RESEARCH ARTICLE

Implementing remote pharmacy objective structured clinical examination during the COVID-19 pandemic

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Abstract

Objective: This paper describes the development and feasibility evaluation of a formative remote objective structured clinical examination (OSCE) for second-year students in a four-year Bachelor of Pharmacy (B.Pharm.) honours programme. **Methods.** A five-station remote formative OSCE was developed and implemented using Microsoft Teams. The authors used a post-OSCE evaluation, in combination with the results of a students' survey and comprehensive feedback from faculty. **Results:** A total of seventy second-year B.Pharm. (Hons.) students participated in the online OSCE. Based on the post-OSCE evaluation, about 80% of students agreed that the OSCE ran smoothly. Respondents agreement on the time allocated to complete each station varied between 63.6% and 81.8%. Time allocation for each station and internet connectivity were raised as the main concerns by both the students and the faculty. **Conclusion:** A remote online OSCE is a feasible strategy for assessment of various skills based on different tasks, reflecting the scope of practice for future pharmacists, and offers a promising direction towards the assessment of such practical skills. Online OSCE planning, development and evaluation are in themselves useful for clarifying assessment goals, processes, hindrances, and affordances

Introduction

The objective structured clinical examination (OSCE) is an assessment of clinical ability, with multiple stations at which candidates perform specified tasks within specified time limits, against specified performance criteria (Harden *et al.*, 1975). In pharmacy degree courses, OSCE is used to assess interpersonal and communication skills for licensure and certification examinations, both in summative and formative ways (Shirwaikar, 2015; Elrod & Bullock; 2018; Martin *et al.*, 2020). The reliability, validity and objectivity of OSCE as the assessment of communications skills, problem-solving, decision-making and patient management abilities have been shown in previous studies (Zayyan, 2011). OSCE is also typically resource-

intensive, requiring supporting infrastructure such as a circuit of small rooms, numbers of assessors and standardised patients, and robustly constructed and tested tasks/stations. A purpose-built, skills teaching facility can offer the spaces and circuits required to recruit and train/prepare standardised patients.

The concept of remote clinical assessments is not new. In medical education, studies have used video conferencing or networked webcams (Novack *et al.*, 2002; Rovamo *et al.*, 2011; Chan *et al.*, 2014). The transferability of the results of these studies is limited by the use of different technological platforms, restricted clinical contexts and mixed results.

Malaysia recorded the first case of COVID-19 in January 2020, following the outbreak of COVID-19 in Wuhan, China (New Sarawak Tribune, 2020). As COVID-19 continues to affect Malaysia and other parts of the world, severe restrictions on movement and contact are being taken to contain the outbreak. In Malaysia, a Movement Control Order (MCO) was declared in March 2020, including the closure of all educational institutions. Higher education providers were encouraged to adopt alternative ways of teaching, learning and assessment (Malay Mail, 2020).

Despite online learning being part of many health professions' education systems, all educators are needed to transit quickly from in-person to remote teaching, learning and assessments. The unprecedented restriction on movement has also forced educators to consider assessing skills online instead of on-campus. This paper describes the development and practical evaluation of a remote OSCE for second-year pharmacy students during Malaysia's movement order control.

Methods

The remote formative OSCE was carried out by the staff of the School of Pharmacy, International Medical University, Kuala Lumpur, Malaysia. A total of seventy second-year pharmacy students were scheduled for this OSCE. These students had one prior experience with an on-campus face-to-face (F2F) formative OSCE. Microsoft Teams, an online multi-purpose interactive application, was chosen because students had gained familiarity with the use of Teams via other synchronous online sessions.

The traditional F2F on-site OSCE had a circuit of 14 active, preparatory and rest stations for five different professional tasks (Rajiah, Veettil, & Kumar, 2014), and used standardised simulated patients (SPs). At each active station, five minutes were allocated for task performance. The performance was observed and graded by an examiner using a standardised task-based scoring checklist. Considering limitations, in this remote OSCE, rest stations were removed and the same five professional tasks were planned, namely responding to symptoms (Station 1); prescription screening (Station 2); lifestyle modification counselling (Station 30); medication counselling (Station 4); and medication device counselling (Station 5). Each station was allocated 12 or 17 minutes for preparation and performance. A one-minute break was provided between students for faculty to complete grading before assessment of the next student.

Station task instructions, SP scripts and grading checklists for each station were reviewed by at least two faculty members, which led to the modification that was deemed appropriate for this remote OSCE. To explain this with an example, as there was no access to inhalers or other medication delivery devices, the task for device counselling (Station 4) was modified to 'verbalise the steps of appropriate usage (a named device), using patient-friendly language'. All SP scripts were also revised to better reflect the reality of social conditions under the pandemic. Simultaneously, every scoring checklist was evaluated for applicability to online interaction. Most checklist items were deemed feasible for online use, except for those assessing aspects related to non-verbal communication. The examiners agreed that it would not be possible to fairly judge the subtleties of body language using low-resolution webcam video, hence these items were removed from the scoring schemes. Finally, all the changes did not affect the overall assessment blueprint or task designs and content, thus it was anticipated that an online process would achieve the same assessment goals or outcomes. Upon completion of the planning and revision of tasks, scoring check lists etc., all involved faculty members were then fully briefed on the revised planning for each station, including the overall flow of the OSCE.

Students were arranged into ten groups of seven each, and assigned to one faculty staff member throughout the two-day OSCE. Since there was insufficient time to recruit and train the required number of SP, involved faculty members played a dual role of SP or prescriber (SP/SHP), and examiner. Two additional faculty members were identified to monitor the overall process, and to provide any needed support both to the staff and students. A WhatsApp group was set up among all involved faculty members for rapid communication during the OSCE.
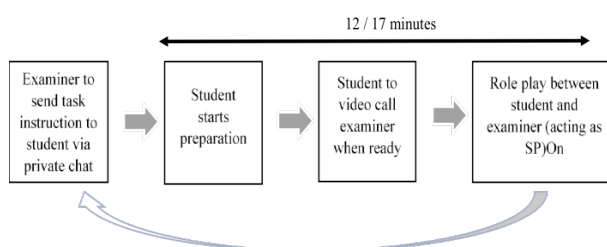

Figure A: Process flow of the individual station using Microsoft Teams

Prior to the conduct of the OSCE, all related instructions were shared with the students, through the use of University's learning management system (LMS), followed by a briefing to all the students using Microsoft Teams. The students' instruction and information included OSCE schedule, time allocations, ground rules, responsibility for managing time, and process flow (Figure A). Students were allowed to use any credible online resources, including those available via University's digital library.

Individualised performance feedback was provided following the completion of the OSCE. Similarly, students' feedback was gathered using a post-OSCE survey, comprising of eight opinion-based items relating to the task instructions and station time allocation. All question items used five-point Likert ratings anchored on 'strongly agree' and 'strongly disagree'. The result of this feedback was then tabulated and presented as percentage of scores and in aggregate, grouping 'strongly agrees' and 'agree' in an 'agree' category; and 'neutral', 'disagree', and 'strongly disagree' in the 'disagree' category. Open comments, both from the faculty members and students were also gathered.

Results

The two-day OSCE was completed as planned, with all 70 students' participation. A total of 44 (63%) completed the post-OSCE survey, whereby the majority of the respondents agreed that the instructions for the process (95.5%) and tasks (100%) were clear. More than 60% of the respondents agreed that the OSCE ran smoothly (79.5%) and that they were able to use the online platform (Microsoft Teams) effectively (68%). Figure B depicts the details of these responses.
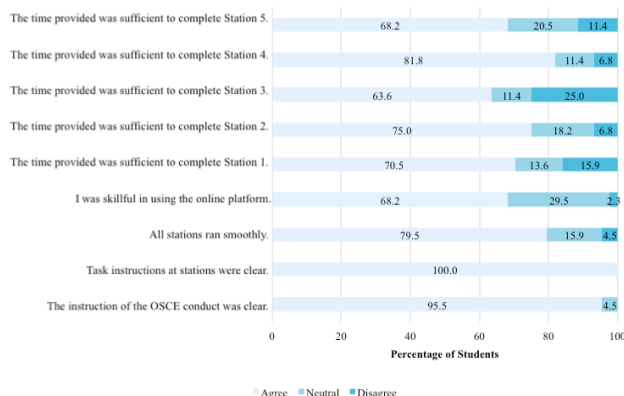
Agreement on whether allocated station time was sufficient to complete the assigned task, varied between 63.6% and 81.8%. Internet connectivity (75.0%) and time provided to complete tasks (68.2%), were raised as the main concerns by the students. Nearly 50% of the respondents were concerned with not having a conducive setting for remote OSCE, accessibility to resources and preparation for the tasks. In one incident, a student experienced multiple dropped calls, and the faculty involved assessed the performance via WhatsApp video call immediately. Details of students concerns are shown in Table I.

Table I: Students concerns with remote OSCE (n=44)

	Number of students	% of students
Internet connectivity	33	75.0
Time provided to complete tasks	30	68.2
Conducive setting e.g. quiet room or corner for OSCE	20	45.5
Accessibility to online resources	19	43.2
The preparation of tasks	19	43.2
The process of receiving tasks instruction	12	27.3
Cheating	8	18.2
Availability of suitable technology device e.g. webcam	7	15.9

Open comments were analysed, based on which some students' preference not to have summative assessment of the OSCE via an online method, primarily because of the unreliability of internet connectivity. Possibility of cheating, not having a conducive setting for assessment, and availability of suitable device such as a webcam etc., were also raised as concerns by a few students.

As for the examiners' feedback, faculty felt they were able to assess communications processes objectively using the revised scoring schemes. Most faculty were able to evaluate students' verbal communication skills from their conversational interactions with students. Although non-verbal cues were not explicitly assessed, faculty raised concerns about some students' poor video conferencing etiquette, including personal grooming, camera position, lighting, and background or distracting noises. Consistent with the students' feedback, faculty reported that most students completed the tasks within the time allocated, with a few requiring additional time because of poor/unreliable internet connectivity. In the

The time provided was sufficient to complete Station 5.	68.2	20.5	11.4
The time provided was sufficient to complete Station 4.	81.8	11.4	6.8
The time provided was sufficient to complete Station 3.	63.6	11.4	25.0
The time provided was sufficient to complete Station 2.	75.0	18.2	6.8
The time provided was sufficient to complete Station 1.	70.5	13.6	15.9
I was skilful in using the online platform.	68.2	29.5	2.3
All stations ran smoothly.	79.5	15.9	4.5
Task instructions at stations were clear.	100.0		
The instruction of the OSCE conduct was clear.	95.5		4.5

Figure B: Students experiences with remote OSCE (n=44)

planning, faculty were responsible for confirming attendance, sharing station task files with the student, acting as a SP/SHP, grading, monitoring examination time and managing any connectivity issue. Although most faculty gained familiarity with their responsibilities after repeated practice with different students, they reported challenges such as sending the wrong task instructions, task file uploading errors and difficulty in switching roles between assessor and SP. Therefore, to improve the examination process and minimise errors, faculty suggested measures such as sufficient breaks between students, labelling task files properly and using the shared screen function, instead of uploading the files. Interestingly, similar to the students, some faculty raised concerns about cheating but they admitted that investigating a suspected case could be challenging in a remote un-proctored examination.

Discussion

The world is experiencing unprecedented challenges from COVID-19 pandemic. Educators face not only the shorter-term challenges associated with closing physical campuses during the pandemic but also identifying and transitioning to a 'new normal' in education that may be characterised by social distancing (Makhbul, 2020). This paper evaluated the feasibility of replacing on-site OSCE with a remote online version. The authors' experience suggests that remote online OSCE is feasible for assessing communications-based professional pharmacy tasks, with candidates and assessors located in their own settings. Analogous to on-site OSCE, a remote online OSCE most importantly requires appropriate infrastructure (the online platform), the logistic requirements of examiners and SPs, meticulous planning, trials of feasibility and acceptability to candidates and examiners. The development process highlighted the increased importance of clear communica-tion throughout planning and implementation. Faculty not only require technical abilities to effectively use the online platform, but also a clear understanding of their roles in the process. Similarly, a clear understanding with regards to the expectations and process flow is essential for the students, including useful feedback provision for overall improvement in process, and identifying areas of support needed for the students.

As per faculty view and feedback, while verbal communication could be assessed remotely via any online system, effectively assessing non-verbal aspects of communication remain a challenge. Hence, specific nonverbal cues which can be fairly judged in online video interaction should be considered in future assessments,

and students should be trained to effectively use video communication. This unique experience of remote OSCE also identified expectations of video conferencing etiquette as a professional behaviour. The level of development of students' ability to identify and access credible online resources may also be questioned, as the expectation was that Year 2 students would already be familiar with key online resources.

Similar to others, in this setting, stable internet connectivity of sufficient bandwidth to support audio-video conversation is a key concern (Walsh, 2015). Overall, there appears to be increased network use associated with the COVID-19 lockdown (New Straits Times, 2020). Students may also live in areas with poor connectivity, lower uptake of household data plans, or relatively expensive data plans. Thus, bandwidth is the rate-limiting step for smooth audio/video communication (Chan *et al.*, 2014). In this setting, though some students relied on personal data plans and did not benefit from household data packages, in the authors' evaluation, connectivity did not prevent the assessment of OSCE performance because appropriate measures were taken to address these problems, for example allowing additional tasks and using alternative communications, e.g. WhatsApp. This indicates that carefully considered contingencies and backup support, as well as allocated task time is an essential key and an integral part of initial planning. In addition, to ensure that connectivity does not compromise assessments, the student-assessor interaction can be video-audio recorded for grading at a later time (Chan *et al.*, 2014).

Manpower availability and large cohort sizes make it difficult to run such online OSCE simultaneously for all the students. Faculty feedback indicated that their multiple roles, to be performed within short encounter time-frames, clearly carry risks that one or more roles are improperly performed. Studies show that 'multitasking' is essentially a rapid shift of attention between tasks and thus more prone to error than single tasks (Sana, Weston, & Cepeda, 2013; Ahmad *et al.*, 2016), therefore, the dual roles of faculty as examiner and SP/prescriber are not ideal. Moreover, the use of SPs contribute significantly to OSCE validity (Gormley, 2011; Smithson *et al.*, 2015); thus the use of SPs must be strongly considered and this can be achieved with planning, funding, and SP training (Chan *et al.*, 2014). E-learning and examination administrative support is also valuable towards effective planning and execution. The authors also recognise the challenges of preventing and identifying cheating, including collusion, in an un-proctored remote summative assessment. Testing reasoning and higher-order cognition, with a random

selection of questions (items) from a pool, have been recommended to minimise cheating (Bengtsson, 2019). In an OSCE station, successive candidates could be asked to perform variations of a task, or SP scripts could be varied by design. This strategy would require all task variants to be of comparable complexity or difficulty but may increase the complexity of SP and assessor roles.

OSCE was originally proposed to improve validity-reliability of the assessment of clinical competence (Harden *et al.*, 1975). An essential condition is required to guarantee high quality and effective OSCE to support the validity of scores. The authors recognise the need to further examine the reliability and validity of the scores to assure full comparability to on-site OSCE.

The COVID-19 pandemic presents pharmacy educators with new challenges of teaching and assessment. The authors embraced the challenge of skills assessment whilst maintaining social distancing by developing and evaluating the feasibility of this remote OSCE. The results offer a promising direction for the 'remote' assessment of skills, but require further validity evidence. Online OSCE planning, development and evaluation are in themselves useful for clarifying assessment goals, processes, hindrances and affordances.

Acknowledgements

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