

## OBJECTIVE STRUCTURED PRACTICAL EXAMINATION AS A LEARNING AND EVALUATION TOOL FOR BIOCHEMISTRY- FIRST EXPERIENCE

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### ABSTRACT

#### BACKGROUND

Assessment plays an important role in helping learners identify their own learning needs. The objective structured practical examination assesses practical skills in an objective and structured manner with direct observation of the students' performance during planned clinical test.

The aim of the study is to evaluate OSPE as a method of learning and formative assessment to the practical skill and to explore faculty perception of OSPE as a learning and assessment tool.

#### MATERIALS AND METHODS

A total of 98 students of first year MBBS student admitted for 2015-16 batch of Jawaharlal Nehru Institute of Medical Sciences, Imphal, were the subjects for the study. Day one- Group A (1-50) students were evaluated by OSPE method of assessment. Day two- Group B (51-98) were evaluated by standard practical examination. To avoid examiners Bias on Day 3- Group C (51-98) who were evaluated by SPE were evaluated by OSPE with minor variations. Group A underwent OSPE. Questionnaire was given to students after the assessment on the fourth day to get the feedback.

#### RESULTS

Independent sample t-test comparing mean percent scores of OSPE and SPE between the groups. There is no statistically significant difference in the mean percent scores for OSPE and SPE among the two groups. Paired sample t-test comparing mean percent scores of OSPE and SPE of group B students. The mean percentage score for OSPE is higher than the percentage scores obtained in SPE among the group B students, but the difference was not found to be statistically significant. The feedback from the students showed that more than 80% agreed that OSPE was less stressful to perform that it was a more objective assessment.

#### CONCLUSION

In conclusion, OSPE has several distinct advantages. From our first experience, we found that OSPE was more objective, measured practical skills better and eliminated examiner bias.

#### KEYWORDS

Biochemistry, Evaluation, Objectives Structured Practical Examination, Formative Assessment, Perception.

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#### BACKGROUND

Assessment drives learning. A single examination does not fulfil all the functions of assessment, assessing knowledge, comprehension, skills, motivation and feedback. Structuring of questions and assessment through highlighting or objectivity has been emphasised and gained importance in the practical evaluation. Objective structured practical

examination- now an accepted tool in the assessment of practical skills in both pre and paraclinical subjects.

In UK, USA and Canada, the OSPE- standard mode of assessment of competency, clinical skills and counseling session satisfactorily complementing cognitive knowledge testing in essay.<sup>1</sup> Biochemistry Departments in many medical schools have been using the OSPE as an assessment method for assessing students' performance in laboratory exercises. Examiner variability significantly affects scoring. OSPE - a versatile multipurpose evaluative tools that can be utilised to evaluate students in practical assessment. Assesses competency based on objective testing through direct observation. It is comprised of several "stations" in which examinees are expected to perform a variety of practical task within a specified time period against criteria formulated to the practical skills, thus demonstrating competency of skills and attitudes. Research shows that the type of assessment method adopted can influence student

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learning.<sup>2</sup> To test the earlier observation that a single exam does not fulfil all the function of assessment, such as assessing knowledge, comprehension and skills, motivation, and providing feedback, we developed an evaluating system. OSPE has been used to evaluate those areas most critical to perform by students such as the ability to obtain and interpret data, solve the problem, teach and communicate. An earlier innovation- Objective Structured Clinical Examination (OSCE) later extended to the OSPE described-1975 - Greater detail-1979 by Harden and his group.<sup>2</sup>

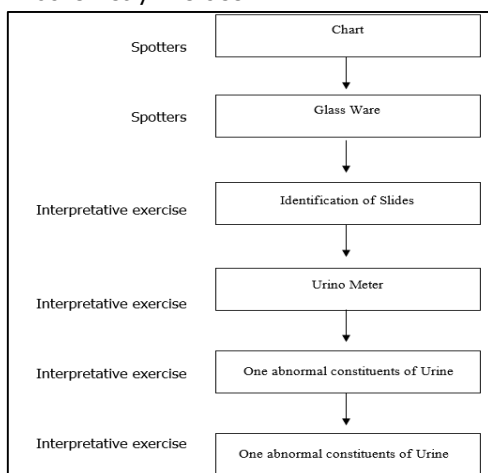
The standard practical examination involves writing of detailed procedure of the given experiments, which is followed by unobserved performance on the topic. Standard practical examination has several problems especially in terms of outcome. Although, marking should depend only on students' competence yet variability in experiments selected and examiners both affects grading in SPE, significantly. Further the subjectivity involved in SPE also affects the correlation negatively between marks awarded by different examiners and performance of the same candidate.<sup>3</sup> In OSPE, the process as well as the product is tested giving importance to the individual competency. The student and faculty variability is prevented in OSPE, thus improving the validity of the examination.<sup>4</sup>

The OSPE method has been reported to be a good substitute for the standard method since it is more objective. This assessment method is based on competency level for practical and procedural skills. It allows thorough evaluation and the deficiency is pointed out clearly.<sup>5</sup>

We undertook this study to evaluate whether OSPE could be a method of learning and assessment to the practical skills in biochemistry. To explore the student, to determine student satisfaction regarding the OSPE as a method of assessment of laboratory exercises. To explore the faculty perception of OSPE as a learning and assessment tool. OSPE is a practical examination system wherein there is a series of stations at which students work together through tasks designed to test various skills. It has been found to be objective, valid and reliable. Eliminates examiners bias.

### Conduct of OSPE

#### Clinical Biochemistry Exercise



**Chart 1. Conduct of OSPE**

Model of OSPE we made can accommodate 50 students at a time and requires 4 examiners and total of 96 minutes. Each student will pass through 6 stations for 16 minutes each with 4 students taking on replicas of each of the 4 stations simultaneously.

### The Four Stations are divided into 3 Categories.

#### They are-

- Clinical biochemistry exercise- 2 stations. They are assessed according to a predetermined checklist and primarily checks the psychomotor domain. Station one given in the form of chart.
- Spotters- 2 stations. Station 1- in the form of Glassware, Station 2- Identification of slides.
- Interpretative exercises- 3 stations. Station 1- Urinometer will be given and the student has to read the urinometer. Station 2- Analysis of abnormal constituents of urine and give the inference. These exercise test the interpretation of data skills of cognitive domain of the three categories, the CB exercise, spotters is observed directly by the examiners. All the exercises kept in spotters and interpretative exercises will be seen by all candidates.

### MATERIALS AND METHODS

A total of 98 students of first year MBBS student admitted for 2015-16 batch of Jawaharlal Nehru Institute of Medical Sciences, Imphal, were the subjects for the study. After successfully completing the syllabus pertaining to the topic on "Identification of Unknown Abnormal Constituents in Urine" in Practical and "Unknown Abnormal Constituents in Urine" in theory, OSPE notification was announced 30 days in advance.

Before administering OSPE evaluation tool, all the faculties involved in designing and conducting OSPE were trained by discussing on how to conduct OSPE/OSCE. Predesigned and agreed checklists to mark the student's performance. The faculties involved formulated checklist having suitable number of questions and marks for each of them within the total marks allotted to a station. Day one- Group A (1-50) students were evaluated by OSPE method of assessment. Day two- Group B (51-98) were evaluated by standard practical examination. To avoid examiners Bias on Day 3- Group C (51-98) who were evaluated by SPE were evaluated by OSPE with minor variations. Group A underwent OSPE. The examiners evaluated the CB exercises according to the predetermined checklist. There was no interaction with the candidates. Group B underwent the conventional practical exam in which the practical skills of CB exercises are not evaluated instead they are assessed based on questions asked at the end of performing the test. The spotters comprises of glassware, slides, calculation of urinometer and interpretation of oral glucose tolerance chart.

Questionnaire was given to students after the assessment on the fourth day to get the feedback.

| Question   | OSPE | Conventional |
|--|------|--------------|
| Feel more comfortable                            | 81%  | 15%          |
| Less stressful to perform                        | 73%  | 23%          |
| More objective assessment                        | 82%  | 16%          |
| Better assessment of practical skills            | 87%  | 11%          |
| Better assessment of practical corrective skills | 73%  | 23%          |
| Interactive is an essential element              | 72%  | 24%          |
| It was a learning experience                     | 82%  | 14%          |

**Table 1. Questionnaire Given to Students**

Table 1. The feedback from the students showed that more than 80% agreed that OSPE was less stressful to perform than it was a more objective assessment. Assessed the practical and correlative skills better. Students supported the interaction with the examiners during the CB exercises. For 82% of the students felt OSPE was also a learning experience.

### OBSERVATIONS AND RESULTS

There is no statistically significant difference in the mean percent scores for OSPE and SPE among the two groups (Table 2).

| Group | Mean (SD)    | Mean Difference (95% CI) | T Value | P Value |
|-------|--------------|--------------------------|---------|---------|
| OSPE  | 54.7 (11.92) | -1.822 (-6.321 to 2.677) | -0.804  | 0.423   |
| SPE   | 56.5 (10.10) |                          |         |         |

**Table 2. Independent Sample t-Test Comparing Mean Percent Scores of OSPE and SPE between the Groups**

Table 3 shows that the mean percentage score for OSPE is higher than the percentage scores obtained in SPE among the Group B students, but the difference was not found to be statistically significant.

| Group | Mean (SD)     | Mean Difference (95% CI) | T Value | P Value |
|-------|---------------|--------------------------|---------|---------|
| OSPE  | 56.52 (10.10) | 3.478 (-2.24 to 7.18)    | 1.892   | 0.065   |
| SPE   | 53.04 (7.489) |                          |         |         |

**Table 3. Paired Sample t-Test Comparing Mean Percent Scores of OSPE and SPE of Group B Students**

### DISCUSSION

OSPE- New evaluative tool designed to make an objective, valid and reliable assessment of different components of competence. The study compared OSPE with standard practical exam conducted in the same batch.

The traditional method of assessment of practical skills raises concerns about examiner variability, standardisation and uniformity of assessment. In the traditional method followed, the practical skills are not directly observed, but are assessed based on questions asked at the end of the session. Since OSPE was conducted for the first time - no statistically significant difference in the mean percent scores for OSPE and SPE among the two groups. Group A and B.

Structuring of questions - Objective assessment has been emphasised and gain importance in the practical examination. The OSPE has over the years gained importance not merely as an evaluation tool, but as a fetching method as well. This has been attributed to the feedback, the OSPE gives to both the students and the faculty.

Shivani Jaswal, Jugesh Chattwal<sup>6</sup> also conducted OSPE for practical assessment in Biochemistry, M. Feroze, AJJACOB<sup>7</sup> conducted OSPE for assessment in pathology and found that OSPE was more objective and measured practical skills better as compared to the traditional method. Studies have also reported that OSPE is an effective tool in discriminating between good and not so good performances.

The better performance- OSPE could be attributed to the fact that the scoring is objective as standards of competence are preset and agreed checklist are used for scoring. Examiner variability is reduced, which also affects the scoring of SPE. A wide range of skills can be assessed by OSPE also assures integration of teaching and evaluation.

Evaluated marks of question station and checklist of procedure station were made available to the students who appreciated what they achieved and identified and where they need to improve. Feedback given by students was constructive and showed high acceptance, which are presented in Table 1. The students appreciated the feedback provided at the end of the OSPE and felt it to be an important factor in improving their learning. Feedback from the faculty provided an insight into their satisfaction and motivation to adopt OSPE as an assessment tool. The OSPE system involves wider coverage of the course and tests individual competency in different topic and skills by asking targeted questions at the non-observed station. On the contrary, the standard method evaluates randomly subjective recall of the given practical(s). In our study, the student attitude and communication skills were also tested by the faculties appointed at the observed OSPE stations. More than 80% of the students reflected a positive attitude towards OSPE method of evaluation. Our findings regarding the attitude of students and faculty toward OSPE correlate with the earlier findings.<sup>8,9</sup>

In a study conducted by Malik et al,<sup>10</sup> OSPE was rated by student as an effective, useful, interesting and challenging exam.

The faculty and students both favoured OSPE as a new tool in a study conducted by Kundu et al.<sup>11</sup>

### CONCLUSION

OSPE improves assessment and provides new tool for the improvement of teaching and learning. Feedback from participating students perceived a new technique of learning. OSPE has several distinct advantages. From our first experience, we found that OSPE was more objective, measured practical skills better and eliminated examiner bias. However, in the current situation, it may not be realistic to expect its inclusion in the formal summative evaluation schedule of universities. It also emphasised the need of

continuous faculty development in the field of medical education.

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