

# Knowledge, behaviors and opinions of medical faculty students during the COVID-19 pandemic

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## Abstract

**Aim:** The emergency of COVID-19 pandemic has severely affected medical students' education and the possibility of being considered as health-care professionals has come to mind. We described knowledge, behaviours and opinions of medical students during the pandemic and separated into the continents and compared them with our country.

**Materials and Methods:** The cross-sectional worldwide study including 26 items online questionnaire was conducted between March 24<sup>th</sup> and April 9<sup>th</sup>, 2020. Medical students were grouped according to their continent and Turkey as a separate group.

**Results:** 1454 medical students studying in 64 countries from 4 continents including Asia, Europe, South America and Africa participated in study. Only 23.7% of all was adequately informed about approach to outbreak situations. This was the lowest in Europe and followed by Turkey (20.8%, 21.7% respectively). 71.2% of all changed their hygiene habits; paying attention to social distance increased from 2% to 61.9%. In Africa, 58.6% of students feel qualified to work in hospitals voluntarily, whereas it was only 19.9% in Turkey and 29.2% in Europe ( $p < 0.001$ ). 91.5% of Asian and 87.7% of European students would agree to volunteer in hospitals. In Turkey it was only 71.1% ( $p < 0.001$ ). 75.9% of all support the view that they should be qualified to volunteer in hospitals when necessary.

**Conclusion:** Medical students seem to want to volunteer, but have not been adequately informed about the approach to outbreak situations. An international consensus on medical students' roles may improve medical school programs about the current COVID-19 Pandemic and future ones.

**Keywords:** COVID-19 pandemic; education medical; surveys and questionnaires

## INTRODUCTION

The Coronavirus disease (COVID-19) has been described as a pandemic by the World Health Organization on the 11<sup>th</sup> of March, 2020 (1). As it spreads easily and the number of cases has increased rapidly, countries have started to take some precautions to prevent healthcare services collapse. Medical students are affected by the outbreak and their training has been suspended worldwide. As the convenient positions for medical students during this unprecedented pandemic are uncertain and full of disagreement, institutions have various approaches to medical student participation in hospitals. In some countries, medical students are allowed to work as a health care professional during COVID-19 pandemic (2-3).

Furthermore, in some countries, the deficiency in the number of health care professionals is compensated by graduating final year medical school students early (4).

Another issue to concern is in which position medical students can be assigned. There are suggestions as to place medical students in state and local public health departments after online education on infectious disease epidemiology, infectious disease control and outbreak management (5).

While these discussions are going on, another point seems to be spoken for longer. It is reported that there are volunteer students who are asking how they could help during the Pandemic (6). Because of this, we have to improve our understanding of medical students' knowledge, motivation and volunteering during this uncertain period, which may have implications on countries and medical schools' approaches. The profound effects of coronavirus disease 2019 (COVID-19) may forever change how future physicians are educated (7).

In this cross-sectional survey study, the primary purpose was to evaluate knowledge, behaviors and opinions that

Received: 19.05.2020 Accepted: 23.11.2020 Available online: 25.12.2020

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have been put in place in response to the COVID-19 pandemic by medical students throughout the world. Secondly, we separated the students into the continents and compared them with our country.

## MATERIALS and METHODS

We conducted a cross-sectional study to evaluate knowledge, behaviors and opinions of medical students during the COVID-19 pandemic. The major themes of this study were: 1) if they think that they are adequately learned in their faculty courses about the approach to outbreak situations or communicable diseases; 2) if they feel themselves qualified to work in hospitals, would they accept to be a volunteer when necessary or not; and 3) their simple but important personal protective behaviors.

A total of 1,454 registered medical students from 64 different countries and 4 different continents were

included to the study. Doctoral students and nonmedical students were excluded. The survey was announced on the servers of the International Federation of Medical Students Associations and Turkish Medical Students International Committee (TurkMSIC) which are the student-run organizations to join the worldwide network of medical students. Participants were required to fill out the online survey which was created by using Google forms. The survey includes 26 items; 4 items on medical student demographics, 7 items on educational experience, 6 items on general knowledge about an outbreak, 6 items on perceived behavior on the ongoing pandemic and 3 items on opinions about the participation during the pandemic. The survey is available as supplementary material in Appendix 1.

4 items on demographics designed to record age, gender, the current academic year and country. The level of 7 items on educational experience assessing the completed

### Appendix 1. The online survey

#### Attitudes, Behaviors and Opinions of Medical Faculty Students During the COVID19 Pandemic

Dear Participant;

This questionnaire has been prepared in order to determine "Attitudes, Behaviors and Opinions of Medical Faculty Students During the COVID19 Pandemic". The results obtained will be evaluated to contribute to scientific knowledge and the confidentiality of the data of the study will be preserved and will not be used for any other purpose.

Thank you for your voluntary support for the study and for contributing to a scientific study.

The aim of the study is to collect information from the participants for the purpose of "Attitudes, Behaviors and Opinions of Medical Faculty Students during the COVID19 Pandemic". It will provide important findings for studies on this subject. Participation in the study should be on a voluntary basis. In the survey, you are not asked for any identifying information. Your answers will be kept strictly confidential and will only be evaluated by researchers; The information to be obtained will be used in scientific publications. The questionnaire does not include questions that will cause personal discomfort in general. At the end of the survey, your questions about this study will be answered. Thank you in advance for participating in this work. You can contact to get more information about the study.

I voluntarily participate in this study and I know that I can cut out whenever I want. I accept the use of the information I provide in scientific publications.

1-Gender: Male / Female / Prefer not to say

2- Your age

3- Your country

Which university are you studying at?

4- The class you are studying:

Answer the questions about the courses taught; (yes/no)

5- Have you done the Infectious Diseases at clinical period?

6- Have you taken a class on Infectious Diseases? (preclinical period)

7- Have you done the Public Health class at your clinical period?

8- Have you taken a class on Public Health? (preclinical period)

9- Have you done the Chest Diseases at your clinical period?

10- Have you taken a class on Chest Diseases? (preclinical period)

11- Have you taken microbiology class?

12- Have you heard the term of 'pandemic' before the COVID19 outbreak?

13- Do you think you have enough information about the terms of pandemic, epidemic, endemia?

14- Do you think that you are adequately informed in your faculty courses about the approach to communicable diseases?

15- Do you think that you are adequately informed in your faculty courses about the approach to outbreak situations?  
(such as intervention, tool and method)

16- Did you know the hygienic hand washing method before the COVID19 pandemic?

17- Do you know the difference between hygienic hand washing and surgical hand washing method?

18- Have you changed your hygiene habits after the COVID19 pandemic?

19-Did you know the term 'Social Distancing' before the COVID19 pandemic?

Followings are going to answer as: 0(never) 1 2 3 4 5 (always)

20- How often did you apply the hygienic hand washing method in your daily life? (Before COVID19 Pandemic)

21- How often do you apply the hygienic hand washing method in your daily life? (After COVID19 Pandemic)

22- Were you maintaining social distancing in your daily life? (Before COVID19 Pandemic)

23- Are you maintaining social distancing in your daily life? (After COVID19 Pandemic)

Followings are going to answer as: Yes No Unstable

24- Do you feel yourself qualified to work in hospitals voluntarily when necessary?

25- If necessary, would you agree to volunteer in hospitals if adequate facilities (such as protective equipment) and training support were provided?

26- Do you support the view that medical students should be qualified to volunteer in hospitals when necessary?

courses on the Public Health, Chest Diseases, Infectious Diseases and Microbiology during the preclinic or clinic training were presented as yes or no. The level of 6 items on general knowledge about an outbreak and 3 items on opinions about the participation during the pandemic were scored as yes, no or unstable. Lastly, 6 items on behavior were evaluated at 5 different level as never, rarely, sometimes, often and usually.

The online data collection was done voluntarily and was implemented between March 24<sup>th</sup> and April 9<sup>th</sup>, 2020. The medical students were grouped according to their geographical continent. Turkish students were not

included in any continent and were accepted as a separate group. The countries included in the study are listed in Appendix 2.

Statistical analyses were performed using IBM SPSS Statistics version 11. As the population of 64 countries is 2.560 million, the sample size was calculated as 1,067 with 3% margin of error; this value was 2,401 with 2% margin of error for 95% confidence interval. Error margin of 2% to 3% was considered acceptable. Chi-square and ANOVA tests were run comparing the survey responses of the medical students.  $P < 0.05$  is accepted as level of significance.

## Appendix 2. The countries in the study

**European countries:** Belgium, Bosnia Herzegovina, Bulgaria, Croatia, France, Germany, Hungary, Ireland, Italy, Kosovo, Lithuania, Malta, North Macedonia, Norway, Poland, Romania, Serbia, Slovenia, Spain, Switzerland, Netherlands, United Kingdom, Portugal

**Asian countries:** Azerbaijan, Cyprus, India, Indonesia, Iran, Iraq, Japan, Malaysia, Nepal, North Cyprus, Pakistan, Jordan, Philippines, Srilanka, Sultanate of Oman, Taiwan, Kuwait, Lebanon, Vietnam

**South America:** Argentina, Brazil, Colombia, Ecuador, Peru

**Africa:** Algeria, Burkina Faso, Cameroon, Egypt, Ethiopia, Kenya, Sierra Leone, Libya, Nigeria, Sudan, Tanzania, Togo, Tunisia, Uganda, Zambia, Ghana Turkey (as separate group)

## RESULTS

### Medical students' demographic characteristics

A total of 1,454 medical students from 64 different countries and 4 different continents participated in the survey, including Turkish (n=1,046), Asian (n=71), European (n=130), South American (n=108) and African (n=99) students. Responses from the countries other than Turkey were grouped according to the continent. Of the 1,454

medical students, most were female (64.9%) and gender distribution did not differ significantly between different continents and Turkey ( $p = 0.012$ ). The mean age and grade of medical students were 21.7, 3.37 among Turkish; 21.7, 3.97 among Asian; 22.0, 3.67 among European; 22.7, 3.85 among South American and 22.7, 3.99 among African students, for an overall mean age and grade of 21.8 years, 3.51 respectively (Table 1).

**Table 1. Demographic characteristics of medical students**

	N	Mean age	Grade	Female	Male	
Asia	71	21.66±1.6	3.97±1.7	67.6%	32.4%	
Europe	130	22.03±2.7	3.67±1.7	76.2%	23.8%	P=0.012
South America	108	21.52±2.9	3.85±1.6	61.1%	38.9%	
Africa	99	22.73±5.2	3.99±1.7	54.5%	45.5%	
Turkey	1046	21.7±2.1	3.37±1.5	64.6%	35.4%	
Total	1454	21.78±2.6	3.51±1.6	64.9%	35.1%	

**Responses to education experience**

Most respondents (61.6 %) had completed the lectures about infectious diseases in the preclinical year courses at the time of survey completion. Additionally, some of them (28.7 %) also have practiced the training on infectious diseases in clinical year rotations. Similarly, most (77.8%) reported to complete public health lectures in the preclinical setting, and just 22.7% have done clinical year rotation on it. A total of 63.6% had completed the lectures about chest diseases in preclinical period and only 36.8% had previous clinical exposure. 90% of the medical students had taken microbiology lectures, it was higher among Turkish respondents (94.2%) and lowest among African respondents (72.7) which is statistically significant ( $p < 0.001$ ) (Table 2).

**Responses about knowledge**

90% of the students on average across all groups (1309 out of 1454) had knowledge about the term of 'pandemic' before the COVID-19 outbreak ( $p = 0.314$ ). 66.2% of medical students (963 out of 1,454) thought that they had enough information about the terms of pandemic, epidemic and endemic; there was no statistically significance between the groups ( $p = 0.012$ ).

Only 44.6 % of the medical students on average across all groups (649 out of 1,454) defined that they had been adequately informed in their faculty courses about the approach to communicable diseases. While medical students training in Africa had the lowest knowledge, this rate was the highest among those studying in Asia (42.4%, 59.2% respectively). There was no statistically significance between groups ( $p = 0.008$ ).

**Table 2. Responses to education experience**

	Asia	Europe	South America	Africa	Turkey	Total	
<b>Clinic Infection</b>	25 35.2%	47 36.2%	43 39.8%	52 52.5%	250 23.9%	417 28.7%	$p < 0.001$
<b>Preclinic Infection</b>	55 77.5%	67 51.5%	78 72.2%	61 61.6%	634 60.6%	895 61.6%	$p = 0.001$
<b>Clinic Public Health</b>	26 36.6%	42 32.3%	39 36.1%	49 49.5%	174 16.6%	330 22.7%	$p = 0.001$
<b>Preclinic Public Health</b>	50 70.4%	69 53.1%	74 68.5%	56 56.6%	882 84.3%	1131 77.8%	$p < 0.001$
<b>Clinic Chest</b>	31 43.7%	68 52.3%	43 39.8%	54 54.5%	339 32.4%	535 36.8%	$p < 0.001$
<b>Preclinic Chest</b>	46 64.8%	85 65.4%	63 58.3%	65 65.7%	666 63.7%	925 63.6%	$p = 0.791$
<b>Microbiology</b>	63 88.7%	98 75.4%	90 83.3%	72 72.7%	985 94.2%	1308 90.0%	$p < 0.001$

**Table 3. Knowledge of the medical students about the COVID-19 pandemic**

	Asia	Europe	South America	Africa	Turkey	Total	
<b>Pandemic</b>	65 91.5%	123 94.6%	98 90.7%	93 93.9%	930 88.9%	1309 90.0%	$p = 0.314$
<b>Pandemic/ Epidemic/ Endemic</b>	47 66.2%	75 57.7%	75 69.4%	67 67.7%	699 66.8%	963 66.2%	$p = 0.012$
<b>Communicable Diseases</b>	42 59.2%	58 44.6%	56 51.9%	42 42.4%	451 43.1%	649 44.6%	$p = 0.008$
<b>Intervention/ Tool/ Method</b>	23 32.4%	27 20.8%	36 33.3%	31 31.3%	227 21.7%	344 23.7%	$P = 0.001$
<b>Hygienic Hand Wash</b>	67 94.4%	127 97.7%	104 96.3%	89 89.9%	999 95.5%	1386 95.3%	$p = 0.128$
<b>Hygienic vs. Surgical</b>	44 62.0%	93 71.5%	91 84.3%	53 53.5%	676 64.6%	957 65.8%	$p < 0.001$

About 23.7 % of all medical students considered that they had been adequately informed in their faculty courses about the approach to outbreak situations such as intervention, tool and method. This rate was the lowest in Europe with 20.8 %, while it was followed by Turkey with 21.7 %. The highest rate was in South America with 33.3% and it was statistically significant ( $p = 0.001$ ).

95.3% of all medical students were aware of the hygienic hand washing method before the COVID-19 pandemic; there was no statistically significance between the groups ( $p = 0.128$ ). However, 84.3% of those training in South America knew the difference between hygienic and surgical hands washing method, while this was only 53.5% of those training in Africa ( $p < 0.001$ ).

Details about the knowledge of the participants are illustrated in Table 3.

### Responses about behaviors

71.2% of all medical students confirmed that they changed their hygiene habits after the COVID-19 pandemic. While 88.9% of the medical students training in Africa have changed their hygiene habits, only 68.3% of the medical students training in Turkey paid attention to this issue ( $p < 0.001$ ). 59.8% of the medical students on average across all groups were aware of the term 'Social Distancing' before the COVID19 pandemic; this ratio was lower in African group as 35.4% ( $p < 0.001$ ).

7.3% of all medical students never apply the hygienic hand washing method in their daily life before the pandemic

while 22.6% of all medical students always apply. While the highest ratio of applying the hygienic hand washing method in daily life before the Pandemic in Asia is 32.4% among medical students, this rate is followed by Africa with 23.2%. The lowest ratio is in Europe with 19.2%, but there was no statistically significance between all groups ( $p = 0.011$ ).

After the Pandemic, 1.0% (14 out of 1,454) of all medical students still never apply the hygienic hand washing method in their daily life. Despite that 65.2% of all medical students always apply the hygienic hand washing method in daily life. There was no statistically significance between all groups ( $p = 0.063$ ).

**Table 4. Behaviors of the medical students about the COVID-19 pandemic**

		Asia	Europe	South America	Africa	Turkey	Total	
<b>Habits after</b>		58	91	84	88	714	1035	$p < 0.001$
		81.7%	70.0%	77.8%	88.9%	68.3%	71.2%	
<b>The term "Social distance"</b>		41	75	66	35	652	869	$p < 0.001$
		57.7%	57.7%	61.1%	35.4%	62.3%	59.8%	
<b>How often wash before</b>	Always	23	25	25	23	232	328	$p = 0.011$
		32.4%	19.2%	23.1%	23.2%	22.2%	22.6%	
	Usually	6	34	27	9	191	267	
		8.5%	26.2%	25.0%	9.1%	18.3%	18.4%	
	Often	18	37	25	21	245	346	
		25.4%	28.5%	23.1%	21.2%	23.4%	23.8%	
	Sometimes	12	21	19	22	189	263	
		16.9%	16.2%	17.6%	22.2%	18.1%	18.1%	
<b>How often wash after</b>	Rarely	8	7	8	18	103	144	$p = 0.063$
		11.3%	5.4%	7.4%	18.2%	9.8%	9.9%	
	Never	4	6	4	6	86	106	
		5.6%	4.6%	3.7%	6.1%	8.2%	7.3%	
	Always	43	86	64	58	697	948	
		60.6%	66.2%	59.3%	58.6%	66.6%	65.2%	
	Usually	11	32	30	19	214	306	
		15.5%	24.6%	27.8%	19.2%	20.5%	21%	
<b>Social distancing before</b>	Often	9	11	8	13	82	123	$p < 0.001$
		12.7%	8.5%	7.4%	13.1%	7.8%	8.5%	
	Sometimes	6	1	3	4	30	44	
		8.5%	0.8%	2.8%	4%	2.9%	3%	
	Rarely	2	0	2	2	13	19	
		2.8%	0.0%	1.9%	2.0%	1.2%	1.3%	
	Never	0	0	1	3	10	14	
		0.0%	0.0%	0.9%	3.0%	1.0%	1.0%	
<b>Social distancing before</b>	Always	2	1	6	2	18	29	$p < 0.001$
		2.8%	0.8%	5.6%	2.0%	1.7%	2.0%	
	Usually	3	1	5	2	43	54	
		4.2%	0.8%	4.6%	2.0%	4.1%	3.7%	
	Often	10	11	14	7	140	182	
		14.1%	8.5%	13.0%	7.1%	13.4%	12.5%	
	Sometimes	14	20	16	16	217	283	
		19.7%	15.4%	14.8%	16.2%	20.7%	19.5%	
<b>Social distancing before</b>	Rarely	11	36	20	18	286	371	$p < 0.001$
		15.5%	27.7%	18.5%	18.2%	27.3%	25.5%	
	Never	31	61	47	54	342	535	
	43.7%	46.9%	43.5%	54.5%	32.7%	36.8%		

Social distancing after		Asia		Europe		Africa		p<0.001
		n	%	n	%	n	%	
Always		46	64.8%	91	70.0%	76	70.4%	643
						44	44.4%	
Usually		13	18.3%	29	22.3%	16	14.8%	286
						26	26.3%	
Often		5	7.0%	2	1.5%	7	6.5%	85
						15	15.2%	
Sometimes		5	7.0%	7	5.4%	6	5.6%	16
						6	6.1%	
Rarely		2	2.8%	1	0.8%	1	0.9%	6
						6	6.1%	
Never		0	0.0%	0	0.0%	2	1.9%	10
						2	2.0%	

2.0% of all medical students always, 3.7% of all medical students usually, 12.5% of all medical students often, 19.5% of all medical students sometimes, 22.5% of all medical students rarely, 36.8% of all medical students never maintaining social distancing in their daily life before the pandemic. There was statistically significance between groups. ( $p<0.001$ ).

After the Pandemic, 61.9% of all medical students always, 25.4% of all medical students usually, 7.8% of all medical students often, 2.8% of all medical students sometimes, 1.1% of all medical students rarely, 1.0% of all medical students (14 out of 1454) never maintaining social distancing in daily life. In Africa, only 44.4% of students care social distancing despite the Pandemic, while 70.4% of students in South America and 70% of students in Europe maintain always. There was statistically significant between groups ( $p<0.001$ ). Details are in Table 4.

### Responses about opinions

In Africa, 58.6% of medical students feel themselves qualified to work in hospitals voluntarily when necessary. On the other hand, in Turkey only 19.9% and in Europe only 29.2% of medical students think they can succeed, this was statistically significant ( $p<0.001$ ).

In Asia 91.5% of students and in Europe 87.7% of students would agree to volunteer in hospitals if adequate facilities (such as protective equipment) and training support were provided. On the other hand, in Turkey this rate was 71.1% which is statistically significant difference between all groups ( $p<0.001$ ).

75.9% of all medical students support the view that medical students should be qualified to volunteer in hospitals when necessary. The highest rate was in Africa as 85.9% and there was no statistically significant difference between all groups ( $p=0.006$ ). Details are illustrated in Table 5.

**Table 5. Opinions of the medical students about the COVID-19 pandemic**

	Asia	Europe	South America	Africa	Turkey	Total	
Do you feel qualified?	33 46.5%	38 29.2%	37 34.3%	58 58.6%	208 19.9%	374 25.7%	$p<0.001$
Do you accept volunteer work?	65 91.5%	114 87.7%	83 76.9%	86 86.9%	744 71.1%	1092 75.1%	$p<0.001$
Do you support the view that medical students should be qualified to volunteer?	52 73.2%	104 80.0%	79 73.1%	85 85.9%	783 74.9%	1103 75.9%	$p=0.006$

## DISCUSSION

This cross-sectional study reveals that only a quarter of all medical students had been adequately informed in their lectures about the management of outbreak situations using intervention, tools and method. About three quarters of all medical students changed their hygiene habits and about three-fifths of all started to pay attention to social distance after the COVID-19 pandemic. If required, medical students from Africa feel themselves more qualified to work in hospitals voluntarily than the students from Turkey and Europe. On the other hand, almost all Asian and European students agree to volunteer in hospitals, but only 71.1% of Turkish students accept it. About three quarters of all

medical students support the view that medical students should be qualified to volunteer in hospitals when necessary.

Since the COVID-19 pandemic is an unforeseeable event, the health system in many countries has difficulty to manage and health care professionals carry a lot of burdens. With the timelessness and uncertainty of the COVID-19 pandemic, a different issue arises related to medical students. As they are the future health care professionals, medical students should be a part of the public health care system and should be responsible in emergencies about the pandemic (8). Otherwise another thought, they are not required in clinical practice and

might be kept away from clinical learning. Medical schools in different countries have had various approaches (9). Some of them have decided to discontinue training, whereas others have created new working orders for clinical placements.

The clinical placement by medical students creates some question marks. Firstly, there may be a lack of knowledge about the essential terms and approaches needed to manage the pandemic. In this study, although 90% of medical students had enough information about the term of pandemic, only 44.6 % of all medical students had knowledge about the approach to communicable diseases. Only 23.7 % of all medical students had known the approach to outbreak situations such as intervention, tool and method. It was the lowest in Europe with 20.8 %, followed by Turkey with 21.7%. The highest rate was in South America with 33.3%. Although there was significant difference between groups, still less than half did not have knowledge. Taghrir et al. evaluated 240 Iranian medical students and unlike our findings they emphasized the high level of knowledge and moderate risk perception (10).

Secondly, if they get infected with the COVID-19, an official situation on insurance is uncertain. On the contrary, if they are not qualified enough, they may spread the COVID-19 disease to the patients and colleagues like a vector. In UK, the trainee doctor Bawa-Garba was not supported because of her malpractice and banned from the profession despite the health system failures, although she was working under the clinical supervisor (11). Although 58.6% of African medical students feel qualified to work in hospitals if required, only 19.9% Turkish and only 29.2% European medical students think they can success, this was statistically significant ( $p < 0.001$ ). We should keep in mind that both Turkey and European countries ranked top in the list of affected countries by the COVID-19 pandemic (12, 13). In these countries, medical students might be more anxious about ongoing events and might feel more inadequate to help. These issues have to discuss thoroughly by countries and medical schools before any medical student starts clinical practice in the pandemic.

During the pandemic, there are still different locations to work as health care professional such as routine antenatal check-up or chronic conditions (8). These locations may be more suitable for the future doctors as they are easier to handle. On the other hand, as the personal risk from the COVID-19 infection cannot be eliminated in policlinics or services, any involvement of the medical students should require volunteering (14). 91.5% of Asian students and 87.7% of European students would agree to volunteer if sufficient protective equipment and training support were provided. Turkish students rate was a bit lower as 71.1% which is statistically significant difference ( $p < 0.001$ ). Although the pandemic is affecting all the continents, the most of the total cases and deaths are from European and Asian countries (15). Thus the medical students from these countries observe more closely that volunteers are needed.

Medical faculties in Italy, the United Kingdom and the United States decided to graduate last year medical students earlier and accepted them as clinicians during the pandemic (16,17). This idea contributes to the features of students such as solidarity, self-reliance, sacrifice and crisis management as well as it benefits to health care system. 75.9% of all medical students support this view, while the highest rate was in Africa as 85.9% and there was no statistically significant difference between all groups ( $p = 0.006$ ).

Limitations of the study are small sample size of the continents and continent-wide differences of educational skills. As expected, continent-wide differences are available in terms of the timings and periods of trainings (18). Also, the education programs are not always uniform within the same country. Further studies might be individualized by countries with larger population.

Countries and medical faculties are responsible to educate the medical students as well-trained doctors with appropriate patient management, even in crises. Medical students might be volunteered to participate in the COVID-19 pandemic; but during this uncertain and risky event, the capabilities of medical students are essential.

## CONCLUSION

Medical students seem to be volunteered, but have not been adequately informed about the approach to outbreak situations in their lectures. A clear national decision with the possibilities of each country is needed to ensure that all medical students reach the appropriate level of education to participate emergent situations like this outbreak. An international consensus on medical students' roles during emergencies may be helpful for the implementation and improvement of medical school programs about the current COVID-19 pandemic and future ones.

*Conflict of interest : The authors declare that they have no competing interest.*

*Financial Disclosure: There are no financial supports.*

*Ethical approval: Obtaining approval from the institutional Ethics committee was not seen as a requirement because of the reasons that the study was not conducted by collecting biological samples from human participants (blood, urine and serum etc.), that it was not based on investigating any collected biological samples and that it was not a type of study in which any experimental procedures (medication etc.) were applied on humans. Thus, online questionnaire performed in this study were done with permission of IFMSA SCOME Director on 27.03.2020/19.05.*

## REFERENCES

1. WHO Director-General's opening remarks at the media briefing on COVID-19—11 March 2020. <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19-11-march-2020> access date 31.03.2020

2. Mahase E. Covid-19: Portugal closes all medical schools after 31 cases confirmed in the country. *BMJ* 2020;368:986.
3. Representatives of the STARSurg Collaborative, EuroSurg Collaborative, and TASMAN Collaborative. Medical student involvement in the COVID-19 response. *Lancet* 2020;395:1254.
4. Iacobucci G. Covid-19: medical schools are urged to fast-track final year students. *BMJ* 2020;368:1064.
5. Bauchner H, Sharfstein J. A Bold Response to the COVID-19 Pandemic: Medical Students, National Service and Public Health. *JAMA* 2020;323:1790-1.
6. Mahase E. Covid-19: medical students to be employed by NHS as part of epidemic response. *BMJ* 2020;368:1156.
7. Rose S. Medical Student Education in the Time of COVID-19. *JAMA* 2020;323:2131-2.
8. Miller DG, Pierson L, Doernberg S. The Role of Medical Students During the COVID-19 Pandemic. *Ann Intern Med* 2020;20-1281.
9. Soled D, Goel S, Barry D, et al. Medical Student Mobilization During A Crisis: Lessons From A COVID-19 Medical Student Response Team. *Acad Med* 2020;10.1097/ACM.0000000000003401.
10. Taghrir MH, Borazjani R, Shiraly R. COVID-19 and Iranian Medical Students; A Survey on Their Related-Knowledge, Preventive Behaviors and Risk Perception. *Arch Iran Med* 2020;23:249-54.
11. Dyer C. Hadiza Bawa-Garba wins right to practise again. *BMJ* 2018;362:3510.
12. Reported Cases and Deaths by Country, Territory, or Conveyance. <https://www.worldometers.info/coronavirus/> access date 25.04.2020
13. Remuzzi A, Remuzzi G. COVID-19 and Italy: what next? *Lancet* 2020;395:1225-8.
14. Advice from Medical Schools Council to UK Medical Schools on actions surrounding Covid-19. <https://www.medschools.ac.uk/media/2620/msc-covid-19-advice-for-uk-medical-schools.pdf> access date 14.03.2020
15. Reported Cases and Deaths by Country, Territory, or Conveyance. <https://www.worldometers.info/coronavirus/> access date 02.06.2020
16. Whelan A, Prescott J, Young G, et al. Guidance on medical students' clinical participation: effective immediately. Association of American Medical Colleges. <https://lcme.org/wp-content/uploads/filebase/March-17-2020-Guidance-on-Medical-Students-Clinical-Participation.pdf> access date 20.03.2020
17. Goldberg E. Early graduation could send medical students to virusfront lines. *The New York Times* 26 March 2020.
18. IFMSA (International Federation of Medical Students' Associations). Medical Education System Worldwide Survey Report, September 2018. [www.ifmsa.org](http://www.ifmsa.org). access date 09.04.2020