Objective Structured Practical Examination as a tool for evaluating competency in Gram staining

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Abstract

Background: Objective structured practical examination is a good tool to assess skill competency. Subjectivity and inter-examiner bias is minimal in this method of assessment.

Aim: The objective of the study was to compare the conventional method of assessment with OSPE to assess skill competency to perform Gram stain.

Methodology: 25 Undergraduate students were included in the study. They were assessed using both methods

Results: There was a significant improvement in the scores obtained by the students in OSPE in comparison to the conventional method(p value <0.001)

Conclusion: OSPE can be implemented as a teaching and assessment tool for skill competency in performing Gram stain.

Key words: Assessment, OSPE, Gram stain.

Introduction :

Medical education has always had challenges with respect to assessment methods. Subjectivity and inter-examiner variation and bias have been the highlight of most examinations. There have been attempts to improve and increase the objectivity of written examination by the introduction of structured essay questions and Multiple Choice Questions. There has however been a lack of objectivity during the evaluation of students skill competency during the practical examination.[1] Assessment of the students should be based solely on student variability in the skill being tested. However in the current system of evaluation, experiment variability and examiner variability have a direct effect on the score of the student. The scores obtained by the student usually reflects the overall performance of the student in the practical examination and is not based on demonstration of individual skill competency of the student.[2]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). This 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,simulation skills and applied medical aspects..There are many steps involved in designing and implementing an OSPE station. 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.[3,4] The current study was under taken as a pilot project to evaluate OSPE as a tool to evaluate skill competency in Gram staining.

Methodology

25 students of MBBS were included in the study. The skill being assessed was performance of Gram stain. This particular skill was selected because the stain involved forms the basis of microscopic diagnosis in most of the infectious conditions.

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A checklist was developed for evaluating the student's skill to perform gram stain. (Table 1)This checklist had been shown to the students and discussed between the participating examiners. Four identical stations were set up and provided with stains, staining racks and slides. The four examiners were provided with the checklist and columns to assess the individual students.

Results

25 students were asked to perform the gram stain and assessed using two methods of scoring namely the conventional method and OSPE. Mean score of OSPE was 7.56/8(SD ± 0.48) with scores ranging from 6.5 to 8/8.Mean score by the conventional method was 4.96/8(SD ± 0.53) with scores ranging from 4 to 6/8. Both the scores were then compared.The statistical test applied was Wilcoxon Signed Ranks Test.There was a statistically significant improvement in the scores of the students in OSPE as compared to the conventional method.(p value <0.001).Refer Chart 1

Discussion

Examiners have always tried various methods to assess students in a fair manner.The conventional scoring system involves the global scoring patterns which categorises students into clear fail, borderline, clear pass, very good pass and excellent pass.[5] 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.[6] It was Harden et al in 1975 who introduced the concept of objective structured examinations as a better method for assessment of student skills.[7] OSCE and OSPE have been tools that have many advantages to use.They evaluate specific skills using multiple(15-20) testing stations.All the candidates are presented with the same test and there is a structured scheme of marking the student.OSCE can have the following types of stations History taking,explanation/response, clinical examination and procedure station.[6] Standardized patients can be used for these stations.

The current study was undertaken to evaluate OSPE as an assessment tool in comparison with the conventional method for assessing skill competency in Gram staining. Students were asked to perform the gram stain and were assessed using both the methods. There was a definite improvement in the scores obtained in OSPE as compared to the conventional scoring system. The difference was statistically significant. The probable reason for the lower scores in the conventional marking system was because the student was also asked questions and was then evaluated on his overall performance whereas the OSPE assessed the practical skill of performing gram stain. 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.[8,9] 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 OSCE/OSPE examination should be used in conjunction with other methods.[10] The limitation of the current study is the small sample size. The authors plan to continue and expand the study by inclusion of more students and other skills including performance of other stains and sample collection stations.

Conclusion

The authors conclude that 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 optimally.

Chart 1.

Individual scores of students using both the methods

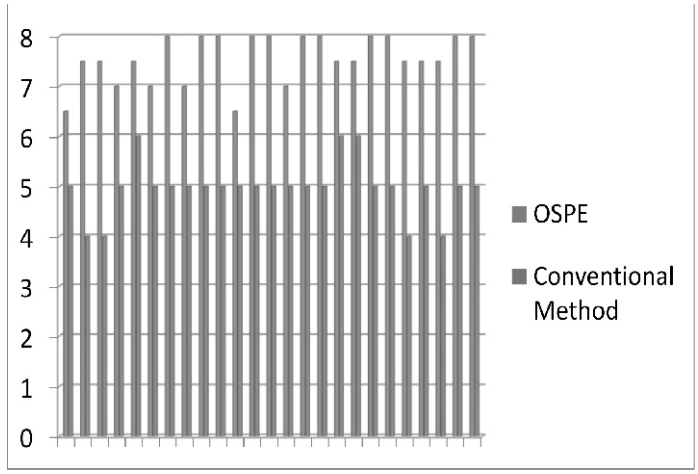

Table 1

Checklist for the Gram stain OSPE station

Sl No	Step
1	Student picks up the slide and confirms that it is the smear to be stained
2.	Confirms the side of slide on which the smear is on
3.	Puts the primary stain(Methyl violet) on the smear area
4.	Keeps the stain on for 1 minute
5.	Washes the smear with distilled water
6.	Puts the mordant(Gram's iodine) on the smear area
7.	Keeps it on for 1 minute
8.	Decolorises the smear with absolute alcohol
9.	Tells that the endpoint of decolorisation is when a colourless drop falls or a maximum of 30 seconds
10.	Washes the smear with distilled water
11.	Puts dilute carbol fuschin on the smear
12.	Leaves the stain on for 30 seconds
13.	Washes the smear with distilled water
14.	Air dries the smear and visualizes the smear under oil immersion microscope

References

1. N.Ananthkrishnan, K.R. Sethuraman, Santosh kumar.Medical education principles and practice. 2nd edn. pondicherry: Alumni Association of National teacher training centre, JIPMER; 2000.
2. Ananthkrishnan N. Objective structured clinical/practical examination(OSCE/OSPE). J Postgrad Med 1993;39:82
3. Medical Education technology Workshop.Participants workbook.Regional training centre,St.John's Medical College,Bangalore ;April 2011
4. ww.idealmed.org/workshop/OSPE J Ware.ppt
5. http://www.ltsn-01.ac.uk
6. Van der Vleuten, C. The assessment of professional competence : developments, research and practical implications Advances in Health Science Education 1996, Vol 1: 41-67
7. Harden R.M, M Stevenson, W. WDownie, G.M. Wilson. Assesment of clinical competence using objective structured examination.Br Med J, 1975;1:447-51
8. Nayar U, Malik SL, Bijlani R.L. Objective structured practical examination : a new concept in assessment of laboratory exercises in preclinical sciences. Med Educ. 1986 May; 20(3):204-9
9. Kundu D, Das HN, Sen G, Osta M, Mandal T, Gautam D. Objective structured practical examination in Biochemistry: An experience in Medical College, Kolkata.J Nat Sci Biol Med.2013 Jan;4(1):103-7
10. Barman A. Critiques on the Objective Structured Clinical Examination. Ann Acad Med Singapore, 2005;34:478-82

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