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How can we help? Medical students' views on their role in the COVID-19 pandemic

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ABSTRACT

Background The ongoing COVID-19 pandemic has resulted in a sharp rise in demand for healthcare workers worldwide. This has been coupled with reduced numbers of available medical professionals due to confirmed or suspected infections with SARS-CoV-2. To counteract these shortages, governments of several countries have considered the enrolment of medical students into the workforce in order to help to tackle the ongoing crisis.

Methods Questionnaire-based study assessing the perceived role of medical students in assisting in the COVID-19 pandemic. The primary aim was to determine factors contributing to the willingness of medical students to actively assist in the pandemic. The secondary aim was to evaluate their perspectives regarding the associated changes in medical education.

Results Out of 760 responses, 71.18% of medical students were willing to assist the medical workforce during the pandemic. Clinical year students were more likely to help in a medical capacity than pre-clinical students (OR = 0.384, 95%CI [0.167, 0.883, $P < 0.05$)]. Respondents concerned about their own well-being were less likely to engage in clinical work (OR = 0.680, 95%CI [0.491, 0.941], $P < 0.020$). Students who agreed that online lectures will negatively impact their education were inclined to think that the academic year should be extended (95%CI [0.065, 0.271], $P = 0.001$).

Conclusions Most students are willing to help in both a medical and non-medical capacity. Their primary concerns when working in a medical setting are the risk of infecting their relatives and patients, lack of protective equipment and necessary knowledge as well as legal uncertainty whilst working without a medical qualification.

Keywords coronavirus, medical students, medical education, pandemic, questionnaire-based study

Introduction

The demands of the ongoing COVID-19 pandemic have overwhelmed many healthcare systems across the globe.[1–4] To date, there is a constant battle to meet the demands for resources and manpower. In order to counteract dire shortages in healthcare workers, governments across several countries have considered enrolling medical students into the workforce. [5–8]

At least 5500 penultimate year students in the UK graduated early and 10 000 from Italy have been fast-tracked in order to work in primary care. This allowed more experienced doctors to be redeployed into hospitals.[7,9–11] However, approaches adopted between and within countries vary. Clinical students in Poland were permitted to volunteer in hospitals without a formal license to practice medicine,[8] whilst the Association of American Medical Colleges (AAMC) advises against students getting involved in direct patient care unless there is a critical staff shortage.[12]

Medical education worldwide has also been disrupted—clinical rotations and electives have been suspended whilst lectures and examinations have been cancelled or conducted online.[13–15] For penultimate year students in countries such as Italy and UK, examinations were brought forward or cancelled in order to ease pressures on health services.[16,17]

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Despite many opinion pieces on the deployment of medical students during the pandemic, there is a paucity of a large-scale quantitative analysis that would provide valuable insight into medical schools across the globe. This study evaluates perspectives of medical students around the world regarding (i) their role in the pandemic and (ii) changes in their medical education.

Methods

A questionnaire consisting of 32 questions was designed with a specialized application for survey administration (Google Forms © 2020; developed by Google LLC, Mountain View, 94043 California, USA). Four sections were outlined: (i) basic demographic data (ii) willingness to help and perceived roles to fill (iii) concerns with involvement in the pandemic fight (iv) opinion on adjustments to medical education. The inclusion criteria were (i) enrolment as a medical student at any university around the world, (ii) students who spoke English and were able to fill out the questionnaire. Questions pertaining to the severity of concerns ($n = 7$), as well as opinions on education ($n = 4$), were graded using a five-point Likert scale (ranging from a score of 1 for 'strongly disagree' to a score of 5 for 'strongly agree'). Four questions used a three-point scale (ranging from 1 for 'No', 2 for 'Maybe' and 3 for 'Yes').

Between 27 March and 15 April 2020, the survey was disseminated to medical students via websites run by medical schools and associations. An accompanying information sheet explained the purpose of study. Voluntary participation and completion of survey implied consent for the use of data collected. The study was conducted in accordance with the World Medical Association's Declaration of Helsinki.

The primary aim was to determine main factors contributing to the willingness of medical students to help during the COVID-19 pandemic in a medical capacity. The secondary aim was to evaluate perspectives regarding the associated changes in medical education.

Statistical analysis

Descriptive and multivariate statistics were performed using designated statistical software—IBM SPSS Statistics for Windows, version 25 (IBM Corp., Armonk, NY, USA).

For primary outcomes, trends in categorical and nominal values were tested with a multinomial regression model. Secondary outcomes were analyzed with use of Chi-squared test and ordinal regression analysis. Missing data were excluded from calculations. All tests were two-tailed, and *P*-values of less than 0.05 were regarded as statistically significant.

Results

A total of 760 responses were obtained from students hailing from 74 countries and 270 medical universities. The mean age of the respondents was 23.68 ([range] = 28, [SD] = 3.23). Responses were predominantly obtained from students currently in their clinical years of medical school training. A summary of the study population demographics can be found in Table 1 and Figure S1–S3 and Table S3.

Majority of respondents (71.18%, $n = 541$) were willing to assist as part of the medical workforce during the COVID-19 pandemic. Assisting senior colleagues in a hospital or primary care setting was preferred over daily household chores (Tables 1 and 2). When questioned further, 67.5% ($n = 513$) of students were happy to assist where clinical need is greatest, followed by internal medicine ward ($n = 256$, 33.68%), accident and emergency department ($n = 220$, 28.95%), general practice ($n = 210$, 27.63%) and intensive therapy unit ($n = 149$, 19.60%). Only 144 (18.95%) students were happy to work in the infectious diseases department. These data are further summarized in Table 2.

Importantly, 57.01% ($n = 434$) of students believe that they should have a formal employment contract and receive financial remuneration for their work in a clinical setting. The opinion that pay should be in excess of their countries minimum wage was held by 55.53% ($n = 422$) of students as they fell into the category of skilled workers. In spite of this, 29.87% ($n = 227$) of total respondents felt that it would be unethical to not volunteer their assistance for the ongoing COVID-19 pandemic. These students were more willing to help in the medical capacity as compared to students who disagreed with the ethics (OR = 0.478, 95%CI [0.337,0.667], $P < 0.0001$). These data are presented in Table 3.

Amongst the study population, 10.53% ($n = 80$) reported a confirmed diagnosis with a chronic medical condition whilst a further 1.97% stated that they may have a medical condition. Within this subgroup, the presence of disease had influenced the decision made by 47.37% ($n = 45$) of respondents to not assist in the pandemic. The most common conditions cited were respiratory in origin (40.19%, $n = 43$). However, having a respiratory illness was not a statistically significant negative predictor for willingness to assist in the pandemic. These data are presented in Table S1.

Common concerns with working in the clinical setting include the fear of unintentionally infecting friends and family members (83.29%) or patients (74.21%), and the lack of adequate personal protective equipment (PPE) (71.32%), as well as supervision whilst working in the clinical setting (60.39%). In comparison, there was less concern that students did not possess the necessary medical knowledge to

Table 1 Characteristics of the 760 respondents

No.	*Variable*	*Respondents (n = 760)*		
		Mean	**Range**	**Standard Deviation**
Q1	Age	23.68	28	3.23
		Frequency (*n*)		**Percentage (%)**
Q2	Sex			
	Male	276		36.3
	Female	479		63.0
	Prefer not to say	5		0.7
Q3	Countries of medical schools by economic growth			
	Developed economy	510		67.1
	Developing economy	212		27.9
	Economy in transition	37		4.9
	Unknown	1		0.1
Q4	Year of medical school			
	Clinical year[a]	617		81.18
	Preclinical year	143		18.82
Q5	Willingness to assist in the COVID-19 pandemic as part of the medical workforce			
	Yes	541		71.18
	No	51		6.71
	Maybe	168		22.11
Q6	Willingness to assist in the COVID-19 pandemic by helping out in a non-medical capacity			
	Yes	422		55.53
	No	140		18.42
	Maybe	198		26.05
Q7	Students suffering from any chronic medical illness			
	Yes	80		10.53
	No	665		87.50
	Maybe	15		1.97

[a]Statistically significant results for multinomial logistic regression. Students from clinical years were more likely to engage in clinical work than preclinical year students (OR = 0.384, 95%CI [0.167, 0.883], $P = 0.024$). Five cases were excluded from calculations.

adequately look after patients (57.89%) or with the legal uncertainty while working without a formal medical qualification (53.29%). Students were least concerned about the potential personal health risks while working in a healthcare environment (44.74%), although those who were worried were less likely to engage in clinical work (OR = 0.680, 95%CI [0.491, 0.941], $P < 0.020$). The data described above are summarized in Table 4.

With regards to changes made in medical education, more students ($n = 302$, 39.73%) thought that the current academic year should not be extended in view of the pandemic. The remaining 22.75% ($n = 173$) and 37.50% ($n = 285$) of students were either neutral or wanted an extension of the current academic year, respectively. In addition, 45.30% ($n = 322$) of students believed that the introduction of online lectures, as a replacement for face-to-face seminars, would have a negative impact on the quality of their medical education. Amongst both clinical and non-clinical students, 41.31% ($n = 314$) indicated that online examinations are inadequate measures of academic performance (Table 5).

When asked if final year students should be fast-tracked in order to commence hospital work earlier than initially scheduled, 57.37% ($n = 436$) agreed while 27.89% ($n = 212$) disagreed. The remaining 14.74% ($n = 112$) support fast-tracking if sufficient training before graduation ($n = 36$, 32.14%), each country's need for medical workers ($n = 24$, 21.43%), student's work preferences ($n = 5$, 4.46%), adequate supervision ($n = 4$, 3.57%), as well as financial remuneration ($n = 2$, 1.79%) were considered; 41 students (36.61%) said it is hard to tell which decision would be best.

Table 2 Questions pertaining to preferred environment of work in the COVID-19 pandemic fight

No.	*Variable*	*Respondents (n = 760)*	
		Frequency (*n*)	**Percentage (%)**
Q1	If you consider yourself willing to help your senior medical colleagues, which would you prefer:		
	a. Helping out in a medical capacity by working as part of the healthcare team in a hospital/primary care environment.	453	59.61%
	b. Helping out with daily household chores that my senior colleagues may not be able to do due to their increased workload.	51	6.71%
	c. I do not have any particular preference – I would be happy to do anything that is required of me.	217	28.55%
	d. Does not apply – I am unwilling or unable to assist in either capacity.	39	5.13%
Q2	If you would be willing to work in a medical capacity, which specialty would you be happy to assist in?[a]	*n* = 1626	
	a. I do not mind – I would be happy to work anywhere where I am needed	513	31.55%
	b. Internal medicine department	256	15.74%
	c. Accident and Emergency department	220	13.53%
	d. General practice/Family medicine	210	12.92%
	e. Intensive Therapy Unit	149	9.16%
	f. Infectious diseases department	144	8.86%
	g. Other	83	5.10%
	h. I would not be happy to work in a clinical capacity during the COVID-19 pandemic	51	3.14%

[a]Q2 was the only multiple choice question included in the survey. Therefore, the total number of answers by 760 students was equal to 1626.

There was no clear consensus if lowering academic standards for final year students in order to join the workforce early results in poorer clinical outcomes for future patients. Overall, 39.6% ($n = 301$) of respondents felt that there was no impact on clinical outcomes while 41.18% ($n = 313$) believed otherwise. The remaining 19.21% ($n = 146$) had no opinion on the issue. The data obtained from these questions are summarized in Table 5.

Discussion

With the surge of COVID-19 patients overwhelming hospitals around the world, medicine and medical education has been forced to undergo radical changes at an unprecedented pace. Most medical schools have cancelled clinical rotations in order to minimize student's risk of exposure to the virus, as well as to conserve the limited quantities of PPE.[18] Whilst some nations have encouraged a push for their final year graduates to join the workforce,[9,17,19] others have decided to place an emphasis on the continuation of their studies. This has left many students frustrated for not being able to help during these times of crisis[20,21] and have propelled some to take initiative and volunteer on the frontlines.[22–24]

Our study affirms that the majority of medical students are willing to assist in the COVID-19 pandemic as part of the medical workforce and be employed in areas where clinical need is the greatest (Tables 1 and 2). This includes specialties such as internal medicine, where students can help fill the gaps in teams whose members have been redeployed to the frontlines. Whilst COVID-19 is an imminent threat, it is not the only disease we have to tackle. Many patients with chronic conditions or medical emergencies still need to be attended to.

Amongst those willing to assist in the clinical setting, the majority of respondents from the study were more concerned about endangering the well-being of family and friends (83.29%) or patients (74.21%) as compared to their own (44.74%). This may be due to numerous reasons (Table 4): i) inadequate PPE to safely interact with patients (71.32%) ii) inadequate supervision whilst working in the clinical setting (60.39%) iii) inadequate medical knowledge or skills to care for patients (57.89%).

Over 10% of respondents have been suffering from chronic illnesses and the presence of disease influenced almost half of this subgroup to not actively assist in the pandemic. Although not statistically significant, it is worth mentioning that students with underlying chronic respiratory conditions (e.g. asthma) were less likely to help in a medical

Table 3 Medical students' opinion on employment, wage and ethics during COVID-19 pandemic fight

No.	*Variable*	*Number of Responses (n = 760)*	*Percentage (%)*
Q1	Do you believe that in order to work in a medical capacity during the pandemic you should sign a formal employment contract with the healthcare facility and receive financial remuneration for your work?		
	Yes	434	57.11
	No	113	15.80
	Maybe	213	29.79
Q2	Medical students should receive more than minimum wage in my country for providing medical services during the pandemic, as they can be considered highly skilled workers.		
	Strongly Agree	156	20.53
	Agree	266	35.00
	Neutral	214	28.16
	Disagree	97	12.76
	Strongly Disagree	27	3.55
Q3	It would be unethical of medical students to not volunteer to help in the COVID-19 pandemic as part of the medical workforce.[a]		
	Strongly Agree	58	7.63
	Agree	169	22.24
	Neutral	176	23.16
	Disagree	241	31.71
	Strongly Disagree	116	15.26

[a]Statistically significant results for multinomial logistic regression. Students who agreed with this sentence were more likely to engage in clinical work (OR = 0.478, 95%CI [0.337, 0.667], $P < 0.0001$). Five cases were excluded from calculations.

capacity. Nevertheless, this response could be explained by the fear of more severe health risks posed to them if they are exposed to the virus.[25,26]

More than half of the respondents believe that they should be drafted a formal employment contract and have financial remuneration above the minimum wage (Table 3). The rationale for financial payments not only helps to support healthcare workers during the associated economic crisis, but also serves as a form of payment in situations where medical students are filling in jobs that are ordinarily waged. Such payments can be provided in the form of free accommodation, refinancing student loans or tuition reimbursement, similar to the Coronavirus Aid, Relief, and Economic Security (CARES) Act passed in the USA.[27]

In addition, 14.74% of respondents opine that final year students should only be fast-tracked if sufficient PPE, supervision and training were present. This highlights the imminent need for proper induction of fresh graduates into their new roles, adequate supervision, and ample supplies of PPE in order to safeguard and assure incoming healthcare workers. The American Association of Medical Colleges has also echoed the same concerns, with recommendations that appropriate liability cover and health insurance should be put in place before assisting in the pandemic.[12,28]

Table 4 Students' concerns on their involvement in the COVID-19 pandemic fight

No.	*Variable*	*Respondents (n = 760)*	
		Frequency (n)	*Percentage (%)*
Q1	I am concerned about the legal aspect of working in a medical capacity prior to formally qualifying as a medical doctor.		
	Strongly Agree	151	19.87
	Agree	254	33.42
	Neutral	159	20.92
	Disagree	130	17.11
	Strongly Disagree	66	8.68
Q2	I am concerned about endangering my own life and wellbeing whilst working in a healthcare environment during the pandemic.[a]		
	Strongly Agree	122	16.05
	Agree	218	28.68
	Neutral	160	21.05
	Disagree	159	20.92
	Strongly Disagree	101	13.29
Q3	I am concerned about endangering the life and wellbeing of my family and friends by unintentionally exposing them to SARS-CoV-2.		
	Strongly Agree	407	53.55
	Agree	226	29.74
	Neutral	61	8.03
	Disagree	41	5.39
	Strongly Disagree	25	3.29
Q4	I am concerned about endangering the life and wellbeing of patients by unintentionally exposing them to SARS-CoV-2.		
	Strongly Agree	312	41.05
	Agree	252	33.16
	Neutral	99	13.03
	Disagree	70	9.21
	Strongly Disagree	27	3.55
Q5	I am concerned that I do not possess the necessary medical knowledge and/or skills to properly look after patients.		
	Strongly Agree	198	26.05
	Agree	242	31.84
	Neutral	137	18.03
	Disagree	131	17.24
	Strongly Disagree	52	6.84
Q6	I am concerned that I will not be appropriately supervised and therefore unable to safely perform clinical duties.		
	Strongly Agree	190	25.00
	Agree	269	35.39
	Neutral	132	17.37
	Disagree	130	17.11
	Strongly Disagree	39	5.1

Continued

Table 4 Continued

No.	*Variable*	*Respondents (n = 760)*	
		Frequency (n)	*Percentage (%)*
Q7	I am concerned that I will not have adequate personal protective equipment (PPE) to safely interact with patients during the pandemic.		
	Strongly Agree	315	41.45
	Agree	227	29.87
	Neutral	96	12.63
	Disagree	85	11.18
	Strongly Disagree	37	4.87

[a]Statistically significant results for multinomial logistic regression. Students who were concerned about their life and wellbeing were less likely to help in a medical capacity (OR = 0.680, 95%CI [0.491, 0.941], $P = 0.020$). Five cases were excluded from calculations.

Table 5 Medical student's view on adjustment in medical education in 2019/2020 academic year

No.	*Variable*	*Respondents (n = 760)*	
		Frequency (n)	*Percentage (%)*
Q1	Do you think that the current academic year should be extended in view of the current pandemic?		
	Strongly Agree	124	16.32
	Agree	161	21.18
	Neutral	173	22.76
	Disagree	143	18.82
	Strongly Disagree	159	20.92
Q2	Do you think that introducing online lectures and seminars will have a negative impact on the quality of your medical education?[a]		
	Strongly Agree	127	16.71
	Agree	214	28.16
	Neutral	138	18.16
	Disagree	167	21.97
	Strongly Disagree	114	15.00
Q3	Do you think that it is a good idea for medical examinations to be conducted online?[b]		
	Strongly Agree	115	15.13
	Agree	158	20.79
	Neutral	173	22.76
	Disagree	176	23.16
	Strongly Disagree	138	18.16

Continued

Table 5 Continued

No.	*Variable*	*Respondents (n = 760)*	
		Frequency (n)	*Percentage (%)*
Q4	Do you think that final year medical students should be fast-tracked in order to allow for them to join the workforce as soon as possible?[b]		
	Yes	436	57.37
	No	212	27.89
	Maybe	112	14.74
Q5	Lowering academic standards for final year medical students in order to allow for them to join the workforce earlier will result in poorer clinical outcomes for future patients, as they will inadvertently be treated by clinicians whose medical knowledge was not properly evaluated at the time of graduating from medical school.[a]		
	Strongly Agree	123	16.18
	Agree	190	25.00
	Neutral	146	19.21
	Disagree	178	23.42
	Strongly Disagree	123	16.18

[a]Statistically significant results for ordinal regression Students who scored higher in these questions were more likely to think that the current academic year should be extended ($P < 0.001$)

[b]Statistically significant results for ordinal regression. Students who scored higher in these questions were less likely to think that the current academic year should be extended ($P < 0.0001$).

Non-clinical or non-final year medical students have already taken initiative and have engaged in a wide range of skills to aid the global fight against the pandemic. This includes setting up donation drives for PPE, offering childcare services and food deliveries for frontline workers, or educating the public about hygiene practices via social media platforms.[29–31] In addition, clinical year students have also begun to assist in telehealth, calling up existing patients whose appointments have been cancelled and addressing any concerns over medications or symptoms.[32] This also reduces the risk of viral transmission for medical students.

In light of the existing social distancing measures and shortages in clinical teaching staff, medical schools around the world are forced to restructure lectures and examinations accordingly.[33,34] However, it is worth noting that almost half of the respondents maintain that online classes would negatively impact the quality of teaching (45.30%) and online examinations were inadequate measures of academic performance (41.31%). Unfortunately, unless medical schools can find suitable alternatives, online lectures and examinations will have to be a temporary solution in order to minimize disruption of education to the future pipeline of doctors.

Finally, the authors acknowledge the ongoing tensions between the need to balance time used in assisting in the clinical setting and protecting the education of the future pipeline of doctors.[35] Working in the challenging environment of a pandemic whilst having to keep afloat with online classes can prove mentally and physically draining for a medical student. Thus, some medical schools have issued statements that a student's first responsibility was to their continuing education and advised against taking on additional responsibilities they could not cope with.[36] Should a student wish to assist in the pandemic however, the authors encourage medical schools to provide the appropriate support for their students by recording classes, providing mental health services, or arranging roles within the affiliated university hospitals/medical centres.

The main limitation of the study is respondent bias. The majority of participants were females and predominantly studying in developed countries. Furthermore, medical students who were affected by COVID-19 could be more likely to respond.[37] However, this could be explained by factors such as: psychological involvement, females are more likely to respond to surveys than men, language barriers or

limited access to the internet in less developed countries.[38,39] Finally, due to the nature of the survey, the response rate could not be calculated and the full extent to which the study sample is representative of the international population remains unclear. Larger studies should be conducted to compare responses between different countries. This enables drafting of policies on medical education to meet both the individual needs of each country and student's educational needs during the ongoing pandemic.

Conclusions

To date, there is a paucity of quantitative studies on an international scale. This study provides perspective on a medical student's role during the ongoing pandemic and its global effects on the quality of medical education. The study suggests that the majority of students around the world are willing to assist in the pandemic as part of the clinical team and engage in direct patient contact. Over half of respondents believe that they should be offered a formal contract of employment to ensure that they receive financial remuneration and legal protection whilst working in a clinical capacity. Fear of cross infecting friends, family members and patients, lack of necessary PPE, inadequate clinical supervision, insufficient medical knowledge and skills, as well as medico legal uncertainties were cited as common reasons for not wanting to assist in the pandemic. There was no common consensus if the affected academic year should have been extended. Almost half of the respondents opined that online classes will negatively impact their medical education, and that online medical examinations are inappropriate substitutes for conventional clinical-based examinations. However, given the ongoing global crisis that healthcare systems face, there are hardly other suitable alternatives at the time of writing.

Involvement in the global fight against the pandemic can be a unique learning experience for medical students. It sheds light on how healthcare systems deal with a medical crisis, especially when there is no definite cure and when resources are strained. It also provides first-hand experience on how to rapidly adapt to situations, equipping future generations of doctors with the capacity and knowledge to better tackle the next global pandemic and can be a reminder to exercise care and compassion for both colleagues and patients during these unprecedented times. The authors agree that rather than discouraging the involvement of medical students, governing bodies should find ways to leverage on the clinical knowledge and skills offered, and in doing so, optimize financial, administrative, emotional, and clinical support to those who are already involved in the front-line pandemic fight. In addition, there is a need for robust guidelines on the continuation of medical education during a global crisis. This is to ensure that the learning needs of medical students are not compromised. For this to work, transparent communication between all parties involved is essential.

We hope the preliminary data presented can be supplemented by larger studies specific to each nation and can serve as a reference for healthcare professionals, regulators, medical universities and professional licensing bodies to make more informed decisions about student participation in any pandemic.

Supplementary data

Supplementary data are available at the *Journal of Public Health* online.

Conflicts of interest

The authors declare that they have no conflict of interest.

Ethics approval

The questionnaire and methodology for this study was discussed with the Royal Free Hospital R&D department and it was deemed that no Human Research Ethics Committee approval was required as the study did not fulfil the criteria for clinical research set out by the NHS.

Consent to participate

As per Royal Free Hospital R&D recommendations questionnaire studies do not require a separate signed consent form as the return of the completed questionnaire to the researcher was assessed as 'implied consent'.

Consent for publication

The information sheet supplied with the questionnaire explained that all data collected will be used in a scientific publication. Return of the completed questionnaire to the researcher was assessed as 'implied consent'.

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Data availability statement

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

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