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# Academic burnout syndrome among medical students in Serbia: prevalence of high risk and determinants

Irena Ilic<sup>1</sup> and Milena Ilic<sup>2\*</sup>

## Abstract

**Background** Although burnout syndrome has been described in numerous research studies, the data on burnout syndrome among medical students in developing countries is scanty. This study aimed to determine the prevalence of high-risk for burnout syndrome and its associated factors among university undergraduate medical students in Serbia.

**Methods** An observational, analytical, cross-sectional study was conducted using the Maslach Burnout Inventory-Student Survey and a survey on associated factors. The research was carried out from February to March 2014. Multivariate logistic regression was used to determine the adjusted odds ratio (Odds Ratio, OR) with 95% Confidence Interval (95%CI) in order to identify independent correlates of high risk of burnout syndrome.

**Results** A high risk for burnout syndrome was noted in 15.0% of respondents; that is, 114/760 medical students suffered from high emotional exhaustion, high cynicism, and low academic efficiency. According to the results of multivariate logistic regression, the main significant independent correlates of high risk for burnout syndrome in medical students were: age of students (for aged 22–24: adjusted OR=5.64, 95%CI=2.58–12.34,  $p < 0.001$  for aged  $\geq 25$ : adjusted OR=5.65, 95%CI=2.08–15.39,  $p = 0.001$ ) with  $p$  for trend  $< 0.001$ , higher frequency of alcohol consumption (for habit 1–2 times a week: adjusted OR=2.01, 95%CI=1.01–4.03,  $p = 0.048$ ) with  $p$  for trend=0.025, and use of sedatives (adjusted OR=3.44, 95%CI=1.31–9.04;  $p = 0.012$ ).

**Conclusion** The present study identified several factors associated with burnout syndrome in Serbian medical students. Some factors associated with the high risk of burnout syndrome in medical students are modifiable. It is important to carry out similar research on burnout syndrome in the future, especially using longitudinal studies, in order to evaluate the associations found in this cross-sectional study.

**Keywords** Burnout syndrome, Risk factors, Medical students, Cross-sectional study

## Introduction

Burnout syndrome in students is a psychological term for long-term emotional exhaustion, a gradual decline in interest in studies, and a decrease in academic efficiency, which occurs due to prolonged stress during studies [1]. Burnout syndrome is specific in particular for occupations characterized by working with people in emotionally demanding situations and represents a triad of symptoms that include emotional exhaustion, cynicism and reduced professional efficiency [2].

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Emotional exhaustion refers to an individual's assessment that his emotional strength has been exhausted beyond limits. Depersonalization (cynicism) refers to developing a callous and cynical attitude towards the people who receive the service/patients and a negative attitude towards studying. The feeling of reduced personal achievement refers to a negative self-assessment of competencies and achievements in studies [3–5].

Previous research shows that medical students are in study groups with very stressful studies. As such, they may be at an increased risk for burnout syndrome [6]. The highly competitive medical faculty entrance exam, along with difficult transitions from preclinical to clinical training, the reality of dealing with critically ill patients with a poor prognosis are traditional stressor patterns in the life of most medical students [7]. For medical students, developing excellent skills and fulfilling the requirements to be good experts is a challenge. One of the sequelae of efforts accompanying medical education is academic burnout or burnout syndrome [8]. Studies have shown that the occurrence of at least one symptom of burnout syndrome in medical students can cause negative effects that not only interfere with teaching/learning, but also cause sleepiness, emotional instability, serious professional and personal consequences, including lack of professionalism (e.g., altruism or self-control, and serious thoughts of dropping out of studies) [9–14]. Quantitative studies of the burnout syndrome have been possible due to the development of reliable and valid instruments [15...]. Although other instruments for the assessment of burnout syndrome in medical students have appeared in the meantime, the Maslach Burnout Inventory - Student Survey (MBI-SS) remains the “gold standard” for burnout assessment [3].

Some recent systematic literature reviews and meta-analyses showed that about one out of two medical students worldwide have burnout syndrome [15–17]. The authors noted a slightly higher prevalence of burnout syndrome among medical students in countries in Oceania and the Middle East than in other areas. On the other hand, some authors indicated that the pooled prevalence of burnout syndrome among medical students in low- and middle-income countries was 12.1% [18]. Overall, the prevalence of burnout syndrome in medical students has shown a wide range from 2 to 76% [19–22]. The authors reported marked heterogeneity in the results between countries of different economic statuses, with different applied research instruments, cutoff criteria for burnout syndrome, etc. [18, 19, 22, 23]. Several studies of the prevalence of burnout syndrome in medical students have been conducted in Serbia [24–26], but only

one applied the validated MBI-SS questionnaire in the research [27].

A variety of demographic factors correlate with burnout syndrome in medical students, including age, sex, whether the student came from an urban or rural setting, marital status, and the number of children, although the findings were not consistent [8, 16, 19, 28]. In addition, burnout levels were associated with medical students' maternal education [29]. Numerous studies identified that senior students experience high levels of burnout, with third and fourth-year students reporting significantly higher scores than younger students [30]. Some authors reported a statistically significant positive correlation between burnout syndrome and a lower grade point average [31]. The use of recreational drugs (like marijuana and tramadol) was noted in medical students who had higher burnout scores and reported the presence of a chronic illness and alcohol consumption [22, 32]. This study aimed to examine the prevalence of high risk for burnout and identify factors associated with high risk for burnout in medical students.

## Methods

### Setting

The study was carried out at the Faculty of Medical Sciences of the University of Kragujevac, Serbia. The Faculty of Medical Sciences in Kragujevac is the youngest state medical faculty in Serbia, founded in 1977. The study program at integrated academic medical studies is organized through blocks (semesters), and medical studies consist of 12 blocks. Teaching by courses is realized through lectures, exercises, other forms of teaching and professional practice lasting six years. The teaching process is carried out using interactive programs oriented towards students, conditions are provided for greater engagement of students during lectures, with constant checking of their knowledge. A relatively small number of students are enrolled in medical studies (only 96 students in recent years), in order to reach the set quality standards of the program. In order to obtain the professional title of the doctor of medicine, a student must pass 35 compulsory and 6 optional courses (out of 15 offered), complete professional practice and defend a diploma (final) thesis. The research was carried out from February to March 2014, and the survey was conducted in the amphitheater and lecture halls at the Faculty of Medical Sciences in Kragujevac. Before the start of the survey, medical students were given a presentation on “burnout syndrome”, with detailed information about this research. All medical students enrolled in the academic year were invited to participate in the study through a direct personal verbal approach by the researcher. Then the students were given a questionnaire, which contained written information

about all details of the research, a form for voluntary informed consent, and a questionnaire. Data collection was carried out during the regular curriculum, while students attended routine activities (theoretical activities), i.e. outside the evaluation period of the curriculum. The researcher (the first author of this paper) was present all the time during the survey, to whom the students could ask questions or turn to for help in order to resolve any doubts related to the survey. Only limited demographic data was collected in this survey, to ensure the anonymity of respondents and to encourage participation and honest responses to the survey.

### Study design

An epidemiological study was conducted using a cross-sectional design to assess the prevalence of high-risk for burnout and its associated factors in medical students (STROBE checklist – Additional file 1).

### Study population

The research included all medical students at the Faculty of Medical Sciences of the University of Kragujevac (including both regular and repeat-year students) from all six years of study.

### Study sample

All students enrolled in all six academic years of undergraduate medical studies at the Faculty of Medical Sciences in Kragujevac were invited to participate in the survey through a direct personal verbal address by the researcher. Data collection was carried out during the regular curriculum while students attended routine activities (theoretical activities), i.e., outside of the evaluation period of the curriculum. The criteria for the inclusion of subjects in the study were that they are of age 18 or over, that they attend regular classes, that they have been given voluntary written consent to participate in the study. The criteria for excluding subjects from the study were age 18 age under 18, absence from regular classes, or the existence of any other objective reason that prevents or hinders participation in the study.

In the study, a convenient sample of 760 participants (out of a total of 836 students) voluntarily filled out the questionnaire (response rate = 90.9%).

### Ethical considerations

This study is a part of research approved by the Ethics Committee of the Faculty of Medical Sciences, University of Kragujevac (Ref. No.: 01-1176). All participants provided informed written voluntary consent prior to taking part. All participants provided consent for publication.

Questionnaires were distributed during the class to all medical students attending the class, along with a

cover letter providing information about the study and a written consent form to participate in the research. All respondents were informed that the researchers will be exclusively responsible for the data obtained in this study, who are therefore also responsible for the privacy of the respondents. For participation in this observational epidemiological study, the subjects were not financially or in any other way compensated. Medical students faced no consequences for refusing to participate in the study. Also, study participants did not have any inconveniences due to participating in the study compared to students who did not participate in the study. Also, all participants were informed that they could withdraw from the study at any stage without any consequences. The study was not sponsored, and the researchers received no compensation for participating in the study's realization.

### Instruments

Data were collected using a printed structured self-report questionnaire. In addition to the epidemiological questionnaire (questionnaire on social-demographic characteristics, academic performance, personal health history, etc.), the research also used, as a measuring instrument for burnout syndrome, a specific questionnaire for assessing the level of risk for burnout in medical students, Maslach Burnout Inventory - Student Survey (MBI-SS) [3]. The MBI-SS questionnaire consists of three dimensions that assess burnout [3]: emotional exhaustion (which is defined as severe fatigue caused by study demands and represents the essential individual component of stress in the syndrome), cynicism (which can be defined as mental distancing of the student from his studies, which represents the interpersonal component of burnout), and reduced academic efficiency (which can be described as a sense of declining competence and productivity and a sense of reduced achievement, which represents the self-evaluation component of burnout).

The questionnaire Maslach Burnout Inventory - Student Survey (MBI-SS), according to the original study, consists of 16 items that make up 3 subscales: Emotional Exhaustion (MBI-EE), Cynicism (MBI-CY) and Academic Efficacy (MBI-AE) [3]. As some authors have suggested, one specific item of the MBI-CY („When I'm in class or I'm studying I don't want to be bothered“) was omitted because it was shown to be ambivalent [3, 33]. In this research, the MBI-SS questionnaire that contains 15 items was used, with items having responses in 7 categories within the 0–6 range (0 - never, 1 – a few times a year, 2 – once a month, 3 – a few times a month, 4 – once a week, 5 – a few times a week, 6 – every day) [3]. The 15 items refer to feelings regarding the university, i.e. feelings about one's own academic work. The subscale emotional exhaustion (MBI-EE) contains 5 items, the

subscale cynicism (MBI-CY) 4 items and subscale academic efficacy (MBI-AE) 6 items [4]. All three subscales of the MBI-SS questionnaire independently measure the levels of burnout, with the results of all three subscales shown in 3 categories of risk for burnout syndrome – as low risk, moderate risk and high risk for burnout syndrome [4]. Burnout is a multidimensional construct, and the subscales are combined to reveal one resulting outcome of burnout. High scores on the MBI-EX and MBI-CY and low score on the MBI-AE are indicative of burnout (i.e., all MBI-AE items are reversely scored in our study, academic efficacy is reversely coded in data analysis in order to estimate academic inefficacy - reverse Academic Efficacy, MBI-rAE). Participants who at the same time had a high score for the subscale of emotional exhaustion, high score for the cynicism subscale and low score for academic efficacy subscale were rated as high risk of burnout syndrome [2, 8, 34]. Based on the recommendation of the MBI-test authors [3, 34] (that the subscale scores are based on the 66th percentile of exhaustion and cynicism, and on the 33rd percentile of efficiency), the participants in this study were classified as having the high level of burnout syndrome when their scores were high for emotional exhaustion (score greater than 14) and cynicism (score greater than 6), and low for academic efficiency (score less than 23) [27, 35].

To the best of our knowledge, this research was the first validation study of the MBI-SS questionnaire in the population of medical students in Serbia [27]. Licenses for the MBI-SS questionnaires were obtained directly from the current license holders, Mind Garden, Inc. (Menlo Park, CA, USA). After obtaining consent for the use of the questionnaire, linguistic adaptation and validation were carried out before starting the research. The translation and cultural adaptation of the original questionnaire from English to Serbian were carried out according to the internationally accepted methodology (i.e., back-translation methodology). The validity and reliability of the MBI-SS questionnaire were confirmed in this research [27]. While the study illustrated the presence of 3 principal components (explaining 64.9% of the variance), test-retest reliability showed good scale stability. The MBI-SS scale applied in this research has good psychometric characteristics, while the reliability demonstrated by Cronbach's alpha coefficient was acceptable and very high for all domains (0.852–0.869).

#### Data collection

Data collection was carried out in the classrooms of the Faculty of Medical Sciences. Before the start of the study, i.e., the survey, a notice was sent out to the heads of departments requesting their cooperation in the research, in terms of using a few minutes of the lecture

class in the auditorium to explain the research to the students and administer the questionnaires. Also, the protocol and objectives of the study were described in the letter, and the anonymity of the participants was emphasized.

Medical students who met the criteria for inclusion in the study were asked to fill out the epidemiological questionnaire and the MBI-SS questionnaire. Respondents had 15 min ( $\pm 5$  min, depending on the respondents' cooperation) to complete the questionnaire. The respondents filled in the questionnaires independently during the class.

In this research, we collected only limited demographic data to ensure the anonymity of the respondents and to encourage participation and honest answers to the questions in the questionnaire. All medical students (from the first to the sixth year of studies) were invited to participate in this study on the first day of lectures when students were present at the beginning of the semester according to their schedules and classrooms.

Characteristics of medical students are categorized and included age (years:  $\leq 21$  / 22–24 /  $\geq 25$ ), gender (male / female), place of residence (Urban / Rural), completed secondary school (Grammar school / Medical school), marital status (With partner / Without partner), having children (No / Yes), housing (In own home / With parents / As subtenants / In student dormitory), study financing (State-sponsored / Self-funded), study year (1st / 2nd / 3rd / 4th / 5th / 6th), repeat-year students (No / Yes), length of study (years:  $\leq 6$  /  $> 6$ ), cigarette smoking (Never / Ever), smoking status (Non-smokers / Former smokers / Current smokers), Yes / No for sports / recreational activity / positive personal medical history / use of sedatives / use of psychoactive substances, training (Preclinical / Clinical). Medical students were considered as smokers if they regularly smoked at least one cigarette per day for one year, and were classified as current smokers (if they had smoked at least one cigarette every day for the last 12 months), and as former smokers (if at least one year passed since smoking cessation).

The survey included questions about the habit of alcohol consumption (alcohol consumption related to the regular intake of any amounts of the beverages during medical studies, while those who consumed were then asked about the frequency (1–2 times a year / 1–2 times a month / 1–2 times a week / Every day), types of alcoholic beverages (Beer / Wine / Spirits / Mixed), Binge drinking). Binge drinking was defined as the consumption of 5+ standard drinks for men and 4+ standard drinks for women on one occasion at least once a month during the last year preceding of this survey. In Serbia, a “standard” drink is any drink that contains about 13 g of “pure” alcohol, whereby it was noted in the survey that a standard

bottle of beer, as well as a glass of wine and a shot of spirits represented measures of consumption.

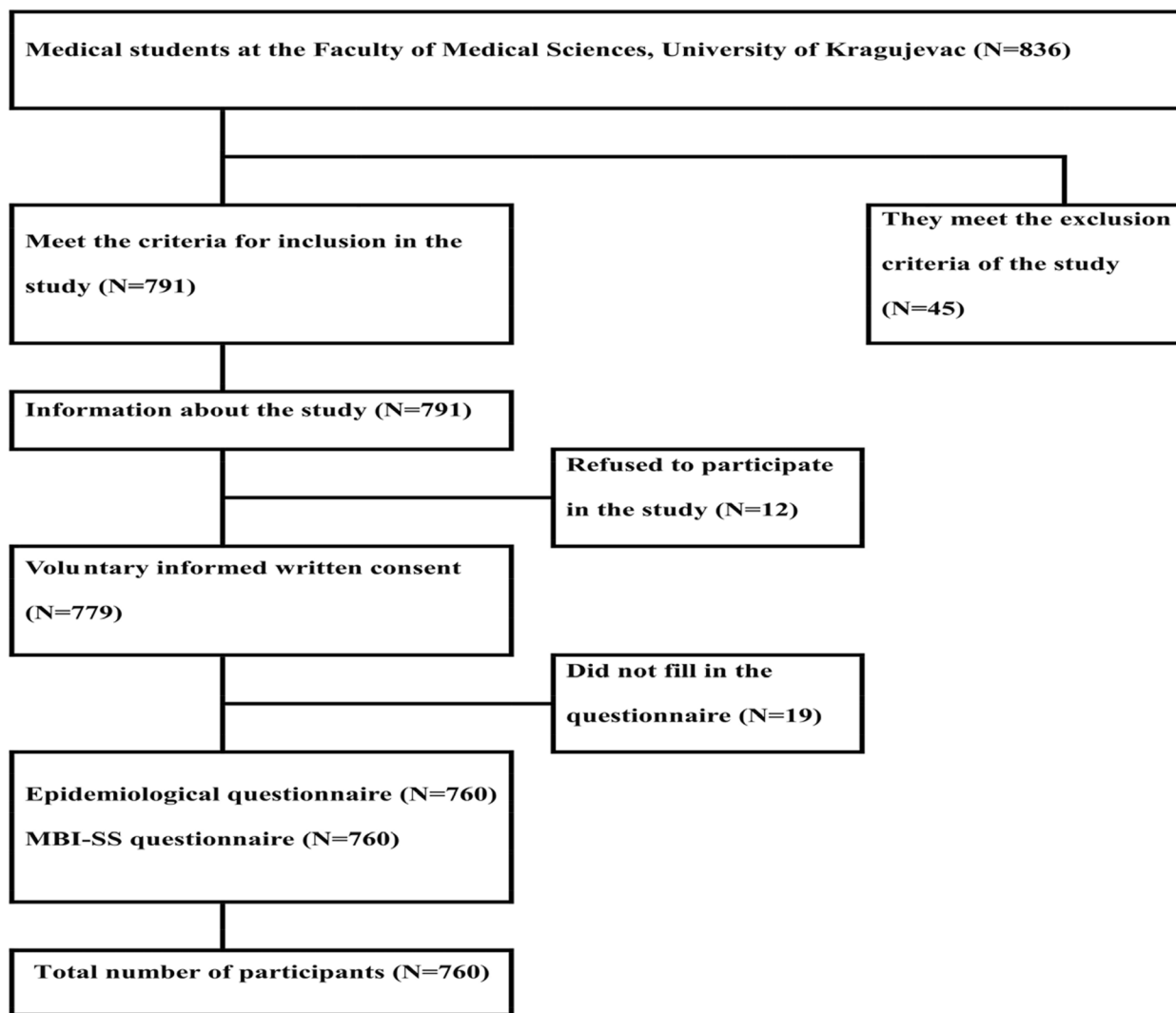
The study included 760 out of 836 medical students who met the participation criteria. Absence from regular classes was the main reason for exclusion from the study (45 students) (Fig. 1). After being informed about the research, out of the total number of medical students who met the criteria for inclusion (791 students), 12 refused to participate. The reason for not accepting or refusing to participate in the survey was most often a lack of interest in the study. After signing the voluntary informed consent to participate in the study (779 students), some subjects did not return the questionnaire or did not complete the questionnaire during recruitment for the study, or the questionnaires were not completely filled out (19 students in total). For this reason, the data of these respondents were excluded from the analysis.

In our survey, the response rate was 90.9%. The research flow diagram is shown in Fig. 1.

**Statistical analysis**

Descriptive and analytical statistics were used for the data analysis. The categorical variables were presented as proportions (percentages). The dependent variable was the level of risk for burnout in medical students. Confounding variables are socio-demographic characteristics (age, gender, place of residence, marital status, completed high school, etc.), academic performance (year of study, length of study), way of financing studies, housing, habits (cigarette smoking, alcohol use), positive personal medical history (presence of any chronic diseases), sport, recreational activity.

Univariate and multivariate logistic regression analyses were used to evaluate variables that could correlate with



**Fig. 1** Research flow diagram

burnout syndrome. Univariate logistic regression was used to determine the crude odds ratio (Odds Ratio, OR) with 95% Confidence Interval (95%CI) in order to assess the association between burnout syndrome and selected characteristics of the study participants. Multivariate logistic regression analysis was used to determine the adjusted OR with 95%CI to identify independent correlates of the high risk of burnout syndrome.

Adjusting was done for all variables associated with the burnout syndrome in the univariate analysis models with values of  $p < 0.50$ . In addition, the definitive model of the multivariate analysis included other variables that, according to the literature data, were associated with the occurrence of burnout syndrome. The Hosmer-Lemeshow goodness-of-fit test and the Cox and Snell, and Nagelkerke values assessed the goodness of fit of the regression models. Among the observed variables, multicollinearity was investigated. The test for linear trend was based on a logistic regression model. For all independent factors, the level of significance was  $p < 0.05$ . All statistical analyses were performed using the IBM SPSS Statistics version 20.0 (SPSS, Chicago, USA).

**Results**

The analysis was divided into two parts, with the following tasks: (1) to determine the prevalence of burnout syndrome and (2) to determine the associated factors of burnout syndrome among medical students.

Of the 760 medical students who filled out the questionnaire, there were 269 (35.4%) men and 491 (64.6%) women (Table 1). The majority of students

were between the ages of 22 and 24 (327; 43.0%), 256 (33.7%) students were 25 or older, while 177 (23.3%) were 21 or younger. The average age of the respondents was  $23.7 \pm 2.7$  years (with a range of 19–36). The largest number of respondents (over 90%) indicated the city as their place of permanent residence. More than half of the students (65.5%) graduated from medical school.

A high risk for burnout syndrome was noted in 15.0% of respondents, that is, 114 medical students suffered from high emotional exhaustion, high cynicism, and low academic efficiency (Table 1).

In medical students, the risk of high levels of burnout syndrome was significantly lower in females than in males ( $p = 0.024$ ) (Table 2). A higher risk for burnout syndrome was recorded in older age groups of medical students, with statistical significance for the trend ( $p = 0.002$ ). Compared with first-year students, a higher risk of burnout syndrome is more often reported among students in higher studies, with statistical significance for the trend ( $p < 0.001$ ). Repeat-year students ( $p = 0.016$ ) and students with a longer duration of studies ( $p = 0.038$ ) often showed a high risk for burnout syndrome. The habits of drinking 1–2 times a week and every day were significantly more common in medical students who had a high risk of burnout syndrome (with significance for trend  $p = 0.001$ ). The use of certain types of alcoholic beverages and binge drinking were not associated with high risk of burnout syndrome. The use of sedatives was linked to a high risk of burnout in medical students ( $p = 0.007$ ). The use of psychoactive substances was associated with a high risk of burnout in medical students ( $p = 0.014$ ).

The following variables entered the final model of the multivariate logistic regression analysis (i.e., variables that were significantly associated with a high risk for burnout syndrome in medical students at the  $p < 0.50$  level in the univariate logistic regression analysis model): gender, age, length of study, re-enrollment year, frequency of alcohol consumption, use of sedatives and use of psychoactive substances (Table 3). Due to collinearity with age, the variable - study year was excluded from the definitive model. According to the results of multivariate logistic regression, the main significant independent correlates of high risk for burnout syndrome in medical students were: age of students (for 22–24 aged: adjusted OR=5.64, 95%CI=2.58–12.34,  $p < 0.001$  for aged  $\geq 25$ : adjusted OR=5.65, 95%CI=2.08–15.39,  $p = 0.001$ ) with  $p$  for trend  $< 0.001$  higher frequency of alcohol consumption (for habit 1–2 times a week: adjusted OR=2.01, 95%CI=1.01–4.03,  $p = 0.048$ ) with  $p$  for trend=0.025) and use of sedatives (adjusted OR=3.44, 95%CI=1.31–9.04;  $p = 0.012$ ).

**Table 1** Characteristics of study participants – prevalence of high risk of burnout syndrome

Variables	Number (N=760)	%
<b>Gender</b>		
Male	269	35.4
Female	491	64.6
<b>Age (years)</b>		
≤ 21	177	23.3
22–24	327	43.0
≥ 25	256	33.7
<b>Place of residence</b>		
Urban	697	91.7
Rural	63	8.3
<b>Completed secondary school</b>		
Grammar school	262	34.5
Medical school	498	65.5
<b>Burnout syndrome – High risk</b>		
No	646	85.0
Yes	114	15.0

**Table 2** Characteristics of medical students with high risk of burnout syndrome

Variables	Burnout syndrome (high risk)		Crude OR (95% CI)	P*
	Absent (N = 646)	Present (N = 114)		
	N (%)	N (%)		
<b>Gender</b>				
Male	218 (81.0)	51 (19.0)	ref <sup>b</sup>	
Female	428 (87.2)	63 (12.8)	0.63 (0.42–0.94)	0.024
<b>Age (years)</b>				
≤ 21	116 (93.8)	11 (6.2)	ref	
22–24	269 (82.3)	58 (17.7)	3.25 (1.66–6.34)	0.001
≥ 25	211 (82.4)	45 (17.6)	3.22 (1.61–6.42)	0.001
<sup>c</sup> p for trend				0.002
<b>Place of residence</b>				
Urban	597 (85.7)	100 (14.3)	ref	
Rural	49 (77.8)	14 (22.2)	1.71 (0.91–3.21)	0.097
<b>Completed secondary school <sup>a</sup></b>				
Grammar school	223 (85.1)	39 (14.9)	ref	
Medical school	423 (84.9)	75 (15.1)	1.01 (0.67–1.54)	0.949
<b>Marital status</b>				
With partner	274 (85.1)	48 (14.9)	ref	
Without partner	372 (84.9)	66 (15.1)	1.01 (0.68–1.52)	0.951
<b>Children</b>				
No	627 (85.0)	111 (15.0)	ref	
Yes	19 (86.4)	3 (13.6)	0.89 (0.26–3.06)	0.854
<b>Housing</b>				
In own home	61 (87.1)	9 (12.9)	ref	
With parents	229 (85.8)	38 (14.2)	1.13 (0.52–2.45)	0.768
As subtenants	288 (83.2)	58 (16.8)	1.37 (0.64–2.90)	0.419
In student dormitory	68 (88.3)	9 (11.7)	0.90 (0.34–2.41)	0.829
<b>Study financing</b>				
State-sponsored	511 (86.0)	83 (14.0)	ref	
Self-funded	135 (81.3)	31 (18.7)	1.41 (0.90–2.23)	0.134
<b>Study year</b>				
1st	87 (93.5)	6 (6.5)	ref	
2nd	86 (93.5)	6 (6.5)	1.01 (0.31–3.26)	0.985
3rd	69 (69.7)	30 (30.3)	6.30 (2.48–16.00)	< 0.001
4th	121 (87.7)	17 (12.3)	2.04 (0.77–5.38)	0.151
5th	145 (83.8)	28 (16.2)	2.80 (1.12–7.03)	0.028
6th	138 (83.6)	27 (16.4)	2.84 (1.13–7.15)	0.027
<sup>c</sup> p for trend				< 0.001
<b>Repeat-year students</b>				
No	499 (86.8)	76 (13.2)	ref	
Yes	147 (79.5)	38 (20.5)	1.70 (1.10–2.61)	0.016
<b>Length of study (years)</b>				
≤ 6	554 (86.2)	89 (13.8)	ref	
> 6	92 (78.6)	25 (21.4)	1.69 (1.03–2.78)	0.038
<b>Cigarette smoking</b>				
Never	447 (86.5)	70 (13.5)	ref	
Ever	199 (81.9)	44 (18.1)	1.41 (0.94–2.13)	0.105
<b>Smoking status</b>				
Non-smokers	447 (86.5)	70 (13.5)	ref	
Former smokers	82 (82.0)	18 (18.0)	1.40 (0.79–2.48)	0.245

**Table 2** (continued)

Variables	Burnout syndrome (high risk)		Crude OR (95% CI)	P <sup>*</sup>
	Absent (N = 646)	Present (N = 114)		
	N (%)	N (%)		
Current smokers	117 (81.8)	26 (18.2)	1.42 (0.87–2.33)	0.165
<sup>c</sup> p for trend				0.261
<b>Alcohol consumption</b>				
No	261 (85.6)	44 (14.4)	ref	
Yes	385 (84.6)	70 (15.4)	1.08 (0.72–1.62)	0.717
<b>Frequency of alcohol consumption</b>				
Non-drinkers	261 (85.6)	44 (14.4)	ref	
1–2 times a year	61 (92.4)	5 (7.6)	0.49 (0.19–1.28)	0.143
1–2 times a month	263 (87.1)	39 (12.9)	0.88 (0.55–1.40)	0.588
1–2 times a week	55 (71.4)	22 (28.6)	2.37 (1.32–4.27)	0.004
Every day	6 (60.0)	4 (40.0)	3.96 (1.07–14.58)	0.039
<sup>c</sup> p for trend				0.001
<b>Alcoholic beverages types</b>				
Non-drinkers	261 (85.6)	44 (14.4)	ref	
Beer	47 (79.7)	12 (20.3)	1.52 (0.75–3.08)	0.252
Wine	34 (87.2)	5 (12.8)	0.87 (0.32–2.35)	0.787
Spirits	37 (88.1)	5 (11.9)	0.80 (0.30–2.15)	0.661
Mixed	267 (84.8)	48 (15.2)	1.07 (0.69–1.66)	0.776
<b>Binge drinking</b>				
Non-drinkers	261 (85.6)	44 (14.4)	ref	
No binge drinking	342 (84.9)	61 (15.1)	1.06 (0.70–1.61)	0.792
Binge drinking	43 (82.7)	9 (17.3)	1.24 (0.57–2.73)	0.590
<sup>c</sup> p for trend				0.860
<b>Sports</b>				
Yes	243 (85.3)	42 (14.7)	ref	
No	403 (84.8)	72 (15.2)	1.03 (0.68–1.56)	0.875
<b>Recreational activity</b>				
Yes	497 (85.5)	84 (14.5)	ref	
No	149 (83.2)	30 (16.8)	1.19 (0.76–1.88)	0.451
<b>Positive personal medical history</b>				
No	610 (85.4)	104 (14.6)	ref	
Yes	4 (50.0)	10 (21.7)	1.63 (0.79–3.38)	0.190
<b>Use of sedatives</b>				
No	629 (85.7)	105 (14.3)	ref	
Yes	17 (65.4)	9 (34.6)	3.17 (1.38–7.30)	0.007
<b>Use of psychoactive substances</b>				
No	642 (85.4)	110 (14.6)	ref	
Yes	4 (77.8)	4 (50.0)	5.84 (1.44–23.68)	0.014
<b>Training</b>				
Preclinical	242 (85.2)	42 (14.8)	ref	
Clinical	404 (84.9)	72 (15.1)	1.03 (0.68–1.55)	0.900

Abbreviations: OR Odds Ratio, 95% CI 95% Confidence Interval

<sup>a</sup> (Secondary schools in Serbia involve grammar and vocational (professional) schools. Grammar schools (gymnasium) take four years to complete and offer general and broad education, awarding students a high school diploma. Professional schools (one example is medical school) also take four years to complete, and they specialize students in a particular field and award them with a first professional degree.)

<sup>\*</sup> p – probability, value according to univariate logistic regression analysis

<sup>b</sup> Reference category

<sup>c</sup> p for trend (according to logistic regression)



**Table 3** High risk of burnout in medical students: multivariate logistic regression analysis

Variables	Adjusted <sup>a</sup> OR	95% CI	<i>p</i>
<b>Gender</b>			
Male	ref <sup>b</sup>		
Female	0.62	0.38–1.03	0.063
<b>Age (years)</b>			
≤ 21	ref		
22–24	5.64	2.58–12.34	< 0.001
≥ 25	5.65	2.08–15.39	0.001
<sup>c</sup> <i>p</i> for trend			< 0.001
<b>Length of study (years)</b>			
≤ 6	ref		
> 6	1.24	0.58–2.69	0.579
<b>Repeat-year students</b>			
No	ref		
Yes	1.33	0.63–2.81	0.454
<b>Frequency of alcohol consumption</b>			
Non-drinkers	ref		
1–2 times a year	0.48	0.18–1.34	0.162
1–2 times a month	0.84	0.50–1.40	0.501
1–2 times a week	2.01	1.01–4.03	0.048
Every day	3.04	0.66–13.93	0.153
<sup>c</sup> <i>p</i> for trend			0.025
<b>Use of sedatives</b>			
No	ref		
Yes	3.44	1.31–9.04	0.012
<b>Use of psychoactive substances</b>			
No	Ref		
Yes	2.73	0.55–13.55	0.218
Constant			0.004

The Hosmer-Lemeshow Goodness of Fit test (Chi square = 8.178, *p* = 0.416); -2 Log Likelihood = 590.223; The Cox and Snell R Square = 0.066; Nagelkerke R Square = 0.177

Abbreviations: OR Odds Ratio, 95% CI 95% Confidence Interval, *p* probability, value according to multivariate logistic regression analysis

<sup>a</sup> Adjusted for year of place of residence, completed secondary school, marital status, children, housing, study financing, cigarette smoking, sports, recreational activity, positive personal medical history, training

<sup>b</sup> Reference category

<sup>c</sup> *p* for trend (according to logistic regression analysis)

## Discussion

This study is one of the first attempts to assess the prevalence of high-risk of burnout syndrome among medical students in Serbia, as well as to analyze the role of demographic characteristics and academic performance of students in burnout. A high risk for burnout syndrome in medical students was noted in 15.0% of respondents. The main significant independent correlates of high risk for burnout syndrome in medical students were age, higher frequency of alcohol consumption, and use of sedatives.

A comprehensive review and meta-analysis of literature published in countries around the world reported different prevalence rates of burnout syndrome in medical students, with an overall range of 7.0–75.2% [19]. A recent

meta-analysis suggests that one in two medical students worldwide suffers from burnout: the prevalence of burnout (covering 17,431 medical students) was 44.2% (8060 students suffered from burnout) [15]. The prevalence of burnout was higher in countries in Oceania (55.9%) and the Middle East (53.7%) than in North America – 45.8%, Asia – 40.6%, Europe – 27.5%, South and Central America – 26.0%. The high risk for burnout syndrome in this study was recorded in 15.0% of medical students. Compared to medical students in Kragujevac, a lower prevalence of burnout was recorded in medical students of two universities in Brazil (10.3% and 14.9%) [20, 36] and preclinical medical students in Spain (14.8%) [37], while higher prevalence was found in medical students in

Great Britain (26.7%) [38], Ethiopia (34.0%) [39], Pakistan (30.6%) [9], as well as in the USA, India, Malaysia, and Saudi Arabia (45–70%) [21, 30, 40–42]. Some possible reasons for differences in the incidence of burnout among medical students include differences in culture, socioeconomic status, and study population. Also, some studies included only third- and fourth-year medical students, while our study included students from all six years of studies. In addition, different burnout assessment questionnaires and sample sizes may contribute to differences in the prevalence of burnout syndrome. Comparison of the results of this study with data in the literature may be difficult for a number of reasons, including the use of different measuring instruments and different threshold values for the assessment of burnout syndrome, the use of different criteria for defining burnout syndrome, significant variability in medical school curricula between universities, etc. [43]. A definition of burnout syndrome that includes a high score on both the emotional exhaustion and depersonalization subscales and a low personal achievement score (according to the MBI questionnaire) may result in an underestimation of burnout [44–46]. Using a definition of burnout syndrome that includes high scores on the emotional exhaustion subscale or the depersonalization subscale but not a low score on the personal accomplishment subscale [21, 47] may result in overestimating the frequency of burnout syndrome [48].

In the present study, the age of medical students was significantly associated with burnout syndrome. Some studies found that older medical students were more likely to have burnout [29], in contrast to other studies that found no association between age and burnout [49]. Similarly to our study, studies in the US [21] and Pakistan [9] showed that the high risk for burnout syndrome was significantly more often noted in senior medical students than in the youngest students. But, these findings must be interpreted with caution. The possible explanation for that is that the increase in age is associated with higher academic years. Besides, an increase in age is intertwined with experience (either in studies or social), so the question of a secondary association with burnout syndrome is always raised.

In this study, a factor that was independently associated with a high risk of developing burnout in medical students was frequent alcohol consumption. To date, only a few studies have reported the association between burnout and alcohol consumption in medical students [21, 50]. Similar results were reported in a study in the USA, where the frequency of risky alcohol use decreased in older medical students, and the frequency of burnout syndrome increased [21]. Among UK medical students, higher alcohol intake was significantly associated with higher personal achievement scores [38]. Findings

that burnout can result from alcohol consumption suggest that the association between alcohol consumption and stress is not unidirectional [50]. Namely, some studies have shown that certain people can use alcohol as a method of coping with stress [51, 52]. On the other hand, a UK study found that young drinkers have a “hedonic” approach to excessive alcohol consumption, suggesting that medical students may be drinking for pleasure rather than coping with stress and burnout [53]. According to the National Health Research Study in Serbia in 2013 [54], about 1.3% of the population aged 15 to 34 consumed alcohol daily in the previous 12 months. Drinking alcoholic beverages in Serbia is a socially acceptable behavior (as part of traditions and customs), which results in a high prevalence of alcohol use, especially among young people.

In this study, a factor that was independently associated with a high risk of developing burnout syndrome in medical students was the use of sedatives. In a study in Brazil [55], about 12% of medical students in all years of study used anxiolytics. In a multicenter study in France [56], in a population of medical students, it was found that first-year students consumed 1.5 times more anxiolytics compared to second-year students: the authors of the study relate this result to the pressure that first-year students have to pass their first exams, resulting in higher rates of mood and anxiety disorders. Among medical students in Cameroon, a significant interaction between various predictors (chronic disease, alcohol consumption, and burnout syndrome) and the outcome - recreational drug use [22] was noted. The question is whether the use of drugs (antidepressants, anxiolytics, sedatives) can be an indicator of the existence of these primary pathologies, thereby making the occurrence of burnout symptoms more likely. It is uncertain whether the use of sedatives directly causes students to burnout more or whether students who are already underachieving and experiencing high levels of stress turn to recreational drug use as a source of comfort [22]. As education about drug abuse, as well as alcohol and illicit substances, is part of the core curriculum of medical schools [57, 58], this association should be investigated in future studies.

It is difficult to compare the results of this study with similar studies in the world for a number of reasons: different research designs used, application of other questionnaires, use of non-validated questionnaires, variations in the concept and construct of burnout syndrome (with consequent assessment of burnout syndrome as a one-dimensional, two-dimensional or three-dimensional concept), different response rates, differences in the studied populations (in terms of age structure, gender, etc.), studies of all or only selected years of studies, study curriculum, length of studies. A better understanding of

the correlates of burnout syndrome in medical students is key to determining solutions to prevent burnout. It is important to carry out similar studies of burnout syndrome in the future, especially using longitudinal studies, in order to confirm the association found in prevalence studies.

The results of this study provide practical implications for students, educators and organization of medical school programs. Namely, identification of factors associated with burnout syndrome, i.e. higher frequency of alcohol consumption and use of sedatives, gives guidance for interventions aimed at preventing alcohol and sedatives use and abuse among medical students, through providing sufficient information about these issues during the studies and conducting training for helping medical students identify and provide peer support to persons at risk of concerning use of these substances. Further on, learning about student burnout should be embedded in curriculums of medical schools in order to raise awareness about this issue and reduce fear about unsuccess in medical studies [59]. The classes, practical exercises and exams should be organized in a way that enables a balance between the studies and private life. Finally, services aimed at providing student support should exist and deliver both individual and group interventions intended to educate medical students about coping strategies, increasing resilience, stress management and encouragement of a healthy lifestyle [60, 61].

Respondents were included in this research through recruitment at one medical faculty, whereby all respondents had the same chance to participate in the study. Consequently, the sample was not selected, which suggests the study sample is representative of the entire population of medical students at the University of Kragujevac. Also, the response rate was high (90.9%). Our research used the validated Serbian version of the MBI-SS questionnaire [27].

However, this study has several limitations. In addition to the known shortcomings of the cross-sectional study design (such as “ecological fallacy”), a limitation of this study is the use of a self-report questionnaire. Although the principle of anonymity was applied during the survey, the existence of information bias cannot be ruled out with certainty because, although the privacy of all information was guaranteed, there is always the possibility that some respondents did not want to reveal the symptoms of burnout. The limitation of this study can be - the limitation of non-response (non-response bias). Although the response rate is high, there may still be response bias, as individuals suffering from burnout may not have been in class at the time of data collection or, may have chosen not to participate in the study, or may have been more or less likely to respond to

the survey. Also, a potential source of response bias can be the phenomenon of social desirability, that is, giving socially desirable answers, rather than true answers, in circumstances where sometimes the presence of classmates, teachers and the overall classroom environment can have a significant impact on responses. In this study, the impact of social desirability bias is reduced by using a survey that relies on self-reports, the survey being anonymous and not containing socially unacceptable questions, as well as by the high response rate. Also, since the study was conducted at one faculty, the results may only be representative for some medical students in Serbia. But, although this study was carried out at one medical faculty, the results of the study can be generalized to a considerable extent, since a sample without selection bias was provided in the study, the sample was unselected, all respondents had the same chance to participate in the study, and a high response rate was achieved (response rate was 90.9%). Further, this study did not provide data on other potential predictors of burnout syndrome (such as socioeconomic status, family history, etc.) that could influence the occurrence of burnout syndrome in medical students. Even with these limitations, this study offers an assessment of burnout syndrome among medical students. Since this is a cross-sectional study, the correlations found may not be actual causative factors, and these findings should be verified in future research.

## Conclusions

The prevalence of burnout syndrome in Serbian medical students was estimated to be 15.0%. Burnout syndrome among medical students in Serbia showed a high correlation with the age of students, a higher frequency of alcohol consumption, and the use of sedatives. Those at-risk medical students should be identified to provide adequate support.

## Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12909-024-05937-7>.

Additional file 1.

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## Author's contributions

Conceptualization, II and MI; methodology, II and MI; validation, II and MI; formal analysis, II and MI; investigation, II and MI; resources, II and MI; data curation, II and MI; writing-original draft preparation, II; writing-review and editing, II and MI; visualization, II and MI; supervision, MI; project administration. All authors have read and agreed to the final version of the manuscript.

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### Availability of data and materials

The data that support the findings of this study are available from the corresponding author upon reasonable request.

### Declarations

#### Ethics approval and consent to participate

This study is a part of research approved by the Ethics Committee of the Faculty of Medical Sciences, University of Kragujevac (Ref. No: 01-1176). All participants provided informed written voluntary consent prior to taking part.

#### Consent for publication

All participants provided consent for publication.

#### Competing interests

The authors declare no competing interests.

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