ORIGINAL ARTICLE

OSPE in Biochemistry - An Assessment Tool for First M.B.B.S. Students as a Prelude to CBME in India

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Abstract:

Background and Introduction:
The study was undertaken with the anticipation of implementation of CBME in India**.**

Aims and Objectives:
Evaluate Objective Structured Practical Examination (OSPE) as a tool for effective assessment of practical skills in the subject of Biochemistry. To introduce the M.B.B.S. students to OSPE, evaluate the perception of students and teachers towards OSPE and compare OSPE with the conventional approach of practical examination taking into consideration the performance of students in both examinations.

Materials and Methods:
This cross-sectional study was conducted in the department of Biochemistry and included First M.B.B.S. students of the batch 2018-19. After prior sensitization to OSPE, First M.B.B.S. students were assessed by rotation around 10 stations. Later a conventional practical examination was also conducted on the same practical syllabus as OSPE. Students score in both examinations was compared and feedback was taken from the students as well as faculty to gain an insight into their perception about OSPE. The mean scores of the students in both the examinations were compared using student t test with the help of the Microsoft excel 2010 and Graph Pad prism 5 software.

Results and Discussion:
Out of the seventy-seven students who appeared for both OSPE and the conventional examination, twenty-six students scored ≥ 50% marks in OSPE as compared to seventy-five students in the conventional examination. Most of them agreed that OSPE was more focused on learning objective, encouraged learning, and analytical and interpretive thinking by the students, eliminated examiner bias and OSPE should be a part of their practical examination.

Conclusion:
OSPE is an objective and reliable tool for assessment in biochemistry, which helps to improve learning and evaluation of practical skills in biochemistry. With a proper and planned implementation, OSPE can be included in the evaluation system for the subject.

Keywords: OSPE, Biochemistry, CBME, assessment.

Introduction:

Competency based medical education (CBME) is an outcome-based practice of education where assessment plays a pivotal role in its successful pursuit. Since assessment is the driving force for learning, assessment in CBME should provide overall information about acquisition of skills by learner and facilitate learning as well[1,2].

Conventional methods of practical examination are based on viva taken at the end after the students complete the given practical. Thus, the practical is not

performed directly in front of the examiners. There is also examiner and experiment variability, and the students' communication skills which might affect the student's scores[3]. With the realization of the pitfalls in conventional assessment methods, Harden in 1975 introduced an objective structured examination for the assessment of clinical competencies (OSCE), which was later, modified to objective structured practical examination (OSPE) for practical skills. Structured examination can more easily control the examiner/ patient or experimental variables[4]. OSPE in Biochemistry can be used to assess various competencies like performance of simple bedside tests, interpretation of laboratory results, correlation of results with clinical conditions, correlation with theory component etc[5].

With this background, the study was undertaken to introduce M.B.B.S. students to OSPE and also to assess the perception of students and teachers towards OSPE.

Aims and Objectives:

1. To evaluate Objective Structured Practical Examination (OSPE) as a tool for effective assessment of practical skills in the subject of Biochemistry.
2. To introduce the First M.B.B.S. students to OSPE as a method of assessment.
3. To compare the performance of students in OSPE and conventional practical examination based on their scores in each exam.
4. To take an account of the perception and awareness of First M.B.B.S. students and teaching faculty towards OSPE as an assessment tool in Biochemistry.

Materials and Methods:

This cross-sectional study was conducted in the department of Biochemistry in a medical college of Rajasthan. The permission of Institutional Ethics Committee was taken. For the study 150 first year M.B.B.S. students were chosen. A written informed consent was also taken from the students. The students were primed about OSPE before the examination.

The syllabus for OSPE was displayed 15 days prior to conduction of OSPE. A conventional practical examination (CPE) based on same syllabus was also conducted the next week after OSPE.

For OSPE, students were rotated around ten stations. Out of these five were observed procedure stations and five were unobserved response stations. The stations were prepared to assess practical skills, analysis and interpretation of lab results, correlation of results with clinical conditions and demonstration of use of basic laboratory instruments like colorimeter and urinometer. Students were given a time of five minutes to attempt the questions at each station. Two rest stations were also given to students to finish any remaining writing work. For the assessment of OSPE, checklist was prepared beforehand with the mark distribution for each of the stations. At the end of OSPE a feedback was taken from the students. The questionnaire was prepared after extensive literature search and the questions were framed to include the cognitive, psychomotor and affective domains as well as assessment domain. A feedback was also taken from all the faculty members of the department.

Inclusion criteria for the study were students who appeared for both exams. Eighty-one students appeared for OSPE out of whom 4 did not appear for the conventional exam and hence were excluded from the study. The mean scores of the students in both the examinations were compared using student t test with the help of the Microsoft excel 2010 and GraphPad prism 5 software.

Results:

A total of 77 students appeared for both OSPE and the conventional examination. Out of these, 26 students scored $\geq$ 50% marks in OSPE as compared to 75 students in the conventional examination. Comparison of scores in OSPE and conventional exam revealed that students achieved more marks in conventional examination (mean score 29.27 $\pm$ 4.58) as compared to OSPE (mean score 15.74 $\pm$ 6.70) and the difference was statistically significant ($p < 0.001$).

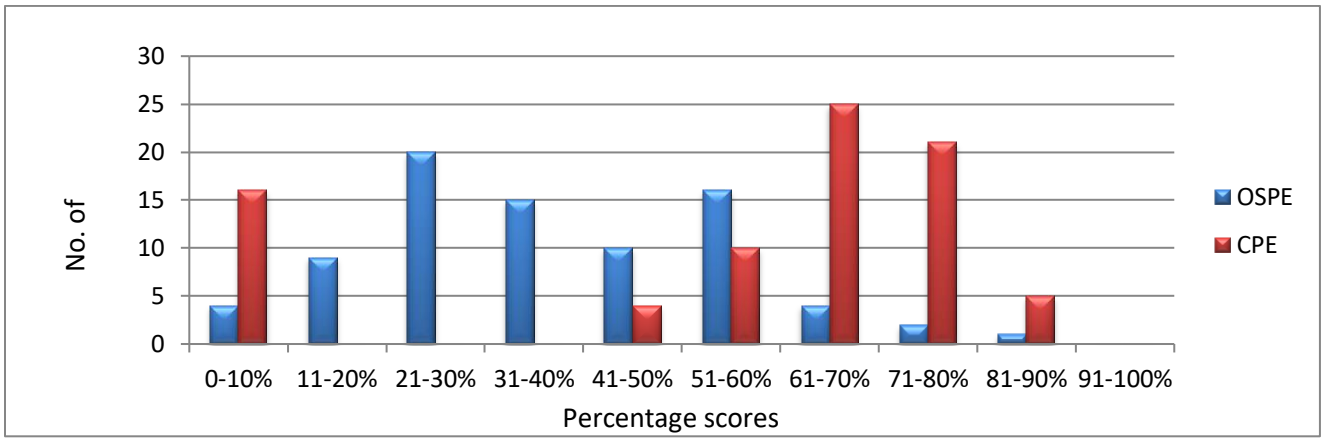

Figure 1: Frequency distribution diagram showing the marks obtained by the students in OSPE and conventional practical examination.

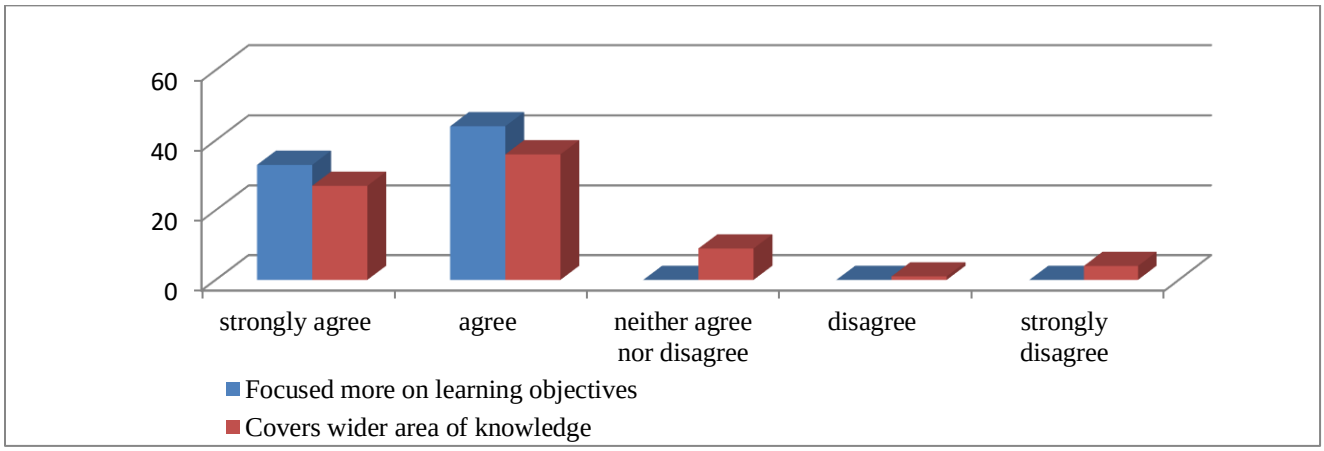

Figure 2: Student's Response for cognitive domain

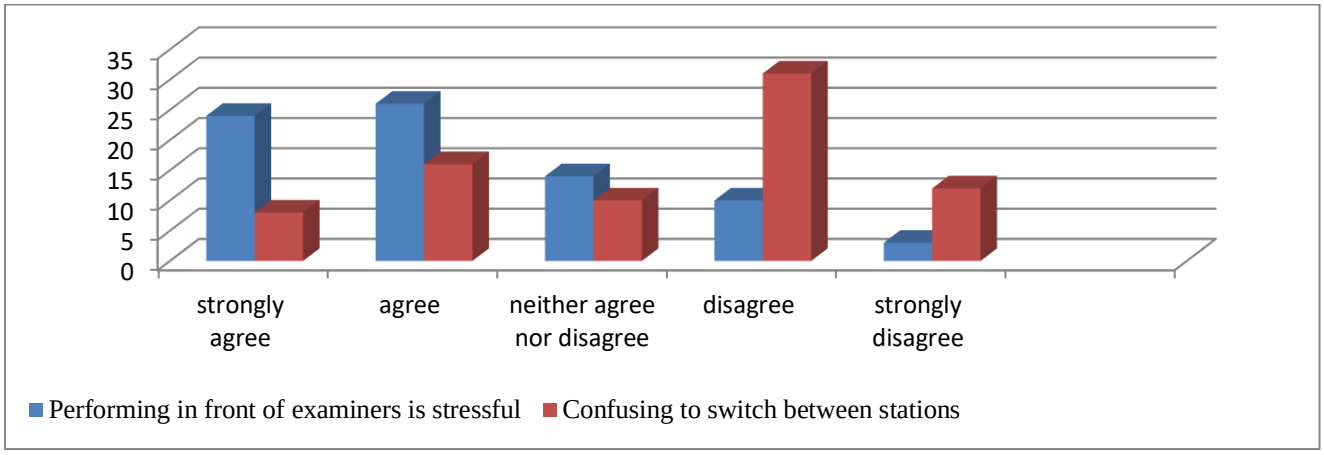

Figure 3: Response for psychomotor domain

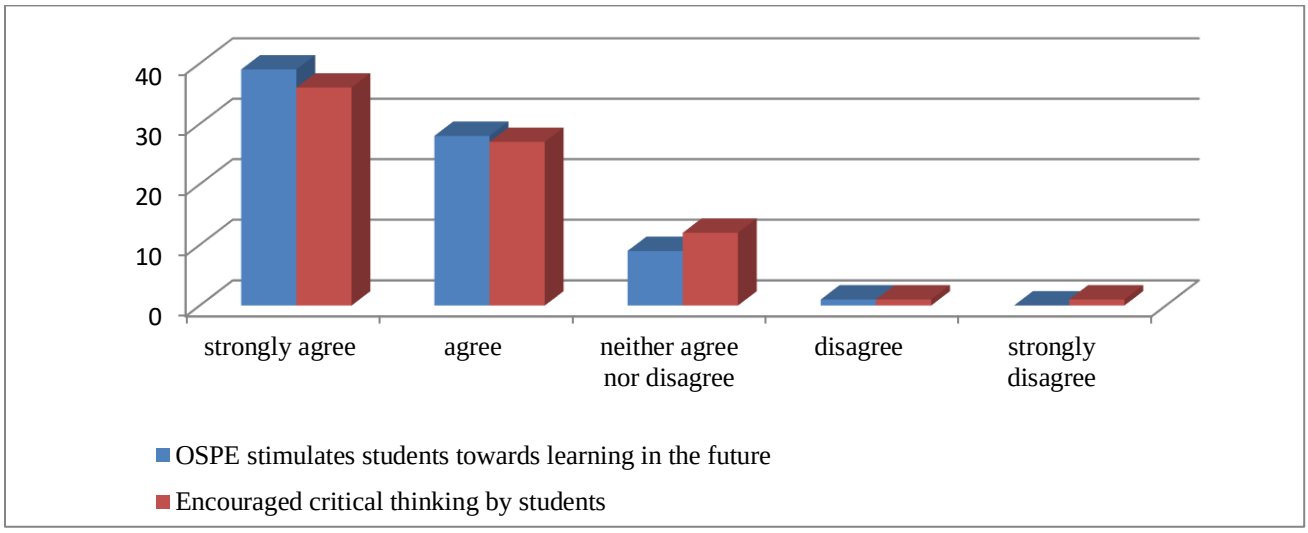

Figure 4: Response for Affective domain

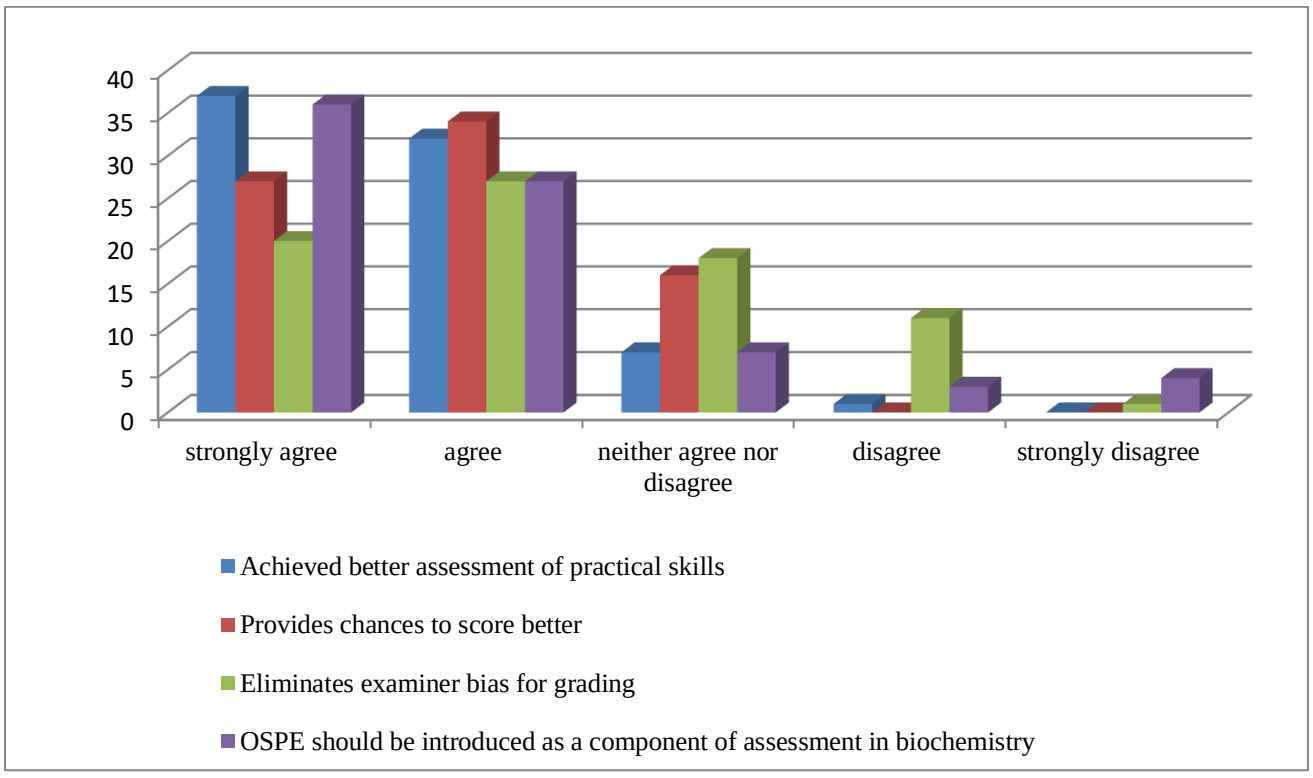

Figure 5: Response for Assessment domain

Table No 1: Student Feedback about OSPE

No.	Questions	strongly agree *n*	agree *n*	neither agree nor disagree *n*	disagree *n*	strongly disagree *n*
1.	Focused more on learning objectives	33	44	0	0	0
2.	Covers wider area of knowledge	27	36	9	1	4
3.	Performing in front of examiners is stressful	24	26	14	10	3
4.	Confusing to switch between stations	8	16	10	31	12
5.	OSPE stimulates students towards learning in the future	39	28	9	1	0
6.	Encouraged critical thinking by students	36	27	12	1	1
7.	Achieved better assessment of practical skills	37	32	7	1	0
8.	Provides chances to score better	27	34	16	0	0
9.	Eliminates examiner bias for grading	20	27	18	11	1
10.	OSPE should be introduced as a component of assessment in biochemistry	36	27	7	3	4

Table No 2: Faculty Feedback about OSPE

No.	Questions	strongly agree *n*	agree *n*	neither agree nor disagree *n*	disagree *n*	strongly disagree *n*
1.	Focused more on learning objectives	5	3	0	0	0
2.	Better assessment of practical skills	6	2	0	0	0
3.	Covers wider area of knowledge	2	5	1	0	0
4.	Provides chances to score better	4	1	1	2	0
5.	Eliminates examiner bias for grading	4	3	0	1	0
6.	Conducting OSPE requires a lot of preparation	5	2	0	1	0
7.	Conducting OSPE is time consuming	5	2	1	0	0
8.	Faculty training in MET is necessary for conducting OSPE	2	4	1	1	0
9.	Present faculty to student ratio is appropriate for implementing OSPE	0	2	0	2	4
10.	OSPE should be introduced as a component of assessment in Biochemistry	3	5	0	0	0

Student's feedback analysis (Table 1) revealed that most of them agreed OSPE was more focused on learning objective and also tested a wider area of knowledge in biochemistry. Most students agreed that switching stations was not confusing, but it was stressful to perform under the direct observation of examiners. They also agreed that OSPE encouraged learning and, analytical and interpretive thinking by the students. Majority of the students felt that OSPE eliminated examiner bias, which could affect scoring, and contrary to their scores in OSPE, most of the students felt that OSPE could help them achieve better score as compared to conventional practical examination. They were of the opinion that OSPE should be a part of their practical examination.

The feedback provided by faculty (Table 2) also revealed that OSPE focused more on learning objectives, with better chances to score by eliminating the examiner bias through the use of preapproved checklist. However, most of the faculty felt that conducting OSPE required more preparation than conventional practical examination, was time consuming and that the present student to teacher ratio was not adequate for OSPE. They also felt that training of faculty in medical education technology was necessary in implementation of newer methods of assessment but still agreed that OSPE should be a part of the practical examinations.

Discussion:

Until last academic session medical colleges in India have directed the training of medical graduates by applying traditional principles of medical education. Traditional curriculum focused more on the learning objectives rather than the outcome and hence conventional assessment methods concentrated mainly on the cognitive aspects with minuscule emphasis on the assessment of psychomotor skills or affective domain. This approach led to a deviation from achieving the goal of yielding first contact physicians for the community. Realization of this scenario ushered the implementation of competency based medical education (CBME) in India[6].

Utilization of a valid and reliable assessment tool to ascertain the achievement of desired competencies by medical students is the need of the hour. OSPE involves rotation of students around multiple stations for the assessment of all learning domains. OSPE helps to reduce the examiner or the experiment variability, by utilizing fixed set of questions, which are assessed using the same checklist by all the examiners. The examiner predefine marking scheme in OSPE and the feedback presented can help improve the teaching strategies as well as the learning process[4].

In the present study, the students' score for OSPE was significantly less than that for conventional pattern of examination. This could be due to the fact that students did not have any prior experience with OSPE. With conduction of repeated OSPE, sharing of checklist with students, their performance can improve. Also, in our study OSPE and the conventional examination were conducted a few days apart as time constraints made it impossible to conduct both on the same day. This could have affected the scores of students to some extent.

At the end of OSPE, feedback was taken from the students to gain an insight into the perception and attitude of students towards OSPE. Feedback plays an important role to ameliorate the standard of teaching – learning methods, assessment tools as well as the performance of the learners[7]. Students' feedback in the present study indicated that majority of them accepted OSPE as a more objective, fair and unbiased tool for assessment. This view has also been supported by other studies[8,9,10]. The students also felt that OSPE helped in assessment of all the three learning domains as opposed to the conventional practical examination.

Out of 77 students included in the study, 50 found that performing in front of the examiners was stressful which could have been due to lack of previous experience with OSPE, lack of knowledge of the procedure and the time restraints for performing it. However, 45 students agreed that there was no confusion while switching stations.

Sixty-seven students agreed that OSPE encouraged learning behavior and 63 students agreed that OSPE encouraged them to critical, analytical and interpretive thinking, which is required of a competent Indian medical graduate. Seventy-three students agreed that OSPE should be introduced as a component of assessment in Biochemistry.

Feedback from the faculty indicated that conducting an OSPE required a lot of prior preparation and was time consuming as opposed to conventional examination but agreed that OSPE should be a part of assessment in Biochemistry. Majority of the faculty agreed that faculty training in Medical Education Technology was necessary for conducting OSPE. This could be to understand the performance level at which assessment has to take place as well as in setting stations fit for the required domain of learning to be assessed. The guidelines put forth by the Medical Council of India (MCI) for Minimum Qualifications for Teachers in Medical Institutions has also made it mandatory for faculty at the post of Associate Professor and above to be trained in medical education technology[11]. Because OSPE involves use of multiple stations, most of our faculty agreed that the present faculty to student ratio was not adequate to implement OSPE. Also, OSPE should be introduced as one of the tools for evaluation in examinations.

Conclusion:

OSPE is an objective and reliable tool for assessment in biochemistry, which helps to improve learning and evaluation of practical skills in biochemistry. With a proper and planned implementation of OSPE, it can be included in the evaluation system for the subject.

Conflict of Interest - Nil
Sources of Support – Nil

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