

The educational and psychological impact of the COVID-19 pandemic on medical students

A descriptive survey at the American University of Beirut

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Abstract

The SARS- CoV-2 virus has been a public health crisis since its emergence in 2019. It has affected nearly all aspects of life. Education has been particularly hit, and a lot of effort has been put to implement more and more virtual platforms through online classes, meetings and conferences. Medical education has also been affected, especially because of the need for hands-on education, specifically in the clinical setting of the last 2 years. This had a huge psychological impact on the medical students currently enrolled in medical schools around the globe.

In this descriptive study, we sent all medical students at the American University of Beirut Faculty of Medicine (AUBFM) an online anonymous survey by email. The survey started with general questions (age, gender and medical school year), followed by 3 sections that contain questions pertaining to the attitudes of medical students towards clinical rotations and online classes. Data was then analyzed using SPSSv24 and was then reported as percentages.

Students were almost equally divided among the medical school classes (Med 1, 2, 3, and 4). The majority of clinical students (Med 3 and Med 4) reported that they feel nervous during their rotations in the hospital. Moreover, they reported that they have increased their use of disinfectants and personal protective equipment since the emergence of the pandemic. Moreover, the majority of medical students reported that they feel more stressed after shifting to online classes. Medical students also reported that they would be willing to go back to on-campus classes.

This study aimed at describing the response of medical students at AUBFM to the COVID-19 pandemic in terms of stress. Limited data exists in the literature concerning the psychological impact of the COVID-19 pandemic on medical students in the middle East. Medical students reported that they feel more stressed and nervous during their clinical rotations and after the shift to online education, affecting their academic and social life. Further studies using a larger sample size are needed.

Abbreviations: AUB = American University of Beirut, AUBFM = American University of Beirut Faculty of Medicine, AUBMC = American University of Beirut Medical Center.

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1. Introduction

Since its emergence, COVID-19 has been declared a public health crisis threatening the globe because of the ease of transmission of the virus, the wide range of symptoms, and the lethal complications. The SARS- CoV-2 virus originated in bats and has so far resulted in more than 3 million deaths worldwide.^[1] It started late 2019 in Wuhan, Hubei province, China, and has since reached all countries around the globe.^[2] Consequently, COVID-19 research has been filling the research faculties in all universities and institutes worldwide. Studies have shown that it impacted nearly all aspects of life.^[3] From interpersonal interactions, to companies on the small scale, to economies on the large scale, they all had their share of the damage caused by the pandemic.^[4] Most countries went into complete lockdown for various periods of time aiming to control the spread of the virus. Moreover, many businesses went out of business due to changes in the economic and social life since the beginning of the pandemic.^[3]

Education has been particularly hit, and a lot of effort has been put to implement more and more virtual platforms through online classes, meetings and conferences.^[5] Medical education has also been affected,^[6–13] especially because of the need for hands-on education, specifically in the clinical setting of the last

2 years (Med 3 and Med 4). Moreover, the pandemic acted as a barrier towards obtaining clinical electives abroad.^[14] Therefore, the pandemic has transformed the medical school experience and has impacted medical students academically, socially and economically thus thriving their anxiety and stress. Medical students showed varying opinions and coping mechanisms with the additional stress that hit their personal, social, and academic lives.^[6–11]

Research concerning the psychological impact of the pandemic on medical students in the literature has been inconsistent. While some studies have shown increased level of stress and anxiety among preclinical and clinical medical students during the COVID-19 pandemic in many countries,^[6,15–17] others showed a positive response and attitude towards continuing education amidst the pandemic.^[9,10,18] The latter studies showed that students wanted to continue proper education despite the difficulties they faced. They want the whole medical experience; they feel that missing out on education will affect their future careers as physicians.^[10,18]

In addition, postgraduate medical education has been drastically impacted, and many questions about the response to this big change have been posed.^[19,20] A study by Calhoun et al^[21] also demonstrated the obstacles that medical students faced during their surgical clerkships. For instance, many students were banned from operating rooms because of the need to preserve personal protective equipment.^[21] In short, all aspects of medical education; classes, clerkships, electives abroad, matching in residency programs and postgraduate training have been influenced by this pandemic.

Historically, many viral outbreaks have been reported worldwide. For example, there was the SARS outbreak in 2003 which affected mainly Toronto and Hong Kong. A few studies were done in 2003 during the SARS epidemic in Toronto^[22] and in Hong Kong,^[23] addressing the psychological effects of the then epidemic on the lives and education of medical students. Those studies found that medical students had increased levels of anxiety and stress in their training in the hospital during the SARS epidemic.^[22,23]

At the American University of Beirut (AUB), online education has been implemented widely in all faculties, including the AUB Faculty of Medicine (AUBFM). For the preclinical students (Med 1 and Med 2), all on-campus classes have been suspended, and online classes have been taking place since March 2020. However, the situation is different for clinical students who have their rotations at the American University of Beirut Medical Center (AUBMC), and whose medical education is based more on hands-on learning. Clerkships are not cancelled, and clinical medical students are still coming to their rotations at AUBMC; with all the necessary precautions. A lot has changed for medical students at AUBFM, so it is important to see how students' academic and day to day lives have been impacted. Therefore, this study aims to dwell through the psychological impact of this pandemic on medical students in both the preclinical and clinical stage. Our hypothesis is that the COVID-19 pandemic has made medical students at AUBFM more anxious, stressed, bored, irritable, and more willing to return back to normal life.

2. Methods

In this study, we sent all medical students in AUBFM an online anonymous survey by email to fill upon their consent. AUBFM contains 448 students divided into 4 years (Med 1 and Med 2 preclinical students, and Med 3 and Med 4 clinical students).

The survey was made through AUB LimeSurvey (Version 3.14) and was sent out on the 22nd of September 2020 with 3 email reminders until the end of December 2020.

The survey was brief and started with general questions (demographics and medical school year), followed by 3 sections:

Section 1: Questions pertaining to the attitudes of medical students (specifically Med 3 and Med 4) towards going to the hospital and having clinical rotations.

Section 2: Questions pertaining to attitudes of medical students towards cancelling on-campus classes and moving towards online learning.

Section 3: Questions pertaining to the general attitudes of all medical students towards the pandemic.

Approval of the Institutional Review Board (IRB) at AUB (Human Research Protection Program HRPP) was secured.

A consent form was attached at the beginning of the survey. Data was extracted from LimeSurvey. Statistical analysis was done using SPSSv24, and the results from each of the 3 sections were divided by medical year (Med 1, Med 2, Med 3, Med 4) in order to determine the attitudes of each towards the pandemic. This paper is a descriptive paper that includes a survey that was filled by medical students online. The variables used were categorical variables rather than continuous variables. Therefore, these results were consequently reported as percentages.

3. Results

3.1. Demographic data (Table 1)

A total of 168 medical students currently enrolled at AUBFM filled the survey (37.5% of medical students at AUBFM). 93.5% of the participants of this study fall within the age group 20 to 24, with the remaining 6.5% between 25 to 30 years of age. Students from both preclinical and clinical years filled the survey. More Med 2 students responded (35%) as compared to Med 1 (20%), Med 3 (26%), and Med 4 (19%). As for gender, males and females almost equally participated in this study (46.5% and 53.5% respectively).

3.2. Questions pertaining to the attitudes of medical students (specifically Med 3 and Med 4) towards going to the hospital and having clinical rotations. (Table 2)

Med 3 and Med 4 students rotating at AUBMC were asked to fill a survey to assess their attitude towards having clinical rotations

Table 1

Demographic data of the participants.

Variables	Percentage (%)
Age	
20–24	93.5
25–30	6.5
Med class	
Med 1	20
Med 2	35
Med 3	26
Med 4	19
Gender	
Female	53.5
Male	46.5

Table 2

Questions pertaining to the attitudes of medical students (specifically Med 3 and Med 4) towards going to the hospital and having clinical rotations.

Questions		Strongly disagree		Neither agree nor disagree		Strongly agree	
		Disagree	Agree	Disagree	Agree	Disagree	Agree
I feel anxious going to my clinical rotations	Med 3	20.5%	27.3%	18.2%	25.0%	9.1%	
	Med 4	12.5%	34.4%	21.9%	28.1%	3.1%	
	Total	17.0%	29.8%	19.1%	26.6%	7.4%	
I feel nervous while interacting with patients due to fears of contracting COVID-19	Med 3	11.4%	20.5%	22.7%	27.3%	18.2%	
	Med 4	12.5%	37.5%	12.5%	31.3%	6.3%	
	Total	12.5%	26.0%	17.7%	30.2%	13.5%	
I have increased the number of times I wash my hands/ use hand sanitizer while on clinical rotations since the beginning of the pandemic	Med 3	4.8%	4.9%	4.8%	14.3%	71.4%	
	Med 4	0%	3.1%	0%	37.5%	59.4%	
	Total	3.1%	4.1%	4.1%	23.5%	65.3%	
I feel overwhelmed with concerns about COVID-19 while on my clinical rotations	Med 3	9.1%	15.9%	27.3%	29.5%	18.2%	
	Med 4	12.5%	31.3%	25.0%	25.0%	6.3%	
	Total	10.5%	20.0%	27.4%	28.4%	13.7%	
I feel nervous interacting with colleagues with no masks on in the wards	Med 3	2.3%	11.4%	18.2%	27.3%	40.9%	
	Med 4	3.1%	6.3%	0%	40.6%	50%	
	Total	4.5%	8.9%	7.1%	33%	46.4%	
I wear my personal protective equipment while on my clinical rotation	Med 3	2.3%	4.5%	2.3%	18.2%	72.7%	
	Med 4	0%	3.1%	6.3%	25%	65.6%	
	Total	2.2%	3.2%	6.5%	21.5%	66.7%	

amidst a pandemic. Students were asked to evaluate their level of anxiety when interacting with patients due to fear of contracting COVID-19. The majority of Med 3 and Med 4 students reported that they do not feel anxious when interacting with patients during their clinical rotations (47.8% of Med 3 and 46.9% of Med 4 respondents, disagree or strongly disagree). However, most of the Med 3 students reported that they do feel nervous during their rotations (45.5% agree or strongly agree). Both Med 3 and Med 4 students did report that they do feel nervous when interacting with colleagues with no masks on the wards (68.2% of Med 3 and 90.6% of Med 4 agree or strongly agree). Moreover, a consensus was almost achieved when Med 3 and Med 4 students were asked if they have increased the time spent washing their hands or using sanitizers since the start of the pandemic (85.7% and 96.9% respectively, agree or strongly agree). A near-consensus was also established when participants were asked if they wear personal protective equipment during their clinical rotations (90.9% and 90.6% respectively, agree or strongly agree). More Med 3 students (47.7%) agreed or strongly agreed that they feel overwhelmed with concerns about COVID-19 during their rotations as compared to Med 4 students (31.3%).

3.3. Questions pertaining to attitudes of medical students towards cancelling on-campus classes and moving towards online learning (Table 3)

Students from all classes were asked to fill a survey to assess their ability to cope with home based online classes and online exams. A discrepancy in the results among the different classes was seen when students were asked if they feel more stressed when doing online exams compared to on-campus exams. While most Med 2 students disagreed with this statement (54.4%), Med 1, Med 3 and Med 4 students reported that in fact they do feel more stressed (51.5%, 54.5% and 70% respectively). Moreover, the shift to online classes was not shown to increase the level of anxiety and stress in most Med 2 students (58.6%). However, the majority of Med 1, Med 3, and Med 4 students agreed with the

statement that they feel more stressed after shifting to online classes (53%, 46.5%, 57.2%). Despite the variance in opinions among students from different classes described above, the majority of students from all classes reported that their motivation to study has decreased. Moreover, most Med 1, Med 2, and Med 3 felt overwhelmed by online assignments and assessments (64.7%, 51.7%, 46.4% respectively)

3.4. Questions pertaining to the general attitudes of all medical students towards the pandemic. (Table 4)

This section of the survey was filled by all students. It assesses the non-academic effects of the pandemic on the lives of medical students. Most Med 1, Med 2, Med 3, and Med 4 students (63.6%, 75.1%, 61.9%, 56.4% respectively) reported that they fear contracting COVID-19. In addition, most of the students agreed that they are worried about friends/ family/ loved ones contracting COVID-19 (93.1% of Med 1, 94.7% of Med 2, 92.8% of Med 3, and 100% of Med 4). Most medical students of all classes agreed when asked if the quarantine affected their social lives negatively (66.7%, 75.4%, 73.9%, 71.9% respectively). Moreover, the majority reported that they feel bored in quarantine (60.6%, 61.4%, 52.4%, 65.7% respectively). When asked if they feel more easily irritable since the beginning of the pandemic, 60.6% of Med 1 students, 54.4% of Med 2 students, 57.1% of Med 3 students, 78.1% of Med 4 students, agreed or strongly agreed with the statement. Med 1 and Med 2 students reported changed quality of sleep since the beginning of the pandemic (51.5% and 54.4% respectively), in contrast to Med 3 and Med 4 students, in which the majority disagreed or strongly disagreed with the statement (52.3% and 59.4% respectively).

3.5. Willingness to return back to on-campus education. (Table 5)

Medical students of all classes were asked to rate their willingness to return to on-campus education on a scale from 1 to 5. 70.6%

Table 3**Questions pertaining to attitudes of medical students towards cancelling on-campus classes and moving towards online learning.**

Questions		Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I feel more stressed while doing online exams than while doing on-campus exams before the pandemic	Med 1	0%	21.2%	27.3%	30.3%	21.2%
	Med 2	22.8%	31.6%	14%	28.1%	3.5%
	Med 3	3%	18.2%	24.2%	21.2%	33.3%
	Med 4	0%	10%	20%	30%	40%
	Total	10.5%	24.1%	20.3%	27.1%	18.0%
I feel more stressed with my studies now that classes have been shifted to online classes	Med 1	14.7%	17.6%	14.7%	20.6%	32.4%
	Med 2	22.4%	36.2%	15.5%	13.8%	12.1%
	Med 3	10.7%	17.9%	25%	28.6%	17.9%
	Med 4	7.1%	14.3%	21.4%	42.9%	14.3%
	Total	16.4%	25.4%	17.9%	21.6%	18.7%
My motivation to study has decreased since the shift to online learning	Med 1	11.8%	11.8%	14.7%	32.4%	29.4%
	Med 2	15.5%	15.5%	17.2%	24.1%	27.6%
	Med 3	6.5%	22.6%	9.7%	29.0%	32.3%
	Med 4	0%	18.8%	6.3%	43.8%	31.3%
	Total	10.8%	16.5%	13.7%	29.5%	29.5%
I feel overwhelmed by online assignments and assessments	Med 1	2.9%	11.8%	20.6%	47.1%	17.6%
	Med 2	10.3%	19.0%	19.0%	27.6%	24.1%
	Med 3	7.1%	21.4%	25%	21.4%	25%
	Med 4	8.3%	25%	41.7%	8.3%	16.7%
	Total	7.6%	18.2%	22.7%	29.5%	22%

Table 4**Questions pertaining to the general attitudes of all medical students towards the pandemic.**

Questions		Strongly disagree	Disagree	Neither agree nor disagree	Agree	I strongly agree
I am scared of contracting COVID-19	Med 1	6.1%	12.1%	18.2%	39.4%	24.2%
	Med 2	3.5%	7%	19.3%	50.9%	19.3%
	Med 3	4.8%	19%	14.3%	50%	11.9%
	Med 4	6.3%	15.6%	21.9%	46.9%	9.4%
	Total	4.9%	12.8%	18.3%	47.6%	16.5%
I am worried about friends/ family/ loved ones contracting COVID-19	Med 1	0%	0%	6.1%	33.3%	60.6%
	Med 2	1.8%	3.5%	0%	22.8%	71.9%
	Med 3	2.4%	4.8%	0%	33.3%	59.5%
	Med 4	0%	0%	0%	37.5%	62.5%
	Total	1.2%	2.4%	1.2%	30.5%	64.6%
The quarantine has affected my social life negatively	Med 1	0%	12.1%	21.2%	36.4%	30.3%
	Med 2	1.8%	3.5%	19.3%	42.1%	33.3%
	Med 3	2.4%	16.7%	7.1%	42.9%	31%
	Med 4	0%	6.3%	21.9%	50%	21.9%
	Total	1.2%	9.1%	17.1%	42.7%	29.9%
I feel bored while in quarantine	Med 1	3%	18.2%	18.2%	39.4%	21.2%
	Med 2	3.5%	22.8%	12.3%	43.9%	17.5%
	Med 3	11.9%	21.4%	14.3%	23.8%	28.6%
	Med 4	0%	12.5%	21.9%	46.9%	18.8%
	Total	4.9%	19.5%	15.9%	38.4%	21.3%
I feel more easily irritable since the beginning of the COVID-19 pandemic	Med 1	0%	15.2%	24.2%	33.3%	27.3%
	Med 2	1.8%	12.3%	31.6%	43.9%	10.5%
	Med 3	2.4%	28.6%	11.9%	35.7%	21.4%
	Med 4	0%	6.3%	15.6%	65.6%	12.5%
	Total	1.2%	15.9%	22%	43.9%	17.1%
My quality of sleep has changed since the beginning of the COVID-19 pandemic	Med 1	15.2%	27.3%	6.1%	30.3%	21.2%
	Med 2	3.5%	22.8%	19.3%	35.1%	19.3%
	Med 3	19%	33.3%	16.7%	21.4%	9.5%
	Med 4	25%	34.4%	18.8%	21.9%	0%
	Total	14%	28.7%	15.9%	28%	13.4%

of Med 1 students and 83.3% of Med 4 students reported that they are willing or very willing to return to on-campus education. 46.6% of Med 2 students and 48% of Med 3 students were willing or very willing to return.

4. Discussion

This study aimed at studying the psychological impact of the COVID-19 pandemic on medical students at AUBFM, using a survey sent out to all students at AUBFM to assess their stress. We

Table 5
Willingness to return to on-campus education.

QUESTION		1	2	3	4	5
Please rate your willingness to return back to on-campus education on a scale from 1 to 5 (1 = not willing at all, 5 = very willing)	Med 1	8.8%	2.9%	17.6%	29.4%	41.2%
	Med 2	8.6%	13.8%	31%	25.9%	20.7%
	Med 3	4%	24%	24%	8%	40%
	Med 4	8.3%	8.3%	0%	25%	58.3%
	Total	7.8%	12.4%	23.3%	23.3%	33.3%

found that most students reported increased stress affecting their academic and social life since the beginning of the pandemic. Students in highly afflicted areas such as Detroit, USA were banned from providing direct patient care due to high risk of contracting COVID-19.^[24] Moreover, the Association of American Medical Colleges (AAMC) issued a guidance in April 2020 that strongly supports medical schools interrupting activities that involve the participation of medical students in direct care of patients who tested positive or who are suspected to have contracted COVID-19.^[25]

Ample research has been conducted worldwide to assess the attitude of both clinical and preclinical medical students towards continuing their education amidst the COVID-19 pandemic. Clinical students, usually in the third and fourth year of medical school, reported that their level of anxiety and nervousness has heightened since the rise of the pandemic.^[26] Moreover, some of the students complained of decreased appetite and sleep.^[27] Trainees, in most cases, were left to struggle with their psychological challenges alone because of the need for long-standing social distancing.^[26,28] This led some final year medical students to lose confidence in their ability to become competent physicians in the future.^[17] Data in the literature was consistent with our results to a certain extent. Despite the fact that clinical students in our study did not report that their anxiety was heightened during the pandemic, Med 3 students expressed excessive nervousness due to fear of contracting COVID-19 during their clinical rotations.

Medical students rotating in hospitals adopted several precautionary measures to protect themselves from becoming infected.^[29,30] These measures include avoiding restaurants and public gatherings, avoiding social hand shaking, using personal protective equipment and most importantly regular hand washing and frequent use of disinfectants. The majority of the medical students were found to be compliant with these measures as reported by a study conducted by Khasawneh et al.^[29] Similarly, Clinical students in our study reported increased hand washing and use of PPE since the emergence of the pandemic.

Medical students are globally classified as a vulnerable population because they have shown increased incidence of depression and suicidality related to stress when compared to the general population.^[31] Therefore, a study by Chandratre in 2020, demonstrated that the sudden shift to online education can contribute to the worsening of already existing mental health conditions. This is due to the omission of direct peer interaction, lack of concentration, and the difficulties that some students face when adapting to the new normal.^[28] Our study showed that the majority of medical students experienced stress due to the rapid shift in their education, however our results assessed stress and not depression using a questionnaire.

Moreover, several medical schools have been facing difficulties in delivering preclinical medical education due to shortage of IT personnel, cyber attacks on online platforms, and time constraints. These challenges were also encountered when trying to implement laboratory-based hands on educational experience such as dissecting human cadavers. Several Medical schools were struggling in finding a suitable medium so that students would not lose access to dissection rooms and practical labs.^[32]

Recent published studies about the impact of COVID-19 on mental health of students have been showing consistent findings. They found that students have increased concerns regarding their health, and that of their families and loved ones.^[33,34] In addition, sleeping patterns have been affected by the pandemic.^[33,35] Feelings of isolation and boredom due to the lockdown have been increasing.^[33] Our study has shown similar findings (Table 4); medical students at AUB have worries about themselves, their families, friends and loved ones contracting COVID-19. They also reported feelings of isolation, boredom, and irritability and changes in sleep patterns since the beginning of the pandemic.

A study published in 2005 about the effect of the SARS epidemic on medical students in Toronto showed varying responses.^[36] Like our study, they have found that students had fears of contracting COVID-19. However, in contrast to our study, they reported that the majority had no feelings of isolation or irritability, and no major changes in sleeping patterns.

A few other recent studies have shown that medical students are willing to go back to normal on-campus education and help, as medical students, in the fight against the pandemic.^[37,38] Our study has shown very similar findings in Table 5. Medical students at AUB reported that they are willing to go back to normal education and on-campus life.

This study is one of the few in the Middle East to study the psychological impact of the COVID-19 pandemic on medical students. It contributes to the literature by showing the effect of major global changes like a pandemic on the education and social life of medical students, and shedding light on the challenges they might face throughout their careers as students and future physicians.

5. Limitations

This study is a descriptive study that involves a survey about the psychological impact of the COVID-19 pandemic on medical students at the American University of Beirut. One of the limitations of this study is that it is a single center study. Moreover, only 168 out of 448 participants filled the survey. Also, the survey used in the study was completely subjective and no objective scale was used. The social context of the students in

the study was not addressed and therefore convenience sampling was used.

6. Conclusion

In conclusion, this study aimed at studying the psychological impact of the COVID-19 pandemic on medical students at AUBFM in terms of stress. Limited data exists in the literature concerning the psychological impact of the COVID-19 pandemic on medical students in the Middle East. Clinical medical students, especially Med 3 responders reported that they do feel nervous rotating in the hospital during the COVID-19 pandemic. The majority of medical students also reported more stress affecting both their academic and social life since the beginning of the pandemic. Further studies with a larger sample size are needed.

Author contributions

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