

Feedback Integrated with Objective Structured Clinical Examination Module- A Teaching Tool in Physiology Department

SHOBITHA MUTHUKRISHNAN¹, SHREELAKSHMI ANANTHANARAYANAN², HARLEEN KAUR³, ASHISH KUMAR MAURYA⁴, MONIKA SHARMA⁵



ABSTRACT

Introduction: Objective Structured Clinical Examination (OSCE) is designed to evaluate various learners' skills. Formative feedback reinforces appropriate learning and contributes to correction of learner's deficiencies. It was observed that the students in Clinical Physiology labs did not have direct observation and feedback on performance of clinical examination to address the gaps in knowledge and clinical skills.

Aim: To evaluate the perception of students and faculty on the effectiveness of structured feedback integrated with OSCE module for teaching clinical skills in Physiology Department.

Materials and Methods: A non randomised, intervention study was conducted on 100 phase I Bachelor of Medicine and Bachelor of Surgery (MBBS) students. Students were sensitised to OSCE topics. After taking written informed consent, initial OSCE sessions integrated with 1:1 feedback was conducted followed by OSCE sessions after 20 days in the same topics of clinical examination. OSCE scores were recorded. Feedback survey questionnaire to assess the perceptions of phase I MBBS students and retrospective pre-post assessment questionnaire

was designed and administered. Student's t-test, Likert scale analysis and Thematic analysis of the responses were done.

Results: Of the total 100 phase I MBBS students, males were 46 and females were 54 with a mean age of 20 and 19 years, respectively. Significant percentage of students got the opportunity to have constructive discussions of their strengths and weaknesses of learning clinical skills with the faculty (p -value=0.0246) and also felt satisfied with the structured points of the feedback given by the faculty (p -value=0.03181). There was significant increase in the OSCE scores of the students after the OSCE session integrated with feedback. Majority of the faculty felt satisfied with self assessment of student's learning gaps and with the performance of clinical system examination by the students. Faculty confidence to give structured feedback to the students had improved.

Conclusion: It can be concluded that 1:1 structured feedback integrated with OSCE has significant educational impact and is an effective method for teaching clinical skills in physiology labs. It is one of the efficient ways to use OSCE checklists as an effective teaching resource.

Keywords: Clinical skill evaluation, Feedback questionnaire, Formative assessment

INTRODUCTION

It is known that for the development of clinical expertise self-assessment alone is often inaccurate and insufficient [1,2]. Objective Structured Clinical Examination (OSCE) introduced in 1975 by Harden and Gleeson is a type of examination designed to test clinical skill performance and competence in a range of skills. Harden's OSCE used actors and choreographed scenarios to evaluate the performance of professional behaviours which dramatically changed the assessment of professional competence [3].

The performance in both formative and summative assessment can be evaluated by OSCEs. Formative feedback is defined as "information communicated to the learner that is intended to modify his or her thinking or behaviour for the purpose of improving learning" [4]. It is especially effective when information about previous performance is used to promote positive and desirable development [4]. Studies have shown that feedback is also more effective when it is based on observed facts, focuses on tasks, specific, concise, and suggests areas for improvement [4,5]. Analysis of previous studies show that evaluation of clinical skills among medical students have been done during their clinical postings in various clinical setups [6,7]. Studies have evaluated student's perception on OSCE as a learning tool and concluded that OSCE was perceived as an excellent learning tool for skill and attitude acquisition in medical education [8]. There is paucity of similar studies to evaluate clinical skills using OSCE checklist integrated with feedback among phase I MBBS students. Previous study also suggests that OSCE is a feasible approach to assess a wide range

of learning outcomes in different specialties and disciplines. It is for both formative and summative purposes in the different phases of education including the early and later years of the undergraduate medical curriculum [9]. It is found that evaluation of educational effectiveness of clinical lab sessions in our present Physiology Department is needed. It was found that the faculty and students did not have direct observation and feedback on performance for clinical examination. Moreover, the gaps in knowledge and skills of students in clinical lab sessions were not being fully addressed in our Physiology Department.

Therefore, to address this gap, the present study aimed to evaluate the effectiveness of 1:1 structured feedback integrated with OSCE as a teaching tool for teaching clinical skills in Physiology Department. It was hypothesised that 1:1 structured feedback integrated with OSCE would be an effective teaching tool for teaching clinical skills to the phase I medical students in physiology clinical lab.

MATERIALS AND METHODS

A prospective, non randomised, interventional study was conducted on 100 phase I MBBS students, between March 2019 to November 2019 in Physiology Clinical lab, Hamdard Institute of Medical Sciences and Research (HIMSR), Jamia Hamdard, New Delhi, India. Permission of Institutional Ethics Committee with letter number 4/19 was obtained. Written Informed consent was obtained from phase I MBBS students.

Sample size calculation: Sample size was calculated by paired t-test with mean difference (-20.2178) and SD (3.0661), it was <6 subjects [10].

Eight physiology faculty members and three III year Master of Science (M.Sc) Medical Physiology postgraduate students were sensitised to uniformly teach clinical skills using OSCE checklist to 100 phase I MBBS students. OSCE teaching modules were peer expert validated.

Inclusion criteria: All the phase I MBBS students who were not exposed to any feedback process in clinical skill examination were included in the study.

Exclusion criteria: Students who did not attend the OSCE checklist based clinical examination teaching sessions were excluded from the study.

Self made feedback survey questionnaire mentioned in [Table/Fig-1] to assess the perceptions of phase I MBBS students on the feedback program were designed, peer expert validated and pilot tested on eight M.Sc physiology students not participating in the study. Topics for the OSCE sessions were identified and 10 OSCE stations for respiratory and cardiovascular system examination were finalised. OSCE checklists were used for examination of pulse, blood pressure, jugular venous pressure, tracheal position, chest auscultation for breath sounds, vocal fremitus, vocal resonance, apical impulse palpation and examination of bronchial breath sound [11]. Student-teacher ratio in each OSCE station for feedback on performance was 1:1. Hundred MBBS students were sensitised to OSCE topics in physiology labs during the practical sessions.

Initial OSCE sessions integrated with feedback was conducted followed by OSCE sessions after 20 days in the same topics of respiratory and cardiovascular system examination. OSCE scores were recorded. Validated survey feedback questionnaire was administered to the students and faculty. Retrospective pre-post assessment questionnaire to rate the student's response before

and after the OSCE session was administered to the students. Scoring for the questionnaire was based on 5 point Likert scale where, 1=very poor, 2=poor, 3=average, 4=good and 5=excellent.

STATISTICAL ANALYSIS

Statistical Package for the Social Sciences software version 21.0 was used for analysis of the quantitative data. Likert scale analysis was done. Themes were identified for the responses to open-ended questions and thematic analysis was done. Paired t-test was done for comparison of OSCE scores.

RESULTS

Out of total 100 phase I MBBS students, males were 46 with mean age±Standard Deviation (SD) of 20±1.3 years and females were 54 with mean age±SD being 19±1.1 years.

In the present study, Question (Q) 3 in [Table/Fig-1] found that 86% of the students felt satisfied with the structured points of the feedback given by the faculty (p -value=0.03181, significant for Q3). Q7 in [Table/Fig-1] found that 83% of the students also agreed that they felt satisfied that OSCE sessions followed by feedback has bridged their learning gaps.

Relevant themes identified in [Table/Fig-2] from student's response were "better learning gap identification" and "improved confidence to perform the skills".

[Table/Fig-3] shows that there was significant increase in the OSCE scores of phase I MBBS students after OSCE session integrated with 1:1 feedback.

[Table/Fig-4] shows significant increase in the Likert scale values of post feedback evaluations compared to that of the pre feedback evaluation.

S. No.	Questions	Strongly agree (%)	Agree (%)	Neither agree nor disagree (%)	Disagree (%)	Strongly disagree (%)	t-value	p-value
1.	I got the opportunity to have constructive discussions of my strengths and weaknesses of learning clinical skills with the faculty after OSCE sessions followed by feedback.	80	15	5	0	0	2.2822	0.0246
2.	Feedbacks should be incorporated regularly in OSCE stations in physiology labs.	75	23	2	0	0	4.6001	1.24e-05
3.	I feel satisfied with the structured points of the feedback given by the faculty.	86	11	3	0	0	2.1773	0.03181
4.	OSCE sessions followed by feedback has improved my interest in these topics.	82	12	6	0	0	1.4213	0.1583
5.	I am aware of the learning gaps that have to be bridged after OSCE sessions followed by feedback.	76	21	3	0	0	3.9279	0.0001577
6.	The OSCE feedback sessions were well focused as per the Learning Objectives that were mentioned.	86	6	6	2	0	-0.89353	0.3737
7.	I feel satisfied that OSCE sessions followed by feedback has bridged my learning gaps.	83	14	3	0	0	2.7534	0.007005
8.	I am confident of performing clinical system examination after the OSCE sessions followed by feedback.	82	16	2	0	0	3.4762	0.0007539

[Table/Fig-1]: Perception of phase I MBBS students about the feedback session.

Overall Rating: (Based on 5 point Likert scale where 1=very poor, 2=poor, 3=average, 4=good and 5=excellent)

p-value ≤ 0.05 is considered statistically significant

Themes	Student's responses
Self-assessment improvement (68 students)	'Better for assessing myself'
More confident (62 students)	'I will be more confident of skills after feedback'
Similar to exams (65 students)	'Sessions were close to the environment of the exam'
Improved interaction (73 students)	'More questions to ask; more interaction'
Learning gap Identification (70 students)	'I get to know my weak points and what needs improvement; to get all the wrong points and try to correct them'
More involvement (65 students)	'I will be more involved in the OSCE sessions'
Better focussed (55 students)	'Focus on my overall performance'
Avoided distractions (30 students)	'1:1 feedback avoided distractions and laughter usually encountered in the groups'
Increase of OSCE topics (58 students)	'Please include more clinical topics in OSCE sessions to improve learning'
Group OSCE's (15 students)	'Include Group OSCE's to know peer's performance and feedback'

[Table/Fig-2]: Thematic analysis of students' responses to open-ended questions about the OSCE feedback.

OSCE scores before feedback (Mean±SD)	OSCE scores after feedback (Mean±SD)	p-value
22.1683±3.0661	42.3861±3.1811	0.03213*

[Table/Fig-3]: Student's OSCE scores before and after feedback.
*p-value ≤0.05 is considered statistically significant

Questions	Likert score before feedback (Mean±SD)	Likert score after feedback (Mean±SD)	p-value
Awareness about knowledge gaps in clinical system examination.	1.73±0.662	3.76±0.723	2.2e-16
Interest to learn the clinical system examination skills	1.83±0.618	3.89±0.647	3.685e-06
Attempt to fill the knowledge gaps in clinical system examination.	1.85±0.606	3.85±0.59	3.275e-16
Confidence to perform the clinical system examinations.	2.03±0.71	4.08±0.44	2.2e-16
Retention of knowledge of clinical skills.	2.344.07±0.66	4.16 ±0.62	2.2e-16
Understanding the importance of the Objective Structured Clinical Examination (OSCE) and feedback.	2.18±0.69	4.07±0.62	2.2e-16
Opportunity to have constructive discussions of my strengths and weaknesses of learning clinical skills with the faculty	1.87±0.59	4.21±0.53	2.2e-16

[Table/Fig-4]: Pre-post feedback evaluations from students.
*p-value ≤0.05 is considered statistically significant

Likert scale analysis of Q1 and Q2 in [Table/Fig-5] showed significant response of faculty for satisfactory assessment of student's learning gaps and for the performance of clinical system examination by the students.

Relevant themes identified in [Table/Fig-6] from faculty response were "improved confidence to teach the clinical skills" and "to deliver effective feedback".

performed better in general communication and the mean score increased in general communication, in assessment, management and during global skill rating [12].

Similar findings by Brazeau C et al., showed that OSCE as a teaching tool proved to be efficient for students at the end of the third year family medicine clerkship, to observe a variety of doctor-patient interaction styles and to practice for future OSCE type

S. No.	Questions	Strongly disagree %	Disagree %	Neither agree nor disagree %	Agree %	Strongly agree %	t-value	p-value
1.	I feel satisfied with self-assessment of student's learning gaps after the OSCE sessions feedback.	0	0	0	50	50	2.6458	0.03315
2.	I feel satisfied with performance of clinical system examination by students after the OSCE sessions followed by feedback.	0	0	0	50	50	2.6458	0.03315
3.	OSCE sessions followed by feedback can be incorporated as teaching tool by the other clinical departments	0	0	0	62	38	2.0494	0.0796
4.	I feel satisfied that OSCE sessions followed by feedback has bridged the student's learning gaps	0	0	0	62	38	2.0494	0.0796
5.	My teaching skills in clinical system examination has improved after OSCE sessions followed by feedback	0	0	12	88	0	-1	0.3506
6.	Feedbacks should be incorporated regularly for all practical classes in Physiology labs.	0	0	13	62	25	0.55168	0.5983
7.	It is difficult to implement OSCE sessions followed by feedback in the midst of the busy teaching schedules.	0	62	28	10	0	-1.8708	0.1036
8.	I was clear about learning objectives to be achieved after the OSCE sessions followed by feedback.	0	0	0	50	50	2.6458	0.03315
9.	OSCE sessions followed by feedback have improved my confidence to give structured feedback to students.	0	0	0	50	50	2.6458	0.03315

[Table/Fig-5]: Perception of the faculty about feedback session. Likert scale analysis (Faculty Feedback Questionnaire).
p-value ≤0.05 is considered statistically significant

Themes	Faculty response
Improved confidence	'More confident in performing and teaching clinical skills'
Learning gaps identification	'More easy to identify student's learning gaps now'
Feedback delivery	'More confident in giving feedbacks'
Group OSCE	'1:1 OSCE with feedback may be replaced by group OSCE with feedback to save time and resources'
Organisation of OSCE	'With good planning, it's easy to organise OSCE sessions'

[Table/Fig-6]: Thematic analysis of faculty response to open-ended questions about the OSCE sessions followed by feedback.

DISCUSSION

Effective teaching and learning of clinical skills to phase I MBBS students in our Physiology Department has been found to be a challenge to both the faculty and the students respectively. The present study has addressed this challenge.

The significant findings of this study are that the students felt satisfied about OSCE sessions followed by feedback and has bridged their

examinations. It was found to improve their abilities to do a focused history and physical examination [13]. Recent study by Ngim CF et al., found that OSCE feedback were highly valued by fourth year medical students in Malaysia who preferred to receive individualised enhanced written feedback and felt it was more beneficial [14].

Though feedback has been shown to be an important component for learning, a recent study by Karol DL and Pugh D found that many factors, such as the emotional reactions feedback evokes, may impact its effect. Only 29% of respondents in the study asserted that they had experienced emotional reactions like embarrassment and anxiousness to verbal feedback received in an OSCE setting and it negatively impacted subsequent OSCE performance [15]. Therefore, it was concluded that feedback provided during an OSCE has the ability to evoke an emotional response in students and to potentially impact subsequent performance [15].

In the present study, structured constructive feedback was given to students and this has resulted in a positive educational impact among the students to perform better in the subsequent OSCE session. This was

also reflected as significant improvement in the OSCE scores after the OSCE feedback sessions. Recent study by Alkhateeb NE et al., among fifth year medical students found that single formative OSCE does not necessarily lead to better performance in subsequent summative OSCE [16]. The present study has overcome this limitation by conducting a second OSCE session after the initial OSCE with 1:1 feedback session and has found significant improvement in the OSCE scores.

Feedback questionnaire to assess the faculty perception for effectiveness of the OSCE sessions showed that they felt satisfied with the assessment of student's learning gaps and with the performance of the students in clinical system examination. These results are similar to study by Brazeau C et al., where faculty members enjoyed this active teaching format involving clinical examination and found the process of giving feedback to the students educationally satisfying [13].

Thematic analysis of faculty perception also highlighted certain categories like "improved confidence in teaching clinical skills" and "improved confidence in giving structured feedback to students". These findings are similar to previous study by Sulaiman ND et al., on Group Objective Structured Clinical Examination (GOSCE) introduced to medical students in years 1, 2, and 3. It showed that both students and clinical tutors valued the experience [17].

Feedback is one of the most important forms of interactions between the 'teacher' and the 'learner'. However as phase I medical students are rarely directly observed and given feedback during their clinical lab sessions, there has been increased interest in the facilitation of feedback [18,19]. However, most of the previous studies have been done on medical students during their clinical postings in various clinical setups [20,21]. Studies on OSCE integrated with feedback are uncommon among phase I Indian medical students. Effectiveness of clinical lab sessions in Physiology Department during the initial phase of MBBS curriculum for phase I MBBS students has not been extensively evaluated. Therefore, the present study has addressed this gap and has exposed the phase I MBBS students to OSCE sessions integrated with feedback with promising positive educational impact. The present study found OSCE sessions followed by feedback to be beneficial to both the faculty and the students and therefore the teaching OSCE can be continued in future for physiology clinical labs and in hospital or clinical postings.

Limitation(s)

OSCE topics were limited to only cardiovascular and respiratory system due to paucity of time, faculty and resources. Authors did not investigate the relation between formative 1:1 OSCE with feedback and final summative or the university grades. The study focused only on the phase I MBBS students.

CONCLUSION(S)

It can be concluded from the present study that structured 1:1 feedback integrated with OSCE is an effective method for teaching clinical skills in physiology lab. Present study demonstrated that both students and faculty viewed OSCE as a favourable opportunity to observe and reflect

on their own performance. Therefore, utilising the existing OSCE checklist resources to transform the OSCE to a teaching tool for clinical skills has increased the educational impact among phase I medical students.

Acknowledgement

We thank the technicians and all staff of Physiology Department of HIMSR, Jamia Hamdard, New Delhi, India.

REFERENCES

- [1] Eva KW, Regehr G. Self-assessment in the health professions: a reformulation and research agenda. *Academic medicine*. 2005;80(10):S46-54.
- [2] Eva KW, Regehr G. "I'll never play professional football" and other fallacies of selfassessment. *Journal of Continuing Education in the Health Professions*. 2008;28(1):14-19.
- [3] Harden RM, Gleeson FA. Assessment of clinical competence using an objective structured clinical examination (OSCE). *Medical Education*. 1979;13(1):39-54.
- [4] Kogan JR, Conforti LN, Bernabeo EC, Durning SJ, Hauer KE, Holmboe ES. Faculty staff perceptions of feedback to residents after direct observation of clinical skills. *Medical Education*. 2012;46(2):201-15.
- [5] Shute VJ. Focus on formative feedback. *Review of Educational Research*. 2008;78(1):153-89.
- [6] Hasnain M, Connell KJ, Downing SM, Olthoff A, Yudkowsky R. Toward meaningful evaluation of clinical competence: the role of direct observation in clerkship ratings. *Academic Medicine*. 2004;79(10):S21-24.
- [7] Aeder L, Alshuler L, Kachur E, Barrett S, Hilfer A, Koepfer S, et al. The "Culture OSCE"-Introducing a formative assessment into a postgraduate program. *Education for Health*. 2007;20(1):11.
- [8] Saroja C, Sathyasree C, Santa Kumari A, Padmini O. Student perception of OSCE as a learning tool in Osmania Medical College, Hyderabad, Telangana. *Applied Physiology and Anatomy Digest*. 2018;3(3):24-28.
- [9] Patrício MF, Julião M, Fareleira F, Carneiro AV. Is the OSCE a feasible tool to assess competencies in undergraduate medical education? *Medical Teacher*. 2013;35(6):503-14.
- [10] Charan J, Biswas T. How to calculate sample size for different study designs in medical research? *Indian Journal of Psychological Medicine*. 2013;35(2):121.
- [11] Objective Structured Clinical Examinations (OSCE) II: Developing Rating Scales and Checklists for OSCEs. 2019 National Board of Medical Examiners, 3750 Market Street Philadelphia, PA 19104.
- [12] Sadia SH, Sultana SA, Rauf RA, Shaheen A, Shrif S, Waqar F. OSCE-a teaching tool. *Pak J Med Health Sci*. 2013;7(3):588-91.
- [13] Brazeau C, Boyd L, Crosson J. Changing an existing OSCE to a teaching tool: the making of a teaching OSCE. *Academic Medicine: Journal of the Association of American Medical Colleges*. 2002;77(9):932-32.
- [14] Ngim CF, Fullerton PD, Ratnasingam V, Arasoo VJ, Dominic NA, Niap CP, et al. Feedback after OSCE: A comparison of face to face versus an enhanced written feedback. *BMC Medical Education*. 2021;21(1):01-09.
- [15] Karol DL, Pugh D. Potential of feedback during objective structured clinical examination to evoke an emotional response in medical students in Canada. *Journal of Educational Evaluation for Health Professions*. 2020;17.
- [16] Alkhateeb NE, Al-Dabbagh A, Ibrahim M, Al-Tawil NG. Effect of a formative objective structured clinical examination on the clinical performance of undergraduate medical students in a summative examination: a randomized controlled trial. *Indian Pediatrics*. 2019;56(9):745-48.
- [17] Sulaiman ND, Shorbaji SI, Abdalla NY, Daghistani MT, Mahmoud IE, Al-Moslih AM. Group OSCE (GOSCE) as a formative clinical assessment tool for pre-clerkship medical students at the University of Sharjah. *Journal of Taibah University Medical Sciences*. 2018;13(5):409-14.
- [18] Burgess A, Mellis C. Feedback and assessment for clinical placements: achieving the right balance. *Advances in Medical Education and Practice*. 2015;6:373.
- [19] Hattie J, Timperley H. The power of feedback. *Review of Educational Research*. 2007;77(1):81-112.
- [20] Bennett V, Furnedge D. The hidden value of a mock OSCE. *The Clinical Teacher*. (Print). 2013;10(6):407-08.
- [21] Perron NJ, Louis-Simonet M, Cerutti B, Pfarrwaller E, Sommer J, Nendaz M. The quality of feedback during formative OSCEs depends on the tutors' profile. *BMC Medical Education*. 2016;16(1):01-08.

PARTICULARS OF CONTRIBUTORS:

1. Professor, Department of Physiology, School of Medical Sciences and Research, Sharda University, Greater Noida, Uttar Pradesh, India.
2. Student, Apeejay School, Sector 16 A, Noida, Uttar Pradesh, India.
3. Assistant Professor, Department of Computer Science and Engineering, Jamia Hamdard, New Delhi, India.
4. Assistant Professor, Department of Computer Science and Engineering, Gautam Buddha University, Greater Noida, Uttar Pradesh, India.
5. Professor, Department of Paediatrics, Christian Medical College, Ludhiana, Punjab, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Shobitha Muthukrishnan,
Professor, Department of Physiology, School of Medical Sciences and Research,
Sharda University, Greater Noida, Uttar Pradesh, India.
E-mail: drshobitha@gmail.com

PLAGIARISM CHECKING METHODS: [Lain H et al.](#)

- Plagiarism X-checker: Jun 26, 2021
- Manual Googling: Oct 19, 2021
- iThenticate Software: Oct 26, 2021 (12%)

ETYMOLOGY: Author Origin

AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. NA

Date of Submission: **Jun 24, 2021**
Date of Peer Review: **Aug 23, 2021**
Date of Acceptance: **Oct 28, 2021**
Date of Publishing: **Jan 01, 2022**

