

Evaluation of the self-assessment knowledge regarding cardiopulmonary resuscitation in medical students at the University of Belgrade

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Abstract. – OBJECTIVE: Cardiopulmonary resuscitation (CPR) is a vital skill that can improve the outcome of patients with sudden cardiac arrest. To raise awareness about CPR some countries have introduced an obligatory First Aid Course (FAC), usually done parallelly to a driver's license (DL). While expected of doctors to know CPR, the curriculum of some medical schools does not seem to have enforced measures to improve that knowledge. The aim was to have students self-evaluate their current knowledge of CPR, comparing it before university and whether it improved during their studies.

SUBJECTS AND METHODS: A cross-sectional study was conducted in October 2020 using an anonymous questionnaire among students at the Faculty of Medicine in Belgrade (studies in English).

RESULTS: A total of 172 (66.7%) students possessed a DL, of which 39.8% felt they were ready, 45.8% felt neutral, and 14.4% felt unable to perform CPR. The total number of students that completed a FAC during their studies was 165. Analysis was performed on the ability assessment data after the first FAC during studies, comparing it to FAC for DL and assessments at the end of studies. No statistically significant difference was observed in the level of self-reported ability to perform CPR, while a statistically significant difference was found in ability assessments when comparing only the FAC for the DL, and the one after the first FAC during medical studies, with students feeling more prepared after the FAC for DL. Across the sample, 90.2% of the students wished they had more CPR training during their medical studies.

CONCLUSIONS: From this study, it may conclude that students wish and need more CPR training in their curriculum.

Key Words:

Cardiopulmonary resuscitation, First aid, Students, Curriculum, Self-assessment.

Introduction

Cardiopulmonary resuscitation (CPR) is a vital skill in saving and prolonging human life. It can be performed not only by professionals in the medical field but also by the general population. Cardiac arrest is an increasing cause of death globally, yearly responsible for over 475,000 deaths in the United States¹ and 75,000 deaths in Germany². These lives may have been saved if all people, not only medical professionals, were trained to perform CPR.

During medical school, awareness is raised about the resistance of different tissues in surviving states of hypoxia. For example, neurons, as a crucial component of the human brain and its function, are very sensitive to the effects of hypoxia and can survive without oxygen for less than 5 minutes³. After this, a dysregulation in their energy supply occurs, and a cascade of pathophysiological processes ultimately leads to cell death⁴. Cell regeneration in the central nervous system is limited, and hypoxic conditions can lead to irreversible brain damage, which could ultimately have fulminant and debilitating consequences on human life. Disruption of the energy supply to the brain has many possible etiologies, one of them being sudden cardiac arrest. This event would stop cerebral blood flow immediately, resulting in

a decreased supply of energy and oxygen. CPR, if started as early as possible, can significantly improve the neurological outcome of patients that have suffered sudden cardiac arrest^{2,5}.

Some countries have introduced an obligatory First Aid Course (FAC), usually done parallelly to a driver's license (DL), to raise CPR knowledge among medical professionals and bystanders. In Germany, individuals applying for a DL have to pass a FAC, consisting of at least 9 sessions of 45 minutes, during which participants learn about basic CPR and first aid procedures^{6,7}. The situation is similar in Serbia, where a person must pass a FAC to attain a DL⁸. It is thus assumed that every person with a valid DL should know how to perform CPR. A study² done in Germany stated that only 16.1% of people, who had witnessed a sudden cardiac arrest, initiated CPR procedures, regardless of their status of having passed a FAC previously. The American Heart Association postulates that 45% of sudden cardiac arrest patients survived after CPR was administered by any member of the general population^{1,9}.

Medical students, as future doctors, should be especially ready to perform CPR. A small study¹⁰ found that 57.3% of medical undergraduate students had no knowledge of CPR. Although efforts have been made to implement knowledge on CPR, in the general population, the curriculum of some medical schools does not seem to have enforced the same measures to improve the CPR knowledge of future healthcare professionals. It is expected that all healthcare professionals know basic life-saving procedures as they are responsible for preserving the population's health.

The aim of this study is to evaluate the current status of CPR knowledge of students at the Faculty of Medicine in Belgrade (Studies in English), year 2020/2021, comparing their CPR knowledge prior to university, and whether their CPR expertise improved during their studies.

Subjects and Methods

Settings and Participants

A cross-sectional study was conducted in October 2020 using an anonymous questionnaire (Table I) among all students at the Faculty of Medicine in Belgrade (Studies in English), during the school year 2020/2021. The inclusion criteria for participating in the study were: any student enrolled at the Faculty of Medicine (Studies in English) during October 2020. There were no exclusion criteria.

Questions included those pertaining to possession of a DL, if passing a FAC was required for their DL, and whether or not they participated in CPR training during their studies. For each question, the students could grade their ability from 1 to 5 (1=do not feel able to perform CPR at all; 2=feel insecure about performing CPR; 3=feel neutral about performing CPR; 4=feel secure about performing CPR; 5=feel absolutely sure in their capabilities to perform CPR). A comparison was made between the students with prior CPR knowledge (owning a DL), and during their medical studies, to determine if there was a statistically significant improvement in their CPR knowledge during medical studies. The study was approved by the Ethics Committee of the Faculty of Medicine University of Belgrade and the University Clinical Center of Serbia.

Statistical Analysis

Categorical data are presented with absolute and relative numbers. Numerical variables are described by the arithmetic mean and standard deviation. The normal distribution is evaluated using mathematical (coefficient of variation, skewness and kurtosis, Kolmogorov-Smirnov and Shapiro-Wilk tests) and graphical methods (histogram, Q-Q diagram, box plot). Data were considered to have normal distribution if at least one mathematical and one graphical method was met. Numerical data with normal distribution in before-after design with 3 measurements are compared with repeated measures ANOVA with LSD post-hoc testing (after the FAC for DL, after the first course during medical studies, after the second course during medical studies, at the end of the study period). All statistical methods are considered statistically significant for $p \leq 0.05$. Statistical analysis was performed with the IBM Corp. Released 2012 (Statistics for Windows, Version 21.0. IBM Corp., Armonk, NY, USA).

Results

The questionnaire was successfully completed with a response rate of 82%, 258 out of the possible 315 students. The students' number distribution per year is presented in Figure 1.

A total of 172 (66.7%) students possessed a driver's license. The distribution of students owning a DL, per year is presented in Figure 1. The number of students with a DL did not differ significantly between separate study years

Table I. Self-designed questionnaire.

1	Year of medical Studies:	FIRST/SECOND/THIRD/FOURTH/FIFTH/SIXTH	
2	Do you have a driver's licence?	O Yes	O No
3	Did you have to pass a First Aid Course for your driver's licence?	O Yes	O No
4	Did the course explain Cardiopulmonary Resuscitation (CPR)?	O Yes	O No
5	How was the First-Aid-Course designed?	<input type="radio"/> ONLY theoretical lessons <input type="radio"/> Mixed Practical & theoretical lessons <input type="radio"/> ONLY practical lessons	
6	Did you feel able to perform CPR after this First-Aid-Course?	<input type="radio"/> 1 (not at all) <input type="radio"/> 2 <input type="radio"/> 3 (neutral) <input type="radio"/> 4 <input type="radio"/> 5 (yes of course)	
7	In which year(s) of studies did you have your First Aid- / CPR- Course(s)? (multiple choices possible) IF You did not have any CPR-/First-Aid-Course- PLEASE skip questions 8&9	<input type="radio"/> None of the mentioned below <input type="radio"/> First <input type="radio"/> Second <input type="radio"/> Third <input type="radio"/> Fourth <input type="radio"/> Fifth <input type="radio"/> Sixth	
8	How was the First Aid- / CPR- Course designed?	<input type="radio"/> ONLY theoretical lessons <input type="radio"/> Mixed Practical & theoretical lessons <input type="radio"/> ONLY practical lessons	
9	Do you feel prepared to perform CPR now (after the course(s) or finishing medical studies)?	Course 1: Course 2:	<input type="radio"/> 1 (not at all) <input type="radio"/> 2 <input type="radio"/> 3 (neutral) <input type="radio"/> 4 <input type="radio"/> 5 (yes of course)
10	Would You wish to have more CPR- Training during your Studies of Medicine?	O Yes	O No
11	Would you like to have regular CPR- Trainings during your medical studies?	O Yes	O No
11a	If Yes in question 11: how often would you like to have a CPR- Training?	<input type="radio"/> every year <input type="radio"/> 2x during whole studies <input type="radio"/> 3x during whole studies	
12	Did you do any external First Aid- / CPR-Courses next to your regular medical studies?	O Yes	O No
13	Did you work or did/do volunteer in the medical field during your studies of medicine?	O Yes	O No
13a	If Yes in Question 13: Did you gain there any experience regarding CPR?	O Yes	O No
14	Do you think every future doctor should know basic CPR?	O Yes	O No
Additional question asked in SIXTH Year of Studies:			
	Do you feel prepared to perform CPR now (at the end of your medical studies)?	<input type="radio"/> 1 (not at all) <input type="radio"/> 2 <input type="radio"/> 3 (neutral) <input type="radio"/> 4 <input type="radio"/> 5 (yes of course)	

($p=0.607$). Of these 172 students, 118 (68.6%) were required to pass a FAC for their DL. 100 of these 118 students (84.7%) had a FAC that explained CPR procedures. Having passed a FAC

for their DL, 47 (39.8%) felt that they were ready to perform CPR, 54 (45.8%) felt neutral about it, and 17 students (14.4%) felt unable to perform it. There is no statistically significant differ-

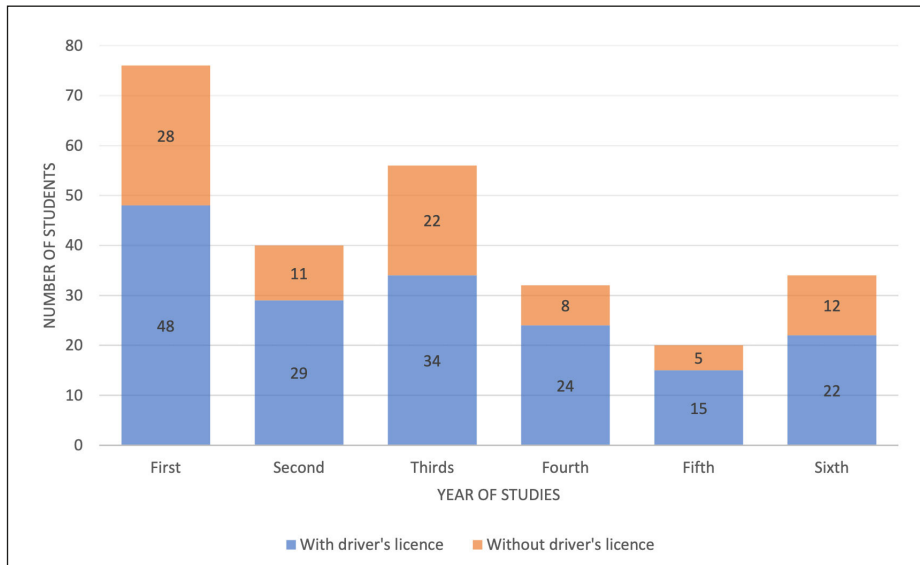


Figure 1. Number of participating students per year of studies at the Faculty of Medicine in Belgrade (Studies in English), Generation 2020/2021 and distribution of students with and without a driving licence per year of studies.

ence between the years of medical studies and their self-reported ability to perform CPR, having only passed the FAC for the DL (Figure 2). The total number of students that completed a FAC during their studies was 165 (64%; one FAC

during their studies: 148; more than 1 FAC: 17), while the other students (n=38, 36%) did not pass any FAC during their studies or did not have any FAC to pass in their curriculum yet. Most students passed their FAC during their first year of studies

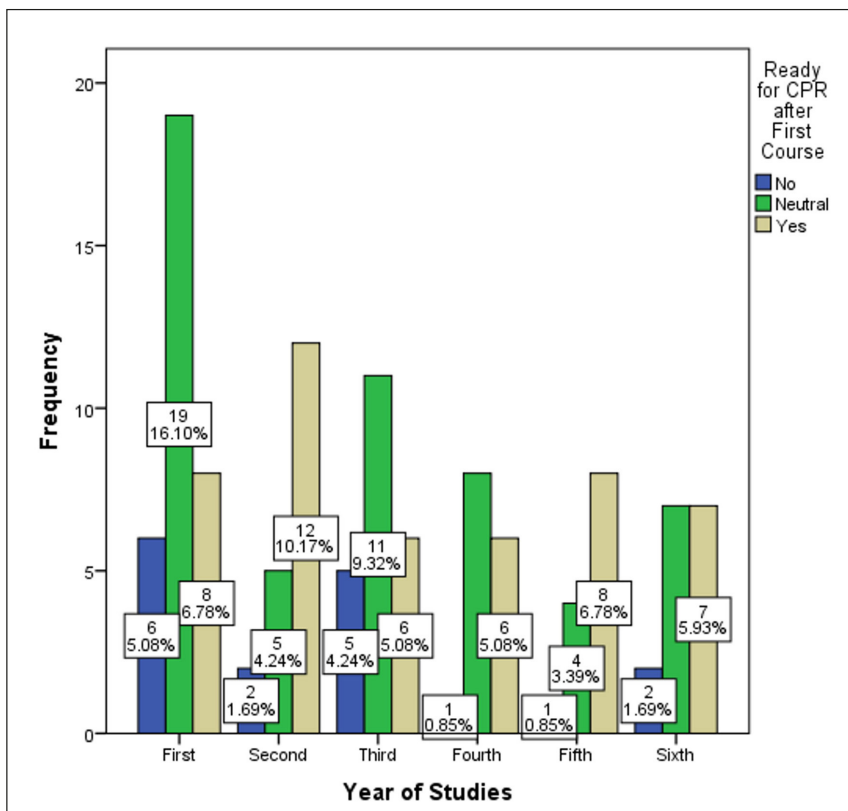


Figure 2. The distribution of the self-reported ability to perform CPR after a First Aid Course for the driver's license between students per study year.

Table II. Self-reported ability to perform CPR of students using the given grading system (1-5).

The ability after	\bar{x}	sd
First Aid Course for the driver's license	3.28	1.38
First CPR course during medical studies	3.12	1.35
Second CPR course during medical studies	4.36	1.29
Whole study period	3.09	1.25

(n=145), 22 of them during their second year of studies, one student during the third year of studies, and 14 during their fifth year of medical studies. The majority of students (n=145), had to pass a FAC course during their first year of medical studies. Comfort and confidence in performing CPR after the first FAC during medical studies was 36% (58/160), rising to 81.8% (9/11) after the second FAC. The distribution of students' self-assessed ability to perform CPR after each FAC, is presented in Figure 3. Students at the end of their studies scored lowest in their readiness to perform CPR, with only 34% of students (11/32) feeling able to do so. The average self-reported ability of all students to perform CPR is shown in Table II.

Students had the option to grade their ability on a scale from 1 to 5. In Figures 3 and 6, in order to ease graphical presentation, the grading was fused into the following categories: no=unable to perform CPR (answers graded 1 and 2), neutral=neutral about performing CPR (answer grade 3), yes=able to perform CPR (answers graded with 4 and 5).

Due to the small sample of students who passed two courses during their studies, they were excluded in our first assessments. Analysis was performed on the ability assessment data after the first FAC during studies, comparing it to FAC for DL, and assessments at the end of studies. The average self-reported ability of these students to perform CPR (excluding the students with two courses) is shown in Table III. There is no statistically significant difference in the level of self-reported ability to perform CPR when comparing all three groups: after FAC for the DL, the first FAC during medical studies, and at the end of studies) ($p=0.474$). However, a statistically significant difference was found in ability assessments when comparing only the FAC for the DL, and the one after the first FAC during medical studies, with students feeling more prepared after the FAC for DL ($p^a=0.049$).

After this analysis, we performed the same evaluation for the few students who had had two courses during medical studies. The average grade of the self-reported ability to perform CPR for these students is shown in Table III. There was a statisti-

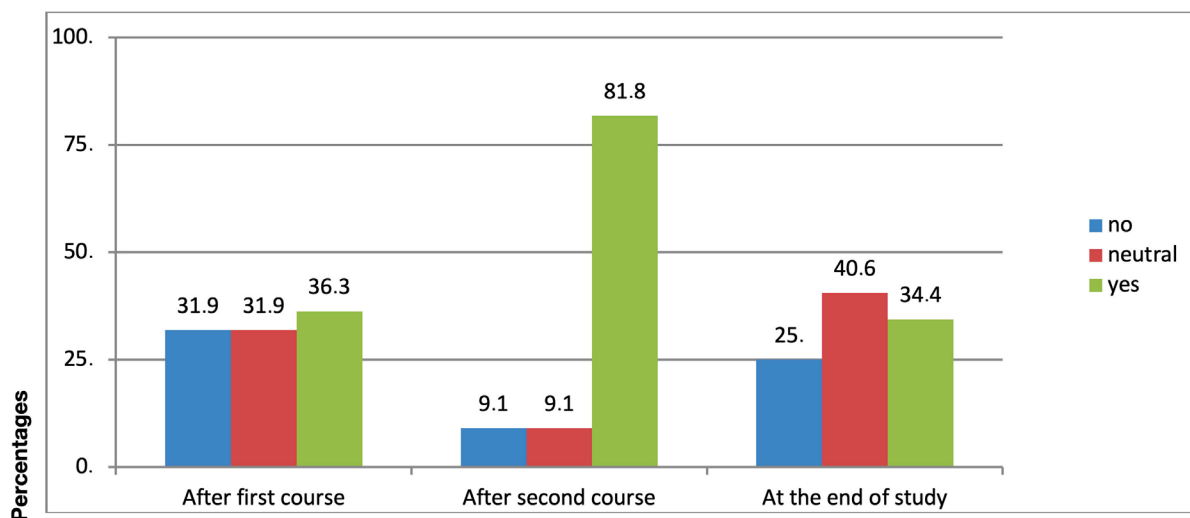


Figure 3. Self-reported CPR-ability level after one, two FACs during studies and at the end of studies (in percentage).

Table III. Self-reported ability to perform CPR (students who had one FAC during their medical studies) and self-reported ability to perform CPR (students who had two FACs during medical studies).

Students who had one FAC during their medical studies						
The ability after	$\bar{\chi}$	sd	p	p^a	p^b	p^c
FAC for the driver's license	3.57	1.35				
First FAC during medical studies	3.12	1.34	0.474	0.049	0.487	0.862
At the end of medical studies	2.95	1.16				
Students who had two FACs during medical studies						
The ability after	$\bar{\chi}$	sd	p	p^d	p^e	p^f
FAC for the driver's license	2.75	1.42				
First FAC during medical studies	3.18	1.43	0.007	1.000	0.006	0.022
Second FAC during medical studies	4.36	1.29				

^aComparison between the ability after DL-FAC and after MS-FAC1. ^bComparison between the ability after MS-FAC1 and the end of medical studies. ^cComparison between the ability after DL-FAC and at the end of studies. ^dComparison between the ability after DL-FAC f and after MS-FAC1. ^eComparison between the ability after MS-FAC1 and MS-FAC2. ^fComparison between the ability after DL-FAC and MS-FAC2.

cally significant difference found when comparing ability assessments between the FAC for the DL, the first FAC, and the second FAC during medical studies ($p=0.007$). Additionally, a significant difference between self-reported ability after the first and second FAC during medical studies was observed ($p^b=0.006$). As well as a significant difference between the assessments after the FAC for DL, and the second FAC during medical studies ($p^c=0.022$). In both cases, the significant difference was in favor of the second FAC during medical studies.

Across the total sample, 230 students (90.2%) wished they could have had more CPR training during their medical studies. Additionally, most students ($n=227$; 89%), would have liked regular CPR training during medical studies. 47% of students, who desired to have regular CPR training, would like to have had a FAC every year ($n=107$), 31% wanted three FACs during their studies ($n=70$), and 22% wanted two FACs during their studies ($n=50$). Almost all medical students thought every future doctor should know basic CPR (99.2%).

Discussion

The aim of this research was to examine the current state of CPR knowledge of medical students at the Medical Faculty in Belgrade.

Assessment of CPR knowledge before entering medical studies, was assumed through possession of a driver's license (DL), and if so, whether they had to pass a FAC to acquire the DL. 2/3 of our sample possessed a DL, and 68.6% of these students had to pass a FAC. 84.7% of students from the DL group acquired CPR knowledge during this FAC. These numbers represent the state of ability to perform CPR before entering medical studies (medical students being part of the general population). These numbers appear high and may lead to wrong conclusions. When the number of students who passed a DL-FAC was compared to the total sampled students, only 38.7% gained CPR knowledge during their DL-FAC, and only 18.2% out of these felt absolutely able and secure to perform CPR after this course.

A German study² found that only 16.1% of bystanders from the general population initiated CPR, regardless of their status on possession of a DL and prior CPR knowledge. In 2016, Germany was one of the countries that had the lowest bystander-initiated CPR-measure-rates². A study compared the rates of individuals in the population performing CPR in situations in which out-of-hospital cardiac arrest occurred in 27 European countries¹¹. It found that the average rate of Bystander-CPR-performance was 47.4%, ranging from 6.3% to 78.0%, the latter being consid-

ered a very high and satisfying general population rate¹¹. Unfortunately, this study did not list the national bystander-CPR rates individually, so they cannot be discussed herein¹¹. If all countries would achieve this high bystander-initiated CPR rate (>75%), many lives could be saved in the future. For example, in America, 475,000 people die from cardiac arrest annually¹. If the bystander-initiated CPR rates were 78%, up to 370,000 lives could potentially have been saved yearly, which is a significant proportion¹.

Many countries have tried to increase their rates by introducing obligatory FAC for DL acquisition, aiming to help educate the general population and improve their confidence in performing CPR^{7,8}. These FAC may be taught as theoretical classes, or as a combination of theoretical and practical sessions^{7,8}. In Austria, there is a predefined curriculum for this DL-FAC, which consists of both practical and theoretical training lasting 6 hours¹². The standard FAC for acquiring the DL in Germany is a one-day course (9 x 45 mins) in which participants gain basic knowledge of first aid and CPR, consisting of both theoretical and practical parts^{6,7}. The study from Austria showed that the skills for providing CPR could be improved further if the practical part of the DL-FAC were more emphasised¹². Another study¹³ suggested that the use of repetitive commercials on TV and brief internet movies on this topic, in order to increase awareness, could possibly motivate the general population to provide CPR measures when required¹³. Such media advertisements could have far-reaching effects as the majority of the current global population has access to TVs and the internet¹⁴. The positive impact of these commercials could be through influencing the population's subconscious to a pro-CPR mindset, similar to the marketing industry's influence on the behavior of their consumers using commercials and short movies on TV promoting their products¹⁵. The results of students' CPR knowledge before medical school were similar to those found in the general population^{2,11}. The second part of our study assessed the CPR knowledge of students gained during their medical studies; and analyzed how the number of passed FACs influenced their self-reported CPR ability. From our total sample (regardless of DL-possession), 64% passed a FAC during their studies. The low result may be on account of the questionnaire being conducted at the beginning of the school year, before the first year students had their FAC, typically taken in second semester¹⁶. Most stu-

dents from the total sample stated that they had their FAC during their first year of medical studies, with only a small proportion having had their course during the second, third, and fifth years. Our analysis showed a significant difference between the self-reported ability level of students after completion of the DL-FAC, and the first FAC during medical studies (MS-FAC1), in favour of the DL-FAC. In contrast to the requirements for the DL-FAC, the MS-FAC1 contains 15 theoretical lessons and 15 practical parts, according to the curriculum of the Faculty of Medicine, University of Belgrade¹⁶. During this course, students should acquire basic first aid and CPR knowledge.

The observed difference between student readiness to perform CPR between DL-FAC and MS-FAC1, brings into question the quality of the FAC passed during first year of studies as we observed a decreased self-reported ability after passing the MS-FAC1 compared to the DL-FAC. One possible explanation for this could be that the theoretical and practical part of the MS-FAC1 are equal, whilst in the FAC for the DL the practical part is emphasised more. This is possibly due to the background and interests of the participants passing a DL-FAC who are not that concerned with the profound medical knowledge and physiology behind every critical situation, contrary to future doctors who are rather more focused on practical skills and how they could directly help in a critical situation while facing it. Finally, we analyzed the group of students who passed two FACs during their medical studies, seeking possible advances regarding their CPR knowledge. In this group, a statistically significant improvement was seen after completion of the second medical studies FAC (MS-FAC2) compared to DL-FAC and MS-FAC1; in all cases, the self-reported ability was highest after MS-FAC2. Interestingly, the curriculum of the second FAC differs from the first FAC at the Medical Faculty of Belgrade. Primarily, more practical training and reinforcement of procedures were emphasized in the second FAC, with comparatively less theory than in the MS-FAC1¹⁷. Students had the opportunity to practice CPR skills on manikins, under supervision and guidance from medical specialists, intensively over one week¹⁷. The second FAC is taught during the fifth year of medical studies in Belgrade and is carried out during the course of "Surgery and Anaesthesiology"^{18,19}. It is important to note that the current 6th-year students, class of 2020/2021, did not pass this second FAC in their fifth year due to the ongoing COVID-19 pandemic²⁰. Since

the start of the pandemic, in December 2019, most on-site classes at the faculty were canceled and instead conducted online, in order to minimize the spread of the SARS-CoV-2.

This could account for the decreased ability of the current sixth-year students to perform CPR, with only 34.4% stating they would be confident to perform CPR. This was found to be even less than the self-reported ability level before studies (where 39.8% of all students in the DL group felt able to perform CPR). This finding is concerning, and students, as well as universities, should be encouraged to improve the current state of medical graduates feeling unprepared to provide CPR. The simulation center, in which the second FAC is carried out, was introduced into the curriculum in 2018 because it was observed that many young doctors had difficulties in managing critical situations and had a gap between theoretical and practical knowledge¹⁸. This discrepancy has been noted in other universities as well, with studies confirming that medical graduates do not feel secure in performing CPR^{10,21,22}. For example, in 2016, a study²¹ in Italy conducted on final-year medical students of different European universities, found that medical graduates had a poor knowledge of CPR at the end of their studies²¹. They recommended that obligatory CPR courses should be introduced preceding the completion of studies in order to improve this situation. Most students tried to improve their CPR knowledge outside the university setting because of the inadequate quality of the FACs provided by the school²¹. The CPR courses were provided by the universities in 73% of cases, and out of these 57% graded the course as unsatisfactory and inadequate²¹. Despite these recommendations, a follow-up study²² was repeated in 2019, by the same researchers, once again concluding that the CPR knowledge of medical students was still poor²². The assessment was done *via* an online questionnaire in 2019, and the sample size was more than doubled compared to the sample in 2016^{21,22}. In 2019, 69.7% of students attended a CPR course provided by the university, and 84.3% of the CPR course was an obligatory part of the medical degree²². The latest study, compared to the former, leads us to conclude that many universities initiated the procedure to improve CPR knowledge in medical graduates by introducing obligatory CPR courses. The goal of improving CPR knowledge in medical students to a satisfying level may still be out of reach, but some improvements are ongoing. A study¹⁰ from Pakistan conducted in 2009, with a small sample (61 students), found that the CPR knowledge in medical undergraduates was nonexistent in 57.3% of cases¹⁰.

This again confirms the poor status of CPR knowledge of medical students across many countries, even during their studies¹⁰. Our study has very similar results to those conducted in Italy and Pakistan, with the same conclusion. Additionally, the lack of the second FAC during medical studies resulted in a marked difference in the self-reported ability to perform CPR compared to the ability levels observed after MS-FAC1 and at the end of the studies. In the group of students who passed two FACs, 81.8% felt able to perform CPR, which is much higher than all other observed ability levels. It is important to note that the result may not be representative as the students' sample that had two FAC during studies was very small.

An additional aspect of this study was asking about how the students suppose their CPR knowledge could be improved, and whether they would like to have more CPR training during their studies. The vast majority, 90.2%, would like more CPR training during their studies. Repetition of information leads to physiological changes helping commit the knowledge to memory²³. There are conflicting opinions on what would be the optimal number of FACs to undergo during medical studies in order to improve CPR knowledge quality. Our analyses showed that students would like to have CPR training every year (47%), 3 times during their studies (31%), or twice during their studies (22%). These results suggest that students are aware of their lack of knowledge and preparedness and that they have the desire for continuous improvement and reinforcement of this knowledge, which should be supported and provided by the faculty. Another influencing factor is the way in which the FACs are conducted. It was noticed that the self-reported ability improved dramatically after the second FAC, in which practical skills are more accentuated. The emphasis on the practical aspect of FACs was shown to have a positive impact on acquiring and memorizing CPR knowledge, in both the lay population and medical professionals¹².

Many universities have started to stress this practical application of skills with simulations of real-life situations during their FACs, which has been shown to improve CPR knowledge in students²⁴. The following examples have been chosen randomly, with both universities ranked in the top 100 universities for Clinical Medicine, according to the Shanghai ranking list²⁵. The Ludwig-Maximilian-University, in Munich, organizes FAC during the fourth year of medical studies in a two-week program²⁶. One week is dedicated to CPR and other trauma management²⁶. Both weeks are

conducted using theoretical lectures and practical application of gained knowledge. Practical classes include opportunities for students to learn and improve their skills on manikins based on real-life scenarios. This way of teaching enforces the student's acquired skills in handling stressful situations²⁶. Additionally, students have the option to be recorded during their training so that they may analyze the recording later with medical specialists in order to further improve their skills and recognize their weaknesses²⁶. At Johns Hopkins University School of Medicine, in America, students have the option to take part in the "Core Clerkship in Emergency Medicine" which lasts 4 weeks^{27,28}. This clerkship includes practical exercises in a simulation center with practice on managing: cardiac arrest, trauma, shock, respiratory distress, and CPR, as well as having practical exercises in the emergency department so that students could directly transfer their simulation skills to real-life situations^{27,28}. These two examples suggest that CPR knowledge could be improved by intensive practice-focused training, not only by increasing the number of FACs students have.

It can be found in literature that many Universities not only in Europe, but all over the world share the same opinion on this topic and are trying to enhance medical (as well as dental) students' CPR abilities^{29, 30, 31}.

Another problem that has arisen recently was how to conduct the training during the COVID-19 pandemic, and how to deal with the both potential lack of motivation of medical students and lack of practice during their studies during the pandemic; some obscure data can be found on the topic across literature^{32,33,34}.

It is important to note some of the limitations of our study. Firstly, it was assumed that all students from the sample passed their DL before enrolling in medical studies thus, we analysed our results as pre-medical school acquired knowledge (our baseline). Another limitation is that the English Studies at Belgrade Faculty of Medicine primarily consists of international students. Requirements for passing FAC for DL is not uniform among students; it varied based on their country of origin. In addition to this, our total sample size consisted only of students enrolled in the English Studies program, which is a small proportion of total students enrolled at the Faculty of Medicine in Belgrade. Distribution of questionnaires was challenging due to the ongoing COVID-19-pandemic, and the results may have been more representative if more students had taken part in this research (Serbian stu-

dents included). An important limitation is also the study design, having in mind that cross-sectional studies do not allow the determination of causal associations. Additionally, upon recording answers form the questionnaire, a general lack of interest regarding this topic was observed, due to the many answers being left blank.

Conclusions

From this study it may be confirmed that the CPR knowledge of medical students has to be improved. This can be done either by emphasizing practical training for students with intense, long-lasting practical courses on CPR, or many short CPR trainings throughout medical studies in order to consolidate basic CPR knowledge in future doctors.

Funding

There was no financial support for this research.

Ethics Approval

The study was approved by the Ethics Committee of the Faculty of Medicine University of Belgrade No. 25/III-10 on January 25, 2020.

Informed Consent

All participants were informed about the research and participated voluntarily in our research after signing an informed consent.

Availability of Data and Materials

The data and material supporting this study's findings are available upon request to the corresponding author.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

Authors' Contributions

Each of the authors contributed uniquely and significantly to the conception and design of the study. Milenkovic Marija, Tesic Marija, Tvrtkovic Marija, Hadzibegovic Adi, Stanislavljevic Jovana, Rovic Ivan, Sijan Djuro, Petrovic Ksenija helped with the acquisition of data, analysis and interpretation of data. Palibrk Ivan, Djukanovic Marija, Jovanovic Vesna, Stevanovic Predrag made critical revisions related to the relevant intellectual content of the manuscript, and they supervised the whole process. Palibrk Ivan and Stevanovic Predrag validated and approved the final version of the article to be published.

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