REVIEW ARTICLE

Overcoming Challenges Posed by COVID-19 Pandemic in Continuing Medical Education Globally

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Abstract
COVID-19 pandemic has derailed the medical education system globally and setting it back on the track is a great challenge for the medical educationists. With the lockdown and social distancing being critical in curbing this pandemic, there is no denying the impact it has on medical education. Various medical schools have suspended all classes and live patient interactions for the students because of the recommended social isolation and quarantine. We are being hampered in our responsibility to educate future doctors and hence a vigorous focus on alternate measures is the need of the hour. Any alternative for the accustomed medical education system should be designed with the objective of facilitating the development of essential aptitudes in medical knowledge, patient care and ethics, personal care like proficient use of PPE, clinical and diagnostic skills. Swift measures need to be taken to prepare us for current and future crisis, if any arises. Hence an approach with the aim of risks outweighing benefits or vice versa should be properly scrutinised.

Key Words
COVID-19, Medical education, Assessment, Telemedicine

In response to the current global crisis caused by the novel virus SARS-COV-2, facilitation of learning and clinical skill development among the future doctors is of paramount importance. With the lockdown and social distancing being critical in curbing this pandemic, there is no denying the impact it has on medical education. Though we are not new to a pandemic outbreak, it is not farfetched to say that the medical educationists are not well prepared to handle this crisis. Various medical schools have suspended all classes and live patient interactions for the students because of the recommended social isolation and quarantine. We are being hampered in our responsibility to educate future doctors and hence a vigorous focus on alternate measures is the need of the

hour. Any alternative for the accustomed medical education system should be designed with the objective of facilitating the development of essential aptitudes in medical knowledge, patient care and ethics, personal care like proficient use of PPE, clinical and diagnostic skills. An equilibrium must be attained weighing the pros and cons of provision of students' education and meaningful patient care. Hence an approach with the aim of risks outweighing benefits or vice versa should be properly scrutinised. In this article, we discuss the challenges faced in medical education viz. teaching, assessment and possible alternatives to overcome them.

How to overcome the challenges faced in teaching?
An alternative to face to face didactic pedagogical teaching, is accomplished by embracing the use of IT

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based educational tools available on-line. There are various on-line teaching platforms that enable live interaction between the teacher and the students like blackboard, Moodle, google classroom, open edX, Brightspace etc. It is to be noted here that, this could be merely an upgrade to medical teaching already followed by many academicians astute in technology, who use digital downloaded images, video vignettes for their didactic teaching. Given the lack of direct contact as in a classroom, the teacher should make sure that the classes are more interactive which would keep the students attentive. Since there is a possibility of students being exposed to more distractions while being on-line, the duration of each online session should be short and crisp while fulfilling the necessary learning objectives. It is also logical to record the online classes and patient interviews (with consent) from now on, to be used in the future, which would help us to be more prepared if similar situations arise.

Self-study is the most important learning aid for the students during this crisis. On-line home-works, assignments and seminar presentations should be given more emphasis since they promote self-motivated learning in students. Since students have very limited access to library right now, the institutions which has digital libraries should make them accessible to all the students worldwide. National emergency library (https://archive.org/) has given global free unlimited access to learning material including e-books and multimedia and forums like Scribed (https://www.scribd.com/) has given an one-month free trial period of unlimited access to e-books (1). Students should be encouraged by educators to use these available aids to its fullest.

Developing clinical skills in students which involves live patient interaction poses a greater challenge in medical education in the current state. Ideally, there is no better way to teach and develop clinical skills in students than live patient interaction. However, given the present scenario and the need to mitigate the spread of the infection, this could prove deleterious to both patients and students. We urge the academicians to use the plethora of digital, on-line and multimedia aids. Digitally recorded cardiac and pulmonary sounds using the electronic stethoscope can be used to train the students to recognise abnormal breath sounds and murmurs (https://www.youtube.com/channel/UCzEbKuIze4AI1523_AWiK4w) (2,3) The students could be taught using digital images including radiographs and interviews of patients and video vignettes of case studies. Various

journals like BMJ case reports (https://casereports.bmj.com/pages/), Canadian Medical Association Journal (http://www.cmaj.ca/), and New England Journal of Medicine (https://www.nejm.org/multimedia/medical-videos?query=main_nav_lg) are providing readers with images and videos of case reports as supplementary materials. There is an abundance of YouTube channels which demonstrate clinical examination skills and case studies with live patients (https://www.youtube.com/user/OxfordMedicalVideos/videos, https://www.youtube.com/channel/UCE4a1o3GMKCRSgHflXqZs8Q/videos). The medical teachers, however, should scrutinize videos for reliability before providing links to the students and the students should be warned against following random YouTube videos for learning without due approval from the concerned faculty as they may contain wrong or biased information.

There are various e-learning modules using virtual reality simulators that enable to helps to develop clinical skills like clinical examination, procedural and diagnostic skills, communication skills and ethics (4-6). Simulated patients, virtual patients, static or interactive simulation dummies, task trainers, computerized screen-based simulators, games, etc. are some of the tools of virtual reality simulators (7). However, only those institutions which already have the facility will be benefitted. It is not practical to suggest the remaining universities to install a virtual reality simulator since it is neither feasible in this lock down time nor comes cheap. In such cases, various fore-mentioned aids can be used. Several universities like UCLA, Texas Heart Institute and National University of Singapore to name a few, are using e teaching modules. Imperial College London has given access to an online repository of patient interview recordings and cases as a substitute for direct patient contact (8). Those universities which follow online teaching modules should make their on-line teaching aids available for all medical students globally, which would help the students and institutions especially from low resourced countries.

Arriving at a diagnosis is a thought process which gets built in a course of time by continued interaction with the patients. There are varied skills that can be obtained only by directly engaging with the patient like communication skills and ethics. With the given constraints, limiting patient contact, telemedicine is an alternative. According to Sood et al., "*Telemedicine being a subset of telehealth, uses communications networks for delivery of healthcare services and medical*

education from one geographical location to another, primarily to address challenges like uneven distribution and shortage of infrastructural and human resources" (9). It is already being used in a variety of healthcare institutions across the globe. A mode of telemedicine, where the students could interact with patients using electronic gadgets like tablets and smart phones could be used. Care should be taken while using the gadgets like wiping them with proper disinfectant before giving to the next patient. The medical teacher present with the patient with properly donned PPE should be performing the clinical examination and the observations should be conveyed to the students. Though there is no denying that there will be some loss of clinical skills, post pandemic interactions with the patients will no doubt revive those skills back.

How to overcome the challenges faced in assessment?

Assessment is an integral part of medical education. Many universities are nearing that time of the year where high stakes summative examinations need to be conducted. With the massive stress on healthcare systems, a few emergency adaptations in this front need to be discussed. Those countries that are worst affected by COVID-19 pandemic has made drastic measures to cope up with the burden on the healthcare system. Newcastle University has announced that end-of-year exams will not be conducted this year and the final year medical students will be allowed to graduate. This year's medical school graduates from Italy will be able to start working as fully qualified doctors immediately (10). Regarding ways to conduct assessment during this pandemic, our primary suggestion is to opt for the one that better suits the current needs and restrictions, keeping in mind the benefit of both students and patients.

Those countries whose healthcare system is already overwhelmed need to think in terms of utilising the student population in tackling this pandemic. Many medical students in US are helping by taking short term roles in health care system by offering childcare to healthcare workers etc (11). The imperial College, London has conducted an open book-final year medical exam (12). However, those countries which have effectively flattened the curve and prevented community spread of the infection and those which are not majorly affected by this pandemic could however use other ways of assessment, including on-line examinations. The various online platforms as mentioned earlier could be used for conducting the

examination. The challenges faced in this front will be ways to prevent malpractice and logistics related mis-happenings. Students could be subjected to temptations while giving online examinations without proper supervision. Though the teaching platforms allow the examiner to view and hear the students, it is not feasible to invigilate all the students effectively as in an exam hall. Hence, the medical educationists should urge the students to follow proper ethics and refrain themselves from giving in to the temptations during remote assessments.

Different modes of conducting theoretical exams are followed globally where multiple-choice questions (MCQ), modified essay questions (MEQ) and a combination of both are followed depending on the university preferences. A question bank with a vast number of questions could be prepared by subject experts covering necessary domains viz. knowledge and cognition. The on-line teaching platforms like Blackboard have the facility to perform random selection of questions producing different question paper for each student while maintaining the university approved distribution of questions for each domain which could potentially prevent malpractice. It should be noted here that the prepared question bank should pass through proper scrutiny by a quality assurance committee. In case of unexpected logistical challenges like interruptions in power supply and/or internet access, we propose using a system where a repeat exam could be conducted for involved students and a maximum of two attempts be provided. The universities can also use previous low stake (formative) assessments into consideration for the final exams. For example, increasing the percentage of marks taken from previous assessments and lowering the contribution of the online exams.

The assessment of clinical skills is even a bigger task and the fore-mentioned methods followed for teaching can be used for assessment too. Patient surrogates and simulators could be used and as stated above tablets or smart phones could be used so that the students will be able to interact with the allotted patient and collect history and necessary details. Assessing the performance of clinical examination is again a challenge where we suggest the examiner make it into a viva voce session enabling the student to identify the clinical signs and make a provisional diagnosis. As mentioned earlier, the loss of time to perform clinical skills will be replenished in plenty after pandemic subsides and direct patient contact becomes no longer, not advisable. As of January 2020, there were 4.54 billion active internet users, which

accounts for 59 percent of the global population (13). However, there are certain parts of the world without regular internet access and students without tablets or smart phones, especially in low resourced countries. In this scenario, the universities should be liberal in considering the performance from previous assessments for the final exams.

Conclusion

COVID-19 pandemic has derailed the medical education system globally and setting them back on the track is a great challenge for the medical educationists. It is not a far cry from truth to say that the future of the healthcare could be jeopardised if the medical educationists do not rise to the challenge and adapt the innovations that are already in place and also think outside the box to come up with new ways to continue medical education during a pandemic crisis. Though there may be some expected and unavoidable negotiations to be made, a clear view of how much is too much is mandatory. What history has taught us is that, this pandemic is not the first and neither will it be the last. Swift measures need to be taken to prepare us for current and future crisis, if any arises. Pandemic/epidemic management regulations should be incorporated into the medical curricula globally. Unity is strength especially at this hour and let us lead the future doctors by example and fight the pandemic proficiently, not by personal or institutional level dedication alone but also by promoting collaboration between institutions and nations.

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Conflicts of Interest
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