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Objectively Structured Clinical Teaching (OSCT) in Undergraduate Clinical Teaching: A Pilot Study

HMP Singh¹, Jaiprakash Mohanraj², Heethal Jaiprakash³, Veena Joshi⁴, Siva Achanna⁵, Ravindran Jegasothy⁶

¹Department of Medicine, Perdana University, Kuala Lumpur, MALAYSIA

²Faculty of Medicine, MAHSA University, Selangor, MALAYSIA

³Department of Pharmacology, International Medical University, Kuala Lumpur, MALAYSIA

⁴Primary Care Unit, MAHSA University, Selangor, MALAYSIA

⁵Obstetrics and Gynaecology Unit, MAHSA University, Selangor, MALAYSIA

⁶Faculty of Medicine, MAHSA University, Selangor, MALAYSIA

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ABSTRACT

In this study, the efficacy of a clinical teaching tool, objectively structured clinical teaching (OSCT) was assessed by comparing students' performance in assessing standardised patients (SPs) and real patients (RPs). The final-year students were randomly divided into two arms and their performance in three different disciplines such as medicine, obstetrics and gynaecology (O&G) and primary care medicine (PCM) was assessed with RPs in one arm and SPs/simulated patients in the other. The assessments were conducted in history-taking, clinical examination and management stations by the content experts under a structured rubric. Students' scores in each arm were compared in the respective disciplines and overall. The perceptions of both students and SPs were recorded. The OSCT and rotational average scores of the participant students in SPs and RPs were compared. The students' mean scores for their rotational exam and OSCT were 65.31 ± 5.56 and 61.14 ± 8.53 , respectively. The performance at the management station in O&G was significantly higher compared with medicine and PCM. The overall performance at all other stations in the three disciplines was comparable, with no significant difference. The reliability and content validity of OSCT was established by calculating Cronbach's alpha and testing content validity. The results indicated that OSCT is an innovative and effective teaching tool that can be used in clinical teaching in the early clinical years to lower the student load in hospitals in a cost-effective manner.

Keywords: *Objectively structured clinical teaching, Obstetrics and gynaecology, Primary care medicine, Standardised patients, Real patients*

CORRESPONDING AUTHOR

Professor Dr. HMP Singh, Department of Medicine, PU-RCSI School of Medicine, Perdana University, Kuala Lumpur, Malaysia | Email: har.mohan@perdanauniversity.edu.my

INTRODUCTION

Clinical medicine teaching has traditionally been done at the patient's bedside; as Sir William Osler commented, "Medicine is learned by the bedside and not in the classroom. Let not your concepts of the manifestations of disease come from words heard in the lecture room or read from the book" (1). However, it has been observed in the last two decades that this teaching modality is in decline. There are fewer clinical clerkship positions in hospitals (2), and clinical skills are taking the back seat in medical education; one of the reasons postulated for this change is technical advances in medical technology (3–4). It is also known that many universities do not have teaching hospitals, so they organise their clinical teaching in government service hospitals, which are overburdened with students. At every bedside teaching (BST) occasion, there are 8 to 10 students, and most of them feel that they are not welcome in these hospitals. On top of this, young medical graduates do not grasp the importance of clinical skills in making a diagnosis. In contrast, they are more dependent on lab reports and imaging techniques for diagnosis. This leads to a gradual absence of a healing touch, empathy and compassion in medical care.

Many universities across the globe are now including standardised patient (SP)-based clinical teaching, where the SPs are not only trained in communication skills like history-taking and examination but also give effective and immediate feedback to the learners about the gaps in their approach to improve their skills. This structured approach in a closed and controlled environment not only allows learners to enhance their skills by repeated practice but also supports their confidence when they face real patients (RPs) in the hospital wards (5–8). The following primary objectives in this observational study are: (a) to describe objectively structured clinical teaching (OSCT) as an innovative tool, (b) to determine the reliability and

validity of OSCT, and (c) to assess OSCT in RPs and SPs. In addition, students' and SPs' perceptions of OSCT as an innovative teaching tool were analysed.

OSCT: AN INNOVATIVE TEACHING TOOL

Conventionally, BST is conducted over one to three hours in an unstructured manner at the bedside in the hospital, depending on the following factors: (a) patient availability, (b) patient willingness to participate, and (c) time available to the specialist (9). In this format, a lot of time is wasted, and the desired results are not achieved. Moreover, due to technological advances in diagnosis and the day care approach by many hospitals, patients' stays in hospital and willingness to participate in BST are declining. To overcome these challenges, a new teaching tool, OSCT were introduced. OSCT is a more structured approach to clinical teaching (history, examination and management) that could be practiced in the ward on RPs or in the clinical skills lab with trained SPs.

Why OSCT?

In the last two decades, it has been observed that the assessment tools in medical education have undergone a sea change compared with the teaching tools, which essentially remain the same. Such age-old assessment methods as long cases and short cases in each discipline, along with viva voces, are now being replaced by the observed long case, mini-clinical examination (mini-CEX), digital objectively structured clinical examination (OSCE), interactive OSCE and so on. It is now evident that the OSCE (8–9) is a better approach to assessment because it is more structured due to the blueprint and eliminates the element of bias. OSCT is a tool to teach students in the same manner as they are assessed. If the students can be trained in the hospital or as effectively as in the hospital using a virtual approach, it will

help to reduce the students' burden in the hospital and give them better opportunities to learn. This is a way forward in proposing to have a more structured approach not only in history-taking and examination but also in management, reflecting plans of investigations and clinical decision-making skills.

Structure of OSCT

- (a) History includes communication skills, critical thinking, interpretation of history to establish differential diagnosis. Conventionally, in unobserved history-taking, students record the history at their own pace to extract the information from the patient with no time limit, discuss all aspects of the history, and organise the information into a valid document. Hence, the process of history-taking is unobserved, and there is no feedback given to the students on their communication skills, the relevance of the questions being asked or their interpretation skills. In contrast, OSCT is a more structured approach; every student has a stipulated amount of time with an SP or RP (10) to take a focus history to improve fluency in communication and become acquainted with analytical and critical thinking skills. In addition, the data are generated in the presence of a specialist; therefore, better results are achieved in less time.
- (b) Examination includes technique and interpretation of signs. The students are observed for their examination technique to elicit signs at the bedside and interpret them to establish differential diagnoses. It is not practical to expect patients' availability and co-operation for multiple examinations when there are 8 to 10 students in each group. Hence, the purpose of learning clinical skills under expert supervision is defeated. In OSCT, it is proposed to train the students in the technique of examination during early clinical years with trained SPs, with effective feedback. In the

later years, they can practise the skills independently with RPs in the wards.

- (c) Management comprises of investigations and treatment strategies. This component is also structured under a rubric, so there is uniformity in the assessors' approach. A scenario is given to the students to achieve a diagnosis and plan relevant investigations with reasons and expected outcomes. They also need to write a prescription as per the diagnosis. All these components are practiced in a controlled setup in the presence of a specialist.

OSCT: A Valid Tool

To assess the validity and reliability of the OSCT teaching tool in the current study, the performance of the final-year undergraduate medical students in all three components (history, examination and management) from all three different disciplines such as medicine, obstetrics and gynaecology (O&G) and primary care medicine (PCM) at different stations was assessed for RPs and SPs. The SPs' and students' perceptions of OSCT compared with conventional clinical teaching were also recorded.

A Futuristic Approach: Virtual OSCT

In view of the unexceptional circumstances of the COVID-19 pandemic, when the global format is changing at a rapid pace to online teaching, virtual OSCT has become more relevant because it can be practised effectively in real time. Using virtual OSCT, the facilitator can behave like a SP for the history component, while other students act as peer assessors. Although it is challenging to do so, the examination can be accomplished via video/pictures to establish the diagnosis. For disease management, virtual training can be as effective as face-to-face teaching.

METHODOLOGY

This study was conducted in the day care centre of Hospital Sungai Buloh (HSB), Selangor, Malaysia. The following steps were implemented:

- (a) Ethical clearance was obtained before the study. After the informed consent, 60 students of the final-year MBBS programme volunteered to participate. They were randomised into two arms, A and B (30 each), depending on their performance on the previous exams, so that both groups were comparable. Arms A (SPs) and B (RPs) were further subdivided into medicine, PCM and O&G.
- (b) A week before the study, all the participants in both arms were given a briefing on what topics they would be assessed on, what was expected of them and how to prepare for OSCT. A demonstration video of OSCT (history/examination) in each discipline with the researchers behaving as students with SPs was shown to them. The students' performances were compared between the SP and RP groups to assess the efficacy of OSCT.
- (c) The SP selection was done through an interview in English to assess the background knowledge of candidates' communication skills and computer literacy. The nine SPs were selected and divided into stations according to the discipline (medicine, O&G or PCM). A 1-day workshop was organised to train them to have a standardised approach in history and examination. In this workshop, two hours were spent giving the SPs general information about the following: (i) SPs in different universities around the globe, (ii) how this training will improve SPs performance in communication, (iii) history of diseases, and (iv) mimicking expressions as well as RPs. The rest of the day was spent training SPs for their respective stations under close observation. SPs performance was then recorded by videography for assessment under a structured rubric by a panel of independent observers. The standard setting of this workshop included the following aspects such as standardising the SPs, who had to be computer literate and have good communication skills; and ensuring the SPs could realistically mimic the disease by gestures and body language.
- (d) In each discipline (medicine, O&G and PCM), four patients were selected from the HSB and *klินิก kesihatan* (primary care centre) after informed consent. A similar clinical scenario was created for the SP stations (three for participation and one reserve), in which the SPs were trained. In each discipline, six patients (three RPs and three SPs) formed one cluster. All the answered scripts for SPs and RPs were vetted by a panel of experts. A sample of the assessment sheet is shown in Appendix I.
- (e) Three stations of RPs and three other SPs were created in each discipline. Overall, 18 stations were formed, with one content expert at each station (for the layout, see Appendix II). Every student was given a code to direct them to the respective task zone. Each student was then assessed in either arm under three components—history, examination and management—for 15 minutes each for a total of 45 minutes by the subject expert. About 18 faculties were involved in conducting this trial.

The trial was carried out at 18 stations concurrently in four rounds to complete the cohort of 58 students from 9:00 a.m. to 2:00 p.m. The components that were assessed included the following: (a) medical interviewing skills, (b) physical examination skills, (c) professionalism, (d) clinical judgement, and (e) overall clinical competency. Student and SP perceptions were recorded using pre-

validated questionnaires on a Likert scale. Perceptions of SPs and RPs were compared using the mean scores. Scoring was done by the subject experts. The scores obtained by students in the SP and RP groups were compared using appropriate statistical methods. The data were analysed using SPSS software, and significance was observed if $p < 0.05$. To validate OSCT as an innovative teaching tool, Cronbach's alpha statistical testing was used prior to analysis.

RESULTS

In this study, it is proposed that OSCT with SPs is effective teaching tool, as conventional BST. To assess this, the

reliability and validity of OSCT were assessed.

Final-year students ($n = 58$) who participated in the study (45% male and 55% female) were divided into two groups by stratified random sampling and had the same range of competency (with their performance in Years 3 and 4). Out of these, 28 students (Arm A) were assessed by OSCT with SPs and 30 students (Arm B) with RPs. They were further subdivided into 19, 20 and 19 students in medicine, PCM and O&G case-carousal, respectively. The OSCT and rotational average scores of the students were compared. The mean scores in their rotational exams and OSCT were 65.31 ± 5.56 and 61.14 ± 8.53 , respectively (Table 1).

Table 1: Rotational average and OSCT mean scores are comparable ($n = 58$)

Details	<i>n</i>	Mean	SD
Rotation average score	58	65.31	5.56
Total scored in OSCT	58	61.14	8.53

Reliability Test

This was done as per their performance in SPs and RPs. A Cronbach's alpha coefficient was calculated for each factor, as well as for the entire scale, and showed

an average level of internal consistency for the developed instrument. However, the medicine and O&G scoring were not as consistent. Overall, the study showed average reliability in both groups (11) (Table 2).

Table 2: Average level of internal consistency for OSCT

Type of patient	Cronbach's alpha	Cronbach's alpha based on standardised items	<i>n</i> of items
SP	0.622	0.643	3
RP	0.600	0.621	3

Validity

The content and face validity of OSCT was assessed to establish that it is a valid and reliable tool. Content validity refers to the extent to which a measure represents all facets of a given construct (12–13). The

content validity index (CVI) is calculated based on identifying the elements related as essential with the highest level of agreement by the reference panel. The content validity was tested for all the questionnaires used in this project, for which three content experts were asked to evaluate the questionnaires

and provide their responses on a 5-point Likert scale. Accordingly, 1 was considered unimportant and 5 extremely important; content with a rating of 3 and above was acceptable. The results showed that all the questionnaires used in this study had a CVI of around 1, indicating that the content of the questionnaire strongly measured what it intended to measure (Table 2).

Face validity is a measure built on the principle of reading through the plans and assessing the viability of the research, but it has little objective measurement. In many ways, face validity offers a contrast to content validity, which attempts to measure how accurately an experiment represents. The difference is that content validity is

carefully evaluated, whereas face validity is a more general measure (14–16).

The mean values of OSCT and rotational average scores obtained by those who participated in Arms A and B showed no significant difference among the students' performance in their rotational exam and OSCT. This indicates that the methodology tested had concurrent validity. On studying the correlation between OSCT scores and rotational exam scores, they showed *p*-values of 0.4 and 0.23 in Arms A and B, respectively, suggesting there is no significant correlation in the students' performance; this further strengthens the concurrent validity of the instrument (Table 3).

Table 3: Average reliability in both groups

Type of patient	Discipline	Cronbach's alpha if item deleted
SP	Medicine	0.476
	PCM	0.615
	O&G	0.395
RP	Medicine	0.604
	PCM	0.423
	O&G	0.441

A test for correlations between the history, examination and management stations within each discipline was done, which showed *p*-values of 0.413 (between history-taking and examination stations), 0.298 (between history-taking and management testing stations) and 0.005 (between examination and management testing stations). The results indicate that, in the study population, if students had performed inadequately at the examination station, they were also found to perform poorly at the management station. This correlation is highly significant (*p*-value of 0.005) and

moderately positive (Pearson's correlation = 0.365). However, their performance at the history-taking station did not affect the way they performed at the other two stations. A comparison of students' performance between the medicine, PCM and O&G disciplines was done. The students' performance in O&G was significantly higher when compared with medicine and PCM at the management station, with a *p*-value of 0.02. Students' performance at all the other stations among the three disciplines was similar, with no significant differences (Table 4).

Table 4: Independent sample *t*-test

Type of patient		Total scored in OSCT	Rotation average score	Test of significance
SP	<i>n</i>	28	28	Levene's test ($p = 0.011$) <i>t</i> -test ($p = 0.163$)
	Mean	59.58	64.84	
	SD	10.23	6.53	
RP	<i>n</i>	30	30	Levene's test ($p = 0.484$) <i>t</i> -test ($p = 0.539$)
	Mean	62.66	65.75	
	SD	6.39	4.54	
Total	<i>n</i>	58	58	
	Mean	61.14	65.31	
	SD	8.53	5.56	

Note: $p > 0.05$, the variances are not significantly different. There was no significant difference in the students' scores on their rotational exam and OSCT when tested with SPs and RPs.

Validity testing was done to determine whether the students' performance in the OSCT examination was related to their performance in the rotational exam and to assess whether this relation was significant. If $p < 0.001$ on a dependant sample *t*-test, the result would indicate high significance between the two scores. If $p > 0.001$, there would be no significant correlation between the students' performance in their rotation and on the OSCT examination (refer Table 5 and Figure 1). This test indicated that students who scored low in rotation performed much better in the OSCT examination. This may be due to their better skills and clinical competency in Year 5 compared with their rotational scores in Years 3 and 4.

Is there any correlation between the student's performance during history-taking, examination and management station? This question is raised to study whether there is any significant relationship between

the performance of the study population at one station and performance at the others. The results show that, in the study population, if the students performed badly at the examination station, they were also found to perform badly at the management station. The correlation is highly significant and moderately positive. However, their performance at the history-taking station did not affect the way they performed at the other two stations. This indicates that the students' performance across the disciplines was similar for the history-taking and examination stations. However, there was a moderately significant difference in their performance between the disciplines, indicating that the students' performance at the management station was not consistent in all the disciplines. It also indicates that there was a significant difference in the students' performance at the management station between the medicine and O&G disciplines.

Table 5: Paired samples *t*-test

Details	Paired differences					<i>t</i>	df	Sig. (2-tailed)
	Mean	SD	Std. error mean	95% Confidence interval of the difference				
				Lower	Upper			
Total scored in OSCT - rotation average score	- 4.17	9.30	1.22	- 6.62	- 1.73	-3.41	57	0.001

Note: Performance in the OSCT examination is related to their performance in the rotational exam. Since the $p < 0.001$ on a dependant sample *t*-test, it indicates high significance between the two scores.

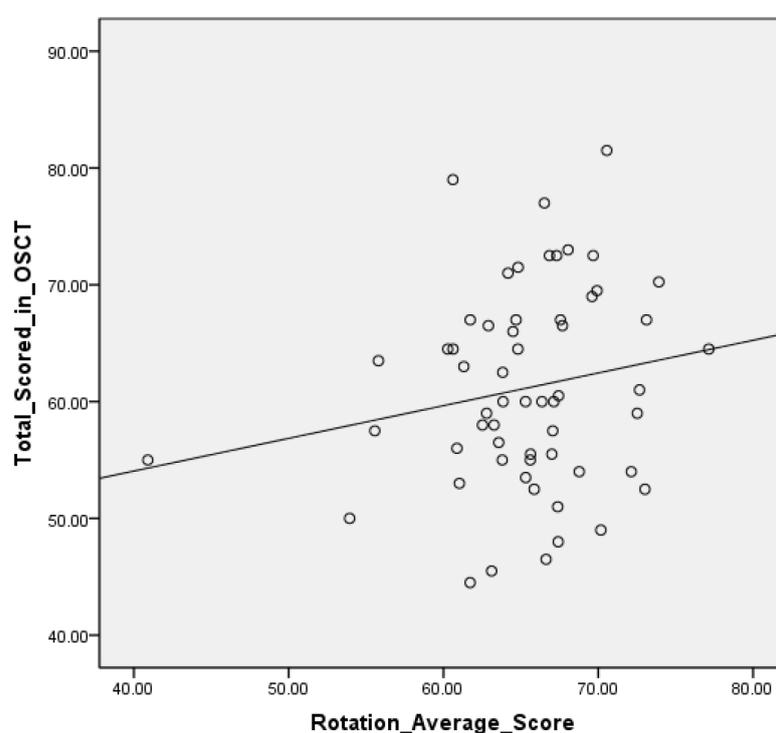


Figure 1: Rotation average score and total score in OSCT.

DISCUSSION

SP-based clinical teaching started in the early 1970s in many universities around the world. SPs are widely used as a complimentary mode of teaching and not a replacement for hospital-based clinical teaching with RPs. In some universities, such as the University of Pittsburgh, Johns Hopkins University and McMaster University, there are structured SP programmes (10, 17–18). In Southeast Asia, except for some universities, such

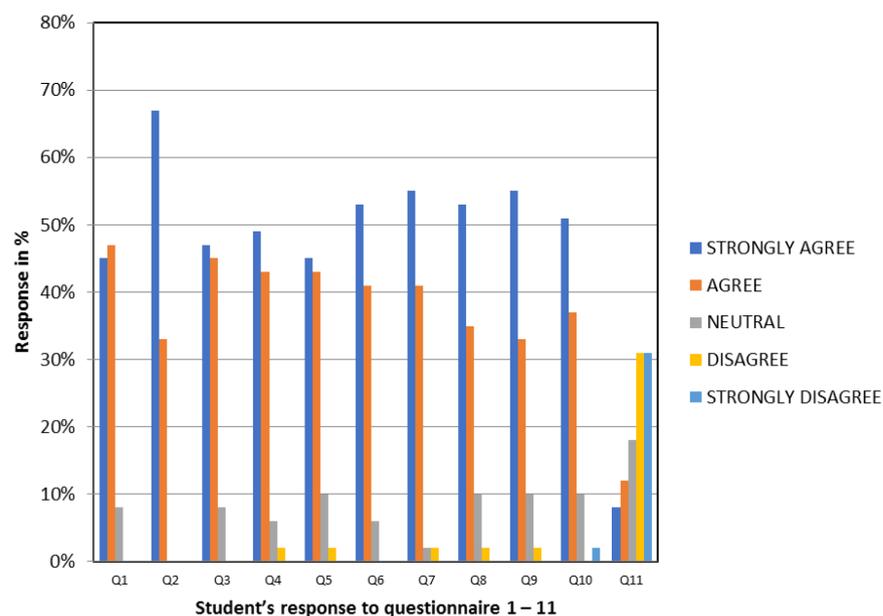
as National University Singapore (NUS) and Duke-NUS (19), it has been observed that most universities practise simulation-based clinical teaching on Sim Man during exams (OSCE, long and short cases) and in the emergency setup. There are few medical schools in Malaysia that use SP in their routine clinical teaching. Learners are not given an opportunity to learn in the same environment as that in which they will be assessed. If the students are given a chance to practice OSCT, they develop their skills in a controlled atmosphere under

the supervision of subject experts. This will improve their performance in OSCE, which is now a standard assessment tool in many universities.

It was observed that trained SPs are better performers compared with untrained SPs in history-taking and examination. The results also suggest that OSCT is a reliable and valid tool. Implementation of OSCT will sharpen learners' skills and support the components of hospital-based teaching except examination, where simulated examination is not as good as examination of RPs. The only limitation is that the structured training of the SP and creating an SP bank is time consuming for the faculty and involves initial expenses. In Malaysia, many universities have adopted SP-based clinical teaching in this unprecedented pandemic context; such teaching was lacking earlier, but the system is now heading towards standard setting and structured training of SPs (20–21). The use of SPs in clinical teaching has many advantages. It not only provides a controlled atmosphere where learners can learn better communication skills in history-taking, breaking bad news, empathy and control of emotional intelligence, but it also allows effective immediate feedback from the SPs and the subject experts so students can practice “*n*” number of times to improve their skills. The examination techniques can be learned in a better way, so learners are well prepared to face the RPs in senior classes. This also provides an opportunity for many educated people of all age groups, ethnicities and genders to learn the art of becoming SPs to contribute to medical education and earn a reasonable income in flexible hours.

The aim of this study was to introduce OSCT as a complimentary tool to the conventional BST in pre-clinical and early clinical years. It gives them opportunity to improve their clinical skills in controlled safe atmosphere outside the hospital. When hospital teaching is suspended during the pandemic crisis, OSCT has proved to be useful in online teaching for even the pre-final and final-year students. The student's perception is very positive for this modality of teaching as depicted in Figure 2. In the long run, with more SP banks and data sharing among medical schools, OSCT will not be so time consuming for the faculty and may also prove to be cost effective.

In the study design, there were some limitations; it was initially proposed to have at least three sessions of OSCT training in each of the disciplines—medicine, O&G and PCM—in the interventional arm, along with BST in the control arm. This method would have allowed students to become acquainted with the innovative teaching tool. However, this was not feasible for the following reasons: (a) BST needed to be replaced by OSCT, (b) students in the interventional arm would have been deprived of their regular teaching, (c) hospital permission was lacking, and (d) ethical clearance from the Institutional Review Board would have been needed. Therefore, to overcome the limitations of this study, OSCT demonstration videos were used. In future, it would be beneficial for the study to have a few OSCT sessions in the relevant disciplines before assessing the students' perception and performance.



- Q1 Participating in the OSCT project has improved my clinical acumen.
- Q2 Participating in the OSCT project has given me experience in preparing for the interactive OSCE.
- Q3 Participating in the OSCT project has improved my clinical reasoning skills.
- Q4 Participating in the OSCT project has trained me in self-learning skills.
- Q5 Participating in the OSCT project has improved my communication skills.
- Q6 Participating in the OSCT project has increased the knowledge level of the topics concerned.
- Q7 Participating in the OSCT project has improved my ability of facing questions.
- Q8 OSCT is a more structured type of teaching and learning activity.
- Q9 The idea of OSCT as a teaching tool is exciting.
- Q10 OSCT can be included as an effective teaching and learning method.
- Q11 OSCT requires too much time and is not worth the effort.

Figure 2: Students’ perception on OSCT as a good tool for teaching learning to improve performance.

CONCLUSION

OSCT is an innovative approach to improving clinical skills among medical students in a controlled atmosphere. Many universities worldwide are using SPs in their clinical teachings but do not have a structured approach. In Southeast Asia, especially Malaysia, there is a lack of trained SP banks, and few medical schools have SP training programmes. We propose that introducing OSCT in the early clinical

years in an integrated curriculum, and later dividing OSCT and clinical BST as a hybrid approach, will give learners the opportunity to improve their soft skills in these foundation years of clinical medicine and boost their confidence to face RPs in later years. It will also reduce students’ burden in the hospital, which affects the services of the hospital and improves the patients’ aptitude in the clinical teaching sessions. The OSCT model of teaching is even more relevant in the present pandemic crisis and will prove to

be complementary in the present teaching, although its financial viability must be assessed in the long run.

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REFERENCES

1. Life in the Fast Lane [Internet]. Australia: LITFL. c2021 [cited 2020 Jul 18]. Oslerisms. Available from: <https://litfl.com/eponymictionary/oslerisms/>
2. Cox WJ, Desai GJ. The crisis of clinical education for physicians in training. *Mo Med*. 2019;116(5):389–91.
3. Association of American Medical Colleges [Internet]. Washington DC: AAMC; 2007 [cited March 2007]. Case study 1: effective use of educational technology in medical education. Available from: https://store.aamc.org/downloadable/download/sample/sample_id/111/
4. McGee JB, Neill J, Goldman L, Casey E. Using multimedia virtual patients to enhance the clinical curriculum for medical students. *Stud Health Technol Inform*. 1998;52(2):732–5.
5. Ziv A, Root Wolpe P, Small SD, Glick S. Simulation-based medical education: an ethical imperative. *Acad Med*. 2003;78(8):783–8. <https://doi.org/10.1097/00001888-200308000-00006>
6. Ellaway R, Poulton T, Fors U, McGee J, Albright S. Building a virtual patient commons. *Med Teach*. 2008;30(2):170–4. <https://doi.org/10.1080/01421590701874074>
7. Huang G, Reynolds R, Candler C. Virtual patient simulation at U.S. and Canadian medical schools. *Acad Med*. 2007;82(5):446–51. <https://doi.org/10.1097/ACM.0b013e31803e8a0a>
8. Harden RMG, Downie WW, Stevenson M, Wilson GM. Assessment of clinical competence using objective structured examination. *Br Med J*. 1975;1(5955):447–51. <https://doi.org/10.1136/bmj.1.5955.447>
9. Peters M, ten Cate O. Bedside teaching in medical education: a literature review. *Perspect Med Educ*. 2014;3(2):76–88. <https://doi.org/10.1007/s40037-013-0083-y>

10. Office of Medical Education, School of Medicine [Internet]. Pennsylvania: University of Pittsburgh. c2021 [cited 2020 Jul 18]. Standardized/simulated patient program. Available from: <https://www.omed.pitt.edu/sp-program>
11. Cronbach LJ, Meehl PE. Construct validity in psychological tests. *Psychol Bull.* 1955;52(4):281–302. <https://doi.org/10.1037/h0040957>
12. Haynes SN, Richard DCS. Content validity in psychological assessment: a functional approach to concepts and methods introduction to content validity. *Psychological Assessment* 1995;7(3):238–47. <https://doi.org/10.1037/1040-3590.7.3.238>
13. Johnston P, Wilkinson K. Enhancing validity of critical tasks selected for college and university program portfolios. *National Forum of Teacher Education Journal.* 2009;19(3):1–6.
14. Kianifard F. Evaluation of clinimetric scales: basic principles and methods. *Journal of the Royal Statistical Society.* 1994;43(4):475–82. <https://doi.org/10.2307/2348132>
15. Lawshe CH. A quantitative approach to content validity. *Personnel Psychology.* 1975;28:563–75. <https://doi.org/10.1111/j.1744-6570.1975.tb01393.x>
16. Polit DF, Beck CT. The content validity index: are you sure you know what's being reported? Critique and recommendations. *Res Nurs Heal.* 2006;29(5):489–97. <https://doi.org/10.1002/nur.20147>
17. McMaster University [Internet]. Ontario: McMaster University. c2021 [cited 2020 Jul 18]. Standardized patient program. Available from: <https://simulation.mcmaster.ca/spp.html>
18. John Hopkins Medicine [Internet]. Baltimore: John Hopkins Medicine. c2021 [cited 2020 Jul 18]. Simulation center: standardized patient program. Available from: https://www.hopkinsmedicine.org/simulation_center/training/standardized_patient_program/
19. Duke-NUS Medical School [Internet]. Singapore: Duke-NUS Medical School. c2020 [cited 2020 Jul 18]. Standardised patient programme FAQs. Available from: <https://www.duke-nus.edu.sg/education/student-resources/student-services/cpc/standardised-patient-program-application-form/standardised-patient-programme-FAQS>
20. Jaiprakash H, Singh HMP, Mohanraj J, Joshi V, Achanna S, Jegasothy R. Standardization of simulated patients: assessing their efficiency and evaluating their perception. 2020 [cited 2020 Jul 18]. Available from: https://www.researchgate.net/publication/340776610_Standardization_of_Simulated_patients_Assessing_their_efficiency_and_evaluating_their_Perception
21. Vargas AL, Boulet JR, Errichetti A, van Zanten M, López MJ, Reta AM. Developing performance-based medical school assessment programs in resource-limited environments. *Med Teach.* 2007;29(2–3):192–8. <https://doi.org/10.1080/01421590701316514>

Appendix I



**OSCT PROJECT (ASSESSMENT SHEET
VENUE: JUC / HSB Hospital**

**Time: 15 min
Marks 30**

Matric No:

Date:

Name of Assessor

(Tick Appropriately) **HISTORY / EXAMINATION / MANAGEMENT - (STATION 4)**

(Tick Appropriately) **Discipline: Medicine / PCM / O&G**

ITEM	MARKS	SCORE
<p>Professional Approach: Greets and introduces him/herself to patient</p> <ol style="list-style-type: none"> Identifying the patient’s age and reproductive history Appropriate and understandable language avoiding medical jargon. sApproaching with empathy Establishing good eye-contact Listening attentively to patient’s history and concerns 	5	
<p>History taking</p> <ol style="list-style-type: none"> Pain: duration, onset, site, radiation, severity, pain score, aggravating/relieving factors Impact: fertility, husband Sexual history: frequency, penetration, deep seated pain Menstrual history: age of menarche, frequency of cycles, duration, relationship of pain to the cycles Past medical and surgical history Past gynae history: miscarriages, infections Psychosocial issues: relationship issues, pressure from friends and family members <p>Communication Skills & Discussion: Formulation of clinical diagnosis & discussion of differential diagnosis</p> <ol style="list-style-type: none"> Endometriosis Pelvic inflammatory disease Pelvic tumours UTI IBS 	20	
TOTAL SCORE	30	
Comment & Overall Performance:		

Name & Signature of Examiner

Appendix II: Layout Plan of OSCT Trial

