

ORIGINAL ARTICLE

PERCEPTION AND PERFORMANCE OF MEDICAL STUDENTS IN OBJECTIVE STRUCTURED PRACTICAL EXAMINATION AND VIVA VOCE

Rehana Rehman, Sadiqa Syed, Azhar Iqbal, Rabiya Rehan

Department of Physiology, Bahria University Medical and Dental College, Karachi

Background: The assessment of laboratory skills in the subject of Physiology is examined by Objective Structured Practical Examination (OSPE) and *Viva Voce* (VV). The performance of students as well as their opinion about the assessment tools is dissimilar. The objective of this study was to compare OSPE and VV in terms of perception and scores acquired by students. **Methods:** A cross-sectional study was conducted on 100 students of 1st year MBBS at Bahria University Medical & Dental College, Karachi from December 2009 to September 2010 in which perception and performance of students in OSPE and VV after completion of each (consecutive) module of Cell Biology, Neuromuscular and Cardiovascular systems were assessed. Performance of students was grouped on the basis of secured marks into 3 categories, fail (less than 50%), pass (50–70%), and distinction (>70%). A closed ended questionnaire analysed students' responses on both assessment tools about subject content, given time, difficulty level and influence by mood of examiners. **Results:** In all modules, 90–92% of distinctions were acquired with the help of OSPE compared to 5–10% by VV ($p < 0.0001$). Pass percentage was acquired more by VV compared to OSPE ($p < 0.0001$). Perception of OSPE revealed it to be a focused system of examination by 86 (92%) students, 76 (82%) were satisfied with allotted time and 75 (81%) found it easy to attempt. VV was considered to be influenced by mood of examiners by 84 (90%) students while 73 (78%) found it to be stressful. **Conclusion:** Students secured significantly higher in OSPE, described it as an easy, uniform, fair, un-stressful and un-biased method of examination and recommended its continuation as an assessment tool for practical examination system.

Keywords: Domains of learning, Cognition, Competency, Assessment tools, OSPE, *Viva Voce*

INTRODUCTION

New teaching and assessment methodologies have been introduced in medical education in last two decades. The learning and teaching approaches from organ systems-based model to problem-based model and then to clinical presentation model 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.¹

Since late 1990's, more emphasis has been placed on outcome based education and curriculum has become multidisciplinary to maintain the effectiveness of problem-centred and competency-based medical education (CBME).² We expect medical graduate to integrate knowledge, advocate health issues, communicate well, take care of patients as well as society and become a lifelong learner. Each competency usually involves more than one domain of learning and comprises a number of small tasks forming specific learning objectives.³ For these objectives to be achieved, the importance of an assessment tool with characteristics of validity, reliability, feasibility, and higher educational impact cannot be over emphasised.⁴

Though many researchers have been trying to identify the best alternative for assessing medical teaching but none has come with a clear cut answer, as different levels of knowledge and skill domains are assessed better by different types of assessment methods.⁵ Recently UK General Medical Council (GMC) recommendations (Tomorrow's Doctors) has determined the direction of progress of medical education and learning outcome around three domains; the doctor as scholar and scientist, doctor as practitioner and doctor as professional. Thus emphasis is increasing on becoming a professional at an early stage, while paying attention to acquire scientific knowledge, practical skills and competencies.⁶

Assessment is a goal oriented process and is most effective when it reflects a multi dimensional integrated learning and compares educational performance with educational purposes and expectations. It works best when it is continuous, formative, summative and judges goals, objectives, course content and teaching-learning strategies. Methods of assessment includes multiple choice questions, single best answers, short essays, objective structured practical examination (OSPE), objective structured clinical examination (OSCE), problem based learning (PBL), short and long cases etc.

The integrated modular curriculum at Bahria University Medical & Dental College (BUMDC) is designed in accordance with the specific learning objectives of medical training in achieving competency of required skills and knowledge as well as personal and professional development. The assessment of first Prof MBBS is done by written (Single best choice and short essay questions) and practical (procedure and viva) examinations with no consensus on the preferred approach. The students are also exposed to clinical skills and methods of examination in laboratory sessions, in addition to standard physiological tests performance on different equipments, right from the first year. Students show great enthusiasm in active learning and thus develop better psychomotor skills. The practical course and its applied aspects are examined by Objective Structured Practical Examination (OSPE) and Viva Voce (VV) at the end of each module.

OSPE is a version of objective structured clinical examination, (OSCE) introduced in Dundee University in the year 1975 that has proved to be a reliable and valid assessment tool to judge psychomotor and communication skills of clinical students.⁷ It is an analytical approach to the assessment of practical skills, which is constructed to judge performance of students in laboratory exercises, consistent with learning objectives taught in respective domain.⁸ VV has been an old traditional method of examining student's knowledge, basic concepts, comprehension level and also communication power in 'question and answer' format.

However integrated teaching has transformed VV in a tool that is not just a recall of theory but empowers students to critically appraise new information, identify their own knowledge and skill gaps and reflect critically on their learning process and outcomes, thus covering both cognitive and effective domains.⁹ Students develop ability to be methodical, logical, analytical, motivated and acquire problem centred approach. Thus learners construct their own knowledge on the basis of what they already know, making judgment about when and how to modify knowledge (constructivism). Since one assessment method cannot assess all domains of competency as each one has got its own merits and demerits.

Therefore a variety of such tools are required so that short coming of one could be overcome by others.⁸ The assessment process itself should be evaluated and refined in light of emerging insights. Thus feedback regarding students' experience about the curricula, teaching and kind of students' efforts that lead to particular outcome should be assessed.

This study evaluates two assessment tools in our practical examination systems by comparing the results of OSPE having all the three domains of learning with VV having cognitive and affective domains only, in terms of performance as well as perception of students.

The results are expected to assist in modification, upgrading and improvement of educational tools to facilitate student's satisfaction, understanding and better performance for the university examination.

MATERIAL AND METHODS

This cross-sectional study was done at Department of Physiology at BUMDC, from Dec 2009 to Sep 2010. Purposive sampling of 100 students was made in three different modules: Cell Biology (Module 1), Nerve & Muscle (Module 2), and Cardio Vascular (Module 3). Each module was completed in a period of 12 weeks in which lab sessions were taken once in a week for two hours. The practical examination in these modules was evaluated with respect to OSPE (30 marks) and VV (40 marks). OSPEs constructed by departmental committee according to predetermined learning objectives were approved by senior faculty members. It was then sealed in the examination envelopes together with OSPE sheets, response sheets and scoring key separately for each day.

Students were divided into 3 batches of 33 students each on the basis of their examination roll number. Then each batch was divided into 2 groups (17+16); one group examined for OSPE and other sent for viva. Eight stations were Response Stations (RS) composed of questions that tested student's knowledge and critical thinking; options to be selected were written in response sheets. At two observed stations (OS), students had to perform skills before the examiner; the task and check lists were provided to examiner. Stations were independent, one station was kept as the rest station and students rotated through all stations with 4 min at each station. After completion, response sheets were collected and scores of each student were assessed by objective key.

Two examiners conducted VV, in a time period of 4 minutes per student, on the basis of table of specification with 20 marks given to them. Students were awarded marks on the basis of answer to the precised, structured questions asked by the examiners. The marks gained by students were <50% is a failing grade, 50–64% a passing grade 65–70% is an honours grade and >70% is a distinction grade, honours and passing grades were then merged. Students were asked to fill a closed ended questionnaire after examination, meant to acquire responses on the merits and demerits of OSPE and VV.

Marks obtained in OSPE and VV were analysed using SPSS-15, Percentages, and Mean±SD were computed and paired *t*-test was applied to compare the results. The perceptions of students were computed as frequencies and percentage.

RESULTS

Statistical analysis as shown in Table-1 indicates that aggregate mean scores of students were significantly

higher in OSPE compared to VV in all the three modules ($p < 0.0001$).

The percentages of pass, fail and distinction marks in all modules are compared with respect to OSPE and VV (Table-2). Perception of 93 students (93% response rate) on comparison of OSPE and VV (Table-3) revealed OSPE to be a better tool designed on the perspective of knowledge evaluation, adequacy of allocated time, less mental stress and easy to attempt as compared to VV. Only 10 (11%) students were scared of OPSE compared to 87 (93%) of VV.

Table-1: Comparison of OSPE and VV results

	OSPE	VIVA	<i>p</i>
Module 1	37.62±6.84	27.45±7.75	<0.0001
Module 2	42.27±5.95	28.95±7.40	<0.0001
Module 3	35.09±11.76	26.47±9.49	<0.0001

Module1: Cell Biology, Module2: Nerve & Muscle, Module3: Cardio Vascular

Table-2: Comparison of fail, pass and distinction percentages by OSPE and VV

Module	Appeared students	Cumulative Result [Number (%)]	OSPE Result [Number (%)]	VV Result [Number (%)]	<i>p</i>
1	96	Fail: 13 (13.54)	1 (7.69)	12 (92.30)	<0.001
		Pass: 44 (45.83)	17 (38.64)	27 (61.36)	
		Distinction: 39 (40.62)	35 (89.74)	4 (10.26)	
2	99	Fail: 2 (2.02)	0 (0)	2 (100)	<0.001
		Pass: 36 (36.36)	3 (8.33)	33 (91.67)	
		Distinction: 61 (61.61)	56 (91.80)	5 (8.20)	
3	91	Fail: 3 (3.29)	1 (33.33)	2 (66.67)	<0.001
		Pass: 49 (53.84)	22 (44.90)	27 (55.10)	
		Distinction: 39 (42.85)	37 (94.87)	2 (5.13)	

Module1: Cell Biology, Module2: Nerve & Muscle, Module3: Cardiovascular. Values expressed in () are percentages

Table-3: Perception of Students regarding OSPE and VV (n=93)

	System of examination	
	OSPE Responses (%)	VV Responses (%)
Positive opinion about effectiveness		
Focused specific knowledge	86 (92%)	78 (83%)
	76 (82%)	65 (70%)
More stressful	20 (21%)	73 (78%)
Was easy to attempt	75 (81%)	50 (54%)
Influenced by biases	2 (20%)	85 (92%)
Influenced by mood of examiners	3 (3%)	84 (90%)
Fear of examiners	10 (11%)	87 (93%)

DISCUSSION

Assessment of learning has been very difficult and time consuming aspects of medical education.¹⁰ Teaching, learning and assessment methodologies used in undergraduate medical education has seen a paradigm

shift in response to educational understanding, developing learning technologies and health care agendas. In the ‘outcome based education’ currently in vogue, the curriculum should be designed first by the outcomes to be obtained by the students. Curriculum design then proceeds backwards to other elements (content, teaching and learning experience, assessment and evaluation).

The approaches to assessment in medical education have been defined and summarised by the quality assurance agency (QAA)¹¹ UK as ‘assessment strategies must ensure that the knowledge, skills and attitudes, set out in curriculum are sufficiently covered’. Thus we studied the relative benefits and limitations of two assessment tools OSPE and VV at the end of each module by comparing their results as well as students’ feedback response to find out which assessment tool is better to assess the student’s competency level.

It has been generally seen that in different medical colleges, the tools of assessment are being continuously switched from one to other. The conventional practical exam (by allotting one practical to each student), has become completely obsolete as it does not evaluate student’s overall competency level as effectively as OSPE, due to lack of objectivity, purposefulness and focus on important concepts. Similar results have been found by a study in which OSPE claimed its affectivity to discriminate between good and poor performers in Physiology practical examination.¹² In OSPE students are forced to learn procedural steps, relevant normal values of different physiological parameters and their formulae, as well as applied aspects of certain pathophysiological conditions, whereas VV evaluates the cognitive level of core knowledge and basic concepts of physiology, along with affective domain.

Statistical analysis showed that students scored significantly higher in OSPE examination as compared to VV in all the three modules ($p < 0.0001$). Cause of 60–90% failure of students was poor performance in VV of all three modules compared to 8–38% failures declared by OSPE. These greater failure and less distinction results by VV explains shortcoming of oral examination since chance factors, biases and nervousness impede student’s performance.¹³ Greater number of students secured distinctions by OSPE in all modules. Its reliability is also higher as shown by consistent test scores from one module to the other. Moreover, it has higher objectivity (as the answers to a question is predetermined in the form of key) along with higher educational impact.

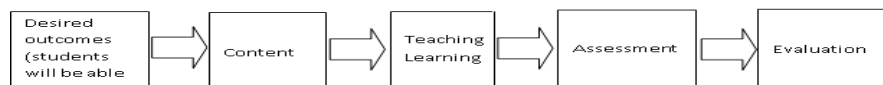


Figure-1: Desired outcomes to Evaluation Paradigm

Feedback is an evaluative response which gives information on all aspects, experiences, difficulties, interpretations and proposals from learners.¹⁰ The perception of students can be used for a series of reforms in the process of improving the quality of teaching and assessment methods.¹³ This can thus be employed, to improve educational programs, in order to facilitate in-depth learning and satisfaction amongst students, for better university ranking and standards. In our study, students perceived OSPE to be a fair system of examination ($p < 0.000$). The response is comparable to a study, in which students rated OSCE as a less difficult and fair assessment tool from which they learned a lot and recommended to increase its frequency of use.¹⁴ OSPE is structured to be uniform as students move in all stations to perform the identical task in the same period of time, by which all the objectives of laboratory teaching are tested with respect to desired weightage.¹⁵ Ninety-nine percent students agreed to the uniformity of OSPE content as compared to VV (70%). Researchers have rated it as a reliable, effective, useful, interesting and challenging examination which decreases mental and physical exertion. The feedback response from students on perception of both tools of practical examination disclosed OSPE to be a better and unbiased system of examination as it is neither stressful nor dependent on mood and fear of examiner.

While comparing perception and performance, 81% students considered OSPE as an easy test to pass and 85% were able to get through. VV was responded to be difficult by more students compared to OSPE, and failures in VV were found to be 92%, 100% and 67% in the 3 modules. Majority of students recommended OSPE to be included as a fundamental component of final examination compared to suggestions for VV.

Experiential learning¹⁵ is continued throughout clinical practice in professional life of medical students, hence effective and accurate evaluation of student performance in practical settings must be ascertained by an updated system of examination. The main objective of medical education is to develop effective learning to understand physiological alterations that forms basis of a disease process.¹⁶ OSPE appeared to be a dependable method with a good capability to discriminate between different categories of students, helped students who showed below average or very high performance on the basis of its cognitive and application skills. The students with average recall capabilities and knowledge, declared almost similar results with both OSPE and VV.

CONCLUSION

OSPE is a preferred method of examination by students compared to VV. Pass percentage acquired was higher on account of evaluation by VV whereas high percentages and distinctions were attributed to evaluation by OSPE. The importance of evaluation by both OSPE and VV cannot be overruled, and VV should be recommended to be continued since it is the only assessment tool that evaluates communication skills, power of explanation, interpretation, and confidence level and retention abilities of students.

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Address for Correspondence:

Dr. Rehana Rehman, Department of Physiology, Bahria University Medical & Dental College, B-102, Block A, KDA Officers Housing Society, Karachi, Pakistan. **Cell:** +92-307-2227775
Email: drrehana7@gmail.com