SOUNDING BOARD

COVID-19 and the Clinical Phase of the Medical Doctorate Curriculum in Oman
Challenges and the way forward

*Ikram A. Burney,[1] Reem Abdwani,[2] Khamis Al-Hashmi,[3] Nadia Al-Wardy,[4] Muna Al-Saadoon[2]

ABSTRACT: COVID-19 has gripped the world with lightning speed. Since the onset of the pandemic, activity throughout the world came to a grinding halt. However, business had to continue and people have to learn to live with the virus while the pandemic continues to rage. Medical education is no exception and may even deserve special mention, as it prepares frontline workers against the endemics of tomorrow. We discuss here the journey of medical education at the College of Medicine and Health Sciences at Sultan Qaboos University, Muscat, Oman, as the pandemic struck the world and Oman. This work suggests a roadmap for changes, discusses challenges and proposes measures to mitigate the effects of COVID-19 on medical schools.

Keywords: COVID-19; Medical Education; Curriculum; Computer Simulation; Artificial Intelligence; Oman.

"IT CAME, IT SAW, IT SWEPT THE WORLD!"

THE QUOTE ABOVE CONVEYS THE SWIFTNESS with which COVID-19 gripped the world starting in early 2020. From the east of China to the west of Canada and every country in between, the COVID-19 wave has been relentless, the speed of spread has been spectacular and the devastation has been unparalleled in modern human history. The pandemic perils have been unprecedented and the cost has been paid in terms of human life, unemployment, social deprivation, losses in small and large businesses and a slump in world economies. At one point in the pandemic's progression, every activity seemed to grind to a halt. However, economic and political pressures have forced businesses to return to normal.[1] People are learning to live with the virus while the pandemic continues to rage.

Like other daily activities, the all-important activity of education, undergraduate and postgraduate alike, was suspended due to the pandemic. However, adversity is known to bring opportunity, and many schools, colleges and universities worldwide have undertaken online teaching and learning. The pandemic introduced many new words and phrases to language, such as 'social distancing' and 'smart lockdown' and one phrase, 'emergency remote teaching' (ERT), has become part of the teaching vernacular.

To continue instruction during the pandemic, Sultan Qaboos University (SQU) introduced ERT to differentiate between online and remote teaching.[2] Online courses and programmes require multiple stages of preparation and extensive measures to ensure effective implementation. However, ERT, as the name implies, is teaching remotely under emergency conditions, and those remote conditions could be online or via another mode.

The medical doctorate (MD) curriculum at the College of Medicine and Health Sciences (COMHS) at SQU is outcome- and system-based and is integrated vertically and horizontally.[3] It is based on clinical presentations rather than on academic disciplines and consists of three phases. Students are exposed to clinical medicine early in phases I and II, while the hospital-based clinical phase (phase III) consists of clerkships and spans three years. There are four clerkship stages: a 10-week pre-clerkship period, a one calendar-year junior clerkship, a one calendar-year senior clerkship and a 12-week pre-internship. When studies were suspended in March 2020 due to the pandemic, almost 350 students were in clinical rotations in the junior and senior clerkships and pre-internships.

The SQU COMHS clinical faculty consists of approximately 500 senior doctors, both at university and affiliated hospitals. When studies resumed, ERT was quickly implemented after discussions with stakeholders including students, faculty and administration. Students in clinical rotations were engaged through the Moodle learning management system and the Zoom communication platform. The Departments of Medical Education and Informatics played a pivotal role in establishing channels and training the faculty on using Moodle and Zoom. Below are salient features of the ERT experience.

[1]Department of Medicine, Sultan Qaboos University Hospital, Muscat, Oman; Departments of [2]Child Health, [3]Physiology and [4]Biochemistry, Sultan Qaboos University, Muscat, Oman
Corresponding Author's e-mail: ikramburney@hotmail.com

DELIVERY OF CLINICAL PHASE OF THE CURRICULUM THROUGH ERT

Several challenges arose in delivering the clinical phase through ERT including quickly reviewing the curriculum to see what could be taught online and how converting student-led seminars to faculty-led tutoring sessions, equipping faculty to effectively use learning and communication platforms, deploying in-rotation assessments and dealing with uncertainty. Initially, it was not clear how long ERT or online mode of teaching would need to continue. In the absence of the opportunity to provide clinical skills teaching, the emphasis of ERT was to help students develop clinical reasoning and the ability to apply management skills. The teaching material was specifically designed and prepared to provide students with opportunities to enhance proficiency in pathophysiology, approach presenting and constructing differential diagnoses based on available information, prioritise investigations and formulate a management plan. Teaching materials specifically created for students in the clinical phase were provided through Moodle. Pre-planned sessions were conducted using Zoom or BigBlueButton to facilitate interaction on the day of virtual contact with students. Before the online sessions, mini-workshops were organised to prepare faculty to use online teaching and learning tools. Technical help was available during teaching sessions from the Departments of Medical Education and Informatics.

Clinical rotations in phase III of the MD curriculum are divided into three broad categories, depending on the nature of teaching and learning and the type of patient contact medicine: (1) surgery, child health, obstetrics and gynaecology and family medicine rotations require direct contact with patients; (2) rotations including radiology, molecular imaging and laboratory medicine require on-site as well as seminar-room/side-room learning; and (3) the so-called supportive learning topic rotations (e.g. evidence-based and forensic medicine) require predominantly teaching small groups in seminar rooms. During pandemic restrictions, ERT was designed to provide the seminar-room content and discussions in the first two categories of rotations and the entire learning opportunity in the third category. As a result of this exercise, it was possible to reduce the length of rotations so that when the students returned to face-to-face instruction, they would be able to complete the remaining rotations without compromising clinical exposure or delaying academic progression from the junior-to-senior clerkship or the senior clerkship to the pre-internship.

The clinical rotation in radiology and molecular imaging illustrates this approach. In this rotation, a group of 20 senior clerkship students rotate for two weeks every six weeks and, given the constraints of space, are divided into smaller groups to be exposed to learning opportunities in three hospitals. In reaction to COVID-19, the rotation coordinator provided students e-access to review scans and support online learning. As a result of stakeholder feedback and the ability to engage and interact with several students simultaneously, most of the rotation has now been converted to an online format. The in-rotation assessment is mainly workplace-based and will be done when the students return. The vast majority of in-rotation assessments provide immediate, on-site feedback. Providing such specific, descriptive feedback has been shown to have an effect size that matches the usual classroom teaching; therefore, it would be necessary for students not to miss this opportunity to enhance their learning face-to-face.[4]

The adversity introduced by COVID-19 also provided opportunities for curriculum managers to rethink and redesign learning opportunities to accommodate the demands of the pandemic and reshape future education. The faculty's hidden potential to adapt to rapidly changing circumstances was unearthed, as was the massive potential of using online technologies during the clinical phase of the curriculum. Faculty who had long considered making pedagogical changes in their teaching found themselves forced to make those changes in days or weeks and, with a sense of pleasure, found achievement within those changes. The ERT helped extend learning opportunities beyond the university's walls while maintaining the important boundaries of the undergraduate learning experience, including attendance, punctuality and self-directed learning. It is anticipated that after the COVID-19 pandemic is controlled, online teaching and learning will remain. Most faculty members believe that it should not cease, even when COVID-19 restrictions are lifted.

WHERE DO WE GO FROM HERE?

The current pandemic has provided opportunities to adopt new methods of teaching and learning in medicine. Despite integrating e-work practices in other disciplines, academic medicine is only just beginning to utilise advancements in information and educational technologies.[5] It seems that conventional lectures will not be as pervasive after the pandemic is over, and methods of information delivery, including remote teaching, may need further enhancement.

As for teaching kinesthetic skills, several methods are in use or have been proposed.[6] For example, telemedicine could be employed to demonstrate communication and counselling skills, physical

examination methods and bedside and surgical procedures; in these situations, students are expected to learn through osmosis and imbibition.[7] For the 'touch and feel skills', students can review videotapes of practitioners obtaining patient histories and carrying out physical examinations and then demonstrate the skills with a family member, friend or colleague who could be provided with a checklist to guide the student. Training through simulations and virtual wards have been proposed for defined learning objectives.[8]

Although using ERT to develop medical knowledge, comprehension and clinical reasoning skills is comparable to traditional forms of learning, outcomes related to behaviour, such as empathy, are less than optimal.[9] Without financial resources, technological support, standardisation of delivery, and training programmes, professional behaviours cannot be developed. Technology-supported approaches cannot replace all aspects of experiential learning or stimulate the satisfaction students get when working on-site in teams, communicating with patients and caregivers and observing and following role models. Students can look and listen, but the feel of a medical environment is essential. The students in the clinical phase of clerkship must meet patients and interact with clinical teams face-to-face. Furthermore, to prevent significant delays in the academic calendar, it is paramount that clerkship students return to face-to-face medical settings where they will ultimately be required to work to provide human touch and a healing hand.

CHALLENGES DUE TO STUDENTS' RETURN TO THE WORKPLACE

Students' return to the workplace is not without significant challenges. The first and foremost issue will be the safety of students, patients and healthcare workers. This concern is due to the added risk that students can pose by increasing the number of individuals working in a clinical care team. Students could acquire infections during clinical rotations or import infections from the community, jeopardising staff and inpatients' safety.

Second, students are experiencing only limited clinical exposure due to the pandemic. Elective surgical procedures and routine care typically provided by major teaching hospitals have been postponed to accommodate patients with COVID-19 who require urgent medical attention. Patients may be reluctant to come to hospitals or be examined by medical students. Furthermore, the physical space in hospitals and health centres may be limited as some space is reserved for treating patients with COVID-19. Also limited is the number of teaching faculty, as some clinicians are busy caring for patients with COVID-19 and others may be asked to stay home after exposure. Finally, fear of the unknown, the state of uncertainty and the stigma of being educated within an environment saturated with new "do's and don'ts" will likely continue to hound students throughout their educations.

THE WAY FORWARD: THE LIKELY NEW NORMAL

Some of these challenges can be addressed by improving communication, raising awareness, establishing standard operating procedures, implementing safety policies, monitoring incidents and auditing procedures.[10,11] These changes aim to effectively manage the safe return of medical and laboratory students as COVID-19 continues.[12] In the longer run, a transition from ERT to well-planned online learning management will be needed. Restructuring the three categories of rotations in phase III may help identify competencies to be achieved through students' on-site physical presence. Other competencies may be achieved through online teaching and learning. This transition will require faculty development, redesigning the curriculum, restructuring and enhancing technical capabilities, introducing new learning material pertinent to the evolving pandemic and redesigning in-rotation assessments. Regulatory approval from the accrediting bodies may be required to support changes in teaching and assessment. Furthermore, there will be a need to enhance medical students and teachers' skills to utilise information communication technology (ICT) facilities. Training students on the use of telemedicine and artificial intelligence for patient care may need to be explored further.[13]

Evidence-based policies for reducing transmission risk have recently been suggested for people who return to work during the ongoing pandemic.[1] These measures can be observed at individual, programme and university levels. At an individual level, raising awareness about common symptoms, self-diagnosis, not working if symptomatic, observing personal hygiene, maintaining physical distance from others, practicing good respiratory etiquette and using masks and personal protective equipment have been suggested. At the programme level, teaching will need to be restructured to ensure only a few students are attached to a clinical teaching unit and are staggered through shifts. Hybrid teaching would need to be used to limit the presence of students in clinical areas. At the institutional level, workplace cleaning, symptoms monitoring, travel limitations and contact tracing and testing are suggested measures. The rapidly expanding evidence-based literature can be used to better understand ways to curb the speed of the pandemic's spread.[10,12]

The will and desire to train and equip the doctors of tomorrow while the pandemic rages today provides an unprecedented opportunity for medical education innovations. It is time that medical schools and curriculum designers move away from information-giving through ERT to providing blended, contemporary, effective, evidence-based medical education.

Conclusions

Herein a medical education journey through the COVID-19 lockdown was described. The experience suggests that medical education could be delivered more effectively using online learning platforms and incorporating modern ICT. COVID-19 catalysed changes in the delivery of medical curricula worldwide. Medical education has learnt rapidly from other disciplines using e-work and e-learning before the pandemic started. However, there are opportunities for further innovation by advancing and fine-tuning online learning. As schools transition from traditional teaching and sustain challenges, blended teaching may become the new norm after the pandemic.

References

1. Barnes M, Sax PE. Challenges of "return to work" in an ongoing pandemic. N Eng J Med 2020; 383:779–86. https://doi.org/10.1056/nejmsr2019953.

2. Hodges C, Moore S, Lockee B, Trust T, Bond M. The difference between emergency remote teaching and online learning. From: er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning Accessed: Oct 2020.

3. Sultan Qaboos University College of Medicine. Dean's message. From: www.squ.edu.om/medicine/About-College/Units-Sections/Curriculum-Office Accessed: Oct 2020.

4. Hattie J. Influences on student learning. From: www.researchgate.net/publication/237248564_Influences_on_Student_Learning Accessed: Oct 2020.

5. He S, Lai D, Mott S, Little A, Grock A, Haas MRC, et al. Remote e-work and distance learning for academic medicine: Best practices and opportunities for future. J Grad Med Edu 2020; 12:256–62. https://doi.org/10.4300/JGME-D-20-00242.1.

6. Kee A, Archuleta S, Dan YY. Internal medicine residency training in the COVID-19 era—Reflections from Singapore. J Grad Med Edu 2020; 12:406–8. https://doi.org/10.4300/JGME-D-20-00315.1.

7. Prober CG, Khan S. Medical education reimagined: A call to action. Acad Med 2013; 88:1407–10. https://doi.org/10.1097/ACM.0b013e3182a368bd.

8. Pottle J. Virtual reality and the transformation of medical education. Fut Healthcare J 2019; 6:181–5. https://doi.org/10.7861/fhj.2019-0036.

9. Kononowicz AA, Woodham LA, Edelbring S, Stathakarou N, Davies D, Saxena N, et al. Virtual patient simulations in health professions education: Systematic review and meta-analysis by the digital health education collaboration. J Med Internet Res 2019; 21:e14676. https://doi.org/10.2196/14676.

10. Haushofer J, Metcalf CJE. Which intervention work best in a pandemic. Science 2020; 368:1063–5. https://doi.org/10.1126/science.abb6144.

11. World Health Organization. Coronavirus disease (COVID-19) training: Online training. From: www.who.int/emergencies/diseases/novel-coronavirus-2019/training/online-training Accessed: Oct 2020.

12. Habersaat KB, Betsch C, Danchin M, Sunstein CR, Böhm R, Falk A, et al. Ten considerations for effectively managing the COVID-19 transition. Nat Hum Behav 2020; 4:677–87. https://doi.org/10.1038/s41562-020-0906-x.

13. Hall AK, Nousiainen MT, Campisi P, Damon Dagnone J, Frank JR, Kroeker KI, et al. Training disrupted: Practical tips for supporting competency-based medical education during the COVID-19 pandemic. Medical Teacher 2020; 42:756–61. https://doi.org/10.1080/0142159X.2020.1766669.