



## STRESS AND HEALTH BEHAVIOR OF HEALTH PROFESSIONS STUDENTS IN BULGARIA

Petya Boncheva, Klara Dokova

*Department of Social Medicine and Health Care Organization, Faculty of Public Health, Medical University - Varna, Bulgaria.*

### ABSTRACT:

The **purpose** of this study is to determine the prevalence of stress among students of various health specialties in Bulgaria and to examine its relationship with the individual and institutional characteristics of the students and with their health behavior.

**Methods:** A survey was conducted among students from all 26 Bachelor and Master of health sciences programmes at a Medical University in Bulgaria. Information on self-assessed levels of health and stress, aspects of the health behavior (physical activity, smoking, alcohol intake, diet and sleep duration), personal (age, gender) and institutional factors (specialty and year of study) was collected with a structured questionnaire. Multinomial logistic regression was performed to evaluate the determinants of the perceived high level of stress.

**Results:** A total of 570 (10% sample) of all students from the university with a mean age of 24 (SD 7.6) years took part in the study. The majority of students (61.7%) experienced a moderate level of stress. Self-reported high level of stress (25.4%) was significantly independently associated with three factors - female gender (OR=2.92, 95% CI=1.09-7.81), low level of self-rated health (OR=6.95, 95% CI=2.17-22.25) and higher (fourth or fifth) year of study compared to first (OR=5.49, 95% CI=1.72-17.59; OR=4.06, 95% CI=1.36-12.16).

**Conclusions:** Stress is an important problem affecting the health of this group of the population. Active actions for building environments conducive to and supporting students' mental health are necessary, for which medical universities are in a very favourable position.

**Keywords:** stress, health behavior, students, health specialties, Bulgaria,

### INTRODUCTION

Stress among health professions students is widespread worldwide [1] and is much more common to them compared to students from other specialties. It causes anxiety depression and leads to poor quality of life [2,3]. If stress is not managed properly, it can lead to cardiovascular, metabolic, oncological, mental and other diseases [4].

Relationships have been established between stress and students' risky health behaviors. Stress is often associated with alcohol, cigarette and drug use, insufficient physical activity, unhealthy diet [5] and sleep disturbances [6].

The aim of the present study is to determine the prevalence of stress among students of various health specialties in Bulgaria and to examine its relationship with the individual (gender, self-rated health) and institutional (specialty and year of study) students' characteristics and their health behavior.

### MATERIALS AND METHODS

A survey was conducted among students from all 26 Bulgarian-speaking bachelor and master of health sciences programmes in one Bulgarian medical university in the period December 2021 - May 2022. All students for the academic year 2021-2022 were invited to take part in the survey through announcements on the Student Council's website. Inclusion criteria were defined as "active student status", age above over 18 years and written informed consent.

Participants were invited to assess their own level of stress on a three-point scale: 1(low), 2 (moderate) and 3 (high). Information was collected on various aspects of students' health behavior and demographic factors. The questionnaire was distributed through the Student Council's social platform.

Multinomial logistic regression was performed to evaluate the determinants of perceived high level of stress. A high level of stress was defined as the reference category for the dependent variable. Factors independently associated with stress ( $p < 0.05$ ): gender, course of study, health specialty, duration of sleep, physical activity, self-assessment of health were included in the multivariate analysis. The alpha level of significance was set at 0.05. Data analysis was performed with the IBM SPSS v.23 statistical package. The study was granted approval by the Ethics Committee of the Medical University -Varna, No. 101/24.03.2021.

## RESULTS

A total of 570 (10% sample) of all 5800 students from the university with a mean age of 24 (SD 7.7) years took part in the study. Women predominated, n=505 (88.6%), as most of the health specialties (nurses, midwives) have only female students. Seventeen of the 26 university specialties were represented in the sample. The students from the initial (first and second) years of study and those from the Faculty of Public Health had the greatest share n=376 (66.0%) (bachelor's and master's degree students in: nursing, midwifery, health

management, speech therapy, physiotherapy, healthcare management, public health etc.). The students in "Medicine" were 148 (26.0%), "Dental Medicine" - 28 (4.9%), "Pharmacy" - 12 (2.1 %) and other masters – 6 (1.0%).

Two-thirds 61.7% (95% CI 57.6-65.8), of the 570 students reported that they experienced a moderate level of stress, and 25.4 % (95% CI 21.9-29.2) reported a high level of stress. Table 1. presents the association between students' demographic and academic characteristics and the level of self-assessed stress.

**Table 1.** Association between students' characteristics and the level of self-assessed stress

Variable	Low level of stress n (%)	Moderate level of stress n (%)	High level of stress n (%)	p value
<b>Gender</b>				
Male	12 (18.5)	41 (63.1)	12 (18.5)	p=0.379
Female	79 (15.6)	293 (58.0)	133 (26.3)	
<b>Specialty</b>				
Medicine, dental medicine, pharmacy	23 (12.2)	94 (50.0)	71 (37.8)	p<0.001
Other	68 (17.8)	240 (62.8)	74 (19.4)	
<b>Year of study</b>				
First	37 (19.8)	116 (62.0)	34 (18.2)	p<0.001
Second	40 (19.4)	118 (57.3)	48 (23.3)	
Third	9 (8.5)	68 (64.2)	29 (27.4)	
Fourth	3 (7.9)	16 (42.1)	19 (50.0)	
≥ Fifth	2 (6.0)	16 (48.5)	15 (45.5)	

A relationship was proven between the level of stress and the studied specialty. Medical, dental, and pharmacy students experienced higher levels of stress than other health specialties ( $\chi^2=22.741$ ,  $p<0.001$ ). Stress was lowest in the first years of studies and increased in the upper years

( $\chi^2=13.023$ ,  $p<0.001$ ).

Further, the association between aspects of students' health behavior and the level of self-assessed stress is examined and presented (Table 2).

**Table 2.** Association between students' health behavior and the level of self-assessed stress

Variable	Low level of stress n (%)	Moderate level of stress n (%)	High level of stress n (%)	p value
<b>Self-perceived health status</b>				
Excellent	37 (24.6)	91 (60.7)	22 (14.7)	<0.001
Very good	33 (13.9)	143 (60.0)	62 (26.1)	
Good	15 (10.3)	89 (61.4)	41 (28.3)	
Satisfactory and poor	6 (16.2)	11 (29.7)	20 (54.1)	
<b>Smoking</b>				
No	61 (16.5)	215 (58.3)	93 (25.2)	0.881
Yes	30 (14.9)	119 (59.2)	52 (25.9)	
<b>Number of cigarettes smoked daily</b>				
<10	15 (15.1)	58 (58.6)	26 (26.3)	0.046
10 - 20	13 (18.3)	46 (64.8)	12 (16.9)	
>20	2 (6.4)	15 (48.4)	14 (45.2)	

<b>Alcohol consumption</b>				
Not consuming	47 (17.6)	161 (61.3)	59 (22.1)	0.061
1 – 4 times monthly	40 (16.2)	143 (57.9)	64 (25.9)	
> 4 times monthly	4 (7.1)	30 (53.6)	22 (39.3)	
<b>Physical activity</b>				
≥ 150 min weekly	39 (22.0)	95 (53.7)	43 (24.3)	0.028
< 150 min weekly	33 (16.5)	120 (60.0)	47 (23.5)	
No physical activity	19 (9.8)	119 (61.7)	55 (28.5)	
<b>Sleep duration</b>				
< 6 hours	16 (12.8)	63 (50.4)	46 (36.8)	0.016
7 - 8 hours	69 (16.9)	251 (61.5)	88 (21.6)	
> 8 hours	6 (16.2)	20 (54.0)	11 (29.8)	
<b>Willingness to participate in stress management</b>				
Yes	61(13.3)	269 (60.0)	118 (26.4)	0.019
Do not know	15 (20.3)	40 (54.0)	19 (25.7)	
No	15 (31.3)	25 (52.1)	8 (16.6)	

Students with poor health self-assessment reported higher level of stress than those with excellent and very good self-assessed health ( $\chi^2=39.280$ ,  $p<0.001$ ).

Every third participant in the study (35.5%) was a smoker. There was no difference in the level of stress between smokers and non-smokers, but for smokers, the increasing number of cigarettes smoked daily was associated with a higher proportion of students with high level of stress ( $\chi^2=9.706$ ,  $p=0.046$ ). Smokers who experienced high levels of stress smoked more than 20 cigarettes a day. High level of stress was associated with a lack of physical activity among students ( $\chi^2=10.853$ ,  $p=0.028$ ), as well as with insufficient sleep duration ( $\chi^2=12.186$ ,  $p=0.016$ ).

There was no association between the level of stress

and alcohol use ( $\chi^2=8.996$ ,  $p=0.061$ ), nor between stress level and frequency of drinking ( $\chi^2=1.306$ ,  $p=0.860$ ).

There was a statistically significant association between students' self-perceived level of stress and their willingness to participate in health promotion stress coping activities ( $\chi^2=11.797$ ,  $p=0.019$ ). Students with high stress were more likely to participate in stress management initiatives.

In a multivariate logistic analysis, the female gender, low self-rated health and higher year of study – fourth or fifth remained independently associated with high level of stress. The duration of sleep below six and more than eight hours daily was initially independently associated with higher levels of stress, which was lost in the multivariate analysis (table 3).

**Table 3.** Multinomial logistic regression analysis of the self-assessed level of stress as a dependent variable and selected health behavior aspects as factors

Variable		Low stress level		Moderate stress level	
		OR	95 % CI	OR	95 % CI
Gender	Male	2.92	(1.09-7.81)	2.68	(1.26-5.72)
	Female	1		1	
Sleep duration	Up to 6 hours	0.58	(0.16-2.08)	0.59	(0.23-1.49)
	6-8 hours	1.39	(0.43-4.47)	1.27	(0.53-3.02)
	More than 8 hours	1		1	
Physical activity length	30 and more min at least 5 times per week	1.66	(0.79-3.51)	0.79	(0.46-1.37)
	Less than 30 min 5 times per week	1.43	(0.68-3.00)	0.99	(0.59-1.66)
	No sports	1		1	
Specialty	Medicine, dental medicine, pharmacy	0.52	(0.11-2.34)	0.3	(0.11-0.87)
	Bachelor	2.28	(0.55-9.34)	0.86	(0.32-2.33)

	Other masters	1		1	
<b>Year of study</b>	First	<b>5.49</b>	<b>(1.72-17.59)</b>	<b>2.76</b>	<b>(1.33-5.74)</b>
	Second	<b>4.06</b>	<b>(1.36-12.16)</b>	<b>2.06</b>	<b>(1.08-3.96)</b>
	Third	1.13	(0.31-4.12)	1.67	(0.79-3.52)
	Higher	1		1	
<b>Health self - assessment</b>	Excellent	<b>6.95</b>	<b>(2.17-22.25)</b>	<b>8.42</b>	<b>(3.26-21.76)</b>
	Very good	1.84	(0.61-5.53)	<b>4.18</b>	<b>(1.76-9.91)</b>
	Good	1.08	(0.34-3.49)	<b>3.18</b>	<b>(1.31-7.74)</b>
	Satisfactory	1		1	

## DISCUSSION

The aim of this study was to present a recent assessment of the level of stress among health professions students in Bulgaria and to look for an association between the level of stress and the academic workload and the health behavior of young people. This is the first Bulgarian study on this topic with a relatively large sample, which confirms the “prevailing moderate levels of stress” among students from health specialties reported recently, but from a significantly smaller sample of 86 respondents [6]. The majority of the students (61.7%) participating in the present study experienced moderate level of stress. When compared to international data, a similar prevalence of 70.6% of moderate stress levels was reported among students in Bosnia and Herzegovina [3].

A quarter (25.4%) of those examined in the current study experienced high stress. This is close to a study from Brazil [7], which reported 28.8% of students with high level of stress, but significantly higher than the reported in Bosnia and Herzegovina 1.6% prevalence of high levels of stress [3]. These differences can be explained by the chosen methods of stress assessment, countries’ specific cultural characteristics, socio-economic conditions and individual characteristics of students [3].

Self-reported high level of stress was found to be significantly independently associated with three factors – female gender, low level of self-reported health, and 5th-6th year of study.

The gender differences in stress severity levels found in our study correspond with most other research

findings. Women usually experience higher levels of stress than men - found both among Bulgarian [6] and foreign students [5,7].

Students who rated their health as satisfactory and poor in the present study had high level of stress. Such association has been confirmed by Brazilian [7] and Polish [8] health studies indicating that severe stress leads to a subjective feeling of poor health.

Student stress was lowest among freshmen and sophomores and increased with the year of study at the university. We assume these results are due to the intensive study of the clinical specialties and practical internships of the third year, and the upcoming graduation examinations in the upper courses. Our findings are confirmed by a study in the USA [9], while according to a German one [10], the highest stress was found in the first year and was associated with adaptation at entry into the university.

The self-assessment of the level of stress in the present study might have some limitations, but at the same time, the simplicity of our approach ensured a high participation rate in the study and representativeness of the sample for the health professions students in Bulgaria.

## CONCLUSIONS

The results indicate that stress is an important problem affecting the health of this young group of the population. Active actions for building environments conducive to and supporting students’ mental health are necessary, for which medical universities are in a very favorable position [11].

## REFERENCES:

- Ribeiro ÍJS, Pereira R, Freire IV, de Oliveira BG, Casotti CA, Boery EN. Stress and Quality of Life Among University Students: A Systematic Literature Review. *Health Prof Educ.* 2018 Jun;4(2):70-77. [[Crossref](#)]
- Rotenstein LS, Ramos MA, Torre M, Segal JB, Peluso MJ, Guille C, et al. Prevalence of Depression, Depressive Symptoms, and Suicidal Ideation Among Medical Students: A Systematic Review and Meta-Analysis. *JAMA.* 2016 Dec 6;316(21):2214-36. [[PubMed](#)]
- Racic M, Todorovic R, Ivkovic N, Masic S, Joksimovic B, Kulic M. Self- Perceived Stress in Relation to Anxiety, Depression and Health-related Quality of Life among Health Professions Students: A Cross-sectional Study from Bosnia and Herzegovina. *Zdr Varst.* 2017 Oct 9;56(4):251-259. [[PubMed](#)]
- Pascoe MC, Hetrick SE, Parker AG. The impact of stress on students in secondary school and higher education. *Int J Adolesc Youth.* 2020 Apr;25:104-12. [[Crossref](#)]
- Tavolacci MP, Ladner J, Grigioni S, Richard L, Villet H,

Dechelotte P. Prevalence and association of perceived stress, substance use and behavioral addictions: a cross-sectional study among university students in France, 2009–2011. *BMC Public Health*. 2013 Aug 6;13:724. [[PubMed](#)]

6. Ivanova L, Popova R, Vukov M. An evaluation of stress among students at the faculty of medicine, Sofia university 'St. Kl. Ohridski'. *Bulg J Public Health*. 2021; 13(3):40-49. [[Internet](#)]

7. Michelotto ALL, Rizzon Cintra AC, Weber S, Michelotto Junior PV, Geber SP, Amorim C, et al. Stress

level affects health and academic performance of undergraduate students in health sciences area courses. *Res Soc Dev*. 2022; 11(4):e39311427488. [[Crossref](#)]

8. Rogowska AM, Kuœnierz C, Bokszczanin A. Examining Anxiety, Life Satisfaction, General Health, Stress and Coping Styles During COVID-19 Pandemic in Polish Sample of University Students. *Psychol Res Behav Manag*. 2020 Sep 28;13:797-811. [[PubMed](#)]

9. Ludwig AB, Burton W, Weingarten J, Milan F, Myers DC,

Kligler B. Depression and stress amongst undergraduate medical students. *BMC Med Educ* 2015 Aug 27;15:141. [[PubMed](#)]

10. Heinen I, Bullinger M, Kocalevent RD. Perceived stress in first year medical students - associations with personal resources and emotional distress. *BMC Med Educ*. 2017 Jan 6;17(1):4. [[PubMed](#)]

11. Okanagan Charter: An international charter for health promoting universities & colleges. Kelowna, British Columbia, Canada. 2015. [[Crossref](#)]

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**Address for correspondence:**

Petya Boncheva

Department of Social Medicine and Health Care Organization, Faculty of Public Health, Medical University of Varna;

55, Marin Drinov Str., 9002 Varna, Bulgaria.

E-mail: [boncheva.petia@gmail.com](mailto:boncheva.petia@gmail.com),