

## Undergraduate medical students' obstacles and opportunities in medical education in COVID-19 pandemic

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### Abstract

COVID-19 pandemic affected medical education worldwide. During the pandemic, a lot of face-to-face teaching changes to online learning for undergraduate medical students. But, medical students after pass through some processes expected to be a clinician not only in virtual condition. This article provides information to know obstacles and opportunities during the pandemic. Research method of this article is literature review via PubMed. The keyword is “((undergraduate medical student) AND (medical education challenges)) AND (pandemic)”. Journal articles that used here is free full text articles, using English, and publication date is a year, and not a review article. Then, resulted 63 articles but 10 of them was chosen. Results showed the obstacles that students face in online learning includes technical issues, e-assessment system, feeling loneliness due to lack of social interaction, poor communication between lecturers and students. Despite of that, opportunities from COVID-19 pandemic are flexibility in time and place, telehealth potential to improve medical curriculum, and find optimum duration of study to be more effective in learning.

**Keywords:** COVID-19 pandemic, medical education, undergraduate medical students

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### INTRODUCTION

COVID-19 pandemic is currently happen and the virus is still mutating with different degrees of infectivity (Khandia et al., 2022). Newly reported cases in global in last seven days are 11,907,940 and Indonesia had 384,856 new cases in the last seven day (World Health Organization, 2022). Mortality that newly reported in last 7 days in global are 62,560 and for Indonesia are 1,403 cases (World Health Organization, 2022).

COVID-19 pandemic also impacted medical education systems in worldwide (Alsoufi et al., 2020). In India lockdown began on March 24 2020 to inhibit the spread of COVID-19 virus, so all medical colleges were closed (Singal et al., 2021) and all face to face lectures change to e-learning as a mandatory (Singh et al., 2021). In the United States COVID-19 pandemic made medical students were removed from direct patient care activities in mid-March 2020 (Muntz et al., 2021). In Pakistan , COVID-19 pandemic also impacts medical education system and face-to face interaction change to online learning for example in Aga Khan University Medical College (Fatima et al., 2021). In Austria, COVID-19 pandemic also influenced medical education (Steiner-Hofbauer et al., 2021).

In Germany, COVID-19 also affect the medical education, for example in the national online course with global health themes (Kreitlow et al., 2021). In the U.S., COVID-19 pandemic also made social distanced learning in undergraduate medical education (Southworth & Gleason, 2021). Even when pandemic, educational systems, learning, teaching, and assessment should be maintain to prevent significant negative long-term impact in education and careers (Fatima et al., 2021). Challenges in the pandemic COVID-19 also includes risk of infection and patient care, telehealth literacy, medical ethics and research in medical education (Steiner-Hofbauer et al., 2021).

## RESEARCH METHOD

This literature review was done by searching relevant articles online through PubMed. The keyword is “((undergraduate medical student) AND (medical education challenges)) AND (pandemic)”. Journal articles that used here is free full text articles, using English, and publication date is a year, and not a review article. Articles result in PubMed is 63, but author choose 10 of them.

## RESULTS AND DISCUSSION

### Result

**Table 1.** Information Analysis

Title	Author (year)	Type of Article	Important conclusion
Anatomy education of medical and dental students during COVID-19 pandemic: a reality check	Singal et al. (2021)	Original article	Virtual anatomy education is a must in pandemic because of no other options, although the practice of this virtual class had several challenges. Feedback from the students is needed for improvement of the class.
A survey of E-learning methods in nursing and medical education during COVID-19 pandemic in India	Singh et al. (2021)	Original article	Optimum duration of classes in online learning and improving teaching methods are recommended to minimize students with boredom and decrease risk of health issues.
Telehealth and Medical Student Education in The Time of COVID-19 – and Beyond	Muntz et al. (2021)	Original article	COVID-19 pandemic period can be utilized to participating medical students into telehealth activities.
Online assessment in undergraduate medical education: Challenges and solutions from a LMIC university	Fatima et al., (2021)	Original article	Good e-assessment in medical education during pandemic for medical students is needed and being improved in LMIC university.
Support for global health and pandemic preparedness in medical education in Germany: Students as change agents	Kreitlow et al. (2021)	Original article	Global health education is needed for future pandemic preparedness strategies and medical students can become the change agents.
Undergraduate medical education amid COVID-19: a qualitative analysis of enablers and barriers to acquiring	Reinhart et al. (2021)	Original article	Study found that medical students miss social contact with their peers, monotonous some of online teaching results negative effect on motivation and the lecturers sometimes feel lonely facing the camera, miss personal interaction with the students. But, both enjoy flexibility of time and place

Title	Author (year)	Type of Article	Important conclusion
competencies in distant learning using focus groups	Southworth & Gleason, (2021)	Original article	COVID-19 pandemic may affect preclinical medical students learning and online teaching method.
COVID 19: A Cause for Pause in Undergraduate Medical Education and Catalyst for Innovation	Mahabamunuge et al. (2021)	Original article	Medical students' perception for a novel Telehealth Education Curriculum for Obsgyn rotation at during COVID-19 showed 83% strongly or moderately agreed a program included in the curriculum (vOSCE) provided valuable patient interaction, 97% strongly and moderately agreed the telehealth should continue during COVID-19 pandemic and 81% agreed the telehealth should be included in the curriculum after COVID-19 pandemic.
Implementation and Assessment of a Novel Telehealth Education Curriculum for Undergraduate Medical Students	Steiner-Hofbauer et al. (2021)	Original article	872 undergraduate medical students in Medical University of Vienna participated in a cross-sectional study resulted 39,2% agreed about the necessity of integrating telehealth throughout the curriculum, 89% agreed about distance learning represents no alternative to in-person learning, 69,9% agreed about the quality of my education is suffering under the safety measures, and 61,3% agreed about social isolation due to distance burdens them.
Now, I think doctors can be heroes . . . Medical student's attitudes towards the COVID-19 pandemic's impact on key aspects of medical education and how the image of the medical profession has changed due to the COVID-19 pandemic	Baticulon et al., (2021)	Original article	3679 medical students in Philippines participated in a study showed that challenges they faced during online learning are adjusting learning styles, distracted by responsibilities at home, and poor communication between educators and students.
Barriers to Online Learning in the Time of COVID-19: A National Survey of Medical Students in the Philippines			

## Discussion

Anatomy is crucial part of medical education to develop clinical skills that needed when medical student become a clinician (Singal et al., 2021). Anatomy education before COVID-19 pandemic includes cadaveric dissection, histology laboratory, direct lectures, making situation that allow discussion with classmates, and interaction with mentors (Singal et al., 2021). Challenges that student faced during the virtual anatomy class include internet network due to rural area (25%),

using smartphone size screen may affect proper understanding of the subject because require to stare closely and more effort to see details and then may causing posture problems and strain eyes in most student, difficulty to get all study material and the books because of their places are relatively far, difficulty in time management in most students, and distracted by comforts or discomfort at home (Singal et al., 2021). In the study, participants that didn't get cadaver dissection due to pandemic, completed the class via virtual felt lack knowledge of that part. To help this problem, college provided live dissection (Singal et al., 2021).

For neuroanatomical class, college provided video recorded lectures and power-point presentation (Singal et al., 2021). Besides of that, assessments was also in challenge because it had a chance for dishonesty, although it was minimized by limited timeframe and the responses were evaluated by faculty (Singal et al., 2021).

All lectures for medical students in India during COVID-19 pandemic change to online lectures as a necessity (Singh et al., 2021). The strength of e-learning is no boundaries in time and place, individualized learning (Cook, 2007; Singh et al., 2021). The weakness of e-learning is limited student feedback, need self-motivation, dependent on internet availability, need expensive digital gadgets, difficult to transfer psychomotor and affective skill, and associated health hazards of prolonged gadget use, may lead to a perception of social isolation (Cook, 2007; Singh et al., 2021). Feasibility of online class depends on internet facilities, device logistics, proficiency of students in computer and internet usage, and availability of dedicated space at home (Singh et al., 2021). For internet facilities, participants whom from affluent families and staying in cities had better access to Wi-Fi router network compared to lower income families and those staying in villages. Network-related issues were frequently reported in the study is audio-visual disparity, unexpected logging out during the classes, audio disturbances, and video not streaming properly (Singh et al., 2021). Health issues among medical students because of online classes were frequently reported in the study are concentration loss (68,9%), eye strain (62,1%), fatigue (48,4%), sleep disturbance (46,3%), neck pain (45,4%), back pain (44,5%), headache (41,8%), ear ache (40,8%), and anxiety (37%) (Singh et al., 2021). For online class, participants preferred 3-6 classes/day, duration of each class no more than 40 minutes, at least 10-20 minutes break between class, and have interactive session (Singh et al., 2021).

In the United States, COVID-19 pandemic inhibit clinical experiences of medical students (Muntz et al., 2021). Then, they can only had telehealth activities as a necessity (Muntz et al., 2021). There are suggestion to expand more comprehensively the telehealth curriculum in undergraduate medical education to accelerate high quality and safe implementation, increase capacity to provide health care during the pandemic, and maintain the change as medical education and evolve health care system to new normal after pandemic COVID-19 (Muntz et al., 2021). Medical students' opportunity in pandemic includes participating in telehealth to achieve the purpose includes maintaining and improving patients' health immediately, serving health care teams and systems through the pandemic crisis and recovery, and rising medical student opportunities for experiential learning and professional identity transformation. For maintaining and improving patients' health, telehealth can help nonemergency care by phone, doing limited physical examination virtually, in-person visits for chronic disease management, follow-up on a hospital virtually for patients who have significant mobility barriers (Muntz et al., 2021). For serving health care teams and systems, either many of the heath care teams included or excluded from providing direct clinical care, have challenges. The challenges include many clinician educators have not yet been experience to acute care settings during pandemic and are available to provide supervision to medical students (Muntz et al., 2021). When integrating medical students to telehealth care system during COVID-19 pandemic would be a priceless experience (Muntz et al., 2021). For facilitating experiential learning and professional identity formation, telehealth potent to expand the structures and processes of medical education by giving medical students experience to evolve level of expertise needed during the pandemic (Muntz et al., 2021).

For serving high quality of telehealth, medical students and residents will need specific and dedicated training (Muntz et al., 2021).

A study from Pakistan, protocol development and pilot testing for e-assessment for medical student is held with support from medical students, proctors, and administrative support (Fatima et al., 2021). In the first pilot, the browser for exam in the most participants failed to launched, with other problems (laptops slowing down, loss of connectivity, and need to reload repeatedly (Fatima et al., 2021). Then, second pilot, the challenges are not all of the expected participants displayed in the screen, recording screen change from one participant to another depends on movement or sound, and delayed loading of the place conducting assessments when students simultaneously signed in (Fatima et al., 2021). In the third pilot, no major problems were observed (Fatima et al., 2021).

A study from Germany showed that global health education in the curriculum was judged by the students as very low and when asked about their interest in global health 62% participants thought COVID-19 pandemic had increased their interest (Kreitlow et al., 2021). Global health education in medical curriculum was strongly demanding by 88% of the preclinical students in this survey (Kreitlow et al., 2021). Also, most of the participants (93%) agreed that global health should be a higher in the medical curriculum (Kreitlow et al., 2021). In the group of lectures, most of participants said COVID-19 increased the relevance of global health in their daily practice and 30% were planning to integrate global health topics in future teaching (Kreitlow et al., 2021). Support for teaching global health demanded by lecturers includes advanced training possibilities, provision of teaching support material, and further education (Kreitlow et al., 2021). Best practice examples of innovative teaching projects and implementation processes for global health education is by providing an elective program in undergraduate medical curriculum at Hanover Medical School (Kreitlow et al., 2021). Then, a new global health course developed and launched by a national students' initiative, 12 weekly one hour lectures, theme global health issues (Kreitlow et al., 2021).

Another study in Germany showed that online learning resulted from COVID-19 pandemic affected mental wellbeing, communication among students, between students and teachers, between students and patients, structure and self-organization, and learning and commitment (Reinhart et al., 2021). For mental wellbeing, most student engage more in sport and as a result feel healthier, and can learn anytime and anywhere. But, long duration of screen time, miss social contact with peers may result loneliness, and creative online teaching is needed to prevent negative effect of decrease motivation (Reinhart et al., 2021). Another side, the lecturers sometimes feel lonely facing the camera (Reinhart et al., 2021). For communication among students, social distancing during pandemic made less communication and more difficult collaboration, although they can study anywhere (Reinhart et al., 2021). Communication between students and lecturer influenced by active interaction between them, for example switching on the camera between the lecturer and the students, making small group to make students more comfortable to speak up, and utilizing chat-features when participating large groups (Reinhart et al., 2021). Communication between students and patients during online is lack of first general impression, non-verbal aspects and spontaneous reactions, body posture of the patient, and how the patient's personal environment (Reinhart et al., 2021). For structure and self-organization, online class made a good training for students to manage their time (Reinhart et al., 2021). For technical issues, participants feel no major technical problems (Reinhart et al., 2021). Last, for learning and commitment, online learning foster deep learning (Reinhart et al., 2021).

In the U.S., medical student debt before COVID-19 pandemic become a national issue, but the pandemic gave medical students time to think about the cost of their education (Southworth & Gleason, 2021). There is also suggestion from Dr. Emanuel to change teaching methods during online learning, give best virtual materials for the students, despite from different resources (Emanuel, 2020; Southworth & Gleason, 2021). Another study from New York Medical College

showed medical students perception for a novel Telehealth Education Curriculum for Obsgyn rotation at during COVID-19 showed 83% strongly or moderately agreed a program included in the curriculum (vOSCE) provided valuable patient interaction, 97% strongly and moderately agreed the telehealth should continue during COVID-19 pandemic and 81% agreed the telehealth should be included in the curriculum after COVID-19 pandemic (Mahabamunuge et al., 2021).

A study from Austria, participating 872 undergraduate medical students in Medical University of Vienna participated in a cross-sectional study resulted 39,2% agreed about the necessity of integrating telehealth throughout the curriculum, 89% agreed about distance learning represents no alternative to in-person learning, 69,9% agreed about the quality of my education is suffering under the safety measures, and 61,3% agreed about social isolation due to distance burdens them (Steiner-Hofbauer et al., 2021). Another study from Philippine, 3679 medical students participated showed that challenges they faced during online learning are adjusting learning styles, distracted by responsibilities at home, and poor communication between educators and students (Baticulon et al., 2021).

## CONCLUSION

Results showed the obstacles that students face in online learning includes technical issues, e-assessment system, feeling loneliness due to lack of social interaction, poor communication between lecturers and students. Despite of that, opportunities from COVID-19 pandemic are flexibility in time and place, telehealth potential to improve curriculum, and find optimum duration of study to be more effective in learning.

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