gymnasium	949	60.2	808	83.0	< 0.001
Medical high school	628	39.4	166	17.0	
Grade point average					
≥ 8/10	896	56.8	595	61.1	0.034
< 8/10	681	43.2	379	38.9	
Original background					
Urban area	1274	80.8	905	92.9	< 0.001
Rural area	65	19.2	69	7.1	
Accommodation during study					
Private apartment	1114	70.6	906	93.0	< 0.001
Dorm	463	29.4	68	7.0	
The main source of family income					
Government employee (at least one parent)	1470	93.2	852	87.5	< 0.001
Business / a private company employee	107	6.8	122	12.5	
Mother's education level					
Incomplete primary, primary and secondary	855	54.2	209	21.5	< 0.001
Higher	722	45.8	765	78.5	
Father's education level					
Incomplete primary, primary and secondary	780	49.5	182	18.7	< 0.002
Higher	797	50.5	792	81.3	
Relationship status					
In emotive relationship	693	43.9	497	51.0	< 0.001
Single	884	56.1	477	49.0	

RSD – Republic of Serbia dinars;
*according to univariate logistic regression analysis;
**< two national average salaries;
†≥ two national average salaries

Table 3. Lifestyle, perception of stress, pressure, and self-esteem among medical students in Belgrade, according to socioeconomic status

Variable	Average monthly family income				p-value*
	< 88,000 RSD (€715)**		≥ 88,000 RSD† (€715)		
	Frequency	Percentage (%)	Frequency	Percentage (%)	
Current smoker	282	17.9	271	27.8	< 0.001
Alcohol consumption	1020	64.7	754	77.4	< 0.001
Energy drinks consumption	586	37.2	396	40.7	0.078
Daily coffee consumption	884	56.1	572	58.7	0.186
Average sleep duration					
< 6 hours	686	43.5	374	38.4	0.011
≥ 6 hours	891	56.5	600	61.6	
Self-reported stress	1117	70.8	656	67.4	0.064
Self-reported excessive spare time	162	10.3	123	12.6	0.067
Self-reported pressure from parents	243	15.4	169	17.4	0.196
Self-reported academic pressure	1208	76.6	712	73.1	0.047
Low self-esteem	195	12.4	93	9.5	0.029

RSD – Republic of Serbia dinars;
*according to univariate logistic regression analysis;
**< two national average salaries;
†≥ two national average salaries

negatively associated with self-reported stress, academic pressure, and low self-esteem.

The results of a multivariate logistic regression analysis, which included significant variables from the univariate logistic regression, are shown in Table 4. According to multivariate analysis, in comparison with students from families with income lower than two national average salaries, students with higher family income significantly more frequently finished gymnasiums before medical school, had urban backgrounds, lived in a private apartment during the academic term, both parents worked as private company employees, and had highly educated parents.

Table 4. Factors associated with high family income of medical students in Belgrade (multivariate logistic regression analysis)

Characteristic (high/low family income)	Odds ratio	95% CI	p-value
Finished the gymnasium before the medical faculty	1.9	1.52–2.38	< 0.001
Urban background	1.65	1.21–2.23	0.001
Living in an apartment during faculty	4.22	3.17–5.62	< 0.001
Both parents work as private company employees	1.65	1.21–2.24	0.001
Highly educated mother	2.19	1.76–2.72	< 0.001
Highly educated father	2.29	1.83–2.86	< 0.001
Being in an emotive relationship	1.33	1.11–1.60	0.002
Being smoker	1.48	1.20–1.82	< 0.001
Alcohol consumption	1.48	1.19–1.85	< 0.001
Energy drinks consumption	1.27	1.05–1.54	0.013
≥ 6 hours average sleep duration	1.287	1.068–1.550	0.008
Academic pressure	0.74	0.92–0.60	0.005

They also were significantly more frequently in emotional relationships, were more frequently smokers and alcohol and energy drinks consumers, their average sleep duration was more frequently ≥ 6 hours, and they less frequently reported academic pressure.

DISCUSSION

The primary purpose of this study was to determine income-related characteristics among medical students in Belgrade. Consistent with the previous literature, our survey showed that students from lower SES are more likely to enroll in a vocational high school such as a medical high school, while higher-income students are more likely to enroll in a gymnasium – academic profile high school [19, 20].

We found that students from higher SES more often have an urban background and have highly educated parents and parents who work as private company employees. We believe that this background difference can align with the large regional disparities in Serbia in terms of socioeconomic conditions [21].

Univariate logistic regression analysis shows that students from higher SES have better academic performance, but the multivariate model didn't find this association, which was contrary to many previous studies [3, 4, 6]. This can be explained by the fact that we used only the GPA as an indicator of academic success. The GPA is a criterion for students' benefits in Serbia, such as a dormitory place or scholarships, which can motivate students from a family with lower income to learn more. Our study showed that students from lower SES are more likely to live in a dormitory (Table 4). We consider that this motivation for benefits can also be associated with increased pressure among students from a family with a lower income. According to the results of this survey, students from higher SES experience university life more comfortably. They more often answered that they did not feel academic pressure, that they slept ≥ 6 hours, and that they were in an emotional relationship (Table 4). Jury et al. [3] described in the literature review that lower-income students face psychological barriers, such as emotional distress and fear of failure. Past research also indicates that students from lower SES are at increased risk for depression and other mental health issues [12, 22, 23]. Counts et al. found a connection between low childhood SES and poor sleep quality of college students [24, 25].

In line with previous studies, our survey shows that higher income is associated with an increased rate of alcohol consumption among students and other young adults [26–29]. Higher income can also be related to other substance uses [14, 27]. The Balkan region, where Serbia is located, is characterized by the fact that people with a better financial situation are more likely to consume cigarettes [27]. Moreover, we have already described that students from high SES go through university with less academic pressure.

Magid et al. [30] consider smoking primarily as a social activity, and they also stated that stressful academic situations can distance students from situations where they can come in contact with cigarettes. This study may be subject to certain limitations. The survey was conducted at only one institution in the country and at only one faculty of the University of Belgrade. Also, students who have paused their studies or left the University were not included. Data about family income and other characteristics were based on self-reports, which can lead to recall bias. Another possible limitation could be information bias due to the classification of participants based on self-reports.

CONCLUSION

In summary, this study highlights that socioeconomic status is not associated with the academic success of undergraduate medical students, but students from higher status feel less academic pressure and feel more comfortable during university. They also more often consume cigarettes, alcohol, and energy drinks. Students from higher SES are more likely to have an urban background, to have highly educated parents and parents who work as private company employees, which can be indicators of the specific economic climate in Serbia. University authorities and policymakers should ensure a level playing field for all students, regardless of background. More studies need to be conducted in order to strengthen the implementation of evidence-based decisions.

Conflict of interest: None declared.

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Повезаност конзумирања цигарета, алкохола и енергетских пића са академским успехом и социоекономским статусом студената медицине

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САЖЕТАК

Увод/Циљ Студенти из породица са ниским приходима могу се суочити са многим изазовима током студија, што може утицати на њихово академско искуство и резултате. Циљеви ове студије били су да се процене одређене карактеристике начина живота и академски успех студената медицине и њихов однос са породичним приходима.

Методе Студија пресека обухватила је 2551 студента основних студија медицине на Медицинском факултету у Београду, Србија.

Резултати Према мултиваријантној анализи, у поређењу са студентима из породица са приходима нижим од две просечне националне плате, студенти са вишим породичним приходима значајно чешће завршавају гимназију пре медицинског факултета, чешће су у емотивним везама, чешће су пушачи и конзументи алкохола и енергетских пића, а ређе пријављују академски притисак.

Закључак Ова студија наглашава да социоекономски статус није повезан са академским успехом студената медицине. Студенти са вишим статусом осећају мањи академски притисак, чешће конзумирају цигарете, алкохол и енергетска пића, вероватније је да су градског порекла и да имају високообразоване родитеље који су запослени у приватним компанијама, што могу бити показатељи специфичне економске климе у Србији. Потребно је спровести додатне студије како би се ојачала примена одлука заснованих на доказима.

Кључне речи: конзумирање алкохола; пушење цигарета; енергетска пића; епидемиологија; студенти медицине