Original Article

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An Objective Structured Practical Examination to Test Undergraduate Medical Students in Anatomy

Shilpa Bhimalli*, Daksha Dixit, Mahantesh Siddibhavi***, Sheetal Pattanshetti******

Abstract

Introduction: Objective Structured Practical Examination is a method of assessment having high validity and reliability and can assess all the domains of Medical Education. This method removes subjectivity bias and is more objective. **Method:** The total number of students can be divided into batches of equal students. The students are rotated to all the stations. The students have to attend three types of stations i.e. Procedure station, Question station, and Interpretation station. **Conclusion:** OSPE is well accepted by the students and Examiners as compared to traditional practical Examination and overall it is an Objective, Valid, Reliable and Reproducible assessment methodology.

Keywords: Objective structured practical examination; Assessment; Objective; Valid; Reliable.

Introduction

Objective Structured Practical Examination (OSPE) is a method of assessment where a student's competencies like the knowledge, skill and attitudes is tested objectively rather than subjectively and the systems or areas tested are carefully planned by examiners. Several studies have proved the OSCE/OSPE as a reliable assessment tool.[1,2] The OSPE is an assessment having high validity and reliability.[3] It minimizes the subjectivity bias. This assessment method is overall a reliable, valid and reproducible method both for formative as well as summative evaluation. This method can test in the students what they can do rather than what they know. OSPE is now believed to meet the deficiencies of the conventional system of practical examination.

Author's Affiliation: *Associate Professor, **Professor & HOD, ****Assistant Professor, Department of Anatomy, Jawaharlal Nehru Medical College, Belgaum, *** Reader, Department of Public Health Dentistry, KLE'S Dental College, Bangalore, Karnataka, India.

Reprint's Request: Dr. Shilpa. M. Bhimalli, Department of Anatomy, JNMC, Belgaum, Karnataka, India.

E-mail: shilpambhimalli@gmail.com

The present assessment method (i.e.) traditional practical and viva – voce cannot assess all the domains of Medical Education. In the Millers pyramid[4] only 'knows' and 'knows how' level are assessed in the traditional assessment method. While the OSPE asseses'upto 'shows how' level of Millers pyramid. The oral examination (or viva voce) has been a traditional part of the examiners tool kit for many years and since decades the students are undergoing the same pattern of formative and summative assessment. The formative assessment is done during the course of study, wherein, the students have the opportunity to understand the content they have already mastered and the content that needs to be studied.[5] The formative assessment includes the written and practical exams.

Our institution follows the traditional practical exam with viva-voce. In this practical exam of anatomy a total of 150 students are divided into 5 batches each consisting of 30 students. The exam is conducted for 5 consecutive days. Each day 30 students of group are divided into 2 subgroups. Fifteen students first attend gross anatomy and 15 attend histology and later the two subgroups are switched. In gross anatomy each student is given a specimen and the time allotted is

around 20 minutes and later discussion is done on the allotted specimen with the Examiner. This is time bound, as the examiner has to attend all the students. After discussion they have to undergo surface marking and spotter test. In histology, a 2 slides discussion with the examiner along with spotter test is done. After practical exams there is viva voce (oral examination) which includes discussion on embryology models, X-rays, osteology and gross specimens. We have formative assessment and summative assessment in this same pattern. In this traditional type of examination there are few advantages like there is direct face to face discussion with the students. There may be opportunity for the examiner to question the student on how he/she has arrived at the answer and if properly designed and conducted a wide coverage of the subject areas is possible. But this present traditional practical examination has many limitations. This is time bound because many students are to be assessed in a given time so few questions are asked in practical discussion and may not assess all the domains. There are many threats to variability [5] and there is construct under sampling (CU) where all the domains are not assessed. It does not measure what it is indented to measure. It is seen that sometimes the questions asked by the examiner are not clear. This might effect in scoring of student. The examination is also not reliable as there is no uniformity in time/duration, question content and in allotting marks. The question asked by the examiner might be too easy or too hard and central tendency is also observed. There is also topic bias observed, not same question asked to all students. There is personality, language/cultural bias seen. There are single or too few raters so the scoring is biased. Many institutions are facing the same situation. The OSPE system has been reported to be a good substitute for the conventional method since it is more objective.

Review of Literature

In a study where in the author describes the conventional practical examination assessment is made on the basis of global performance rather than the candidates individual competency. Some of the problems involved in conventional practical examination include patient and examiner variability significantly affecting the scores. In OSPE the process as well as the product is tested giving importance to individual competency. The examiner variability is prevented in OSPE thus improving the validity of the examination.[6]

Davis *et al*[7] reported that the viva or oral discussion during practical is usually unstructured and does not have pre-validated questions and answers. The topics assessed the level of difficulty of questions asked and the amount of help or prompting the candidate received may vary widely. The exam may thus be unfair to individual candidate.

Swanson *et al* (1995) estimated that approximately 8 hours of examiners time (either as paired examiner or individual examiners) is needed to produce an acceptable degree of reliability.[8]

According to a study conducted in 2001, the author compared the student's performance in traditional and objective structured practical examination. The students were divided into 3 batches and batches II appeared for traditional and batches I and III appeared for OSPE. The result showed that OSPE can be used to incorporate a large number of questions and skills from a wide variety and the students tested from a much wider sphere of cognitive competency skills compared to traditional method of examination and concluded that OSPE appears to be a reliable measurement tool to discriminate between good and poor performers in physiology practical examination.[9]

Most of the authors agree that structured examinations have better validity and reliability with less susceptibility to gender or cultural bias than unstructured examination.

In a questionnaire survey study conducted on the nature of oral examinations in different

disciplines in Medical Schools in Sri-Lanka, which included twelve disciplines, it was found that the time duration of the oral encounter ranged from 10-20 minutes. The number of questions asked ranged from 5 to 9 and the questions were simple recall level and none at the level of problem solving. The oral examination in addition to its inherent weakness of low reliability and objectivity also lacks validity in terms of content sampling. Content analysis of the items also revealed that all the abilities tested in orals could best be tested in pen-and-paper examination or a structured practical or clinical examination.[10]

In another study conducted in 1986, OSPE was rated by the students as a reliable, effective, useful, interesting and challenging examination although it was considered taxing both mentally and physically.[11,12]

In a similar study, the author compared the OSPE examination with traditional type of examination. In traditional type of examination, external examiners complained about the extensiveness of the examination and students complained about the irrelevant questions asked by the examiners and also that the questions asked in the performance exercises varied from easy to tough questions , giving rise to much variation in the scores. OSPE was adopted as a method of assessment with the intention of restricting the examination only in the before-noon sessions, thereby reducing the total time, to make the assessment uniform for all students and also to reduce the stress of students by making them go through only 1 round of examination instead of 2 rounds.[13]

The proposed solution is objective structured practical examination. OSPE is a method of assessment where a student competence is tested objectively rather that subjectively and areas tested are carefully planned by examiners.

Before implementing of OSPE an exam blue printing ensures that the domain of interest is systematically and representatively sampled.[5] The blue print includes:

- Depending upon the curriculum purpose and domain of the station is clearly defined.
- Identifing the skills which the students must learn and thus need to be assessed.
- Identifying the number of stations and allotting the time/duration (5 min) depending upon the competencies to be assessed in the examination.
- Identifying the number of questions per station.
- There should be multiple examiners at multiple stations.

The next very important step is the training of examiner.[5] The examiners must be clearly instructed or trained about their roles at the observation station. They should be explained the competencies to be assessed, types of questions to be asked and how to use trigger material.

Method

Before starting the examination it is good to review and validate the test by mock test with any PG student and all the stations should be ready by the previous day. Before examination students must be given clear and concise instructions about the different stations.

The total of 150 students were divided into 5 practical batches each consisting of 30 students. The OSPE examination is conducted for 5 consecutive days. The OSPE stations consist of 10 stations each of which requires 5 minutes of time. All the stations should be capable of being completed in the same time. The students are rotated through all stations and have to move to the next station at the signal. The students can start with any station and complete all as there are independent stations. Thus using 10 stations of 5 minutes each, 30 students can complete the examination within 2 hours. There are three types of station where the students have to attend. There are 3 procedure stations where the students have to perform e.g. perform the

movement of first carpo-metacarpal joint. (Annexure I). The observer has the checklist and he / she observes the performance of the student and marks scores on the checklist. At other stations called question stations contextual questions which can't be asked properly in theory exams are asked. The allotted time is 5 minutes and 5 marks where each questions carries 1mark. For e.g. (Annexure II) and other stations are interpretation stations where questions asked are in relation to a given model, chart or bones (Annexure III). In common answer sheet student will go at all the stations and either performs or answer questions in common answer sheet and keep the answer sheet with him\her and submit at the end of the whole exam. Here they will write Roll.No and other basic formalities in the common answer sheet. After the examination is over, the answer sheets are collected and then feedback is provided to the examiners as well as students to note any deficiency in the organization and rectified in the subsequent examinations.

There are many advantages of introducing this OSPE examination. The first and foremost is all the domains of Medical Education can be assessed. A large number of students can be examined at a same time. This method removes subjectively bias and is more objective. All the students undertake similar stations and are judged on common parameters thus permiting uniform and reproducible level of assessment. Overall, this method is an objective, valid and reliable method, both for formative and summative assessment.[3] This method has little limitations, the students' knowledge and skills are tested in compartments. It requires extensive planning and preparation on the part of examiners. It requires more time, resources and there might be a risk of observer fatigue. The examiners need to be specially trained for OSPE.

Conclusion

In conclusion OSPE is well accepted by the students and examiners compared to traditional practical examination and overall, it is an objective, valid, reliable and reproducible assessment methodology.

Annexure – I (Procedure Station)

OSPE in Anatomy

Check List for the Observer

Student Registration No. Max. Marks : 05 Time : 5 Minutes

Instructions to the observer:

- Marks (-/) if yes / does the procedure correctly
- Marks (x) if no / does not do the procedure correctly
- Each step carries 1 mark

Does/Does Not	**Marks**
Flexion: Movement of thumb in plane of palm medially	1
Extension: Movement of thumb in plane of palm laterally	1
Adduction: Movement of thumb towards the other fingers at a plane right angels to palm	1
Abduction: Movements of thumb away from other fingers at plane right angle to other fingers	1
Opposition: Tip of thumb touching the tips of other fingers	1

Annexure – II (Question Station)

OSPE in Anatomy

OSPE Station No. Time: 5 Minutes Max. Marks: 05

Student Registration No.	**Marks**
1. Identify the slide?	1
2. Name the two identification features of it.	1
3. What type of fibers are present	

in the perichondrium	1
4. Name the cells present in it	1
5. Give any two examples	1

Annexure – III (Interpretation Station)

OSPE in Anatomy

OSPE Station No. Time:5 Minutes Max. Marks: 05

Instructions to the students	**Marks**
1. Identify the green colored structure in given model	½
2. Where it originates from	½
3. Name its two derivatives	2
a.	
b.	
4. Mentions its two functions	2
a.	
b.	

References

1. Hilliard RI, Susan TE. The use of an objective structured clinical examination with postgraduate residents in pediatrics. *Arch Pediatr Adolesc Med.* 1998; 152: 74–*78.*
2. Sloan DA, Donnelly MB, Schwartz RW, Strodel WE. The objective structured clinical examination. The new gold standard for evaluating postgraduate clinical performance. *Ann Surg.* 1995; 222: 735–*742.*
3. Hodges B Regehr G, Harison M, et al. Validation on an Objective Structured Clinical Examination in Psychiatry. *Acad Med.* 99 73:91012
4. Miller G. The assessment of clinical skills/ competence/performance. *Academic Medicine.* 1990; 65: S63-S67.
5. Steven M Downing and Rachel Yudkowsky. Assessment in Health Professions Education by Routledge. Madison Ave, New York: 2009; 270.
6. Anantha Krishnan N. Objective structured clinical/practical examination (OSCE/OSPE). *JPGM.* 1993; 39(2): 82–4.
7. Davis MH & Karunathilake I. The place of the oral examination in today's assessment systems. *Medical Teacher.* 2005; 27(4): 294-297.
8. Swanson DB, Norman GR, and Linn RL. Performance-based assessment:lessons learnt from the health professions. Educational Researcher, 24, 5-11 UEMS Section for Psychiatry/European Board of Psychiatry. 1995.
9. MP Sandila, A Ahad, ZK Khan. An Objective Structured Practical Examination to test Students in Experimental Physiology. *J Pak Med Assoc.* 2001; 51(6): 207-10.
10. Jayawickramarajah PT. Oral examinations in medical education. *Medical Education.* 1985; 19: 290.
11. Nayer U, Malik SL, Bijiani RL. Objective Structured Practical Examination (OSPE). A new concept in assessment of laboratory exercise in pre-clinical sciences. *Med Educ.* 1986; 20: 204-9.
12. Malik SL, Manchanda SK, Deepak KK, Sunderam KR. The attitudes of medical students to the objective structured practical examination. *Med Educ.* 1988; 22: 40–*46.*
13. Reem Rachel, Abraham Rao, Ragvendra Kamath, Surekha Kamath, Asha. A trial of the objective structured practical examination in physiology at Melaka Manipal Medical College, India. *Adv Physiol Educ.* 2009; 33: 21–23.