



Objective Structured Practical Examination (OSPE) In Biochemistry: An Innovative Tool of Learning and Assessment

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Abstract

Background: Competency based medical education curriculum has been proposed by experts and implemented by NMC (National Medical Council) since 2019 batch in India. Many institutes are still following traditional method for practical examination despite of radical shift in assessment methodology. To address these issues and to motivate students learning OSPE (Objective Structured Practical Examination) was introduced as an assessment tool.

Objectives: To implement OSPE in the assessment of practical skills in biochemistry department and to know the perception of students and faculty about OSPE.

Methodology: A total number of 150 students participated in the study. The present study is an exploratory observational work and was conducted after Institutional Ethic committee approval. Informed consent was taken from the volunteer students. Students and faculties were sensitised about OSPE pattern. Five topics were selected for the study. Firstly, the students were taught by interactive lecture with videos then students were asked to give two tests-one with traditional method and the second with OSPE method. The test copies were evaluated by different faculties for both the tests (with the help of validated check list of OSPE) by giving marks out of 10 on each topic. The mean, standard deviation and coefficient of variation of marks were calculated. The difference in mean score at two evaluation was tested using paired 't' test.

Results: The mean score was found to be significantly higher ($p < 0.0001$) when assessed with OSPE. Feedback from students and faculty proved OSPE as the best method.

Conclusion: This evaluation showed the OSPE as better method of assessment of practical biochemistry by the students. OSPE surely will help in tailoring teaching learning method up to the student satisfaction.

Keywords: NMC, OSPE, 't' test

Introduction

Reforms in curriculum development delivery mechanism and performance evolution have always been of prime importance in higher education in all branches of learning. It has been of greater relevance in medical education. The assessment methods in

medical education have been a topic of debate as traditional method raises concerns about exact accuracy, reliability and uniformity of the method. In traditional methods practical skills are not directly observed but assessed based on questions asked at the end. The OSPE (Objective Structured Practical

Examination) described by Harden *et al* [1975] at the Dundee University has been a very useful tool in this regard [1, 2].

This method assesses different domains like Cognitive, Psychomotor and affective. This method is based on assessment of students through direct observation. This pattern helps students to learn case based, problem based and picture-based questions. OSPE pattern consists of a series of stations Performance station and question station, where students are expected to perform practical tasks within specific period. At question stations students are asked to answer the question. Observer faculty will have a check list which is validated before.

The aim of the study was to observe OSPE as a learning and assessment tool compared to traditional method. The study was conducted to see the perspectives of student and faculty about OSPE in Biochemistry.

Materials and Methods

A total number of 150 students participated in the study. The present study is an exploratory observational work and was conducted after Institutional Ethic committee approval. Informed consent was taken from the volunteer students. Students were sensitised about OSPE pattern. Faculty of the department were also sensitised. Five topics from each category - Topic 1- Vitamins, Topic 2- Early clinical exposure (Jaundice), Topic 3- Case based (Diabetic ketoacidosis), Topic 4- Self-directed learning (Structure & functions of Liver) and topic 5- AETCOM module (communication) were selected for the study.

Firstly, the students were taught all the selected topics by interactive lecture with videos, then students were asked to give two tests. One with traditional method (procedure exercise and viva) and second with OSPE method (Procedure station and

question station) were held and evaluated on each topic. Practical skills in the analysis of abnormal constituents of urine (Sugar, Ketone bodies, Bile salt) and estimation of blood glucose were assessed by traditional and OSPE methods. Question stations contained questions on jaundice, liver function test, diabetic ketoacidosis case, vitamins pictorial questions and communication questions. The scores were assessed and evaluated by different faculties with the help of validated check list of OSPE by giving marks out of 10 on each topic and total of 50 marks. The mean and standard deviation and coefficient of variation of marks were calculated.

Results and Discussion

A total number of 150 students participated in the study where practical skills in the analysis of abnormal constituents of urine and estimation of blood glucose were assessed by traditional and OSPE methods. The mean score obtained by students in two evaluations of all the five topics were calculated. The result revealed that mean score of OSPE method was higher as compared to Traditional method. This showed improvement in marks which may be due to structured questions in OSPE pattern which all the three domains that is skill, psychomotor and affective.

Analysis of mean scores obtained by students with two methods suggested that the students scored significant higher marks in OSPE method. As seen from Table 1 the percentage increase in mean values were ranged 49 % to 112 %, when compared with traditional method with OSPE method. The performance score was significantly higher in OSPE as compared to Traditional method. The P value is less than 0.005 for all the topics indicating significant difference in marks obtained by students. By conventional criteria, this difference was extremely statistically significant.

Table1: Mean, SD and CV of marks obtained by Students in Traditional and OSPE (N=150)

Topic No.	Traditional method (50 marks)	OSPE Method (50 Marks, 10 marks each topic)	% increase in mean value	P value

	Mean	SD	CV	Mean	SD	CV	(%)	
Topic 1 (Fat soluble Vitamins)	3.13	1.26	40.00	6.66	1.16	17.0	112.77	0.0001*
Topic 2 (Early Clinical Exposure- Jaundice)	3.58	0.91	25.50	7.48	0.86	15.59	108.93	0.0001*
Topic 3 (Case Based- Diabetic keto acidosis)	4.10	0.95	23.13	7.17	0.93	13.01	74.87	0.0001*
Topic 4 (Self-Directed Learning- Liver functions)	4.80	1.36	28.36	7.18	0.93	12.95	49.58	0.0001*
Topic 5 (AETCOM- module 1.4)	5.01	1.23	24.72	7.90	0.76	9.63	57.68	0.0001*
Total of all topics	4.12			7.27				

* $p \leq 0.000$, SD= Standard deviation, CV= coefficient of variation.

The students and faculty perception towards OSPE was analysed. 90 % of students strongly agreed OSPE to be better method, with more relevance and objectivity in comparison to traditional method. Students and faculty agreed that the method was structured, relevant and uniform method without Bias. All students and faculty strongly agreed to implement OSPE method.

A single examination does not fulfil the assessment of all the three domains such as assessing knowledge, skills and attitude. Structuring of questions and objective assessment has been emphasized and gained importance in the practical examination. Some studies have proved that OSPE is a reliable assessment tool [3,4]. The OSPE has gained importance not only as assessment tool but also as a teaching method. Studies of Feroz and Jacob 2002 also found OSPE to be more objective and reported that OSPE measured practical skills better than traditional method [5, 6].

Table2: Perception of students about OSPE method (N=150)

Questions	strongly Agree	Agree	Neither Agree nor Disagree	Disagree	strongly disagree
1. OSPE is better than traditional practical examination.	92%	4%	1%	2%	1%
2. OSPE covered all the domains compared with traditional practical examination.	90%	8%	0%	2%	0%
3. OSPE was exhausting and lengthy	1%	2%	14%	8%	75%
4. Procedure and Questions were relevant	86%	5%	3%	4%	2%
5. OSPE should be followed as the method of assessment in biochemistry department	96%	1%	0%	2%	1%
6. Examiner bias can be removed to a large extent by OSPE	88%	9%	1%	0%	2%
7. Attitude of examiners during OSPE was better as compared to traditional practical examination.	79%	14%	1%	5%	1%
8. The degree of emotional stress in OSPE was less as compared to traditional practical examination.	85%	12%	1%	0%	2%
9. OSPE was better in Case based questions than Traditional method	88%	8%	2%	2%	2%
10. Time management was better in OSPE method	72%	17%	5%	5%	1%

Table 3: Perception of Faculties about OSPE method (N=6)

Questions	strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly disagree
1. OSPE is better than traditional practical examination.	95%	5%	0%	0%	0%

2. OSPE covered all the domains compared with traditional practical examination.	90%	10%	0%	0%	0%
3. OSPE was exhausting and lengthy	1%	2%	0%	0%	97%
4. Procedure and Questions were relevant	86%	10%	3%	1%	0%
5. OSPE should be followed as the method of assessment in biochemistry department.	96%	4%	0%	0%	0%
6. Examiner bias can be removed by OSPE	88%	12%	0%	0%	0%
7. Attitude of examiners during OSPE was better as compared to traditional practical examination.	79%	21%	0%	0%	0%
8. The degree of emotional stress in OSPE was less as compared to traditional practical examination.	85%	15%	0%	0%	0%
9. OSPE was better in Case based questions than Traditional method	88%	22%	0%	0%	0%
10. Time management was better in OSPE method	72%	28%	0%	0%	0%

Table 2 and 3 showed the perception of students and faculties about OSPE method. The report of feedback responses indicated that students and faculties strongly preferred OSPE over traditional method. Almost all students felt that OSPE led to an improvement in satisfaction of assessment and confidence in performing the skills. They also agreed that the questions in question station were relevant. Students and faculties endorsed on the implementation of OSPE as a method of assessment in Biochemistry. Students and faculty felt that time management was appropriate. The students also appreciated the feedback given after OSPE. Responses also indicated a high level of acceptability and motivation towards incorporation of OSPE.

Conclusion

The study concluded that in comparison of OSPE with traditional method, OSPE was more useful and effective method over traditional method, which could assess all the domains. The OSPE method has not only improved the mean score of participated students but also it has reduced the interstadial variation in score. This innovative method should be enforced in biochemistry department as it helps to understand case based, problem based and picture-based questions and improve procedure skills.

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References

1. Harden RM, Stevenson M, Downie WW, Wilson GM. Assessment of clinical competence using objective structured examination. *Br Med J*. 1975; 1: 447-51.
2. Seale JK, Chapman J, Davey C. The influence of assessments on students' motivation to learn in a therapy degree course. *Med Educ*. 2000; 34 (8): 614-21.
3. Hilliard RI, Tallett SE. The use of an objective structured clinical examination with postgraduate residents in paediatrics. *Arch Pelitrexols Med*. 1998; 152: 74-8.
4. Sloan DA, Donnely M B, Schwartz R W, Strodel WE. The objective structured clinical examination. The new goal standard for evaluating postgraduate clinic performance. *Ann Surg*. 1995; 222:735-42.
5. Mohan A, Kumar R, Sharma VK, Kumar P, Gupta K. Objective structured practical examination in undergraduate pathology course - A trial study in a teaching medical college in Western Uttar Pradesh. *Ind J of Path and Onc*. 2017; 4 (3):354-357.
6. Rahman N, Ferdous S, Hoq N, Amin R, Kabir J. Evaluation of objective structured practical examination and Traditional Practical Examination. *Mymensingh Med J*. 2007; 16: 7-11.