

## Learning during the pandemic: Perspectives of medical students in Singapore

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### ABSTRACT

The COVID-19 pandemic has significantly disrupted medical education, particularly affecting clinical-year students. Educational institutions often had to halt, shorten or impose significant restrictions on their hospital rotations due to strict infection control and social-distancing guidelines implemented in tertiary healthcare institutions, as well as manpower and logistical constraints amid the pandemic. Thus, distance-based learning platforms such as online lectures and case-based teaching were increasingly adopted in place of bedside and face-to-face tutorials. While interactive virtual case-based discussions are generally useful in imparting clinical reasoning skills to medical students, they are unfortunately not able to fully replicate the experience of clerking, examining and managing real patients in the wards, which is a quintessential process towards building clinical acumen and attaining core clinical competencies. Therefore, for final year medical students who are preparing for their Bachelor of Medicine and Bachelor of Surgery (MBBS) examinations, many are naturally concerned by how learning in this “new normal” may affect their ability to make the transition to become competent junior doctors. As such, we seek to share our learning experiences as the first batch of medical students to have completed our entire final year of clinical education amid the COVID-19 pandemic, and offer 4 practical suggestions to future batches of students on how to adapt and optimise clinical learning under these circumstances: actively engaging in virtual learning, making the most of every clinical encounter, learning how to construct peer teaching/practice sessions, and maintaining physical and psychological well-being.

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The COVID-19 pandemic has been a major disruption to medical education worldwide and will continue to pose challenges to medical students and educators alike for some time to come until we transition into a post-vaccinated world. In early to mid-2020, clinical clerkships were initially halted in many countries<sup>1,2</sup> before being gradually re-introduced, as medical educators recognised their importance for medical students. Nonetheless, clinical postings were often shortened and replaced with home-based online learning due to manpower, logistical and social-distancing constraints. Depending on local institutional guidelines, students on clinical clerkships also faced significant restrictions—such as being barred from entering high-risk areas

like isolation wards for patients with acute respiratory symptoms, intensive care units, operating theatres and the emergency department,<sup>3,4</sup> as well as “crossing” over to other wards or teams to clerk patients admitted under another subspecialty.<sup>4</sup> For final year medical students preparing for their Bachelor of Medicine and Bachelor of Surgery (MBBS) examinations, there are concerns on how these changes may affect their clinical competency as junior doctors<sup>5</sup>—as Sir William Osler declared, “Medicine is learned by the bedside and not in the classroom.” Hence, in this commentary, we aim to share our experiences as the first batch of medical students to have completed our entire final year of clinical education amid the COVID-19 pandemic, and

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offer practical suggestions on learning strategies in this “new normal”, which may be beneficial to future batches of medical students.

**Tip 1: Active engagement in virtual learning.** In our medical school, physical classes exceeding 50 students and approximately half of clinical attachments were shifted to home-based virtual learning<sup>6</sup> where online platforms such as Zoom and Microsoft Teams facilitated case-based tutorials. Clinical tutors typically interact with 20–30 students, guiding them through history-taking, physical examination, differential diagnoses and investigation/management plans either verbally or through online polling platforms such as PollEv. While online classes may not fully replicate the clinical training provided in hospital rotations,<sup>7</sup> they do provide us with several benefits if we maximise them.

Firstly, home-based learning allows more time for pre-preparation and post-session consolidation of learnt content. In particular, consistent note-making is important to assimilate and process the vast amounts of clinical content we acquire on a daily basis. Notes can be classified into approaches to clinical manifestations and specific conditions. For example, an “approach to dyspnea” should cover key points in history-taking, physical examination and investigations for an undifferentiated patient with first presentation of breathlessness. Conversely, notes on “asthma” ought to cover all aspects of the condition—including the definition, epidemiology, risk factors/aetiology/precipitating factors, pathophysiology, clinical manifestations, diagnostic criteria, investigations, management and complications of disease and treatment. The practice of such concept mapping is powerful in helping students integrate their knowledge, engage in critical thinking<sup>8</sup> and form “illness scripts” to link theory to practice.<sup>9</sup> To ensure the accuracy of our notes, we cross-referenced to multiple reliable and up-to-date sources including textbooks, official guidelines, review articles in academic journals, UpToDate, StatPearls and Medscape. In particular, articles on the *Singapore Medical Journal’s* Continuing Medical Education and the Singapore Family Physician journal provide insights into local clinical practices.

Secondly, we find that coming up with questions before each home-based tutorial significantly helps with our learning as this process creates self-awareness of current knowledge and gaps, promotes productive thinking, and inculcates a scientific habit of mind.<sup>10</sup> Furthermore, students can take the opportunity of online tutorials to clarify on how Singapore’s clinical practices may differ from international guidelines, when contextualised to our local patient cohort. Hence, in

contrast to hospital-based clinical tutorials that may be more ad hoc, structured online tutorials afford greater predictability that we can capitalise on to maximise learning.

**Tip 2: Making the most of every clinical opportunity.**

A major challenge to medical education in the COVID-19 pandemic is the reduction in patient contact. Locally, clerkships were shortened, or modified such that students do not “cross teams or wards” to clerk patients under other sub-disciplines,<sup>4</sup> for infection control purposes. This presents new difficulties for final year medical students, who tend to be preoccupied with clerking many patients across different sub-disciplines with good clinical signs to examine in order to prepare for the final MBBS examinations. However, the new cohorting restrictions in local hospitals meant that we had to adapt our clinical learning to maximise every clinical interaction. To do so, we find that it is important to take full ownership of several patients admitted under our assigned medical teams—that includes comprehensive clerking, examining, reading up on past clinical notes, drafting new clinical entries and presenting updates on our patients during ward rounds. In particular, the process of drafting up our own management plans before discussing with the medical team is important for developing clinical acumen. When we spend more time on each patient in our assigned teams, we can better appreciate and participate in the provision of holistic healthcare that goes beyond addressing the presenting complaint, to managing psychosocial issues, discharge planning and step-down care. In a way, the reduced breadth of clinical exposure has led to greater depth of learning and a more holistic clinical clerkship experience.

Finally, we are able to find ample learning opportunities by being thorough in clerking our patients within the confines of a single ward team. For instance, a patient with interstitial lung disease may have an underlying connective tissue disease for which we can perform a rheumatological examination. In fact, we may occasionally discover incidental clinical findings that we can learn from and value-add to patient care. For example, aortic stenosis or mitral regurgitation murmurs can be quite prevalent in the elderly population.<sup>11</sup>

**Tip 3: The value of peer teaching and practice sessions.**

In the lead-up to our final MBBS examinations, practising case scenarios with each other became ever more important in honing our history-taking and physical examination skills, given the reduced patient contact during the COVID-19 pandemic. To maximise the efficacy of each session, we found it useful to prepare a

set of case scenarios with PowerPoint slides, including a task vignette, examination findings and discussion questions (Fig. 1). To simulate real-life clinical scenarios, we inserted cardiovascular and respiratory sound files, video clips of gait patterns, and images of rheumatological findings. The clinical findings were released sequentially to the candidate, when the correct examination step was performed.

The benefits of peer teaching are well documented.<sup>12,13</sup> Firstly, it is known to be effective because of cognitive and social congruence,<sup>14</sup> where peer teachers can better pitch the study session at an appropriate level, empathise with gaps in clinical knowledge, and help learners feel more comfortable clarifying their doubts.<sup>15</sup> Secondly, the peer teacher also learns from the session as a good understanding of theoretical concepts is required to quiz

and educate the learner.<sup>16</sup> In addition, the peer teacher enhances his/her knowledge through self-reflection when preparing the teaching material<sup>16</sup> and wrestling with new and opposing information that emerges from active discussion with the learner.<sup>17</sup> In a way, peer teaching in medical education becomes a direct application of the constructivist learning theory.<sup>18</sup>

Beyond clinical content, peer-assisted learning also helps to build collegiality among medical students who will be fellow colleagues in future. It has recently been reported that communication and interpersonal skills among medical students can be improved through this educational modality.<sup>16</sup>

In the broader context, integration of peer teaching into the medical curriculum may even potentially relieve the immense pressure on clinical educators who not only

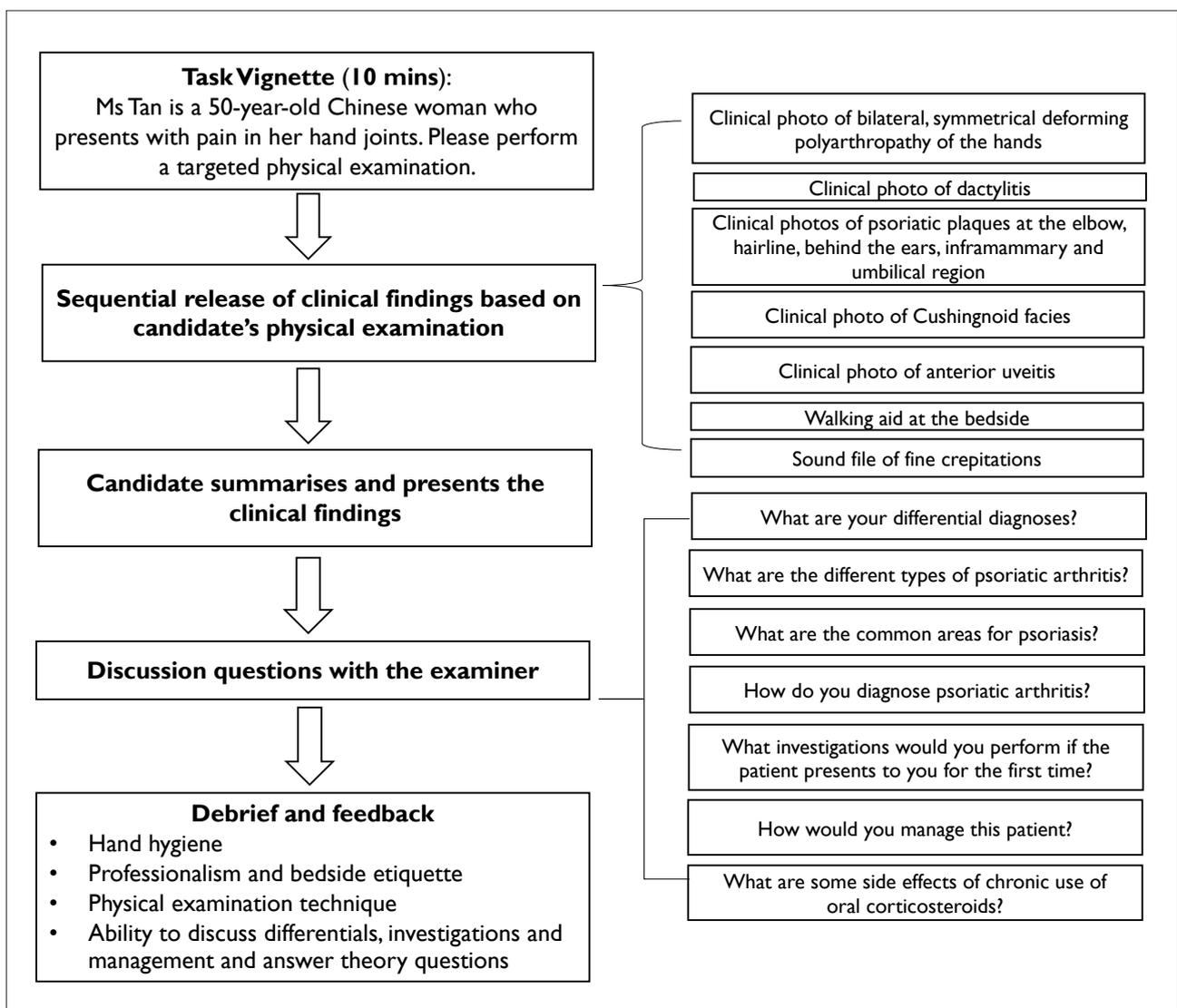


Fig. 1. Illustration of a practice case scenario.

have to manage a surge in clinical duties, but also deal with challenges in re-organising both clinical patient care and educational curriculum for medical students.<sup>19</sup>

**Tip 4: Maintaining physical and psychological well-being.** A priority when resuming clinical training for medical students amid the COVID-19 pandemic is to safeguard the physical health of both the students and patients. In a recent study, medical students viewed the provision of adequate personal protective equipment (PPE) as most important for safety when restarting clinical rotations.<sup>20</sup> Locally, beyond the provision of PPE training for students, tertiary healthcare institutions and medical schools have instituted infection control guidelines that include mandatory twice-daily temperature recording, installation of Singapore’s contact tracing phone application “TraceTogether”, and documentation of every clinical encounter in an online portal for contact tracing purposes.

Finally, the COVID-19 pandemic has unfortunately taken a toll on the mental health of medical students, with reportedly higher rates of depression, stress and anxiety.<sup>20,21</sup> As preparations for the final MBBS examinations under COVID-19 circumstances can be quite stressful, peer support is potentially useful to strengthen resilience and reduce levels of distress.<sup>22,23</sup> For us, peer support came from batchmates with whom we did our clerkship rotations, and existing student communities such as our “House” System and undergraduate medical society. In addition, we found reassuring the ready availability of psychosocial support from the school in the form of periodic virtual town hall sessions with faculty members, professional counselling services and mindfulness workshops, which help with psychological strengthening and stress relief.<sup>24</sup>

**Limitations.** We acknowledge several limitations to the aforementioned learning strategies. Firstly, our approach to optimising home-based learning requires great commitment and self-discipline, which are known disadvantages of e-learning<sup>25</sup>. Secondly, the utility of our peer teaching pedagogy depends on various factors such as learning styles and the presence of a like-minded peer. Thirdly, there is a potential risk of inaccuracy in the content taught during peer-teaching sessions—hence it is important for students to cross-reference to reliable academic sources as mentioned earlier and clarify any unfamiliar content with their seniors or clinical tutors. Lastly, the generalisability of our learning strategies may be limited to medical students in countries adopting a similar approach in handling medical education amid

the pandemic. For example, several countries such as the US,<sup>26</sup> UK<sup>27</sup> and Italy<sup>28</sup> had fast-tracked the graduation of their medical students last year to support their healthcare workforce to deal with the surging pandemic.

Clinical clerkship is a cornerstone of medical education that helps medical students transition from classroom learning to becoming competent junior doctors in the wards. With many countries facing multiple waves of COVID-19 infections, medical students have to be flexible in adapting learning methods whenever there are inadvertent disruptions to clinical clerkships. In this article, we share our experiences as the first batch of medical students to have completed our final year of clinical training amid the COVID-19 pandemic. We propose strategies for effective learning in this new environment that may be helpful to future batches of medical students.

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