

Relevance of Objective Structured Practical Examination Reinforced with Multiple Choice Questions as a Tool of Learning and Retention of Knowledge in Pathology among the Undergraduate Students

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ABSTRACT

Objectives: To study the impact of combined Objective Structured Practical Examination (OSPE) with Multiple Choice Questions (MCQs) on retention of knowledge and to obtain the feedback of the students on the combined approach.

Methods: 59 undergraduate students were subjected to a pretest MCQs on anaemia and then exposed to 4 OSPE stations along with MCQs of must know category and high difficulty index on nutritional anaemia. A post test MCQs were given after a gap of 3 months. The pretest and post test scores were evaluated. Statistical analysis was done using paired *t*-test. A student's feedback was taken.

Results: The 'P' value was found to be 0.001 which was statistically significant. About 80% students felt the combined OSPE with MCQs is a more useful tool of learning than OSPE alone and 66% of students wanted this format to be included in the formative assessment.

Conclusion: A combined format of OSPE with the MCQs can be used as a good tool of learning with retention of knowledge.

KEY WORDS: Objective structured practical examination, Multiple choice questions, assessment, formative

Introduction

A considerable loss of knowledge is found among medical students in the basic science courses. If the students do not remember much from their para clinical subjects, then whatever we are teaching as content do not seem relevant to later clinical work or studies.^[1,2] The teaching and learning of medical students have always been a complicated process. At times, even the best of teachers may struggle in communicating knowledge and assessing its uptake.^[3] Objective structured practical examination (OSPE) has been used in the preclinical and para

clinical subjects for formative and summative assessment of practical skills. OSPE provides integration of learning and evaluation. It helps student's learning performance and their perceptions of quality of their learning experience.^[4,5]

Objective multiple choice question tests (MCQ tests) can be useful for formative assessment and to stimulate students' active and self-managed learning. They improve students' learning performance and their perceptions of the quality of learning experience.^[5]

Both the OSPE and MCQs are well known effective methods of formative assessment in medical education, but using them together for evaluation of educational benefits are lacking in the literature.

This study is an attempt to evaluate whether OSPE reinforced with MCQs can be used as a

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tool of learning among undergraduates and also look into the long term impact on the retention of the knowledge in pathology.

Objectives

1. To plan and implement OSPE reinforced with MCQs as a method of learning and assessment in pathology practicals.
2. To look for an impact on learning with a retention of knowledge by comparing the scores of one pre-test exam of MCQs before the combined MCQS + OSPE with the score of a post-test MCQs after a gap of about 3 months.
3. To obtain the opinion of the students on the approach of a combined OSPE with MCQs in the practicals of pathology as a tool of learning.

Methods

Participants

The batch of 3rd term medical students comprising 75 students was invited to participate in this study. The consent of the students was taken. All the students were asked to participate in this study in order to avoid bias. Three faculties from the Department of Pathology comprising one Professor, one Associate Professor, and an Assistant Professor were involved to carry out the project.

The concept of the project was first presented in the Department of Pathology to all the teaching staffs. An ethical clearance was obtained from the Ethical Committee. The students were explained in details about the concept of OSPE such as the stations, objective system of scores. The topic of Iron deficiency and megaloblastic anemia was identified as it is a common health problem in our society, and also this topic was completed in the subject of pathology just before the project was taken up.

All the staffs of the Department of Pathology were asked to submit six MCQs each on the relevant topic within a week time. Later a set of 25 MCQs were screened and finalized by the group of three faculties who participated in the project.

The students were given a pre-test on the set of 25 MCQs and scores were tabulated. The MCQs with high difficulty index and the MCQs of must know category was identified. These MCQs were about eight in number.

The students were subjected to four OSPE stations divided into three question stations and one of procedure station with a time limit of 4 min for each station. The three stations were also not purely cognitive. The student had to see a peripheral smear of anemia and answer questions related to it. These stations were designed toward learning with various levels of interpretation. The psychomotor domain involved performing a differential count on a stained peripheral blood smear.

These OSPE stations were combined with eight identified MCQs. After this, the students were asked to write the feedback on a questionnaire provided to them in confidentiality. A feedback was given to the students on the OSPE stations as well as on the MCQs.

A post-test on the 25 MCQs was conducted about 3 months later as a surprise to the students. The scores were tabulated for 59 students after excluding students who were absent for the intervention of OSPE with MCQs or in the post-test.

Statistical analysis

It was done using paired samples *t*-tests.

AP < 0.05 was considered significant. An analysis of feedback of the students on the questionnaire was also performed.

Observation and Results

The mean of pre-test and post-test with standard deviation were shown in Table 1. The *t*-tests were significant with a “*P* = 0.0001” showing that the students scored higher marks in the post-test.

About 9 (15%) students had a post-test score less than the pre-test scores.

The number of students (*n* = 5) has increased in the post-test to (*n* = 24) with scores above 20. Similarly, the number of students with low scores has reduced in the post-test as shown in Figure 1.

Table 1: Statistical evaluation of pre-test and post-test scores

Paired <i>t</i> -statistics	N	Mean	SD	<i>P</i> value
Pre-test	59	15.59	3.988	0.0001
Post-test	59	17.92	5.049	Significant

N: Total number of students, SD: Standard deviation

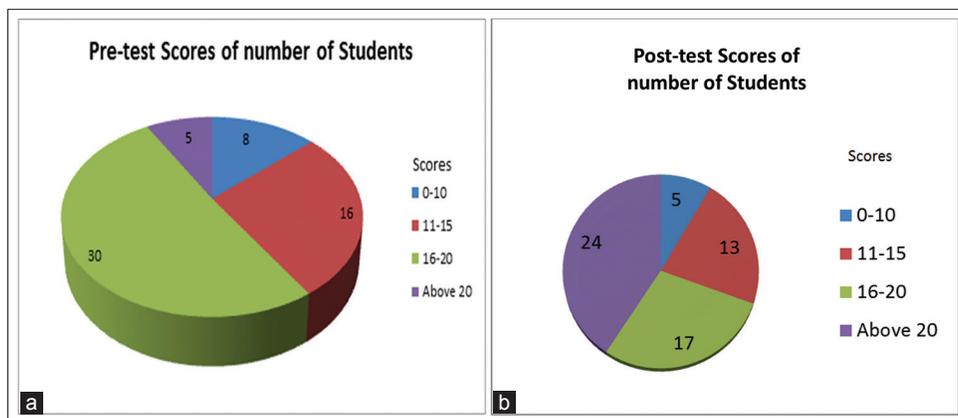


Figure 1: The number of students in different pre- and post-scores, (a) Pre-test scores of number of students, (b) post-test scores of number of students

Table 2: Students feedback on OSPE combined with MCQs

	Feedback	Yes	%
Exam conducted fair or not	A	59	100
Exam well conducted	B	54	92
Were you fully appraised of the pattern of OSPE test	C	49	83
Was the time for each station sufficient	D	46	78
Instruction clear and unambiguous	E	56	95
Technique station was fair	F	44	75
OSPE method useful for learning	G	58	98
OSPE alone is more useful	H	12	20
OSPE combined with MCQs more useful than OSPE alone	I	47	80
Score better in this format than conventional exam	J	39	66
Do you think such format should be included in internal assessment	K	39	66

MCQs: Multiple choice questions, OSPE: Objective structured practical examination

The feedback of the students was taken after subjecting them to a combined OSPE and MCQs. Although 98% of students felt OSPE is a useful tool of learning and 20% felt OSPE alone is useful in comparison to 80% of students who felt OSPE combined with MCQs as more useful shown in Figure 2.

Furthermore, 66% of students felt such a format should be included in the formative assessment. This feedback is shown in Table 2.

Discussion

As per various studies, a significant loss of knowledge has been identified among the medical undergraduate students in basic sciences. Knowledge is not retained significantly in the subjects of basic sciences. This knowledge of basic

sciences is very important for later work on clinical significance.^[1,2]

Assessment of students is an important aspect of learning in medical education and hence deserves the attention of medical academicians. Formative assessment not only assesses students' achievements but it also enables students to recognize the areas in which they are having difficulty and to concentrate their future efforts on those areas. Adequate frequency of formative assessment with immediate feedback is beneficial as it stimulates meaningful and multifaceted learning.^[6]

OSPE assesses students' knowledge, different skills, attitude at the same time, therefore, leads the students to read the subject widely and to practice clinical skills extensively. It helps students not to just

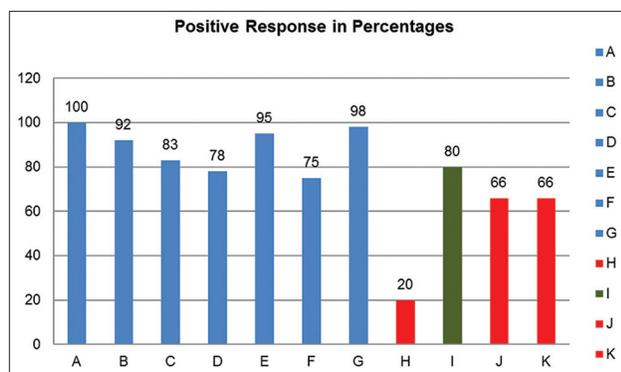


Figure 2: Bar diagram of positive responses from the students' feedback

remember theory but also helps them to critically reflection their learning course and its outcomes.^[3]

While MCQs are viewed as a tool for the assessment of learning, this could be used as a very effective knowledge acquisition tool and stimulate active learning among students.^[5]

This study was conducted to look for an impact on learning with the retention of knowledge using the format of combining OSPE with MCQs as a tool. It was statistically significant ($P = 0.001$) that the students retained the knowledge when they were exposed to the combination of OSPE with MCQs.

It was observed that, of the 9 students who scored less in the post-test, 4 were either absent for the combined OSPE and MCQs exposure and rest 5 students are those who had although undergone intervention but possibly lacked motivation to learn. Hence, these 5 students probably needed some other methods of learning.

The feedback given to the students after the exercise of combined OSPE and MCQs was useful based on a questionnaire.^[7] It helped to identify the learning difficulties such as to operate the microscope and interpret the slides and correlate with the given questions. The overall exposure made them to learn better than the conventional way. The feedback from the students showed that about 98% of the student felt OSPE is a useful tool of learning. About 20% felt OSPE alone is a useful method of learning, and 80%

felt a combination of OSPE with MCQs is a better method of learning. About 66% felt this format can be included in the formative assessment.

A format of an OSPE with MCQs can be tried in formative assessment as it will enable the students not only to get assessed but also be used as a learning experience.

Conclusion

OSPE is a known tool of learning. However, a combination of OSPE with MCQs can be a useful tool of learning with retention of knowledge.

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