

The effectiveness of tutor vs peer feedback on formative OSPE practice in undergraduate physiology

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Abstract

Objective: To compare the effectiveness and feasibility of tutor feedback and peer feedback for formative Objectively Structured Practical Examination practice among undergraduate Physiology students.

Method: The mixed-method, experimental study was conducted at Combined Military Hospital Multan Institute of Medical Sciences, Multan, Pakistan, from May 13 to July 15, 2024, and comprised second-year medical students in the Physiology module who undertook Objectively Structured Practical Examination practice sessions. They were randomised into control group A and experimental group B. In group A, the students played the role of performer and simulated patient, while the facilitators acted as examiners and reviewers. In group B, the students played the role of performer, simulated patients, examiners and peer reviewers, with the tutor separately and confidentially scoring the performer on each station. Summative scores of the two groups were compared, while inter-rater reliability between tutor and peer grading was assessed using the intraclass correlation coefficient. Using the Likert scale and open-ended questions, a questionnaire was employed to evaluate student perceptions regarding feedback efficacy. Data was analysed using SPSS 26.

Results: Of the 148 students, 72 (48.6%) were in group A and 76 (51.4%) were in group B. Among which 90 (59%) participants were females and 62 (41%) males, with a mean age of 20 ± 1.2 years. There was no significant difference in summative scores of the two groups ($p=0.42$). Interrater reliability between tutor and peer scoring showed moderate agreement (intra-class correlation coefficient = 0.54). Both the groups acknowledged the pivotal role of feedback in enhancing Objectively Structured Practical Examination skills, and exam performance, facilitating learning, and boosting confidence and communication. Challenges associated with both feedback models included participation dynamics, feedback quality, assessment transparency and strategies for practice Objectively Structured Practical Examination modulation.

Conclusion: Both tutor-led and peer-assisted feedbacks were effective in elevating Objectively Structured Practical Examination proficiency, fostering error comprehension, and bolstering confidence among Physiology undergraduates. However, maintaining consistent peer feedback quality and ensuring transparent assessment were essential challenges.

Keywords: Formative feedback, Peer feedback, Practice OSPE, Formative OSPE, Inter-rater reliability, Tutor feedback, Physiology, Medical education. (JPMA 76: 1639; 2026) DOI: <https://doi.org/10.47391/JPMA.22900>

Introduction

The implementation of competence-based medical education curricula has led to the utilisation of diverse assessment methods to evaluate cognitive, psychomotor and affective domains in undergraduate medical education.¹ Among these methods, the Objective Structured Practical Examination (OSPE) stands out as a highly recommended tool for assessing skill-based competencies. Derived from the Objective Structured Clinical Examination (OSCE), OSPE was originally developed as an assessment tool for basic, preclinical and para-clinical sciences.¹

While reliable and valid tools for summative assessments are crucial, the integration of formative assessments is increasingly recognised as an essential component of teaching and learning. Formative assessments not only enhance academic performance, but also elevate student motivation, satisfaction and self-assessment opportunities.² Students these days have quite an easy accessibility to various forms of learning resources where they can practice written exams on any topic for rehearsal and self-assessment. As opposed to written examinations, OSPE is relevantly challenging as mock OSPE opportunities are scarce. Institutions arrange mock / practice OSPEs sometimes, but these appear as an administrative and financial burden. Due to this, many low-resource institutions include OSPEs only in final exams, where students are exposed to this mode of exam for the first time.³ Lack of practice is one of the determinants of high levels of stress and anxiety associated with low performance by students in OSPE exams.³

Research has shown an improvement in students'

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confidence and decreased anxiety after practicing OSPEs before their final professional exams.⁴ Timely and constructive feedback is one of the key elements for effective learning via practice OSPE sessions.⁵ However, practice OSPEs pose a burden for both students and faculty in terms of time, money and resources.³ Considering the lack of resources, the peer feedback model of practice OSPEs can provide an effective alternative to enhance the learning environment in preclinical lab-based practical sessions.⁶ Recently, the peer feedback model has been increasingly adopted in higher education, including undergraduate medical education, to increase collaborative learning and student engagement within the available resources.⁷

In tertiary education, the peer learning model was first introduced in 1988.⁸ Formative peer feedback involves learners communicating task-related information to peers of similar status to enhance academic performance.⁷ Peer feedback is considered a credible learning opportunity for both the learner and peer assessors. The introduction of peer-assisted learning in undergraduate medical education has shown improved OSPE scores.⁹ Also, students consider peer feedback less stressful and better suited to their needs.⁴ Peer feedback in academics has previously been shown to increase the content knowledge, skills, metacognitive, dialogical and pedagogical skills of students.⁸

Despite the strengths of peer-assisted practice OSPEs, a limitation of inconsistency in the quality of peer feedback cannot be denied.¹⁰ However, after proper training, the quality of peer grading and feedback can be at par with tutor feedback.⁷ The existing literature has a potential gap where only a few studies have shown training of peer examiners before assessment, possibly owing to the lack of resources and feasibility.⁸

The current study was planned to compare the effectiveness and feasibility of tutor feedback and peer feedback for formative OSPE practice among undergraduate Physiology students.

Subjects and Methods

The mixed-method, experimental study was conducted at Combined Military Hospital (CMH) Multan Institute of Medical Sciences, Multan, Pakistan, from May 13 to July 15, 2024. A tutor-led peer feedback model for practice OSPEs was incorporated into laboratory practical sessions for second-year medical Physiology students at the institution where routine weekly Physiology laboratory practical sessions are conducted for such students in four batches of 38 students each. The students are encouraged to practice the allotted practical in small groups after a brief

demonstration by the facilitator. Two trained faculty members facilitate the students during hands-on performance and provide feedback.

After approval from the institutional ethics review board, the sample size was calculated using the OpenEpi calculator¹¹ for comparing two means, with 95% confidence interval (CI), 80% power, and mean difference 9.16 regarding summative exam scores following the introduction of formative practice quizzes.¹² The sample size was inflated by 45% to uphold ethical standards and promote inclusive participation. All second-year medical students in the Physiology module who undertook OSPE practice sessions were included. To maintain standardisation and to reduce selection bias, all students were selected from a single module. Only students from the current academic session were included, and informed consent was taken from each participant. Those who missed >50% of the practice OSPE sessions were excluded.

For consistency and clarity, both students and faculty members were separately introduced to the details of practice OSPE and feedback activity in an interactive orientation session. Four batches of students were randomised into control group A and experimental group B using cluster randomisation technique, with two batches randomly assigned to each group. Throughout the module, two to four practice OSPE stations of essential importance were organised from the weekly practical topic at the end of each practical session. In group A, the students played the role of performer and simulated patient, while the facilitators acted as examiners and reviewers. In group B, the students played the role of performer, simulated patients, examiners and peer reviewers, with the tutor separately and confidentially scoring the performer on each station to analyse inter-rater reliability. It was ensured that every student in both the groups got to play the role of performer and performer/peer reviewer at least once during the module.

After the performance at each practice OSPE station, the tutor in the control group and fellow students in the experimental group provided verbal feedback and scored the performing student as per the rubric provided. Students performed practice OSPE stations and provided and received feedback in front of the whole batch and the facilitators to ensure maximum learning for all the students.

To assess the effectiveness of practice OSPE sessions and peer feedback, summative OSPE scores of both the groups were compared in the end-of-module neuroscience examination. To decrease bias, facilitators and researchers were not involved in summative exam preparation, conduction or grading.

Annexure - A: Students' perception of peer feedback (to be filled by the experimental group).

	Strongly Agreed	Agreed	Neutral	Disagreed Strongly	Disagreed
The peer feedback activity was useful.					
It has improved my OSPE skills.					
It has improved my communication skills.					
Peer examiner was aware of what I needed to learn.					
Peer examiner made performer feel comfortable and confident.					
Peer examiner asked performer to evaluate what he/she did well.					
Peer examiner asked performers to evaluate what he/she could improve.					
Peer examiner gave balanced feedback (including both Positive and less positive aspects)					
Peer examiner gave precise and concrete suggestions for improvement.					
I would like this peer reviewed mock OSPE practice to continue in future.					
What did you like the most about peer reviewed OSPE practice?					
What could have been improved in the peer reviewed OSPE practice?					
Any suggestions for improvement in future peer reviewed OSPE practice (be specific)?					

Annexure - B: Students' perception of the Facilitator/Tutor's feedback (to be filled in by the control group).

	Strongly Agreed	Agreed	Neutral	Disagreed	Strongly Disagreed
The tutor's feedback activity was useful.					
It has improved my OSPE skills.					
It has improved my communication skills.					
The tutor was aware of what performers needed to learn.					
The tutor made performers feel comfortable and confident.					
The tutor asked performer to evaluate what he/she did well.					
The tutor asked performer to evaluate what he/she could improve.					
The tutor gave balanced feedback (including both Positive and less positive aspects)					
The tutor gave precise and concrete suggestions for improvement.					
I would like this tutor-reviewed OSPE practice to continue in the next module.					
What did you like the most about the tutor-reviewed OSPE practice?					
What could have been improved in the tutor-reviewed OSPE practice?					
Any suggestions for improvement in future tutor-reviewed OSPE practice (be specific)?					

For the evaluation of the feasibility of peer feedback on practice OSPE sessions, end-of-course quantitative and qualitative feedback was gathered. After the completion of the summative modular exam, a questionnaire assessing the perception of feedback practice was completed by all the students. The questionnaire assessed the perceived quality of feedback on a Likert scale of 1-5 via 10 items and three open-ended questions.⁴ The questionnaire was adapted with slight modifications from the study assessing the perceived usefulness of feedback in improving clinical skills (Annexure A and B).⁴

Data was analysed using SPSS 26. Continuous data was expressed as mean±standard deviation, and ordinal data as median with interquartile range (IQR). Graphical representation was done via scatter plots. Inter-rater reliability between tutor- and peer-graded practice OSPE scores in the experimental group was evaluated using the Intra-class Correlation Coefficient (ICC) on the basis of two-way random-effects model and absolute-agreement. Pearson correlation of summative exam score with practice OSPE score was also analysed for both the groups. The summative OSPE scores of the groups were compared using the Mann-Whitney U test after assessing distribution

with the Shapiro-Wilk normality test. Mann Whitey U-test was used to compare the perceived quality of feedback between the groups after satisfying assumptions. For all analytical statistics, $p < 0.05$ was considered significant.

Qualitative data was subjected to thematic analysis following the six-step framework.¹³ Two researchers independently reviewed and manually coded the responses. Both deductive and inductive approaches were used; deductive codes reflected predefined areas of strengths and improvement, while additional codes were generated inductively during analysis. Disagreements were resolved through discussion, and a third researcher adjudicated, when required. Coding consistency was monitored throughout the process.

Results

Of the total 152 students, 4(2.6%) were excluded for not having attended at least 50% of the practice OSPE sessions, and the final sample stood at 148(97.4%), with 72(48.6%) in group A and 76(51.4%) in group B. About 59% (n=90) participants were females and

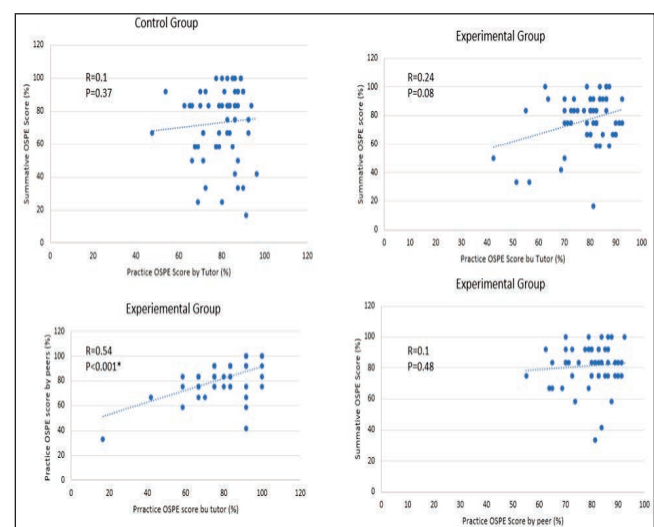


Figure: Correlation between practice Objectively Structured Practical Examination (OSPE) scores and summative OSPE performance in the control and experimental groups. * $p < 0.05$.

41% (n=62) males, with a mean age of 20 ± 1.2 years.

The mean summative OSPE scores in group A was 80.49 ± 9.74 compared to 79.31 ± 9.95 in group B ($p=0.42$). Inter-rater reliability between tutor and peer scoring showed moderate agreement (ICC: 0.54; 95% CI: 0.3-0.71; $p<0.001$). However, there was a non-significant correlation of summative OSPE scores with the tutor and peer-graded practice OSPE scores in both the groups (Figure).

The students' perceptions of tutor and peer feedback on practice OSPE showed that both the groups acknowledged the value of feedback in enhancing OSPE and

Table-1: Students' perception of tutor/peer feedback on practice Objectively Structured Practical Examination (OSPE).

Perception of Feedback	Control Group (Median $\pm$ IQR)	Experimental Group (Median $\pm$ IQR)	p-value
Useful feedback	1.0 $\pm$ 1.0	1.0 $\pm$ 1.0	0.72
Improved OSPE skills	1.0 $\pm$ 1.0	1.0 $\pm$ 1.0	0.52
Improved communication skills	2.0 $\pm$ 1.0	1.5 $\pm$ 1.0	0.93
Awareness of learning needs	2.0 $\pm$ 0.0	2.0 $\pm$ 0.75	0.18
The performer felt comfortable and confident	2.0 $\pm$ 1.0	2.0 $\pm$ 2.0	0.69
The performer self-evaluated his/her strengths	2.0 $\pm$ 1.0	2.0 $\pm$ 1.0	0.51
Performer self-evaluated areas of improvement	2.0 $\pm$ 1.0	2.0 $\pm$ 1.0	0.53
Received balanced feedback	2.0 $\pm$ 0.0	2.0 $\pm$ 0.75	0.76
Received precise and concrete suggestions	2.0 $\pm$ 1.0	2.0 $\pm$ 1.75	0.20
Like to continue feedback on the practice OSPE	1.0 $\pm$ 1.0	1.0 $\pm$ 1.0	0.58

IQR: Interquartile range.

communication skills while providing self-awareness opportunities, and gaining precise suggestions for improvement in a comfortable learning environment (Table 1).

The thematic analysis of qualitative data led to the generation of themes and sub-themes (Table 2).

Both the tutor and peer feedback encompassed enhanced skill development, stepwise learning, improved exam performance and self-awareness opportunities. Tutor feedback was better perceived to boost academic performance via valuable feedback and guided learning opportunities (Table 2).

Peer feedback strengthened learning majorly by enhancing collaboration, fostering a positive learning environment, and increasing students' confidence and communication skills (Table 2).

The participants identified challenges related to participation dynamics, learning environment, and feedback quality for both tutor and peer feedback, emphasising the importance of addressing concerns regarding examiner behaviour, communication clarity and peer feedback quality assurance (Table 2).

Discussion

The current study showed that the summative exam scores

Table-2: Advantages and areas of improvement for tutor and peer feedback on Physiology practice Objectively Structured Practical Examination (OSPE).

Sub-Themes	Tutor Feedback (Control Group, n=72)	Peer Feedback (Experimental Group, n=76)
Advantages of Feedback	Theme 1: Enhanced Learning through Guided Feedback	
1.1 Comprehensive skill development	"It literally helped me in my OSPE exam-taking skills." "Helps us learn the required steps in OSPE performance that we often skip and learn stepwise."	"[Gave me] detailed idea of marks distribution of different steps to be performed." "Rubric displayed gives an idea about the step-by-step procedure."
1.2 Learning from Mistakes	"The examiner told us about shortcomings so we can improve ourselves accordingly." "Helps us improve our mistakes and evaluate my marks."	"Helped a lot to improve our mistakes and get a chance to perform well next time." "Great experience to know about mistakes and performance."
1.3 Improved Confidence and Communication	"Practice before the final exam increases confidence." "Improved communication skills."	"Gained confidence to perform." "Improves confidence level."
1.4 Valuable Feedback	"Feedback was the strength of practice OSPE." "The examiner was very polite and explained well about the mistakes and missing points."	-
1.5 Learning Environment	-	"Created a comfortable environment to learn and improve OSPE skills." "Improved and less tense environment, conducive to learning."
Areas of Improvement	Theme 2: Optimization of Feedback	
1.1 Engagement strategies	"There should be a proper sequence to determine who will perform the practice OSPE each week." "Increase student engagement through interactive elements in the practice OSPE."	"Students should be allowed to perform voluntarily rather than roll number-wise." "Allow performance twice so that all students get a chance to observe."
1.2 Learning Environment	"Examiners should be more encouraging and polite." "Doing a lot of practice OSPEs at once is difficult; balance the number of sessions per week."	"Students should be made more comfortable during OSPE." "The environment needs to improve, like reducing noise and distractions."
1.3 Feedback Quality Assurance	"Balanced feedback should be given instead of only pointing out negative aspects." "Examiners should provide feedback in a positive and constructive manner."	"Peer examiners should be reviewed by session facilitators." "Peer should give feedback after more preparation."
1.4 Assessment Transparency	"Examiner should provide clearer expectations about the assessment criteria." "Practice OSPE should not be scored. It should be for practice alone."	"Give practical assignments earlier so students can come prepared."

of the control group did not significantly differ from those of the experimental group, indicating that feedback, when given properly, by either tutors or peers is equally beneficial.

Interestingly, the inter-rater reliability analysis revealed a moderate positive correlation between tutor- and peer-graded practice OSPE scores in the experimental group. This correlation underpins the potential of peer feedback when provided within a structured framework and supported by appropriate training. The qualitative analysis enlisted the benefits and disadvantages of the intervention, revealing that the learners gained similar benefits from either tutor or peer feedback, and the hallmark of these advantages was the skill enhancement by learning from their mistakes and thus boosting confidence and improving their communication. Quantitative analysis showed that differences between the two approaches were not statistically significant, indicating that the students perceived both feedback methods as valuable for their learning process.

However, the participants highlighted the added advantage of peer feedback in providing a more comfortable environment and encouraging open dialogue and learning. This added comfort was seen as an advantage over tutor feedback, as the students were less hesitant to ask questions among peers. Nevertheless, the importance of non-selective feedback opportunities and a more comfortable learning environment was emphasised by the learners. Additionally, they suggested that peers providing feedback should receive more training from experts to improve the quality of feedback.

The current findings align with prior research emphasising the crucial role of constructive feedback in promoting skill development and self-assessment in medical education.^{14,15} The positive impact on skill enhancement, learning and communication skills suggests that both tutor and peer feedback serve as essential tools for improving practical examination techniques¹⁶ and also reinforces the credibility of peer feedback as a valuable tool for assessing peers' performances, which resonates with existing literature.^{16,17} Moreover, the perceived advantages of peer feedback in the current study extend beyond skill enhancement to include improved learning environments, boosted confidence and effective communication.

Given the study's findings, it becomes imperative to address specific areas of improvement that surfaced within both the tutor and peer feedback models. These areas encompass participation dynamics, learning environment, feedback quality, assessment transparency, and strategy for practice OSPE modulation. A naturalistic case study

comparing tutor and peer feedback processes reported that feedback uptake is largely influenced by contextual and individual factors.¹⁸ These insights can inform the optimisation of practice OSPE sessions to ensure greater inclusivity, comfort, engagement and learning outcomes.¹⁷ However, the challenge of addressing certain quality issues, such as favouritism, may be particularly complex when randomisation and anonymity are unfeasible.¹⁹

The practical implications of the current study can be categorised into two key aspects. Firstly, the incorporation of peer feedback in formative OSPE practice can provide a feasible alternative, especially in resource-constrained environments. Secondly, tutor-led feedback sessions can significantly contribute to enhancing the quality of practice OSPE through structured guidance, clear assessment criteria and targeted feedback. The study's insights into the dynamics of peer and tutor feedback may inform educational institutions in shaping effective feedback mechanisms that cater to the diverse learning needs of students.

However, the current study has certain limitations as well. The study focussed on a specific cohort of undergraduate Physiology students in a particular medical institution, which limits the generalisability of the findings. Also, the self-response nature of the questionnaire-based study carries the risk of bias.

Conclusion

Both tutor-led and peer-assisted feedbacks were effective in elevating OSPE proficiency, fostering error comprehension, and bolstering confidence among Physiology undergraduates. However, maintaining consistent peer feedback quality and ensuring transparent assessment are essential challenges.

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FI: Concept, data analysis, interpretation and writing.

AS: Data interpretation, analysis, writing and critical revision.

SA, IA & II: Data collection, literature review and critical revision.

MAR: Data analysis, literature search and critical revision.