

Comparison Of Objective Structured Practical Examination To Conventional Practical Examination In Microbiology.

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Abstract: Background & Objectives: Objective structured practical examination (OSPE) is a good tool to assess skill competency. The objectives of the study was to compare the score of marks obtained by Conventional method of assessment (CPE) with OSPE for assessing skill competency to perform Gram and Zeihl- Neelsen stain and to know the students' and teachers' perception about OSPE. Methods: Ninety two MBBS students were included in the study as 'OSPE' and 'CPE' groups (46+46). The two groups were assessed for their skill competency to perform Gram and Zeihl- Neelsen stain using OSPE and CPE methods respectively. Teachers' perception was analysed for both the assessment methods with respect to objectivity, reliability, validity, feasibility etc. Feedback was taken from students too. Results: The difference of marks score by OSPE and CPE was found to be extremely statistically significant. The perception (students' & teachers') assessment reflected the acceptability of the method among students and teachers. Interpretation & Conclusion: OSPE is a tool which would help increase the objectivity while assessing skills in Microbiology and needs to be evaluated further so as to enable teachers to use this valuable tool alone or in combination with CPE. [Namrata K NJIRM 2016; 7(5):87-91]

Key Words: Assessment, Gram stain, Microbiology, OSPE, Zeihl- Neelsen stain.

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Introduction: New teaching and assessment methodologies have been introduced in medical education in last two decades.¹ Nowadays, the learning and teaching approaches are designed and structured to ensure that the medical students not only acquire the appropriate scientific and clinical knowledge, but also the practical procedural and communication skills, i.e., all the three domains of learning, cognitive, affective and psychomotor.² Medical graduates are expected to integrate knowledge, advocate health issues, communicate well, take care of patients as well as society and become a lifelong learner.³ Each competency usually involves more than one domain of learning and comprises a number of small tasks forming specific learning objectives.⁴ For these objectives to be achieved, the importance of an assessment tool with characteristics of validity, reliability, feasibility, and higher educational impact cannot be denied.⁵

The assessment of the student in conventional practical examination (CPE) is based on global (overall) performance rather than candidate's individual practical competency.⁶ There has been a lack of objectivity during the evaluation of student's skill competency in the practical examination. Subjectivity and inter examiner variation and bias have been the highlight of most examinations.⁷ It is with this view in mind that educationists have been trying to devise ways by which skills can be evaluated using an

objective tool. One method which can be employed is Objective structured clinical/practical examination (OSCE/OSPE), which can be used as an evaluation as well as teaching tool. OSPE stations can be used to test laboratory based measurements or procedures, microscopic skills and applied medical aspects. After defining the objective, the task to be assessed is identified. This task is broken down into subtasks and scores are assigned to each subtask. Checklists are created and the OSPE stations are set up. Stations could be equipped with photomicrographs, specimens, computer graphics or illustrations, X-Rays, laboratory reports etc depending on the objective of testing station. The students and examiners are oriented to the process. The results are analyzed and the process is reviewed for future use.^{5,8,9}

At present our Institute (IGIMS) is following the conventional practical method only. Keeping the above facts in mind, the study was proposed with the aim to know the effectiveness and acceptability of OSPE over CPE as an assessment tool in Microbiology.

Objectives were to :

- compare the score of marks obtained by OSPE with Conventional method of assessment (CPE)
- know the students' and teachers' perception about OSPE.

Materials and Methods: The study was conducted and analyzed in the Department of Microbiology at Indira Gandhi Institute of Medical Sciences (IGIMS) , Patna, Bihar in a duration of 4 & ½ months, from April to mid August 2015 after getting approval from the Institutional Ethics Committee. This experimental comparative study involved the Students of MBBS course, 4th semester and teachers (5 faculty members and 4 senior residents) of the department of Microbiology. Persons willing to participate, only were included in the study.

The students were selected by simple random sampling to be divided into ‘CPE’ and ‘OSPE’ groups, each being of 46 students. An orientation program along with practice session was organized for teachers regarding newer assessment tools and techniques specially OSPE. The students participating in the study were introduced to the OSPE system by short lectures and demonstrations organized by these teachers. A verbal informed consent was taken from all the participants.

In the conventional assessment method (CPE), each student performed practical skill on Gram and Zeihl-Neelsen staining, which was followed by a viva-voce on the same and the judgment of the student was done based on overall performance of the student. Each student was asked unique questions with no standardization or uniformity. While in OSPE, blueprint of the structured checklists for six stations on Gram and Zeihl- Neelsen staining were prepared as per Bloom’s taxonomy along with examiner’s and student’s instruction manual. The checklists were validated with standard answers by senior faculty members.

OSPE set up was used for the ‘OSPE’ group. Similarly the conventional method was applied for the ‘CPE’ group. In OSPE, the stations were allotted time, according to its need to complete the exercise. A time of 2 minutes extra was given to each student to facilitate movement to the stations and read the instructions. At a time, single student was present at the station to perform the exercise and was assessed by the examiner, present there, using the checklist. In CPE, all the 46 students were asked to perform the skill at their respective places in the practical examination hall. Examination started at a fixed time. Forty five minutes were given to perform the exercises but viva was taken one by one.

Out of 5 faculty members, four senior faculty along with two senior residents were examiners and conducted CPE for ‘CPE’ group, followed by OSPE for ‘OSPE’ group the next day. The other one faculty with two more senior residents was involved in administrative aspect of examination (general conduction of the entire examination procedure). At the end of the CPE and OSPE, all the 5 faculty members with 4 senior residents answered an open – ended questionnaire regarding their experience on CPE and OSPE with respect to objectivity, reliability, validity, feasibility etc (while conducting these assessment methods). CPE group of students were given the opportunity to watch OSPE.

Quantitative analysis was done on the marks scores obtained by the two methods. This score was not included in formative or summative assessment. Unpaired t-test was used to test the significance of difference in mean of the two samples. Online version of Graph-Pad was used for the purpose.

Teachers’ perception, on the mentioned themes, was also analysed. Feedback was taken from students too.

Results: Marks Score Analysis: The scores from both methodologies were plotted as histograms (Figure 1). The CPE plot can be seen as left skewed (Figure 2), which implies tendency towards lower scores. Whereas OSPE plot can be found to be right skewed (Figure), which implies tendency towards higher scores. Unpaired t-test was conducted to test the significance of difference in mean of the two samples (OSPE & CPE): Table 1.

Table 1: Descriptive Summary of scores

Method	Sample Size	Max Score	Mean Score	Standard Deviation	Standard Error
CPE	46	28	16.30	1.75	0.2580
OSPE	46	28	24.13	1.92	0.2831

Summary of Analysis: Statistical significance: The two-tailed P value was found to be less than 0.0001. By conventional criteria, this difference is considered to be statistically extremely significant.

Confidence interval: The mean of Conventional minus OSPE equals -7.8300 95% confidence interval of this difference: From -8.5910 to -7.0690 Intermediate values used in calculations: t = 20.4420 df = 90 Standard error of difference = 0.383

Perception (teachers' & students') Analysis: Table 2 and Table 3 are showing feedback from students and views from teachers respectively. Most of the

students and teachers liked the method (OSPE), however at few places they had neutral attitude. Moreover, they could also point out some shortcomings of the method.

Figure 1 : Comparison Between CPE And OSPE Scores

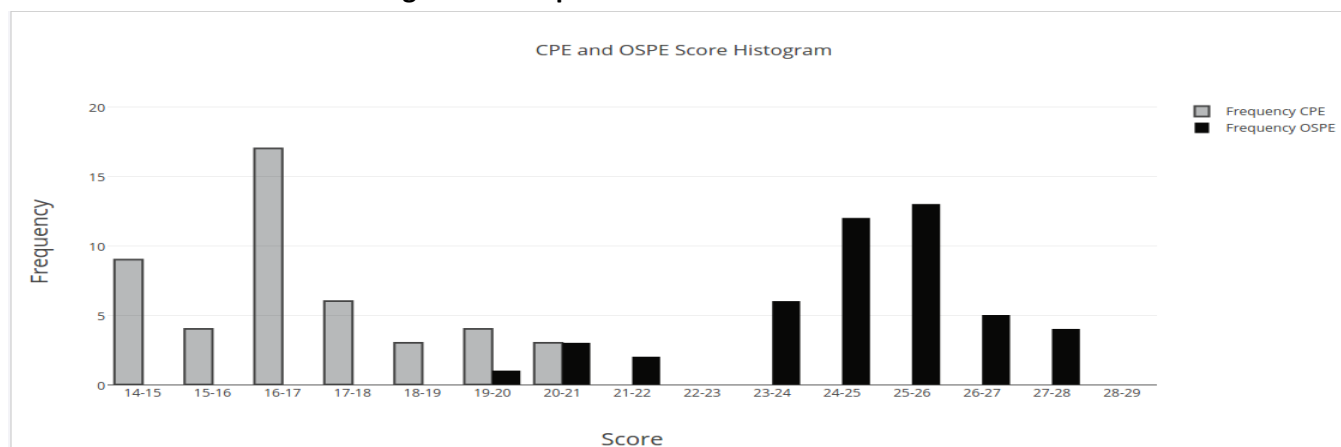


Table 2: Feedback From Students (N=92)

Questions	Agree (%)	Neutral (%)	Disagree (%)
1.The OSPE was conducted in a well organized manner	90(97.83)	2(2.17)	0(0)
2. The examination (OSPE) conducted covered most of the aspects of Gram staining skill	83(90.22)	9(9.78)	0(0)
3. OSPE is a fair method of assessment	92(100)	0(0)	0(0)
4. OSPE is a better way to assess the different aspects of knowledge & skill	88(95.65)	4(4.35)	0(0)
5. " OSPE is helpful for improving our learning"	84(91.30)	7(7.61)	1(1.09)
6. "OSPE will improve our performance in the examination"	83(90.22)	9(9.78)	0(0)
7. OSPE is an ideal setting for giving feedback	68(73.91)	12(13.04)	12(13.04)
8. OSPE is more comfortable method for the students	88(95.65)	4(4.35)	0(0)
9. Observer's attitude during OSPE was better compared with	81(88.04)	11(11.96)	0(0)

conventional method			
10. OSPE(Objective structured Practical Examination) can be good teaching tool to learn microbiology	88(95.65)	4(4.35)	0(0)

Table 3: Teachers' Views (N=9)

Questions	Agree (%)	Neutral (%)	Disagree (%)
1. OSPE covers a wide range of knowledge and can assess all domains of learning in a better manner compared to CPE.	7(77.78)	2(22.22)	0(0)
2. OSPE compels students to learn the skill more perfectly and in detail.	9(100)	0(0)	0(0)
3. OSPE is more easy and convenient to conduct as compared to CPE.	7(77.78)	2(22.22)	0(0)
4. OSPE is less time consuming when it is applied to a large number of students	7(77.78)	2(22.22)	0(0)
5. OSPE keeps the students more focused and disciplined	7(77.78)	2(22.22)	0(0)
6. OSPE provides a fairer method of assessment	7(77.78)	2(22.22)	0(0)
7. OSPE is reproducible and internally consistent	5(55.56)	2(22.22)	2(22.22)

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8. OSPE reduces individual examiner bias.	7(77.78)	2(22.22)	0(0)
9. OSPE has higher educational impact.	5(55.56)	4(44.44)	0(0)
10. OSPE can be the method of assessment in the coming examinations- internal or final.	5(55.56)	4(44.44)	0(0)
11. It is better to use the combination of OSPE and CPE to make the system more valid and reliable.	9(100)	0(0)	0(0)

“Shortcomings of the method” (as per teachers’ perception and suggestions) were: As the questions tend to be ‘typed’, time to time changes are always needed. More manpower and expertise is needed. At some places comprehensive assessment seems to be better, so it is wise to incorporate CPE also in some of the assessments.

Discussion: Examiners have always tried various methods to assess students in a fair manner. The conventional scoring system involves the global scoring patterns, which categorizes students into clear fail, borderline, clear pass, very good pass and excellent pass.⁸ As this encourages assessment of the students’ overall performance there is a need to generate assessment methods which would test skill competency alone and have an increased objectivity. In addition to this the utility of any assessment tool is based on the reliability, validity, acceptability, feasibility and educational impact.⁸ It was Harden et al in 1975 who introduced the concept of objective structured examinations as a better method for assessment of student skills.⁹

The current study was undertaken to evaluate OSPE as an assessment tool in comparison with CPE for assessing skill competency in the department of Microbiology. Scores obtained in OSPE was definitely improved as compared to the conventional scoring system. The difference was extremely statistically significant. The probable reason for the lower scores in CPE was because the students were evaluated on their overall performance whereas the OSPE assessed the practical skill of performing gram and Z. N. staining. The objectives for assessment were fixed. So this study suggests that OSPE would be a good skill assessment tool.

Similar studies in physiology and biochemistry have shown that OSPE is a reliable tool that can be used

both for teaching as well as assessment.^{10,11} A recent study on OSCE from the department of Medicine from this same Institute also shows the same type of result.¹² However in a critique published by Barman, the reliability, validity, objectivity and feasibility of this type of examination depends upon the number of stations, construction of the stations, methods of scoring (checklists) and number of students being assessed. Hence for a comprehensive assessment the OSPE/OSCE examination should be used in conjunction with other methods.¹³

The perception (students’ & teachers’) assessment also was quite encouraging. It reflected the acceptability of the method among students and teachers.

Students accepted it as objective oriented, fair and unbiased method. According to them, they could perform better as compared to CPE as there was no fear of examiners. The same has been reported by Wani et al.¹⁴ A large number of students went in favour of the method as they expected it to improve their knowledge and performance.

Most of the teachers liked the method due to its merits of being easy, less time consuming and finding the students more disciplined during the process. All the teachers agreed on the fact that the method compels the students to learn the skill more accurately and in detail.

Most of the teachers were in favour of incorporating it as a method of assessment in formative as well as summative examination. But all the teachers agreed on the opinion of using the combination of OSPE and CPE to make the assessment system more valid and reliable. The same has been reported by Wani et al and many of the researchers.¹⁵

So the study strengthens the recommendation that OSPE should be incorporated in the assessment system.

Limitations: Stations set assessed the cognitive and psychomotor skills only. Study was restricted to a small and specific group. Long term effect of the claim has not been checked

Conclusion: OSPE is a tool which would help increase the objectivity while assessing skills in Microbiology

and needs to be evaluated further so as to enable teachers to use this valuable tool alone or in combination with CPE.

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