RESEARCH ARTICLE

Implementing objective structured practical examination as a formative assessment tool for practical skills in 1st-year MBBS students: A comparative study in the physiology department at Surat Municipal Institute of Medical Education and Research, Surat

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ABSTRACT

Background: It is a well-known fact that assessment drives learning. One of the most important aspects of training a doctor is the acquisition of practical skills. The conventional practical examination (CPE) fails to guarantee the development of the skills expected from students by the end of the course. In addition, the scoring is affected based on the examiner’s variability for different students. Objective structured practical examination (OSPE) has been used to evaluate those areas of performance by students. CPE also does not provide any feedback except stating pass or fail. To overcome this problem, an earlier innovation in this regard is the OSPE described in 1975 and greater detail in 1979 by Harden and his group. The OSPE is now an accepted tool in the assessment of practical skills in both pre- and para-clinical subjects. In view of this, we have implemented the system of OSPE for the assessment of practical physiology in the Department of Physiology at SMIMER College in Surat. Aims and Objectives: The study aims to introduce OSPE as a formative assessment method for 1st-year MBBS students within the physiology department. It involves conducting a comparative analysis between CPE and OSPE to evaluate the efficacy of these assessment methods. In addition, the study seeks to assess students’ satisfaction with the implementation of OSPE for evaluating practical skills and to investigate faculty perceptions of OSPE as a formative assessment tool. Materials and Methods: The study was conducted in the physiology department of SMIMER on 138 students of 1st-year MBBS. The first CPE was conducted on 46 students each on 3 alternate days over a period of 1 week by six faculties. The students underwent a second evaluation of the same practical skills, next week through the OSPE method. Feedback from students and faculties was taken separately. CPE was compared with OSCE statistically to find the significance of the difference in means between the marks of these two methods. Results: The results indicate that while students achieved higher marks in the conventional method of practical assessment compared to OSPE, the difference between the two was not deemed statistically significant ($P = 0.1$). Interestingly, over 80% of students expressed a preference for integrating OSPE into future assessments. Notably, 60% of students perceived OSPE as potentially easier to navigate than traditional practical assessments, while over 80% acknowledged its broader coverage of topics. Furthermore, a significant majority, more than 70% of students, deemed OSPE as a fairer evaluation method compared to traditional approaches. Moreover, a majority of faculty members, exceeding 50%, endorsed the feasibility of conducting OSPE within the Department of Physiology at SMIMER. Their strong consensus highlighted the objectivity and efficacy of OSPE stations in evaluating cognitive and psychomotor skills, surpassing conventional assessment methods. Conclusion: Overall, the findings suggest that
INTRODUCTION

It is a well-known fact that assessment drives learning. One of the most important aspects of training of a doctor is the acquisition of practical skills. Evaluating practical skills can be quite challenging for examiners. It has been observed that a single written examination in the undergraduate medical curriculum does not fulfill all the aspects of assessment, such as assessing knowledge, skill, and attitude. The marks awarded in such methods are usually based on the overall performance of the candidate and not on their individual skills. The assessment methods used fail to guarantee the development of the skills expected from students by the end of the course. The assessment of these skills leaves a lot to be desired using traditional methods. Moreover, this method is tedious and time-consuming. In addition, the scoring is affected based on the examiner’s variability for different students, thus decreasing its reliability and/or reproducibility. Objective structured clinical examination (OSPE) has been used to evaluate those areas most critical to perform by students, such as the ability to obtain/interpret data, solve a problem, teach, and communicate. Moreover, research shows that the type of assessment method adopted can influence student learning. All practical assessment methods must be targeted to test proficiency in psychomotor skills.

For many years, we have been following the conventional assessment method in the Department of Physiology at SMIMER Medical College in Surat. This system entails, asking the candidate to select a sealed folder and perform the two experiments listed in that folder thus it starts with a chance factor. It also incorporates subjectivity, as the student is evaluated 45 min later based on a few orally asked questions, some of which may even not be relevant to the experiments she/he has performed. The incorporation of chance factors and subjectivity associated with this form of examination led to the need for a reliable method of assessment at the Department of Physiology in SMIMER College, Surat.

The examination must be objective, reliable, and valid and conducted in a reasonable time. Our conventional method does not provide any feedback except stating pass or fail. To overcome this problem, an earlier innovation in this regard is the OSCE later extended to the OSPE described in 1975 and in greater detail in 1979 by Harden and his group. Harden defined OSCE as an assessment method in which component clinical/practical skills are evaluated in a planned, structured, and objective manner. The OSPE is a versatile multipurpose evaluation tool that can be utilized to evaluate students in practical assessment. It comprises several “stations” in which examinees are expected to perform a variety of practical tasks within a specified period against criteria formulated to the practical skill, thus demonstrating competency of skills. Thus, demonstrating competency of skills, using agreed checklists, and rotating the students around several stations. Most of which have observers/examiners with checklists.

The National Medical Commission has also advised in its curriculum to assess the practical skills of the students preferably by the OSPE method. Our conventional method also does not provide any feedback except stating pass or fail. OSPE has been found to be a reliable and valid assessment tool to test the competency of students in practical skills. Hence, after long deliberations to overcome this problem, we decided to replace it with the innovative OSPE for objective assessment of practical competence.

In principle, OSPE appropriately tests students’ grasp of subject knowledge, and it is believed that it is motivating, inspiring, and interesting. In view of this, we have implemented the system of OSPE for the assessment of practical in physiology in the Department of Physiology at SMIMER College in Surat.

Aims and Objectives

1. Implementing OSPE as an internal assessment method for practical skills in 1st-year MBBS students within the physiology department at SMIMER Medical College, Surat
2. Conducting a comparative analysis between conventional practical examination (CPE) and OSPE to evaluate the efficacy of new practical assessment methods
3. To assess student’s satisfaction with the implementation of OSPE for evaluating practical skills
4. To investigate the faculty perception of OSPE as a formative assessment tool.

MATERIALS AND METHODS

The project was planned and presented to the institutional ethical committee of SMIMER College and their approval was

while there may not be a statistically significant difference in marks obtained between traditional practical assessment methods and OSPE, there is a strong inclination among students and faculty toward incorporating OSPE into future assessments. Students appreciated the wider coverage of topics in this method. Faculty members recognize the objectivity, validity, and reliability of OSPE but are unsure about its feasibility. The consensus leans toward utilizing OSPE for formative assessment in the future.

KEY WORDS: Objective Structured Practical Examination; Formative Assessment Tools; Practical Skills
obtained. Then, to conduct the study, 138 students of 1st-year MBBS were selected after taking their consent in the physiology department of SMIMER. The first CPE was conducted on 46 students each on 3 alternate days over a period of 1 week by six faculties. The students underwent a second evaluation of the same practical skills, next week through the OSPE method. Five OSPE stations of 3 min (three procedural and two response stations) and four marks each were included at each station. Eight structured questions of 0.5 marks were included at each station to assess one specific learning objective. Feedback from students and faculties was taken separately and was assessed using a Likert’s scale-based questionnaire. Then mean of total marks obtained from CPE method was compared with the mean of marks obtained in OPCE. The data were compiled in Microsoft Excel and a paired t-test was used to find the significance of the difference in means between marks of the conventional method of practical examination and OSPE and were analyzed to find the effectiveness of the OSPE.

**RESULTS**

Marks obtained by students in the traditional method of practical assessment were better than marks obtained in OSPE. The “t”-value obtained in the paired “t”-test was 2.954. Thus, the difference between marks obtained in the two methods was not statistically significant ($P = 0.1$) [Figure 1].

More than 80% of the students wanted OSPE to be included as a tool for assessment in the future. Sixty percent of the students thought that OSPE would be easier to clear than traditional methods of practical assessment. More than 80% of the students agreed that OSPE covered a wider range of topics as compared to traditional methods. More than 70% of the students opined that OSPE was fairer as compared to traditional methods. Students were largely undecided on whether OSPE was more stressful as compared to traditional methods. There were divided opinions on whether OSPE had similarities with traditional methods. The majority of the students thought that the OSPE stations were well organized to test their knowledge. However, they were largely undecided when asked if OSPE would encourage them to pay more attention to conceptual aspects of physiology practicals [Figure 2].
More than 50% of the faculties were of the opinion that OSPE can be conducted in the Department of Physiology, SMIMER. The majority of the faculties agreed that OSPE was a reliable and fair method of assessment. Faculties were unsure if the administration of OSPE (in terms of manpower, resources, and time) was at par with the conventional method of examination. They strongly agreed that OSPE stations were more objective and better for assessing cognitive and psychomotor domains than traditional methods of assessment. However, they were divided in opinion when asked if OSPE was better timed as compared to conventional examination methods. They strongly thought that OSPE makes students aware of their areas of weakness. They also overwhelmingly thought that OSPE prepares students thoroughly for final assessment. Faculties were however undecided on whether OSPE helps in emphasizing all steps in practical examination. They agreed that OSPE largely nullifies examiner bias and subjectivity during practical examinations. Faculties were not ready to commit to whether OSPE examines practical skills better than traditional methods. However, they opined that OSPE was better structured as compared to traditional methods. The overwhelming majority agreed that OSPE should be used for formative assessment in the future [Figure 3].

Responses to “Should OSPE be included in the future as a method of assessment in physiology practical?” and “Is OSPE feasible in our department?” are recorded in Figures 4 and 5, respectively.

DISCUSSION

The comparison between conventional practical assessment (CPE) and OSPE revealed a non-significant statistical difference in marks obtained. Despite this, over 80% of students favored OSPE for future assessments due to its broader topic coverage and perceived fairness. While 60% believed OSPE would be easier to pass, opinions were divided on its stress levels and similarity to conventional methods. Faculty opinions varied regarding OSPE’s administration and timing, but they unanimously acknowledged its objectivity, capacity to prepare students for final assessments, and reduction of examiner bias. The effectiveness of OSPE in examining practical skills remained inconclusive, yet it was widely viewed as better structured for formative assessments.

- The study done by Mahajan et al. and Ravichandran et al. showed significant differences in marks obtained in

![Figure 3: Faculty feedback for objective structured practical examination](image-url)
CPE and OSPE but in our study, conventional practical assessments were comparable to those in OSPE, with a non-significant statistical difference.

- In their study, Zafar et al. found OSPE to be motivating, inspiring, and interesting. In our study, more than 80% of students preferred OSPE for future assessment, citing its wider topic coverage and fairness.

- Al Mously et al. in their study found that OSPE is a fair, reliable, effective, and useful assessment tool but the majority of the students felt stressed during OSPE. In our study, while 60% of students believed that OSPE would be easier to clear, opinions were divided on whether it was more stressful in comparison to conventional methods.

- Students generally found OSPE stations well-organized but were unsure if it would encourage attention to conceptual aspects.

- Faculty opinions varied regarding OSPE’s administration, timing, and effectiveness in assessing practical skills.

- In his study, Baral discovered that OSPE offered greater objectivity, effectively assessed practical skills, and eliminated examiner bias. Similarly, faculty members in our department also concur with the objectivity of OSPE, its effectiveness in preparing students for final assessments, and its ability to mitigate examiner bias. These findings align well with the research conducted by Ananthakrishnan too.

- Ananthakrishnan study highlights the significant advantages of incorporating OSPE as a formative assessment tool to enhance practical competence. In addition, the study by Malhotra et al. concludes that OSPE is both feasible and well received by students as an internal assessment method for practical skills during undergraduate training. While our study did not yield a consensus on whether OSPE is superior in evaluating practical skills, it was widely recognized for its structured approach to formative assessment.

CONCLUSION

Overall, the findings suggest that while there may not be a statistically significant difference in marks obtained between traditional practical assessment methods and OSPE, there is a strong inclination among students and faculty toward incorporating OSPE into future assessments. Students appreciate the wider coverage and fairness of OSPE, although opinions vary on its stress levels and similarities with traditional methods.

Faculty members recognize the objectivity, validity, and reliability of OSPE but are unsure about its logistical aspects compared to conventional methods. Despite some uncertainties, both students and faculty agree on the benefits of OSPE for identifying weaknesses, thorough preparation, and reducing examiner bias. The consensus leans toward utilizing OSPE for formative assessment in the future, indicating a shift toward its broader adoption in academic evaluations.

REFERENCES


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