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Modified OBGYN undergraduate medical education during the COVID-19 pandemic in Singapore

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INTRODUCTION

Since the first COVID-19 case was reported in Singapore on 23 January 2020, the case numbers have increased rapidly. The Singapore authorities raised the nation's Disease Outbreak Response System Condition (DORSCON) level from yellow to orange⁽¹⁾ on 7 February 2020. As of 25 September 2020, there was a total of 57,638 COVID-19 cases and 27 deaths.⁽²⁾ To prevent spread within the community and among healthcare workers, strict measures were put in place to manage the inflow of visitors to any healthcare institution.

Fourth year medical students from Lee Kong Chian School of Medicine (LKCMedicine) had completed their first week of core theoretical sessions in the Obstetrics and Gynaecology (OBGYN) posting in KK Women's and Children's Hospital (KKH) on 7 February 2020. Their clinical OBGYN posting, which was due to begin on 10 February 2020, was suspended. However, the curriculum planning committee found an alternative way of proceeding with the OBGYN posting without any direct patient contact while ensuring that all the learning objectives and formative assessment criteria were met. This was done by converting the original clinical posting into a virtual one with distant learning conducted in the same timespan using online teleconferencing platforms. Since this was our first attempt at conducting a complete virtual clinical posting, we aimed to analyse the perceptions, concerns and feedback of the affected students and tutors.

METHODS

The traditional LKCMedicine OBGYN curriculum included core sessions that covered the theoretical part of the learning outcomes. The students then rotated through clinics, inpatient wards, labour ward (LW), and operating theatres (OT). They were expected to complete a list of workplace-based assessments, including case logs, partograms, direct observation of procedural skills (DOPS) evaluation for speculum examination and mini-Clinical Evaluation

Exercise (mini-CEX). Students were required to observe at least one normal vaginal delivery and several surgical procedures during their posting.

The LKC Medicine-KKH curriculum planning committee, which included the principal lead and clinical lead for OBGYN, and three administrative executives created the virtual posting. The committee's plans were reviewed and supported by LKC Medicine's Assistant Dean for Year 4 and KKH's Associate Designated Institutional Official for Education. The curriculum for the virtual OBGYN posting was adapted to achieve the following learning objectives, without the students' actual presence in KKH.

- **Communication:** An online virtual classroom (Google™) and a chatgroup were created for all the students, administrators and clinical leads to disseminate schedules, clinical case scenarios and assignments. A detailed briefing was sent to the tutors to inform them of the changes in the curriculum delivery format.
- **Core sessions:** These were conducted through a video-conferencing tool (ZOOM™) that allows for screen-sharing and interaction between the tutors and students.
- **'Clerk the Expert Patient':** Eight clinical scenarios (four obstetrics and four gynaecology) were posted on the virtual classroom. Standardised patient scripts for these scenarios were sent to the tutors. Medical students in small groups of four to five were tasked to elicit history from the clinician standardised patients, following which case-based discussions were conducted through ZOOM. This gave students the chance to practise patient encounters and provided the opportunity to complete their mini-CEX evaluations.
- **Virtual OT posting:** Live surgery was streamed through ZOOM (with the patients' consent), along with voiceover by the clinicians, allowing the students to get a close-up view and explanation. The session lasted four hours and covered mandatory procedures to be observed, including Caesarean section, endometrial biopsy, hysteroscopy, dilatation and curettage, laparoscopy in gynaecology, and hysterectomy.

- Virtual LW posting: This 12-hour module consisted of voiceover Microsoft PowerPoint® lectures on obstetric terminologies and anatomy, video introduction to labour ward covering the layout and internal setup of rooms, and various aspects of labour covered through case-based discussions of three patients. The learning objectives for the LW posting were met through discussions via ZOOM and the use of videos by clinicians to demonstrate various modes of delivery.
- Workplace-based assessments: These included (a) one mini-CEX based on case scenarios from ‘Clerk the Expert Patient’; (b) one virtual DOPS for speculum examination, where students demonstrated examination technique on mannequins at the LKC Medicine premises while the tutors assessed them through ZOOM from KKH; (c) three Single Best Answer (SBA) assessments with ten questions each, consisting of mostly application-type questions – a new initiative to help students consolidate their knowledge and application every week; and (d) end-of-posting quiz with 15 questions.

For all workplace-based assessments, students received real-time feedback from their respective tutors. In addition, the principal lead of OBGYN conducted a weekly ‘check-in’ session with all students through ZOOM to receive feedback on the week’s activities and to address any concerns.

After the completion of the virtual posting, the first batch of students completed a questionnaire on their initial concerns regarding the cancellation of clinical postings, technical aspects of virtual posting and content coverage, with suggestions for improvements. The questionnaire was piloted on the OBGYN undergraduate programme coordinators to ensure ease of use prior to distribution to the students. Based on the feedback received, the curriculum planning team modified the virtual LW session and made minor changes to the rest of the curriculum for the next batch. Students from the second batch completed the same questionnaire in two stages: prior to embarking on the virtual posting, students answered

questions regarding concerns surrounding the cancellation of the clinical posting (Questions 1 and 2); and after completing the virtual posting, the rest of the questionnaire was completed. Results from both batches of students were analysed together, and a sub-analysis was performed comparing the two groups using chi-square test. The tutors involved in teaching the students were also invited to answer the same questionnaire from their point of view.

The study was approved and given exempt status by the SingHealth Centralised Institutional Review Board for research (CIRB approval 2020/2292).

RESULTS

The first batch of 36 students had their posting from 3 February 2020 to 6 March 2020 (five weeks). 34 (94.4%) students from the first batch responded. The second batch of 35 students had their posting from 16 March 2020 to 17 April 2020 (five weeks); 31 (88.6%) students responded to the first two questions and 33 (94.3%) students responded to the remaining questions.

Overall, 38 (58.5%) students expressed that they were worried or very worried about the outcome of their clinical posting when the Ministry of Health announced the DORSCON Orange alert level. When each group was analysed separately, we found that, although the first batch of students appeared more worried ($n = 22$, 64.7%) than the second batch ($n = 16$, 51.6%), this was not statistically significant ($p = 0.22$), suggesting that both batches of students were equally worried (Fig. 1).

When informed that clinical postings would cease, the majority in the first batch were concerned that they would be unprepared for the summative examination ($n = 29$, 85.3%), and some were concerned that the OBGYN curriculum would not be covered ($n = 17$, 50%). In contrast, the main concerns of the second batch were the lack of clinical experience ($n = 29$, 93.5%) and the lack of patient interaction ($n = 28$, 90.3%). Concerns about being unprepared

for the summative examination were raised by 22 (71.0%) students in the second batch, and only a minority (n = 6, 19.4%) were worried that the OBGYN curriculum would not be covered.

Analysis of results from both batches showed that 86.6% (n = 58) of students found the virtual strategies effective or very effective. The rest were neutral, and none found them to be ineffective. All the students found it easy to log on to the e-learning platforms (i.e. ZOOM session and Google classroom), and most (n = 64, 95.5%) found it easy or very easy to submit their assignments online. When using the ZOOM platform, the majority found the audio quality (n = 63, 94.0%) as well as the video/image quality (n = 60, 89.6%) to be clear or very clear. Overall, 51 (76.1%) students felt that the ZOOM sessions were interactive or very interactive, while 14 (20.9%) students were neutral and 2 (3.0%) felt otherwise. Most (n = 58, 86.6%) described their experience with distant learning platforms as good or very good. The remaining (n = 9, 13.4%) were neutral and none had negative experiences. All students would prefer to continue using these virtual learning strategies under DORSCON Orange.

The majority of students found the modules to be effective or very effective: core teaching sessions (n = 62, 92.5%); case-based discussions in small groups (n = 66, 98.5%); virtual OT posting (n = 47, 70.1%); SBA assessments (n = 66, 98.5%); and partogram charting (n = 59, 88.1%). Notably, only 16 (47.0%) students in the first batch found the virtual labour ward posting to be effective or very effective, while 13 (38.2%) were neutral and 5 (14.6%) felt it was ineffective or very ineffective. In contrast, all second batch students found the virtual labour ward posting to be effective or very effective ($p < 0.001$). Fig. 2 shows the mean scores for each module as ranked by batch.

The majority found it easy to contact their tutors (n = 51, 76.1%) and felt there was adequate student-tutor interaction (n = 62, 92.5%). Most students had no problem completing their workplace-based assessments (n = 55, 82.1%) and found the administrative team helpful

during their transition to a virtual posting (n = 65, 95.5%). The students almost unanimously found the OBGYN lead to be very helpful (n = 66, 98.5%).

A total of 21 tutors responded to the survey, 18 (85.7%) of whom were concerned about their students' OBGYN clinical posting being affected by DORSCON Orange. The main concern was the lack of clinical experience and patient interaction (n = 19, 90.5%). Most of the tutors (n = 19, 90.5%) found it very easy to arrange sessions with their students. Only 12 (57.1%) tutors felt that the ZOOM sessions were interactive, as compared to 51 (76.1%) students (p = 0.88).

DISCUSSION

LKCmedicine students have been exposed to online learning in their pre-clinical years with regular team-based learning sessions. This paved the way for the planning committee to convert the OBGYN curriculum into virtual learning using strategies in line with those suggested by others,⁽³⁻⁶⁾ to continue with medical education during DORSCON Orange. Our virtual OT module has been described by Chao et al,⁽⁷⁾ who adopted virtual OT experience in their Head and Neck Surgery posting. We incorporated a virtual LW module that is unique to OBGYN.

All our students were able to access the online platforms easily. As described by Prensky,⁽⁸⁾ our students are 'digital natives' born into a digital world and, hence, are able to adapt to virtual learning with ease. The majority were satisfied with the video and audio quality. Although the original LKCmedicine OBGYN posting did not rely heavily on learning management systems, as described by Tibyampansha et al,⁽⁹⁾ the virtual posting was hosted smoothly through ZOOM sessions and Google classroom. From an administrative point of view, our use of established, user-friendly platforms made it easy to upload and access contents.

Almost unanimously (98.5%), the students considered case-based discussions or the 'Clerk the Expert Patient' module to be useful. This was supported by a systematic review by

Thistlethwaite et al,⁽¹⁰⁾ which concluded that students largely enjoy case-based learning. However, owing to the difference between actual and virtual case-based learning, there were initial concerns that the lack of opportunity to clerk a patient would compromise learning. Reassuringly, our students felt that virtual case-based learning was sufficient given the circumstances. Furthermore, the tutors were directly observing the students during their 'clerking' and were able to give real-time feedback.

Another well-received module was the newly introduced weekly SBA formative assessments. Prior to COVID-19, our OBGYN clinical posting had only one end-of-posting SBA assessment. SBA assessments have been used widely in medical education to test students on the 'know' and 'know-how' categories.⁽¹¹⁾ Many students found these assessments helped to consolidate learning and prepare them for the end-of-posting assessment. The study by Fitzsimmons et al likewise showed that SBA assessments improved student satisfaction when incorporated into revision lectures.⁽¹²⁾ We have decided to continue weekly SBA formative assessments even after the resumption of regular clinical posting.

Virtual OT was another module that was well received by the students, and they have requested for it to be incorporated into the regular curriculum. This is likely because live-streamed surgery with a mounted video camera worn by the surgeon provided a close-up, first-person and high-definition view of the procedures. Similarly, Landry et al⁽¹³⁾ reported that learner experiences were enhanced by the video glasses used to project surgical procedures to students. In addition, recordings can be paused and screenshots taken to allow for annotations of structures and discussion. This format of allowing segmentation, annotation and voiceover by the tutors during teaching, instead of pure video demonstration, has been shown to be more effective.^(14,15)

While the majority of students who participated in the questionnaire felt that the ZOOM sessions were interactive, just over half of the tutors expressed the same view. The disparity

could be attributed to differences in comfort level with using technology. While students may be comfortable with virtual learning, tutors may feel out of their 'comfort zone', as they would have to adopt new teaching techniques and learn to reach out to a virtual audience, as shown in a review by O'Doherty et al.⁽¹⁶⁾

This study had some limitations, including a small sample size of 67 responders and the fact that the study was only able to assess Kirkpatrick's level 1 outcomes. Additionally, as the first batch of students completed the first two questions only at the end of their posting, their level of worry and concerns may have been different if the questions were answered at the start of their posting, and there may also be the possibility of recall bias.

In conclusion, even during a pandemic, there is necessity for medical education to continue, so that we can continue to equip the next generation of doctors with the knowledge, skills and tenacity to deal with the challenges of modern healthcare. COVID-19 is not the first virus that has reached pandemic proportions and it will certainly not be the last.⁽¹⁷⁾ What matters is that educators learn to balance the moving forward of medical education⁽¹⁸⁾ with maintaining normalcy in medical students' postings by using the available technology.⁽¹⁹⁻²¹⁾ In this way, we will be able to maximise learning without compromising student or patient safety.

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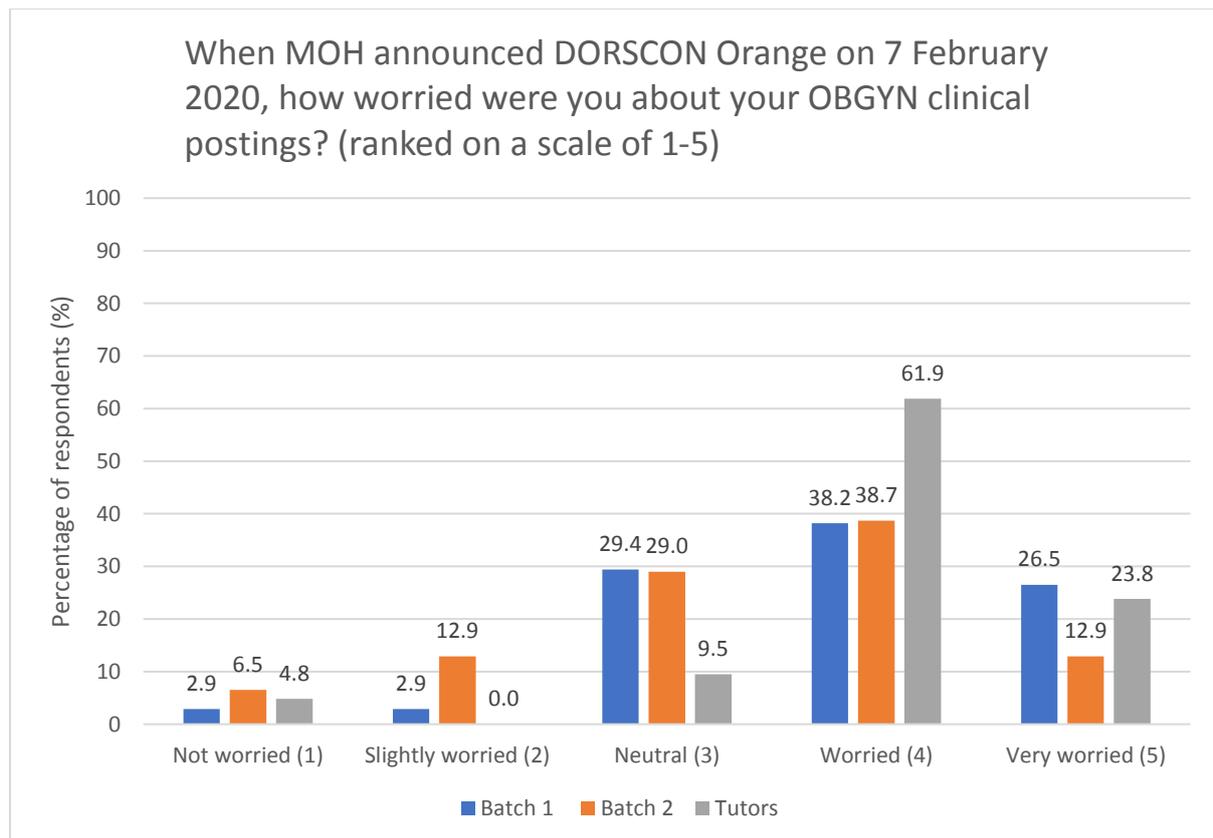


Fig 1. Graph shows the responses of medical students and tutors to the Ministry of Health’s (MOH) announcement of DORSCON Orange.

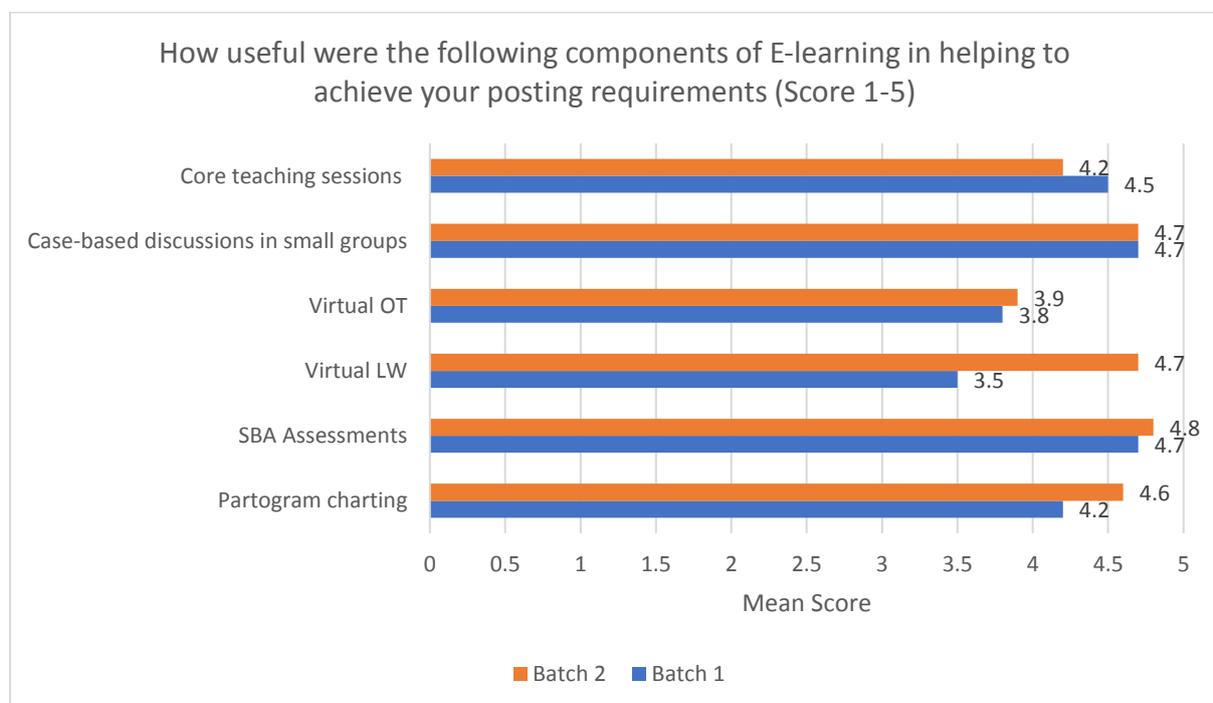


Fig 2. Graph shows the mean scores for each E-learning module as ranked by the 2 batches of medical students.