

## CROSS-SECTIONAL STUDY

# Understanding attitudes and willingness to volunteer in COVID-19 hospitals in a setting where medical students were not deployed

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## ABSTRACT

**OBJECTIVE:** To examine the attitude and willingness of medical students in Serbia to volunteer in COVID-19 hospitals.

**METHODS:** This study was conducted in late 2021 among 326 students in latter 3 study years. Data were collected using an anonymous online questionnaire focusing on demographic characteristics, epidemiology-related factors surrounding participants, self-assessed personality traits and a validated scale about attitudes toward volunteering.

**RESULTS:** A total of 58.1 % of medical students were willing to volunteer in COVID-19 hospitals. Having higher grades, having parents with lower education level and having volunteered previously were characteristics associated with a stronger positive attitude toward volunteering. Having higher grades, having parents with lower education level, living with people aged > 65 years and having had COVID-19 infection was associated with the willingness to volunteer. The adjusted multivariate regression model suggested that higher levels of self-perceived consciousness, extraversion and openness to experience were independently associated with stronger positive attitudes toward volunteering. A similar model showed that openness to experience remained independently associated with the willingness to volunteer in COVID-19 hospitals.

**CONCLUSION:** A number of individual factors may be involved in the decision to volunteer in COVID-19 hospitals. Promotion of volunteering in medical schools could be influential for future health emergencies (Tab. 6, Ref. 32). Text in PDF [www.elis.sk](http://www.elis.sk)

**KEY WORDS:** COVID-19, students, volunteering, hospital.

## Introduction

The coronavirus pandemic (COVID-19) has profoundly influenced the delivery of health care (1, 2) to provide much needed hospital treatment to an increasing number of people who were affected with COVID-19. While vaccination against COVID-19 contributed to the reduction in morbidity and mortality associated with COVID-19 (3, 4), there continues to be a large proportion of people who refuse to receive the vaccine (5, 6). As a result, the health care systems worldwide are under tremendous pressure due to the shortage of health care personnel (7, 8).

The COVID-19 pandemic in Serbia began in March 2020. Until the end of August 2022, there were several epidemic waves when more than 2 million people got affected and more than 16,000 people died as a result. To control the spread, in mid-March 2020 the Serbian government introduced a 2-month long curfew. After

the curfew had ended, social distancing, wearing of face masks and restrictions on use of public spaces (such as limiting the opening hours of bars, restaurants and shops) were in place. At the beginning of 2021, mass vaccination with 4 different vaccines against COVID-19 was organized for all adult citizens regardless of their age. Despite this, only about 50 % of the population received at least one vaccine dose.

Over the course of the pandemic, health care workers who treated people affected with COVID-19 experienced burnout and increase in anxiety and depression symptoms (9, 10), because of the long working hours, unpredictable clinical course of COVID-19, continuing demand for intensive care and structural shortcomings. Such working conditions have perpetuated growing intention of health care personnel to leave work (11). Finally, many health care workers have been affected with COVID-19 at work and died as a result (12).

To help health care workers overcome numerous challenges over the course of the pandemic, medical students have been mobilized and included in the management of people with COVID-19 in hospitals (13, 14). This approach has been debated as to whether it was appropriate to expose the students to COVID-19 in such a way (15). Despite different opinions on this issue, new perspectives were brought to light as medical students expectedly encountered

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different challenges to those observed in the health care workers. For example, students addressed the lack of personal preparedness in terms of practical skills and dealing with difficult patients and needing psychological support (14, 16). Moreover, it was observed that students who volunteered exhibited higher levels of altruism (13), suggesting that personality traits may be indicative of whether or not an individual would opt into volunteer in such difficult circumstances.

In Serbia during the academic 2020/2021, the curriculum in medical schools transitioned to full-time online teaching and while in the academic 2021/2022 the curriculum was divided between online lectures and seminars and on-site practical sessions. During the pandemic, many hospitals were reorganized to accommodate a high influx of people with COVID-19 who needed hospital treatment. As a result, numerous hospitals were labeled as the “COVID-19 hospitals” and only people with COVID-19 were admitted. Due to the reorganization of practical sessions, there is some anecdotal evidence about the debates on the inclusion of students in later academic years as volunteers in COVID-19 hospitals in Serbia as a modality to have practical session in clinical subjects. However, this proposal was never enacted and over the course of the COVID-19 pandemic in Serbia medical students were not involved.

While previous studies focused on specific factors that contribute to willingness of medical students to volunteer, there is a lack of studies that examined several different predictors combined, such as demographic factors, COVID-19 related experiences and personality traits. Because volunteering of medical students in COVID-19 hospitals was being considered as a potential solution to provide relief to the health care system, but also to offer practical clinical training to students, the purpose of this study was to examine the attitude and willingness of medical students to volunteer in COVID-19 hospitals.

## Materials and methods

This cross-sectional study was conducted in November and December 2021 at the Faculty of Medicine, University of Belgrade. Undergraduate medical studies last for 6 academic years (the first 3 years are focusing on pre-clinical subjects and the latter 3 years are focusing on clinical subjects). As students in 4th, 5th and 6th year have most of the practical sessions in different hospitals, they were the target population for this study.

The calculation of sample size was based on the total number of students enrolled in the last 3 study years (in total 1,532) using

**Tab. 1. Demographic, epidemiologic and personality characteristics of study participants**

Variable		Count	Percentage
Gender	Male	79	24.2
	Female	247	75.8
Age ± standard deviation (age range)		23.0±1.2 (20–28)	
Grade point average ± standard deviation (range)		8.8±0.7 (6.7–10.00)	
Study year in school	Fourth	123	37.7
	Fifth	145	44.5
	Sixth	58	17.8
Parental education level	Primary	2	0.6
	Secondary	98	30.1
	Higher	226	69.3
Living with person aged > 65 years	No	276	84.7
	Yes	50	15.3
Having had verified COVID-19	No	199	61.0
	Yes	127	39.0
Knowing personally an individual affected with COVID-19	No	2	0.6
	Yes	324	99.4
Knowing personally an individual who died from COVID-19	No	67	20.6
	Yes	259	79.4
Having hobbies before the COVID-19 pandemic	No	142	43.6
	Yes	184	56.4
Having previous volunteering experience	No	177	55.1
	Yes	144	44.9
Willingness to volunteer in COVID-19 hospitals	No	135	41.4
	Yes	191	58.6
Personality traits*	Conscientiousness	8.5±2.5 (1-10)	
	Extraversion	6.3±2.9 (1-10)	
	Emotionality	6.4±2.9 (1-10)	
	Openness to Experience	7.8±2.6 (1-10)	

\* Personality traits were rated on a scale from 1 to 10

the Slovin's formula  $(1,532/(1 + 1,532 \times 0.05^2))$ . The calculated sample size was 317 participants.

The Ethics Committee of the Faculty of Medicine, University of Belgrade approved this study (Approval no. 1322/II-14). Participation was voluntary and anonymous. Participants provided signed informed consent before accessing the online questionnaire.

### Data collection

The data were collected using an anonymous online questionnaire. The questionnaire was constructed using Google Forms and distributed in the online communication groups in each study year. The questionnaire was developed based on the previous studies exploring attitudes toward volunteering in COVID-19 hospitals (17–19).

First part of the questionnaire focused on demographic characteristics of the participants: such as gender, age, grade point average (minimum passing grade is 6, maximum grade is 10), year of study, highest education attainment of both parents (primary, secondary, higher), living with a person aged > 65 year in the household (yes, no).

Second part of the questionnaire examined epidemiologic characteristics related to COVID-19 infection: having had verified COVID-19 (yes, no), having been vaccinated with at least one dose of the COVID-19 vaccine (yes, no), knowing personally an indi-

Tab. 2. Attitudes toward volunteering in the COVID-19 hospitals.

No	Statement	All Mean (SD)	Females Mean (SD)	Males Mean (SD)	P for difference
1	I would have sufficient knowledge and skills to volunteer in a COVID-19 hospital if I had a chance to do it	2.6 (1.1)	2.6 (1.1)	2.7 (1.3)	0.479
2	My participation in COVID-19 hospitals would support the health care delivery	2.7 (1.3)	2.7 (1.2)	2.7 (1.4)	0.946
3	My participation in COVID-19 hospitals would contribute to the quality of treatment of the patients	2.4 (1.1)	2.4 (1.1)	2.4 (1.3)	0.755
4	By volunteering in the COVID-19 hospitals I would gain additional knowledge and skills	4.1 (1.1)	4.1 (1.2)	4.0 (1.1)	0.201
5	My health could be in jeopardy if I volunteered in the COVID-19 hospitals	2.9 (1.3)	2.9 (1.3)	2.9 (1.3)	0.892
6	Health of people near me would be in jeopardy if I volunteered in the COVID-19 hospitals	2.5 (1.3)	2.4 (1.3)	2.6 (1.4)	0.554
7	I have a moral duty to help the colleagues and patients in the COVID-19 hospitals	3.4 (1.3)	3.5 (1.3)	3.1 (1.3)	0.005
8	I am not mentally prepared to volunteer in the COVID-19 hospitals	3.9 (1.2)	3.9 (1.3)	4.0 (1.2)	0.869
9	I do not have time to volunteer in the COVID-19 hospitals	3.5 (1.3)	3.5 (1.3)	3.4 (1.3)	0.445
10	It is alright that medical students too are engaged in the COVID-19 hospitals	3.4 (1.5)	3.4 (1.4)	3.3 (1.3)	0.524
11	My participation in the COVID-19 hospitals is not necessary	3.2 (1.3)	3.3 (1.3)	3.1 (1.2)	0.136
12	Volunteering in the COVID-19 hospitals would be a unique opportunity to be part of something big and important in my profession	3.5 (1.4)	3.5 (1.4)	3.4 (1.3)	0.257

SD – standard deviation; 1 – strongly disagree; 2 – disagree; 3 – neutral (neither agree nor disagree); 4 – agree; 5 – strongly agree

vidual affected with COVID-19 (yes, no) and knowing personally an individual who died from COVID-19 (yes, no). Additionally, we asked the students whether before COVID-19 pandemic they engaged in hobbies and volunteering (yes, no).

Third part of the questionnaire examined willingness to volunteer in COVID-19 hospitals using the question: “Would you volunteer in a COVID-19 hospital if you had the opportunity to do so?” (yes, no). Further, we provided a 12-item scale examining attitudes toward volunteering in COVID-19 hospitals. The scale was composed of 12 statements related to students’ perception of the value and contribution of their knowledge, skills and labor in COVID-19 hospitals as well as the perception of risks and gains of such an engagement. Responses were graded on a 5-point Likert scale, where grade 1 indicated strong disagreement and grade 5 indicated strong agreement. Negative statements (numbered 5, 6, 8, 9 and 11) were scored in reverse. The attitude score was calculated as the sum of grades on all 12 items. Higher values of the attitude score indicated a stronger positive attitude towards volunteering in COVID-19 hospitals.

Lastly, we asked the students to rate how conscientious, extroverted, emotional and open to experience they were on a scale from 1 (does not apply to me at all) to 10 (applies to me fully). Higher scores indicated a more pronounced personality trait. These four personality traits were based on the HEXACO personality inventory which assesses 6 dimensions: Honesty-Humility, Emotionality, Extraversion, Agreeableness, Conscientiousness and Openness to Experience (20). Because the HEXACO has 100 items and takes longer time to complete, we opted to present students with an ultra-short self-perceived assessment of personality traits to lessen the possibility of missing answers as they have previously been proven valid (21).

The selection of 4 out of 6 HEXACO traits was based on the notion that medical students in Serbia scored the highest on conscientiousness and lowest on emotionality (22) as well as that empirical evidence suggests that extraversion may be associated with a higher likelihood of volunteering (23). Finally, because COVID-19 is a new disease and working in COVID-19 hospitals would be a completely novel experience, we included openness to experience as a trait that might be of importance for the outcomes of this study.

#### Validity testing of the attitude scale

The Cronbach’s alpha coefficient for the total attitude scale was 0.907, indicating a high level of internal consistency of the questionnaire items. The exploratory factor analysis with Varimax rotation suggested that the scale has 2 factors/domains which explained 63.6 % of variance. All communalities were above 0.40, suggesting a high level of correlation with the questionnaire construct (Supplemental Table S1). Based on results of the psychometric testing, it was concluded that the questionnaire was a valid instrument to assess attitudes towards volunteering in COVID-19 hospitals.

#### Data analysis

To describe the characteristics of the study sample we applied mean and standard deviation (for continuous variables) and per-

centages (for categorical variables). The differences between the continuous variables were tested using the t-test for 2 independent samples.

To examine factors associated with a stronger positive attitude toward volunteering and willingness to volunteer in COVID-19 hospitals, we applied linear regression analysis and logistic regression analysis, respectively. The linear regression was applied since the attitude score represented the continuous outcome and logistic regression was applied because willingness to volunteer was a binary outcome (yes/no).

The linear regression analysis was divided in 2 parts. In the first part we assessed the association between demographic and epidemiologic characteristics of students with a stronger positive attitude toward volunteering. Thus, the attitude score represented the outcome (i.e. dependent variable). The demographic (gender, study year, grade point average, parental education level, living with people aged > 65 years) and epidemiologic characteristics (having had COVID-19, receiving at least one dose of COVID-19 vaccine, knowing personally an individual who was affected as well as died from COVID-19, having had hobbies and being a volunteer before COVID-19 pandemic) were observed as the independent variables (i.e., potential predictors).

In the second part, we assessed the independent contribution of each of the 4 personality traits toward volunteering in COVID-19 hospitals. This was tested in 4 separate multivariate models. In each model, the independent variable was one of the examined personality traits (conscientiousness, extraversion, emotionality and openness to experience). The covariates, which the models were adjusted for, included all above-mentioned demographic and epidemiologic characteristics of the participants.

A similar analytical strategy was applied to examine demographic and epidemiologic characteristics on the one hand and personality characteristics on the other that were potentially associated with the willingness to volunteer in COVID-19 hospitals in a logistic regression model.

Statistical analysis was conducted in the Statistical Package for Social Sciences version 20. Probability of < 0.05 was considered statistically significant.

## Results

### Description of the study sample

The study sample consisted of 326 students in 4th, 5th and 6th study year. Demographic and epidemiologic characteristics of

**Tab. 3. Demographic and epidemiologic characteristics associated with stronger positive attitude toward volunteering in the COVID-19 hospitals: results of linear regression analysis.**

Variable	Unstandardized coefficient B	95% confidence interval	P
Gender	0.75	-1.91–3.41	0.580
Study year	1.45	-0.15–3.05	0.076
Grade point average	2.26	0.57–3.95	0.009
Parental education	-2.72	-5.14–0.30	0.028
Living with a person aged >65	3.41	-1.63–8.45	0.184
Having had COVID-19	1.85	-0.49–4.20	0.122
Knowing a person who was affected with COVID-19	7.58	-7.04–22.19	0.309
Knowing a person who died from COVID-19	-1.20	-4.08–1.68	0.414
Having hobbies before the COVID-19 pandemic	1.38	-0.98–3.75	0.251
Having previous volunteering experience	3.91	1.54–6.27	0.001

The variable „receiving at least one dose of COVID-19 vaccine“ was excluded from the model due to almost all students being vaccinated and therefore not have enough statistical power

**Tab. 4. Demographic and epidemiologic characteristics associated with willingness to volunteer in the COVID-19 hospitals: results of logistic regression analysis.**

Variable	Unstandardized coefficient B	95% confidence interval	P
Gender	1.35	0.78–2.34	0.232
Study year	1.21	0.86–1.69	0.273
Grade point average	1.66	1.15–2.37	0.009
Parental education	0.49	0.29–0.83	0.006
Living with a person aged >65	3.13	1.06–9.23	0.039
Having had COVID-19	2.01	1.21–3.32	0.007
Knowing a person who was affected with COVID-19	1.21	0.06–25.40	0.903
Knowing a person who died from COVID-19	0.98	0.54–1.79	0.957
Having hobbies before the COVID-19 pandemic	1.42	0.86–2.32	0.168
Having previous volunteering experience	1.64	1.00–2.69	0.050

The variable „receiving at least one dose of COVID-19 vaccine“ was excluded from the model due to almost all students being vaccinated and therefore not have enough statistical power

the participants are shown in Table 1. There were more females compared to males in the study sample, which corresponds to the gender composition at the undergraduate medical studies. The mean age of students was  $23.0 \pm 1.2$  years. The majority of the participants' parents had a high level of education. Around 15 % of students lived with an older person in the household. More than one-half did not have a verified COVID-19 infection, however, almost all participants personally knew an individual who had COVID-19. About one fourth of participants personally knew an individual who died from COVID-19. Close to one-half of students had hobbies in the pre-pandemic period as well as previous volunteering experience. A total of 58.6 % expressed willingness to volunteer in COVID-19 hospitals.

Of personal characteristics, students ranked conscientiousness as the strongest trait (on average 8.5 out of 10) and extraversion as the weakest trait (6.3 out of 10).

### Attitudes toward volunteering in COVID-19 hospitals

Table 2 presents mean scores on attitudes scale according to items for all students combined and per gender. The statement “By volunteering in the COVID-19 hospitals I would gain additional



**Tab. 5. Self-reported personality traits associated with stronger positive attitude toward volunteering in the COVID-19 hospitals: results of linear regression analysis.**

Model	Personality trait	Unstandardized coefficient B	95% confidence interval	p
1	Conscientiousness	0.58	0.09–1.08	0.022
2	Extraversion	0.84	0.44–1.24	0.001
3	Emotionality	0.08	–0.34–0.50	0.697
4	Openness to Experience	1.32	0.89–1.75	0.001

Each personality trait was tested in a separate multivariate model adjusted for gender, study year, grade point average, parental education, living with a person aged >65, having had COVID-19, knowing a person who was affected with COVID-19, knowing a person who died from COVID-19, having hobbies before the COVID-19 pandemic and having previous volunteering experience

knowledge and skills” was ranked the highest on the attitude scale (mean 4.1 out of 5). Contrary, the statement “My participation in COVID-19 hospitals would contribute to the quality of treatment of the patients” received the lowest score (mean 2.4 out of 5). In terms of gender, opinion on the vast majority of items did not differ between females and males. The only opinion which differed between genders was related to the moral duty to help the colleagues and patients in the COVID-19 hospitals, where females expressed a stronger agreement compared to males.

#### *Demographic and epidemiologic factors associated with a stronger positive attitude toward volunteering in COVID-19 hospitals*

Table 3 displays the results of the multivariate linear regression model which aimed to assess demographic and epidemiologic factors associated with a stronger positive attitude toward volunteering in COVID-19 hospitals among medical students. The model showed that having a higher GPA, parents with a lower education level and having volunteered previously were characteristics associated with a stronger positive attitude toward volunteering in COVID-19 hospitals.

#### *Demographic and epidemiologic factors associated with willingness to volunteer in COVID-19 hospitals*

Table 4 shows the results of the multivariate logistic regression model which aimed to assess demographic and epidemiologic factors associated with willingness to volunteer in COVID-19 hospitals among medical students. This model suggested that having a higher GPA, parents with a lower education level, living with a person aged >65 years and having had COVID-19 infection was associated with willingness to volunteer in COVID-19 hospitals.

#### *Personality traits associated with a stronger positive attitude toward volunteering in COVID-19 hospitals*

Table 5 displays the results of 4 multivariate linear regression models aiming to assess the association between personality traits and a stronger positive factor toward volunteering in COVID-19 hospitals among medical students. It was observed that a higher level of self-perceived conscientiousness, extraversion and openness to experience were independently associated with a stronger positive attitude toward volunteering in COVID-19 hospitals.

**Tab. 6. Self-reported personality traits associated with willingness to volunteer in the COVID-19 hospitals: results of logistic regression analysis.**

Model	Personality trait	Unstandardized coefficient B	95% confidence interval	P
1	Conscientiousness	1.03	0.93–1.14	0.563
2	Extraversion	1.06	0.98–1.16	0.155
3	Emotionality	0.99	0.90–1.08	0.786
4	Openness to Experience	1.17	1.06–1.29	0.002

Each personality trait was tested in a separate multivariate model adjusted for gender, study year, grade point average, parental education, living with a person aged >65, having had COVID-19, knowing a person who was affected with COVID-19, knowing a person who died from COVID-19, having hobbies before the COVID-19 pandemic and having previous volunteering experience

#### *Personality traits associated with willingness to volunteer in COVID-19 hospitals*

Table 6 presents the results of 4 multivariate logistic regression models aiming to assess the association between personality traits and willingness to volunteer in COVID-19 hospitals among medical students. Of the examined 4 personality traits, openness to experience remained independently associated with the willingness to volunteer in COVID-19 hospitals.

## **Discussion**

The results of this study suggest that slightly more than one-half of students in advanced study years (58.1 %) were in favor of their voluntary engagement in COVID-19 hospitals. Similar results were observed among medical students in Ireland (59.1 %) (24) and Indonesia (48 %) (25). In other countries globally, such the UK (18) or China (19), more than 80 % of the surveyed medical students were interested in volunteering during the COVID-19 pandemic. These differences may be the result of genuine interest and feelings of duty to help in an emergency situation but may also reflect the local institutional and structural response as well as the public crisis management strategy. Because of the challenges faced by virtually all health care systems worldwide and bearing in mind that other pandemics may arise, it has been highlighted that education about emergency preparedness should be part of medical curricula (26).

Overall, students in this study felt that they would gain new knowledge and skills through that volunteering experience but were aware of their limited capacity to contribute to treatment of the hospitalized patients. Previous studies (27, 28) also reported that medical students find working with COVID-19 patients as a favorable experience that would enable them to improve their professionalism. This result could be explained by the fact that students are aware of the unique pandemic circumstances and that the treatment of these patients would enable them to expand their competence and learn how to better respond to emergencies. On the other hand, not feeling sufficiently competent may be related to the perception that students do not feel ready to independently recognize life-threatening symptoms, administer therapy or perform life-saving procedures such as intubation and cardiopulmonary resuscitation. Because of these objective draw-

backs, medical students could be supplementary assistants (13) that would be in charge for simpler tasks and patients who do not require intensive care.

Compared to males, female students in this study felt more strongly about the moral duty to help other health care workers and patients. Similar results were observed among medical students in other parts of the world (28), where females were more interested in volunteering compared to their male counterparts. Some authors believe that this gender gap, as observed in our study, may be due to the socialization of gender roles - in the sense that females develop a sense of duty as potential mothers and wives very early in life (29).

This study found that factors associated with a positive attitude and willingness to volunteer differed to some extent. Specifically, having higher grades in school and parents of lower education level were associated with both study outcomes. Higher school grades, as a potential contributor, could be explained by the notion that students who have a higher academic achievement might feel more confident and prepared in terms of theoretical information management. They may also integrate better new information to what they previously learned. However, parental education is more difficult to explain as some previous data suggest that in some settings, students who have lower socio-economic level, which could be usually considered as proxy of education level, were less willing to volunteer (30). Also, a meta-analysis of factors associated with volunteering in general suggests that people who have higher education and income are more likely to take part in volunteering (31). The finding in this study may be explained by the circumstance that during the pandemic students' parents who had secondary education level were more likely to work outside of their homes and, therefore, be more likely exposed to COVID-19.

Other factor associated with a stronger positive attitude toward volunteering in COVID-19 hospitals was past experience with volunteering work. This finding supports previous evidence (31), and it is not surprising. However, past volunteering work was not associated with the willingness to volunteer in COVID-19 hospitals in our sample of medical students, but rather living with an older person and having had COVID-19. Over the course of COVID-19 pandemic, people above 65 years of age were identified as a risk group to develop more severe clinical forms of COVID-19 and poorer outcomes. As it is not uncommon in Serbia that families live in multigenerational homes, this finding is likely related to the fact that students who live with their grandparents in the same household have the propensity to volunteer. Because students' grandparents and/or other older relatives were at the highest risk of dying from COVID-19 it seems that this notion was a strong motivator for students to help other who were affected with COVID-19. Additionally, having own experience with COVID-19 may have been a disturbing experience, especially because many students have moderate to severe clinical symptoms of COVID-19 (4). As a result, students who had COVID-19 knew first-hand about the difficulties that other COVID-19 patients encounter and this knowledge has been the determining factor to be willing to volunteer in COVID-19 hospitals.

Openness to experience was a personality trait associated with both stronger positive attitude toward volunteering and willingness to volunteer. In addition, conscientiousness and extraversion were

associated with a stronger positive attitude. Studies on voluntarism suggested that extroverts and people who have higher levels of agreeableness typically engage in voluntary work (23, 32). Therefore, our findings support previous evidence. Still, medical students in general have high levels of conscientiousness (22). This may be because their vocation demands such approach to patients who depend on physicians' decisions. Further, conscientiousness in the context of COVID-19 pandemic and volunteering is likely related to the efforts to provide optimum health care for those who are hospitalized and use all the available means to mitigate this health care crisis. On the other hand, more pronounced openness to experience trait seems to be the driver of medical students to enter into the "unknown territory", such as dealing with the patients in a real-time setting. People who have this trait may also exhibit self-efficacy and be confident in their ability to navigate unfamiliar situations. Therefore, openness to experience could perhaps be used to differentiate between students who would be more willing to volunteer in COVID-19 hospitals and those who were unwilling.

#### Limitations

The study included students of one out of five medical schools in Serbia. For this reason, the results of this study could be generalized only to students from the Belgrade University and not all medical students in the country. In cross-sectional studies, such as this one, it is difficult to identify the direction of the association because exposures and outcomes are investigated at the same moment in time. For this reason, the observed associations may not be entirely plausible. To be able to identify potential volunteers through their personality characteristics, it would be optimal to apply detailed personality testing.

In conclusion, this study showed that 58.1 % of medical students were willing to volunteer in COVID-19 hospitals. Students were conscious of the fact that such volunteering would be beneficial to their medical knowledge but were in doubt about their meaningful contribution. A number of individual factors may be involved in the decision to volunteer in COVID-19 hospitals. Those individuals who had higher academic achievements, lived with a person at high risk of severe COVID-19 infection and had COVID-19 were willing to volunteer in COVID-19 hospitals. Students who have a more pronounced openness to experience trait are more likely to volunteer with COVID-19 patients. The decision to engage medical students in COVID-19 hospitals as volunteers should take into account students' preferences. In such circumstances, students must be provided with necessary guidance to enable them to meaningfully support the health care workers.

#### Learning points

- Females felt stronger moral duty to help the colleagues and patients in the COVID-19 hospitals compared to males
- Living with a person aged >65 years and having had COVID-19 was associated with the willingness to volunteer
- Openness to experience was the only personality trait associated with the willingness to volunteer in COVID-19 hospitals

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