Original Research Article

A comparative study between the conventional practical exam and objective structured practical exam as assessment tools in physiology

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Abstract

Introduction: Evaluation is an integral part of medical education which is closely linked with educational objectives. OSPE assures the use of all its domains. It is an innovative technique that emphasizes on the application of knowledge. **Aim:** To assess the 1st year medical students with OSPE and to prove it as an assessment tool that can be used in Physiology. **Objective:** To compare OSPE with the conventional method of assessment in Physiology practical exam. **Method:** 150 first year medical students were included and were assessed by the conventional method first, then with OSPE. It was conducted over 3 days. There were 4 procedure stations, each station having an examiner with a check list and a subject. There were also 4 response stations where questionnaire was placed at each station against a graph, a chart, and a clinical case. Each station was given 5 mints and was awarded 5 marks. **Results:** All the aspects of the exam under hematology and clinical physiology practical exam showed higher marks obtained with OSPE ($p < 0.0001$). **Conclusion:** OSPE is student friendly, more scoring technique of evaluation that can assess all the domains of educational objectives. It can be used to train the students in OSPE all year long then slowly be included in the practical exam.

Keywords: Conventional Practical Exam, OSPE, Physiology.

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INTRODUCTION

Medical education and evaluation

Evaluation is an integral part of medical education. Being closely linked with educational objectives, its key purpose is to ensure learning followed by judging whether a student is adequately equipped with the theoretical background and practical dexterity. Assessment drives learning and improving it is richly repaid in terms of students emerging as better learners[1]. Most medical colleges follow the conventional method of teaching where the evaluation system in basic sciences is centered on primary recall of isolated basic science facts. Attitudes are usually not tested at all by the conventional examination. Even in clinical skills, often the student is questioned only regarding his final conclusion. The ability to examine a patient and arriving at that conclusion is not observed by the examiners. The final score indicating his overall performance gives no significant feedback to the candidate[2]. The current trend however is to follow innovative techniques with emphasis on the application of knowledge in basic sciences to clinical problems and on the affective domain of education.

Objective structured practical examination (OSPE)

An earlier innovation in this regard was the objective structured clinical examination (OSCE), later extended to the practical examination (OSPE) which was initially described in 1975 then Ronald M Harden explained it in greater detail in 1979[2] OSPE is an assessment tool in which the competence of a student is evaluated for general experiments; in terms of: Identification of equipment/accessories of experiment, procedure of experiment, making observations/results, interpretation of results, conclusion and for clinical experiments; in terms of: history taking, physical examination, simple

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procedures, interpretation of lab results, patient management problems, communication, attitude, etc.[3]

MATERIAL AND METHODS

Place and year of study

This study was done in the Department of Physiology, Bhaskar Medical College during the month of June 2014.

Study group and procedure

This study was approved by the Institute's Ethics Committee.150 medical students of 1st year were included in this study. They were initially examined by the Conventional /traditional Practical Exam (CPE), then with the OSPE. The questionnaires and marks assigned were the same for both the exams. The 150 students were divided into three batches of 50 each and examined on 3 separate days.7 students in total could not attend the exam for various personal reasons. The students were trained on couple of occasions in the OSPE before the exam was conducted. On the day of the OSPE the students' cell phones were collected and they were made to sit in a room where the pattern of examination was explained. They were given sheets of paper for writing at the response stations. The sheets were collected at the end of the last station and evaluated later. Then they were given a feedback form to be filled at the end. No contact of any sort was allowed to be made between the students and the questions were thus confidential.

Stations

Eight stations were made with the cooperation and suggestions of the entire department.4 were procedure stations, where 4 different examiners were seated with a subject to perform the task and a check list. The examiner valued the performance of the student there itself. The lab assistant was used at the procedure stations where the tray had to be replenished after each student performed the task, where hematology experiments were a part of the station. The other 4 stations were response stations where questionnaire was placed and students were instructed to answer them. Same amphibian graph, clinical chart, and clinical case at these stations were used as in the conventional practical exam. Each procedure and response station was assigned 5 mints and was awarded 5 marks. The student moved to the next station on the ring of a bell every 5 mints. Each student took 40 mints to move across the stations and was given a feedback form at the end of the last station. It took 3 hours to conduct the OSPE for 50 students. Similarly the other two batches of 50 each were examined on the next two consecutive days. Some examples of various Stations with the check list used in our study: The number of questions and marks for each of them may vary in both type of stations reflecting importance of a question or the type of experiment given.

Procedure Station

Requires an examiner with the checklist given below, a subject, sphygmomanometer and a stethoscope

Object: To record the blood pressure of a subject.- 5 marks(1/2 mark each)

1. Greets the subject, asks the name of the subject.
2. Explains the procedure to the subject
3. Positions the limb properly
4. Exposes the limb
5. Places the sphygmomanometer at the heart level
6. Ties the cuff at correct site and properly
7. Records by palpatory method
8. Places the stethoscope at the correct site
9. Deflates the cuff stepwise
10. Thanks the subject

Procedure Station

Requires an examiner with checklist given below, a subject and a knee hammer Object: To Ellicit knee jerk on the given subject-5 marks (1/2 mark each)

1. Greets the subject
2. Asks the name of the subject
3. Explains the procedure to the subject
4. Positions the limb properly
5. Exposes the limb
6. Feels for the ligamentum patellae
7. Uses the hammer with moment at the wrist
8. Strikes at the correct site
9. Performs on the other side also
10. Thanks the subject

Procedure Station

Requires an examiner with checklist given below, a tray with cotton swab and spirit, needle, porcelain tile, antisera, normal saline, pipette, sticks and a lab assistant who can change the tray with each candidate.

Object: To determine your own blood group-5 marks(1mark each)

1. Collects the antiserum in the wells of the porceline tile

2. Preprares a control with normal saline
3. Makes an aseptic prick
4. Makes a suspension in a well
5. Uses separate sticks to mix in the wells

Procedure Station

Requires an examiner with checklist given below, microscope, neubaures chamber, filled up RBC pipette
Object: To Charge the chamber with RBC fluid and focus one RBC square-5 marks(1/2mark each)

1. Greets the examiner
2. Discards the stem fluid
3. Places tip of pipette at an angle
4. Charges without overflow of fluid into the gutter
5. Fixes the chamber on the stage
6. Focuses under low power first
7. Then turns to high power
8. Adjusts the diaphragm
9. Lifts up the condenser high
10. Focuses one RBC square

Response Station related to the previous procedure station

Object: Answer the following

1. What is the RBC normal count?
2. What is the appearance of the RBC seen under high power?
3. What is the composition of the fluid used?
4. Define anemia.
5. Define polycythemia.

Procedure Station

Object: To focus the Neubaures chamber and note down the observation of the WBCs suqares-5 marks (1/2mark each)

1. Focuses Neubaures chamber under low power
2. Adjusts the condenser low
3. Adjusts the diaphragm
4. Starts counting from the left upper corner square
5. Follows an order of counting

Response Station related to the previous procedure station

Object: Answer the following

1. Calculate the WBC count with the above noted observation?
2. What is the dilution factor?
3. What is the composition of the fluid used?
4. What are the causes of leucocytosis?
5. What is leucopenia?

Statistical Analysis

The entire data was processed through SPSS software and statistical significance was studied. The data from the feedback forms also was analyzed and studied.

OBSERVATION

Table 1: Mean SD values of the marks obtained in CPE and OSPE

	CPE		OSPE		
Marks	**Mean**	**SD**	**Mean**	**SD**	**P value**
Hematology-total(20)	9.6713	3.8817	14.2727	3.3234	<0.0001
Major –(10)	4.6154	2.0927	6.7972	1.8521	<0.0001
Minor –(5)	2.7902	1.2325	4.0210	1.1099	<0.0001
Amph.graph-(5)	2.2587	1.2766	3.4615	1.3879	<0.0001
Clinical-total(20)	11.2448	4.3138	13.9580	3.5203	<0.0001
Major –(10)	5.3287	2.3128	7.2657	1.4821	<0.0001
Clinical case-(5)	2.7972	1.3818	3.2517	1.5854	0.002
Clinical chart –(5)	3.0979	1.2963	3.4405	1.6810	0.029
Total(40)	**20.8462**	**6.1898**	**28.2308**	**6.0882**	**<0.0001**

Table 2: The analysis of the feedback forms

Q No.		Sufficient		Less		More	
		No.	**%**	**No.**	**%**	**No.**	**%**
Q1.	The number of stations were	137	95.8	3	2.09	3	2.09
Q2.	The time assigned at each station was	94	65.7	48	33.5	1	0.69
Q3.	The number of students assigned on one day(50)	116	81.1	2	1.3	25	17.4
		Yes		No			
		No.	%	No.	%		
Q4.	The plan and procedure was explained and understood prior to the OSPE	143	100	0	0		
Q5.	The procedure stations that were used to demonstrate skills were relevant	142	99.3	1	0.69		
Q6.	OSPE is the same as the earlier pattern of examination (CPE)	33	23	110	76.9		
Q7.	OSPE covered a wide range of knowledge compared with CPE	113		30			

			79		20.9
Q8.	OSPE is more stressful compared to the old method (CPE).	32	22.3	111	77.6
Q9.	OSPE is fair compared to CPE	128	89.5	15	10.4
Q10.	OSPE is easier to pass compared to CPE	120	83.9	23	16
Q11.	OSPE should be followed as the method of assessment of lab in physiology henceforth	125	87	18	12 .5

RESULTS

TABLE 1 shows all the aspects of OSPE having higher marks obtained that are statistically significant, similar to the studies of Nayar *et al*[4] and Rehman *et al*[5] TABLE 2- depicts the analysis of the feedback forms given to the students at the end of the OSPE .Total of 143 forms were studied. The students were positive about this procedure being followed in the Physiology practicals. Similar to the study done by Rachel *et al*[7]

DISCUSSION

The criterion of a good examination includes validity, reliability, objectivity, practicability, relevance, and promotion of learning, power to discriminate between students, relaxed environment and a positive student feedback. Clearly no single test fulfills the criterion of a good examination and the different methods complement each other. The procedure stations in our study could assess the psychomotor domain of educational objectives. The response stations assessed the cognitive skills of the students. The checklists included in the OSPE had areas to assess the affective domain of the educational objectives. Thus, this study proves OSPE as a promising assessment tool for Physiology Practical exam. Moreover, it has scope for being structured in such a way that all the objectives of laboratory teaching can be tested and each aspect can be assigned the desired weight age as also seen by[4] Nayar U *et al*. The outcome of the present study thus indicates that OSPE is a better choice as an assessment technique over the Traditional method measuring wide range of practical skill as also seen by Rehman *et al*[5]. They even concluded that it is important for competency based performance discrimination and helps improving students performance quality in laboratory exercise. They even observed male students achieved significantly higher score than that of female students, especially in responding question station, no such thing was observed in our study. Performance in stations evaluating skills was in general better than in those testing analytical and interpretive abilities same observed by Dissanayake *et al*[6] Feedback from the students indicated that students were in favor of the OSPE compared with the CPE similar to the findings of Rachel *et al*[7]. This study reveals the importance of the role of students in developing a new assessment tools. The feedback provided scope for improvement in OSPE. From the students' point of view, the OSPE was acceptable and generated wide appreciation as also seen by Malik *et al*[8]. OSPE was rated by the students as a reliable, effective, useful, interesting, and challenging examination. Although it was considered taxing, both mentally and physically by the students studied by Mallik, in our study they did not find it stressful. The majority of students showed a positive attitude to OSPE. Their students preferred a combination of OSPE and CPE as in the present system to a complete change-over to the OSPE[8] in contrast to our study where students preferred OSPE over CPE.

Restrictions or limitations

Conduction of OSPE needs proper planning for execution, an adequate area for preparing stations, briefing to the students (before examination), preparation of procedure/response stations in an appropriate ratio (matching the number of students/groups).All procedure and response stations must be assigned equal time with suitable check lists and response questions, agreed upon by the examination committee. One teacher is required per procedure station to act as observer and organizer. They should ensure smooth flow through stations to complete the cycle, including a person, who is handling the bell, to indicate the shift of student to the next station as sited by Muhammad Abdul Azeem[9]. But once properly planned OSPE can be conducted with ease giving excellent outcome. The OSPE was considered to be time consuming, and no assessment of depth of knowledge could be done and it also does not provide flexibility to the examiners, as also observed by Pallavi *et al*[10]. In Physiology the entire practical exam can be conducted with various experiments unlike anatomy as found by Pallavi *et al* that all the headings cannot be tested by OSPE.[10]

CONCLUSIONS

OSPE is a method of examination which is student friendly, more scoring and a method that can assess all the domains of educational objectives. It is becoming a popular tool for evaluation with the inherent advantages of being a practical, reliable and valid alternative for objective assessment of practical skills. An effort can be made initially to train all year long, the students in OSPE and slowly include OSPE in certain areas of exam and then slowly replace it with OSPE.

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