Impact of COVID-19 on Canadian Medical Education: Pre-clerkship and Clerkship Students Affected Differently

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ABSTRACT: The coronavirus pandemic (COVID-19) has altered the undergraduate learning experience for many students across Canada. Medical education is no exception; clinical programs, in-person lectures, and mandatory hands-on activities have been suspended to adhere to social distancing guidelines. As remote teaching becomes the forefront of education, medical curricula have been forced to adapt accordingly in order to fulfill the core competencies of medical training and to provide quality education to medical students. With that in mind, the COVID-19 crisis offers a unique opportunity to evaluate the current “continuity plans” in medical education as they stand. This paper provides the perspective of medical students on how medical education is changing for both pre-clerkship and clerkship students, using their experience at McGill University as an example for the Canadian medical education system. Additionally, we discuss the accommodations put forth by the undergraduate medical education (UGME) office, and reflect on the limitations and sustainable solutions in supporting quality medical education.

KEYWORDS: COVID-19, Coronavirus, medical education, undergraduate medical education, clerkship

Introduction

In early 2020, coronavirus disease 2019 (COVID-19) was declared a global public health emergency. The rapidly rising incidence of positive cases, increasing death toll, and the absence of an effective vaccine highlighted the importance of public’s and frontline worker’s response and attitudes toward this pandemic in preventing the spread of disease.1,2 The pandemic has certainly shown the resilience of healthcare workers, many of whom have sacrificed their lives in the line of duty,3 and our system’s ability to adapt during adversity.4 As medical students at McGill University, we observed the rapid reconfiguration of hospitals and physician practices to better accommodate the needs of COVID-19 patients and to contain the disease. Additionally, non-urgent clinic consultations and elective surgical procedures were canceled in order to prevent overcrowding of hospitals and to make hospital beds available for COVID-19 patients.5 Unsurprisingly, protocols were put in place to limit the use of personal protective equipment (PPE) to allow the hospitals to accommodate the large influx of patients.5

This pandemic has also altered medical students’ learning experience as the undergraduate medical education (UGME) office has adapted the medical curriculum and delivery methods in order to comply with social distancing guidelines set forth for COVID-19.5,7 At our institution, similar to the vast majority of other Canadian medical schools, the undergraduate medical program is 4 years in length, with the first 2 years making up the “pre-clerkship” component and the latter 2 years comprising of “clerkship.” Notably, the pre-clerkship component at McGill is compressed into 18 months, following which medical students undergo a “Transition to Clinical Practice (TCP)” program for 6 months. During TCP, students rotate through various medical and surgical specialties in hospitals while practicing their history taking skills, performing physical exams on real patients, and learning to appreciate clinical signs under the tutelage of physicians.

Given the alarming rate of incoming COVID-19 cases and the potential for rapid spread of the disease,2 all pre-clerkship and clerkship students were withdrawn from clinical duties in mid-March 2020.8 Disappointing as this news may be, the role of medical students in hospitals is still that of learners which requires supervision from the attending physicians. However, the priority of frontline healthcare workers had rightfully shifted to treating the rapidly incoming sick and vulnerable patients. It was understandable that our presence in hospitals and clinics would not only put a strain on the already depleting PPE but also harbor an increase in the risk of viral dissemination. In addition to the arrest of clinical programs, in-person lectures and other academic activities were suspended in accordance with provincial mandates on social distancing. In this paper, we describe the alterations made in Canadian medical curricula, using our experience at McGill University as an example for the Canadian medical education system, and discuss personal reflections about current lessons to be learned for the future of medical education.

Pre-clerkship: First- and Second-Year Medical Students

The pre-clerkship curricula of Canadian medical schools focus on didactic acquisition of medical knowledge through in-class lectures, hands-on anatomy labs, and small group discussions.
Following the cancellation of in-person classes in mid-March, Canadian universities quickly resorted to using virtual teaching platforms, online educational resources, and pre-recorded lectures to continue delivering educational material. It could then be argued that the first- and second-year medical students experienced minimal disruptions in their didactic education, as teleconferencing has been reported to facilitate learning in continuing medical education. Indeed, a 2019 meta-analysis looking at the efficacy of online and offline methods in teaching medical students demonstrated similar learning potential among the 2 formats. However, in our experience and that of our peers, the main limitation of virtual teaching has been attributable to the limited capacity of interactive learning, typically occurring in the form of question-answer periods and peer-to-peer discussions. Although the initial transition to virtual teaching also presented with several practical and technical concerns on the ends of both students and tutors, we noted that these issues were largely troubleshooted in a matter of weeks. At our institution, this was made possible in part by virtual assistance provided by the faculty during the lectures, and through student-led initiatives that offered support to the less tech-savvy tutors on how to appropriately navigate the online systems. Given the visuospatial nature of anatomy, the transition of hands-on lab to virtual learning has been understandably more difficult. Attenuation of content understanding, that would normally be facilitated during in-lab small group discussions, combined with the lack of interaction with cadaveric specimens, at-home distractions, and poor audio-video quality of available online anatomy material resulted in a sub-optimal learning experience. The department of Anatomy at our institution is currently making efforts to replace the use of 2-D images with 3-D software applications for remote teaching purposes. This strategy sounds quite promising as it can mimic a pseudo-laboratory environment; however, its efficacy and benefits remain to be evaluated.

Examinations have presented yet another challenge. McGill University, among other Canadian medical institutions, has utilized online platforms to continue delivering at-home examinations. However, concerns regarding academic integrity have become apparent among our peers as we adjust to this inherently “open-book” format of testing. In speaking with our medical colleagues at other Canadian medical institutions, University of Toronto requires students to have their webcam turned on throughout the examination to monitor any misconduct by e-proctoring. Taking on a more extreme stance, medical faculty at the University of Calgary have preliminarily decided to postpone examinations altogether until the school can resume in-person examinations. This strategy has been met with added frustration from our peers in Calgary as the course material continues to be delivered regularly, with only online quizzes as objective assessments to guide students’ progress.

Although the majority of the medical curriculum in pre-clerkship is focused on didactic lectures, anatomy labs, and small group sessions, Canadian institutions also implement several programs to allow students to learn from experienced physicians—utilizing what is so-called the social learning theory. At McGill for instance, curricular activities such as “Longitudinal Family Medicine Experience (LFME),” “Clinical Methods—History Taking,” and “Osler Shadowing Program” provide pre-clerkship students with the opportunity for bedside learning from residents, physicians, and standardized patients throughout the first 18 months. In LFME, first-year medical students are paired with a general practitioner whereby the student shadows the physician in their clinic 3 to 4 times a month to practice physical examination techniques and learn to recognize clinical signs. Similarly, we have been allowed to shadow physicians on internal medicine wards, observe surgeries, and attend physician rounds to further strengthen our clinical acumen. According to Horsburgh and Ippolito, such programs utilize a role modeling platform and create an environment that enables medical students to learn through: (1) close observation of clinical teachers and their interaction with patients, (2) receiving a unique insight into the invisible thought process that guides such interactions, (3) opportunities to reproduce similar behaviors under clinical supervision, and (4) reflecting on the experience with feedback from their clinical teachers. Unfortunately, the aforementioned educational experiences have been halted altogether due to the cancelation of clinics and elective surgical cases. Furthermore, skill-based learning programs such as physical exam sessions and ultrasound training with mock patients have also been suspended to respect social distancing guidelines. For those of us in the TCP component of pre-clerkship, the clinical immersion that should have taken place in the hospital wards, operating rooms, and specialty clinics was replaced with written assignments and online tutorials discussing different clinical cases. With the suspension of all the informal and formal clinical activities, we have felt a significant step-back in our medical education.

In our opinion, mitigating this gap in clinical knowledge is imperative. Clinical exercises and shadowing experiences are highly valued by medical students as they provide us the opportunity to improve our medical reasoning and diagnostic acumen, learn physicianship, and develop appropriate bedside manner—soft skills that are not easily attained through didactic knowledge alone. Although limitations are placed on hospital and clinic visits, we strongly believe that efforts should be made in creating e-learning modules that cater to improving our non-cognitive skills. One option is to develop resident- or faculty-led virtual sessions that discuss topics such as “approach to a palliative care patient,” “approach to an uncooperative patient,” “how to deliver bad news,” or “how to request tests in a hospital” in case-based scenarios with a small group of medical students. Students could also be asked to watch mock clinical-encounter videos or even engage in role-playing activities to simulate patient encounters under the supervision of a faculty member who may guide the discussion on themes pertaining to soft skills. A similar curriculum was adopted by Warren...
Alpert Medical School at Brown University (Rhode Island, USA) to teach pre-clerkship students about communication, empathy, and compassionate care through discussion on patient cases, question-answer sessions with guest patients, and role-plays or videos depicting successful and ineffective interactions. In accordance with the social learning theory, this methodology can be taken further by having students observe physician-patient interaction through video surveillance, thereby facilitating learning of nuanced soft skills.

We acknowledge that logistical and administrative challenges will likely be encountered to set up such programs given the current priority of medical educators in treating sick patients; however, a collaborative effort from the medical faculty, student leaders, and willing educators can facilitate the start of “pilot” projects. More specifically, the pilot projects could help delineate the limiting factors—including the availability of preceptors/educators, administrative and financial considerations for the medical faculty, ethical considerations from the patient-physician privacy perspective, and student engagement and learning potential during the sessions—that will provide insight into the sustainability of the above ideas. Needless to say, implementing such programs would not only improve the current lack of clinical exercises but also promote interaction among our medical colleagues in the time of social isolation. Lastly, these programs could act as a reservoir of supplemental learning material to be utilized again in the future.

Clerkship: Third- and Fourth-year Medical Students

In considering the impact of the COVID-19 pandemic on medical education, as medical clerks, we experienced the most uncertainty. Following our removal from clinical rotations in mid-March 2020, we are preliminarily expected to return to hospitals after having missed approximately 4 months of clinical training. Indeed, the Canadian Federation of Medical Students (CFMS) has outlined their principles for our safe return to clerkship by advocating for: (1) learner safety with minimized infection risk, (2) adequate supplies of PPE, and (3) proper supervision during skill-appropriate clinical teaching. As North American medical education is transitioning toward a competency-based model, we fear that we may not have enough time to cultivate the necessary basic clinical skills required to become competent residents. Attempts have been made to address this situation by curating specific online modules and interactive tutorials to cover key learning materials that are geared toward helping students meet the core competencies of their associated rotations. However, the significant reduction in hands-on learning presents a considerable challenge in our medical education.

Although medical faculties across Canada have been trying to resume clerkship as soon as feasible, there has not been much progress in the way of updating the curricula to help continue the development of history taking, diagnostic and practical skills while in quarantine. It is during clerkship where we develop hands-on skills such as performing intubations, starting intravenous (IV) lines, practicing suturing techniques, and operating surgical instruments under the supervision of trained physicians. This presents another opportunity to curate programs that specifically improve our knowledge of the aforementioned techniques. For example, a recent student-led initiative at our university evidenced the efficacy of peer-led, hands-on surgical skills workshops on increasing students’ confidence in their surgical skills. The medical faculty could collaborate with such student groups and surgical residents to implement similar workshops in the medical curriculum and offer ongoing tutorials on suturing techniques which can be practiced in real-time by medical students with at-home suturing kits. Furthermore, the mannequin “patients” in medical simulation centers can be utilized to teach appropriate intubation, bag masking, and IV placement techniques through virtual seminars. Further, a small number of students can be scheduled at a time to have hands-on practice in simulation centers following appropriate PPE and social distancing guidelines.

COVID-19 pandemic led to the rise of e-learning opportunities with many medical and surgical societies offering online webinars and educational platforms. While these resources are extremely valuable, in view of the evidenced superiority of active learning methods in improved cognitive outcomes, we fear that the lack of active participation with online pre-recorded study materials may limit our learning. One way to remedy this is to encourage active participation by holding regular faculty-led or peer-to-peer discussion sessions on the topic related to the suggested webinars or online educational videos. For example, real-life cases with labs and imaging results can be utilized by the internal medicine residents to conduct weekly role-playing exercises with medical students in order to continually improve our diagnostic knowledge and understanding of necessary versus unnecessary tests in the given scenario.

Telemedicine has been crucial to the resumption of clinics. Many physicians are benefitting from the available technological platforms and consult their patients over the phone or through videoconference. At our institution, medical clerks partake in the care of patients through telemedicine, under the supervision of staff physicians in a multi-step process. The first step includes a telephone encounter during which we review the patient’s past medical history, listen to their chief complaints, and ask the medically relevant questions. Subsequently, we present the case to the supervising staff physician and discuss our differential diagnoses, the appropriate next steps, and suitable treatment plans. Once the case is discussed in detail, we call the patient in presence of the staff physician and discuss our findings with them. During the same telephone encounter, the staff physician talks with the patient and answers their questions as needed. Moving forward, we strongly believe that the increasing use of telemedicine warrants consideration and implementation of telemedicine in the
formal undergraduate medical education to better prepare the next generation of care providers.

The current circumstances have elicited significant uncertainty regarding the residency application as well. Nation-wide suspension of visiting electives not only limits our capacity to explore our specialties of interest in different medical institutions across North America, but it also presents a challenge for post-graduate programs to assess potential candidates. In light of these unprecedented circumstances, the Armed Forced Medical College (AFMC) in collaboration with Canadian post-graduate medical programs have decided to postpone their residency application cycle by 3 months.21 They have also decided to hold all the interviews online in order to maintain appropriate social distancing and avoid unnecessary risks.22 These positive measures have somewhat helped reduce our stress; nevertheless, they are accompanied by shortcomings, some of which are worth discussing. Traveling for residency interviews allows in-person exposure to the programs and faculty members which can facilitate decision making for both residency selection committees and applicants. Notably, for students who are interested in specialties that are not offered at their home school, in-person interviews were the only opportunity for them to officially explore their options. For programs that routinely assess candidates’ psychomotor skills during the in-person interviews, transitioning to online interviews will limit their assessment domains. Considerable uncertainty still exists which warrants continuous communication and compromise by both medical students as well as residency programs to overcome this troubling period.

Community Engagement
A large number of medical students, irrespective of their level of training, have benefitted from this extra time by focusing on their professional development and engaging in leadership and volunteering opportunities. Eagerly waiting to be at the service of others, some of us are helping health care workers with contact tracing while others are involved in discussing COVID-19 test results with patients over the phone. Additionally, medical student groups such as “3D PPE GTHA” have emerged across Canada and have made significant strides in manufacturing and distributing PPE for frontline health care workers by 3-D printing materials. Many other student-led initiatives continue to materialize at McGill and other Canadian medical institutions, including outreach tutoring programs for children at home, food delivery for hospital staff, and peer-to-peer teaching sessions among medical students. We hope to cultivate compassion, teamwork, and ingenuity by addressing the evolving needs of our community at large during these stressful times.

Concluding Remarks
The COVID-19 pandemic has affected medical education for both pre-clerkship and clerkship students. In this article, by using our experience at McGill University as an example, we provide insight into how Canadian medical curricula are changing, albeit with their own limitations, to accommodate us during these unprecedented times. The lack of clinical learning and limitations placed on attaining the core competencies of clerkship demands immediate attention by the medical faculties in considering some of the proposed solutions in this paper. Although patient care and frontline service remain a priority, medical education also mandates similar vigor in reshaping the curricula to provide high-quality medical education for the physicians of tomorrow. We believe that the lessons learned from this pandemic will prepare us for future health emergencies by providing a roadmap on how to quickly adapt medical curricula and reduce medical education disruptions.

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