



Comparison of Objective Structured Practical Examination (OSPE) Versus Conventional Pathology Practical Examination Methods Among the Second-Year Medical Students—a Cross-sectional Study

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Abstract

Introduction The medical education in India is moving towards competency-based medical education (CBME) with many cognitive and psychomotor skills needed to be taught and assessed in the various subjects of the undergraduate medical curriculum. In the Pathology subject, psychomotor skills such as haemoglobin estimation, blood grouping, urine examination, liver function test/cerebrospinal fluid interpretation, histopathology and haematology slide interpretation are taught and assessed for many years. Skill assessment by the conventional method, which is followed since many years, is subjective in nature and lack of scope for direct observation of the performance of skills. Objective structured practical examination (OSPE) is one of the methods to minimize the variations in subjectivity, thus enhancing the objectivity. Due to a technicality and labour intensity, it is implemented only in a few medical colleges and universities across India. Because of CBME curriculum on the roll, the assessment of practical skills in medical education needs to be shifted from conventional subjective methods to more objective OSPE methods.

Material and Methods After institutional ethical clearance, the second-year medical students appearing for practical in Pathology were selected for the study. Practical skills of the students were assessed by both the conventional way and OSPE after obtaining the written consent. Among 104 students, 89 students were assessed by both methods. Adequate instructions about the pattern of the examination were given in both assessment methods. For the OSPE group, specific instructions about the role of observer, response stations and method of scoring were given. Practical performance of haemoglobin estimation and blood grouping by slide method was assessed, and scores were compared. Student and faculty perception regarding OSPE was assessed by a prevalidated questionnaire.

Results In the conventional group, the mean score of 6.91 ± 1.08 was obtained, while in OSPE, it was 8.43 ± 1.41 . In comparing both, a *p* value of > 0.001 was obtained, which is found to be significant. Student's perceptions appeared to favour the OSPE format rather than the traditional examination.

Conclusion This study showed a significant difference in scores obtained by OSPE in comparison with conventional practical examination. Thus, this information suggests that OSPE format was perceived better by the students, and resulted in a higher average score. Hence, the use of OSPE as a formative assessment tool will help in modifying teaching-learning strategies so that it is beneficial to students and teachers.

Keywords OSPE · Conventional · Pathology · Practical · Perception

Introduction

The teaching-learning methods are a complex and continuous process in medical education. [1] The Medical Council of India (MCI), the regulatory body for medical education from 2019 onwards, moved towards competency-based medical education (CBME) curriculum. [1–3] The pathology subject deals with the pathogenesis of the disease and it forms the solid base for understanding the clinical manifestations,

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course and complications of the disease. [3, 4] An appropriate assessment of medical student's practical competency is an integral part of the existing and the future CBME curriculum. In the Pathology subject, various psychomotor skills such as haemoglobin estimation, blood grouping, urine examination, liver function test/cerebrospinal fluid interpretation, histopathology and haematology slide interpretation are taught and need to be assessed. Skill assessment by the conventional method, which is followed since many years, is subjective in nature and lack of scope for direct observation of the performance of skills. [1–6] For example, for assessment of the skill of blood grouping, importance will be given to the end result or his/her cognitive skills rather than assessing the systematic procedure skills. A similar form of assessment will be carried out in psychomotor skills of other clinical subjects. The teaching and assessing the gained knowledge is of crucial importance in subjects like pathology. The objective structured practical examination (OSPE) is one of the methods to minimize the variations in subjectivity, thus enhancing the objectivity. This form of assessment comprised of practical skills are structured and assessed to minimize the subjectivity. The OSPE will minimize the variations in subjectivity by different examiners during the assessment of student's cognitive and psychomotor skills. [3–5] Due to a technicality of OSPE with prior planning and coordination of the faculties, labour intensity, i.e. too many assessors are required for a simple exercise and lack of will from the faculty and management, OSPE is implemented only in a few of the medical colleges and universities in India. [3–7] Due to various constraints, this method of examination is not yet implemented in the majority of the Health Universities and medical colleges across India. Hence, the assessment of practical skills in medical education may consider shifting from conventional methods to OSPE. [4–7]

The objective of our study is to compare the OSPE versus the conventional method of assessing pathology skills of haemoglobin estimations and blood grouping in transfusion medicine. Our study compares students' scores and perceptions of these methods to suggest if one method may have a

higher education benefit than the other. We have also analysed the faculty perception among these methods.

Materials and Methods

After institutional ethical clearance, second-year medical students appearing for practicals in the Department of Pathology were selected for the study. This study was conducted in August 2018 in the Department of Pathology. Participation in the study was voluntary and with skills intended to perform were allotted to students in a random manner. The examination was conducted with prior information to the students so that they come well prepared. The confidentiality of the stations was maintained until the end of the examination. The students underwent conventional practical examination and OSPE. One hundred four students participated in the study, but 89 students appeared for both sets of practical examination; hence, only these were included. Written consent was taken from all the study participants. Adequate instructions about the pattern of examination by conventional and OSPE method were given. Practical performance of haemoglobin estimation by Sahli's method and blood grouping by slide method was assessed. Conventional examination comprised of demonstrating the required skills and in the end, the teacher used to assess the student skills subjectively. Assessment of student was teacher-centric. For example, for haemoglobin estimation, after completion of skill, the teacher used to assess the skills with either questions or questioning the steps involved in skills, similarly, for the blood group estimation. For the OSPE group, specific direction about the role of observer, response stations and method of scoring was given for the study participants and teachers. For both methods, the maximum score was 10. For the OSPE method, assessment of these skills was structured and validated with subject experts. Multiple skill and response stations were arranged (shown in Tables 1 and 2). Randomly, haemoglobin and blood grouping by slide method were allotted to the participants. Meantime taken for practical exercise was 15 min per

Table 1 OSPE checklist for haemoglobin estimation by Sahli's methods (skill and response station)

Sl No.	Skills with scores
1	Taking N/10 Hcl in Hb tube up to 2 marks (1)
2	Taking 20 μ l of blood in Hb pipette (1)
3	Wiping out the excessive blood for the Hb tube (0.5)
4	Mixing the blood and waiting for 10 min (1)
5	Diluting the mixture with distilled water until the colour matches with the comparator (2)
6	Recording Hb in Gm% (0.5)
7	Write the haemoglobin value of adult male, adult female and an infant (1.5)
8	Name the reliable method of Hb estimation (1)
9	Write the principle of Hb estimation by Sahli's method (1)
10	Name the one condition in which Hb is increased (0.5)

Table 2 OSPE station for blood grouping by slide method (skill and response station)

Sl No.	Skills with scores
1	Labelling the slide with A, B, D (1)
2	Taking 1 drop of blood in each slide and mixing with respective antisera (1 drop) (1)
3	Proper mixing with precautions (1)
4	observing the agglutination
5	Writing the appropriate ABO and Rh typing (1)
6	State the Landsteiner law (1)
7	Mention two major transfusion reactions (1)
8	Name two indications for Direct Coombs test (1)
9	List the mandatory tests performed in blood bank before blood transfusion (2)

candidate. The scores of both assessment methods in each group were tabulated and compared. Perception regarding OSPE by students and the faculty was assessed in the form of a prevalidated questionnaire. Results were analysed using SPSS software.

Results

Among the 104 students who have participated in the study, 89 of them participated in both conventional and OSPE. In the conventional group, the mean score of 6.91 ± 1.08 was obtained, while in OSPE, it was 8.43 ± 1.41 . Results are shown in Tables 3 and 4. Among the 89 participants, the majority had a score of seven (49.3%) in the routine examination whereas in the OSPE group majority had a score of nine (30.4%). The significant number of students (13.5%) attained less than 5 scores by conventional methods whereas only 2.2% scored by OSPE. The mean score for the traditional exam was 6.91 ± 1.08 whereas in the OSPE group it was 8.43 ± 1.41 . The *p* value of < 0.001 was found to be statistically significant.

This study was aimed to assess the student’s perception of OSPE. For this, student’s feedback was taken after OSPE. As shown in Table 5, the 95% of students strongly agreed that OSPE is an excellent assessment method when compared with the traditional way. They were opined that examiners’ bias was negligible, and uniformity of the assessment pattern was better. Many of them felt the conventional method has disadvantages with stress and subjectivity compared with OSPE. Many of them also opined the traditional practical approach

Table 3 Comparison of scores obtained by conventional and OSPE (expressed in %) (*n* = 89)

Assessment methods	The total score obtained (%)					
	≤5	6	7	8	9	10
Conventional	13.5	13.5	49.4	16.9	5.6	1.1
OSPE	2.2	6.7	16.9	18.1	30.3	25.8

should continue; however, they need to give more importance to objective methods like OSPE. 68.1% of students felt that OSPE was less stressful compared with the traditional method of practical examination.

Six faculties were involved in the assessment. Their perception about the examination was taken. All the faculties felt that OSPE is an excellent tool for assessing the psychomotor skills compared with the traditional examination with more objective nature.

Discussion

The MCI is implementing the new CBME curriculum from the academic year 2019–2020, where assessment is an essential step in analysing the knowledge of the learners and acquired skills. [1–3] This CBME curriculum comprised of certifying the skills after assessment, the practical skills in medical education which is followed since many years need to be shifted from conventional subjective methods to objective OSPE. [4–10]

The student assessment will be the single and strong determinant of what students have learned as compared with what has been taught. [3–6] Discussions are going on with the medical education experts to make the assessment more objective compared with conventional subjective examination. [4–6] Most of the medical colleges in India are following the traditional practical examination pattern, which was designed many years ago. This is due to lack of cooperation and poor coordination from the faculty, management and regulatory bodies like MCI in India [1–7]. Attempts are being made to make the practical examination more reliable and valid. Few

Table 4 Comparison of mean scores obtained by conventional and OSPE (*n* = 89), Wilcoxon signed-rank test

	Conventional	OSPE	<i>p</i> value
Mean±SD	6.91 ± 1.08	8.43 ± 1.41	$< 0.001^*$

**p* value considered statistically significant

of the premier institutes in India have already started the OSPE in psychomotor skill assessment. [5–11]

The OSPE/OSCE (objective structured clinical examination) is utilized for the practical assessment of preclinical, paraclinical and clinical subjects. Harden described the OSCE in 1975 as a means to assess the clinical skills of final-year medical students. The benefits of the OSPE to learners, faculty, institutions, and the public are significant. [8–13] The labour- and resource-intensive method has become standard practice in the modern assessment of clinical competence across the world. [10–17] This type of examination has growing international popularity with educational experts now recommending OSPE for both educational and evaluation purposes. [8–11] It is an excellent tool to avoid inter-examiners' bias, to bring objectivity in the exam and simultaneously, the student has higher chances to express their knowledge. [7–9] The essential advantages are to judge interactive skills, assess the depth of knowledge and provide flexibility to examiners. [7–11] If the benefits are weighed against disadvantages, the demerits of regular practical examination followed since many years outweigh its merits. This study was a small attempt to compare the conventional practical examination with OSPE in pathology practical examination. In our study, a total of 89 students have participated in both forms of assessment methods. Similar attempts have been made in different medical speciality subjects to compare the traditional methods versus OPSE. [10–14]

The study by Nigam R et al. was to evaluate the efficacy of OSPE as an assessment tool compared with conventional practical examination in the subject of Community Medicine with similar results. [9] The study by Trivedi et al. also concluded that using OSPE as a better assessment tool with the students gives a chance to score better. [10] In our study, it

was found that students score higher in OSPE than in traditional methods of assessment.

We have analysed the student's perception of the examination. This is similar to many of the previous studies in other medical subjects. [10–17] In the present study, 90% agreed that the degree of students' stress in OSPE was less as compared with the traditional practical examination, which is similar to a study conducted by Wadde et al. [4–8] A balance has to be done in covering maximum portion, and increasing the number of OSPE stations for the same. In the present study, 68.1% of students felt that OSPE was less stressful compared with the traditional method of practical examination. The fact that the students think they are objectively assessed gives them more confidence and makes them much less stressful. Stress-related student suicides are also on the rise in recent times. In such circumstances, less stressful methods like OSPE can benefit the students both emotionally and psychologically. [10–18] After OSPE, we analysed the answers and were able to identify the common errors committed by the students. This helped us to recognize the areas or topic where more emphasis was needed in subsequent lectures. The study showed students and faculties were optimistic and positive towards OSPE and felt that it should be followed as a method of assessment in the practical assessment of various subjects.

We also analysed the perception of faculty [6] towards the two forms of assessment as a secondary objective. The study by Radhika et al. found 94% faculties felt that OSPE is an excellent method of assessment that is similar to the present study. [14] The faculties have a positive attitude towards OSPE, and thus, they may be amicable for OSPE implementation as a method of assessment. The study by Vijay et al. found that the majority of teachers agreed that OSPE could eliminate inter-examiner bias. [15] The examiner's

Table 5 Students perception questionnaire

Sl No.	Statement	Agree (%)	Don't know (%)	Disagree (%)
1	Questions asked in OSPE were relevant to assess my knowledge	97.8	1.1	1.1
2	Sufficient time was given to each student in OSPE	100	0	0
3	The procedure stations that were used in OSPE were relevant to demonstrate the practical skills	100	0	0
4	OSPE covered a wider range of knowledge as compared to the traditional method	93.4	3.3	3.3
5	There is no difference in the examination of practical skills by OSPE or the traditional method	0	12.4	87.6
6	Practical skills are better tested in the examination by the traditional method	7.8	7.8	84.4
7	OSPE is a more objective way of assessment as compared to the traditional method	87.6	2.2	10.2
8	OSPE is easier to pass as compared to the traditional method	88.7	1.1	11.2
9	OSPE is more stressful as compared to the traditional method	10.2	2.2	87.6
10	OSPE should be followed as the method of assessment of practical skills in Pathology	93.4	3.3	3.3
11	The traditional method of assessment of practical skills should continue in Pathology	87.6	2.1	10.2
12	OSPE should be extended to other subjects as well as a method of assessment of practical skills	97.8	1.1	1.1
13	OSPE has resulted in improving my practical skills	97.8	1.1	1.1
14	I feel more confident in performing practical tests after OSPE	93.4	3.3	3.3
15	I feel more satisfied with my assessment with OSPE as compared to the traditional method	93.4	3.3	3.3

subjectivity and favouritism are few essential factors, which negatively affect students' performance in traditional methods. These are minimized largely in OSPE, which help the students score better knowledge compared with conventional examination methods. [10–16]

The OSPE assesses cognitive, psychomotor and affective domains while traditional practical examination usually is useful only in determining cognitive domain and some aspects of the psychomotor domain. [10–12] The OSPE can assess the knowledge but also the skills and attitude of students in a short time. Various stations used in OSPE can be tuned with different portions of the syllabus, and thus students can be assessed more comprehensively. [8–12]

Conclusion

This study showed there was a significant difference in scores obtained in OSPE, in comparison with conventional practical examination. Hence, OSPE is a more effective and valid assessment tool as inter-examiner variation and bias will be eliminated. OSPE should be further enforced in other Indian medical universities and colleges. Use of OSPE as a formative tool will help in modifying teaching-learning strategies so that both the teachers and the students can derive maximum benefit.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval Institutional ethics committee approval taken before starting the study.

Informed Consent Taken from all the study participants.

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