

PERCEPTIONS AND PERFORMANCE OF UNDERGRADUATE MEDICAL STUDENTS IN OBJECTIVE STRUCTURED PRACTICAL EXAMINATIONS (OSPE) IN BIOCHEMISTRY AT RAK MEDICAL AND HEALTH SCIENCES UNIVERSITY (RAKMHSU), UAE.

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ABSTRACT

INTRODUCTION: Health educators and accrediting bodies have defined objectives and competencies that medical students need to acquire to become a safe doctor. The present study was done to determine the student perception and satisfaction regarding OSPE as an assessment method of laboratory practical sessions in Biochemistry.

MATERIAL AND METHODS: During OSPE sessions hundred MBBS first year students were divided into 3 different batches. These students were asked to rotate around 10 different working stations. Each station designed to complete a task comfortably within 5 minutes. One or two rest stations of 5 minutes are given at end or in between to complete the unfinished writing work. All the students perform the same task in the same time frame. Institutional research and effectiveness office (IRO) gets the student feedbacks on OSPE will inevitably result in the refinement of the OSPE as a tool for learning and evaluation.

RESULTS: The study showed that 96.5% students agreed that OSPE questions were linked to the curriculum and 93% of students felt objectives were clear. Eight eight percent students perceived that OSPE covered a wide range of learning outcomes. Ninety five percent felt relevant psychomotor skills were assessed using agreed check list. An 86% and 81% of student perceived that it was conducted fairly and is unbiased. In terms of stress we got mixed response as 50.5% percent of students perceived OSPE to be less stressful and other half felt stressful. Seventy two percent of students agreed OSPE preparation facilitated team work. Ninety percent strongly agreed that exam scores are better and 83% said it is easier to pass. Fifty four percent of the students felt that the time given was too short; especially for procedure stations. Ninety six percent of students felt OSPE should be an integral part of assessment tool for the Biochemistry practical's.

CONCLUSION: The current study showed several advantages of OSPE as an objective, structured, unbiased, fair, valid and reliable assessment method. In view of the tremendous advantages, OSPE should be included in summative evaluation to improve student's clinical competence.

KEY-WORDS: Objective Structured Practical Examination, OSPE, Institutional research and effectiveness office, IRO, Student feedback, Internal assessment, Undergraduates

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INTRODUCTION

Health educators and accrediting bodies have defined objectives and competencies that medical students need to acquire to become a safe doctor. One of such objectives is to provide students with the knowledge, skills and attitudes pertaining to the undergraduate medical curriculum.¹ The term OSPE is derived from Objectively Structured Clinical Examination (OSCE) in 1975, which was later modified to practical examination by Harden and Gleeson.² In an International Conference held in 1985 at Ottawa, OSPE and OSCE techniques were introduced as a teaching and evaluation tool and its advantages were compared with disadvantages.³ Being an objective parameter rather than subjective, OSPE pattern holds transparency in proper assessment of students.⁴

It is a well-known fact that assessment drives learning and single examination does not fulfill all the functions of assessment, such as assessing knowledge, comprehension, skills, motivation, and feedback.⁵ At RAKMHSU we use a wide range of summative assessment tools like multiple choice questions (MCQS), restricted response examination (RRE), problem based examination (PBL), assignments and OSPE to test the Cognitive, Psychomotor, and Affective domains. OSPE is a globally implemented practical examination system, which is reliable and used in many medical colleges. OSPE is an instrument to assess the components in practical skills such as simple procedures, interpretation of lab results, co-relation to theory component, communication, and attitude. These are tested using agreed check lists and rotating the student round a number of stations some which have observers with check lists. The advantage of OSPE includes objectivity and uniformity in questions and marking of students.⁶ Evaluation is a systematic process that consists of finding out the extent to which educational objectives have been achieved by students.^{7,8} No examination pattern currently available which can fulfill all criteria for assessment of students on the basis of their knowledge, comprehension and skills.^{9,5} OSPE is an accepted tool in the assessment of practical skills both in Pre- and Para-clinical subjects.^{10,11} Basic practical skills are essential competencies that students should develop during undergraduate medical training and medical schools should ensure that students have acquired these skills.¹²

There are some concerns that doctors are inadequately prepared for their internship particularly in the areas of practical procedures.¹³ These knowledge component will never be addressed in their professional life thereafter.¹⁴ It is suggested that every undergraduate medical curriculum

should have a formal training programme for the basic practical skills and the students should be assessed to make sure that they learn these skills.¹⁵ In addition, student feedback is considered to be the best method to bridge the communication gap between teachers and students in all aspects.¹⁶ It is an inexpensive and valuable tool to improve the quality of teaching in any medical college. The various studies have shown that reviewing the teaching and assessment methods at regular intervals is necessary. As it helps in modifying the teaching methodologies thereby improving the undergraduate medical education. Various evaluation tools, such as feedback, help the faculty to identify the strengths and weaknesses of their teaching and assessment methods.^{17, 18-20} The present study was done to determine the student perception and satisfaction regarding OSPE as a method of assessment of laboratory practical sessions in Department of Biochemistry.

MATERIAL AND METHODS

The study was conducted in the Department of Biochemistry at Ras AL Khaimah medical and Health Sciences University, Ras Al Khaimah to determine the student perception and satisfaction regarding the OSPE as a method of assessment of laboratory practical exercises in Biochemistry. Since the inception of the University in the year 2006, objective structured practical examination was started in the Department of Biochemistry. OSPE examinations are conducted 4 times in a year, three as a part of summative internal assessment, and 1 at the end year summative comprehensive examination.

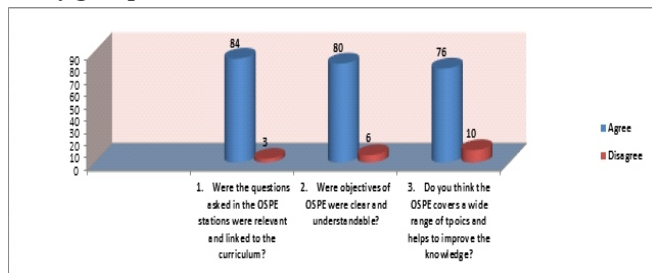
For the OSPE session the MBBS year-1 students were divided into 3 different batches from total strength of 100. Twelve students were selected from the three batches for pre validation of the questionnaire and are not included in the study. The study was approved by the institutional ethical committee. With the informed consent from the students, they were given a pre validated, pre designed and pre tested questionnaire having 13 items. The questionnaire was divided into four categories: cognitive, psychomotor, affective domain and assessment category were asked to give their feedback regarding the present study. This was done uniformly to all the batches and the filled questionnaire collected at the same time. The internal consistency of questions were done using Cronbach's alpha before administering the questionnaire to the study group and Cronbach's alpha was 0.83. During OSPE session students were asked to rotate around 10 different working stations, each station was designed to complete a task comfortably within 5 minutes (fig: Blue print and session in progress). One or two rest stations of 5 minutes are given at

end or in between to complete the unfinished writing work. All the students perform the same tasks in the same time frame. The OSPE booklet consisted of ten tasks a student is expected to perform which were linked to various learning outcomes of the curriculum and are usually representative of those faced in real clinical situations in the form of procedure, response and spotter stations (Fig: specific guidelines). For example after completing the syllabus pertaining to the topic on protein metabolism theory complementing with practical's "Metabolic screening" was incorporated in the curriculum and usually tested for 3rd summative internal assessment. The data was analyzed using SPSS version 18 and results were expressed in percentage. The chi square test was used to know the significance of the result.

RESULTS

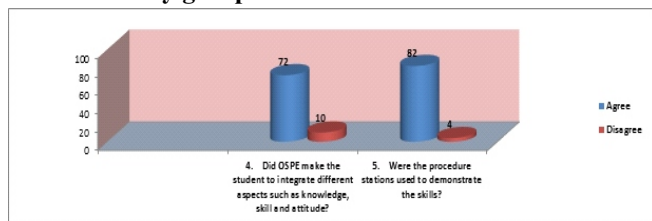
The study questionnaires were collected from 87 students out of 100. The feedback given by the students is shown in the (Table 1) and p value <0.05 were considered as significant. Majority of students (96.5%) agreed that objective pattern of questions asked in the OSPE stations were relevant and linked to the curriculum. Ninety three percent of students felt OSPE objectives were clear and understandable in assessing the knowledge, comprehension and application. Eight eight percent students felt OSPE covered a wide range of learning outcomes and helps to improve the knowledge (Fig.1).

Figure 1: Showing the cognitive domain response from the study group.



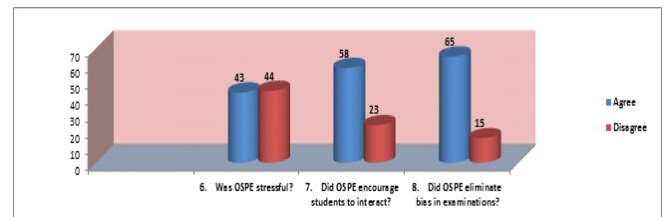
Ninety five percent of students felt relevant psychomotor skills were assessed using agreed check list (Fig. 2).

Figure 2: Showing the Psychomotor domain response from the study group.



In terms of stress we got mixed response as 50.5% percent of students perceived OSPE to be less stressful and other half felt stressful. Seventy two percent of students agreed OSPE preparation encouraged them to interact as a team and which promotes team work. (Fig. 3).

Figure 3: Showing the affective domain response from the study group.



Ninety percent strongly agreed that OSPE provide a chance to score better and 83% said it is easier to pass. Fifty four percent of the students felt that the time given was too short; especially for procedure stations. Ninety six percent of students felt OSPE should be an assessment tool for the Biochemistry practical's and Eighty six percent perceived that it is conducted fairly (Fig. 4).

Figure 4: Showing the assessment domain response from the study group.

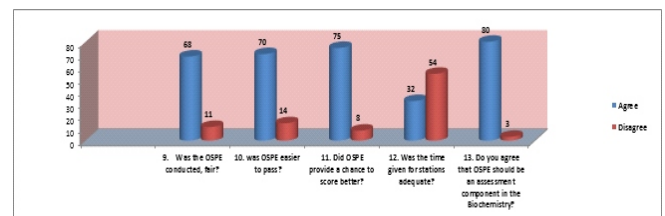


Table 1: Showing students perception about Biochemistry OSPE.

Questions	Agree	Disagree	p value
Cognitive domain			
1. Were the questions asked in the OSPE stations were relevant and linked to the curriculum?	84 (96.5%)	3 (3.5%)	0.001
2. Were objectives of OSPE were clear and understandable?	80 (93%)	6 (7%)	0.001
3. Do you think the OSPE covers a wide range of topics and helps to improve the knowledge?	76 (88%)	10 (12%)	0.001
Psychomotor domain			
4. Did OSPE make the student to integrate different aspects such as knowledge, skill and attitude?	72 (88%)	10 (12%)	0.001
5. Were the procedure stations used to demonstrate the skills?	82 (95%)	4 (5%)	0.001
Affective Domain			
6. Was OSPE stressful?	43 (49.5%)	44 (50.5%)	0.91
7. Did OSPE encourage students to interact?	58 (72%)	23 (28%)	0.001
8. Did OSPE eliminate bias in examinations?	65 (81%)	15 (19%)	0.001
Assessment			
9. Was the OSPE conducted, fair?	68 (86%)	11 (14%)	0.001
10. Was OSPE easier to pass?	70 (83%)	14 (17%)	0.001
11. Did OSPE provide a chance to score better?	75 (90%)	8 (10%)	0.001
12. Was the time given for stations adequate?	32 (37%)	54 (63%)	0.01
13. Do you agree that OSPE should be an assessment component in the Biochemistry?	80 (96%)	3 (4%)	0.001

DISCUSSION

Objective structured practical examination a multi station, multi task process of assessment is to assess the cognitive, psychomotor and affective domain of medical undergraduates in Biochemistry laboratory practicals. OSPE method of examination gives the student greater chance to express their knowledge and skill component.

Several studies have proved the Objective Structured Practical Examination is a valid objective and reliable assessment tool and eliminate examiner bias.^{13-16, 19-22} The current study also showed a positive perception towards OSPE as a fair, unbiased, valid, reliable assessment method.

Over the years, experience has led to the use of OSPE not merely as an evaluation tool and also method of assessment in the international medical school. This has largely been attributed to the feedback that OSPE gives both to students and teachers.^{23,24} A medical curriculum should constantly develop in response to the need of students, institutions and communities.^{18,25}

Periodically at RAKMHSU we redefine our OSPE stations based on the incidences of diseases prevailing in the community and country. In UAE for example there is high incidence of obesity, diabetes mellitus, hemoglobinopathies etc, so we have incorporated in the curriculum qualitative tests like benedicts, urine dip stick, quantitative glucose estimation, oral glucose tolerance test (OGTT), lipid profile and hemoglobin electrophoresis. We also improvised on technology and shifted to dry chemistry experiments where ever possible like glucose and lipid profile estimations by glucometer and lipid profile analyzer.

Student feedback about educational methodologies is a useful basis for modifying and improving medical education. The ultimate aim of such feedback is to identify areas of strength and/or weakness of teaching methodology used so that steps can be taken to rectify the deficiencies and to evolve the curriculum and achieve the intended goal.

At RAKMHSU institutional research and effectiveness office (IRO) conducts biannual student feedback surveys with an aim to ensure the learning outcomes of educational programs are assessed and the results used for program improvement. Some of the components related to skills surveyed are design and delivery of the curriculum, laboratory facilities and equipment, knowledge gained, skills gained and attitude change/ competency. Any genuine issues in the student feedback are addressed and rectified before the start of the next semester to achieve the intended goal of RAKMSU which is to

ensure that its graduates are equipped with knowledge and skills which allow them to enter the medical and health sciences fields as self-learners, critical thinkers, team players, ethically oriented, and to contribute to the development of the society they live in.

Any examination is a well-known source of stress and anxiety and OSPEs in particular considered as quite stressful.^{18,26} In present study half of students agreed and other half disagreed that OSPE is a stressful examination. This component of our research can be compared with a study done by Manjula A et al.²⁷ Stress in mild forms can motivate a student. Moderately increased stress levels may make student more alert and more motivated to complete the syllabus. However, if stress levels are too high then it can cause difficulties, including impairing ability to prepare for and perform during exams.²⁸

Many students postpone reading to ends so several large lecture contents gets accumulated and find it difficult to complete the syllabus, preparing for the examination and ultimately finds the course hard. Medical students should never procrastinate and learn effective time management.

Students found difficulty in management of time at some stations so they demanded more time to be given for these stations probably for the lack of practice. This component of our research can be compared with a study done by Manjula A et al.²⁷ Our research can be compared with a studies done by Kundu, et al.²⁹ Krishna murthy N et al.³⁰ Shoaiband Hasaan Rafique,³¹ Pinaki Wani et al.³²

CONCLUSION

The current study showed several advantages of OSPE as an objective, structured, unbiased, fair, valid and reliable assessment method. All the participants in the study were in favor of using this assessment method in future also for all Biochemistry practical sessions. We have to make sure that the students achieve the adequate level of competency in the practical skills incorporated in the curriculum before they can proceed further to the next semester. IRO feedbacks on OSPE will inevitably result in the refinement of the OSPE as a tool for learning and evaluation. A good assessment requires continuous efforts for innovation, sufficient resources like manpower and instrumentation, money and time.

RECOMMENDATION

In view of the tremendous advantages OSPE should be included in summative evaluation to improve student's clinical competence.

LIMITATION

With large sample size, our study can be extended to increase the overall strength of our findings.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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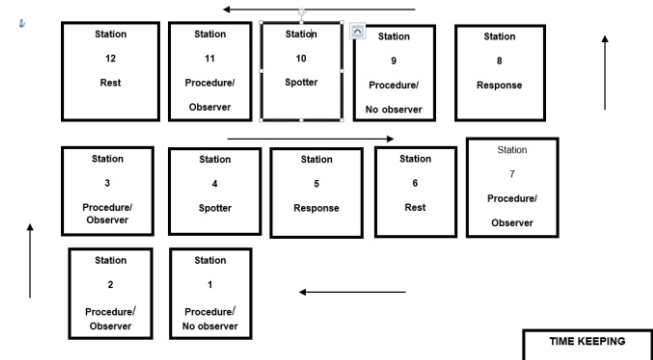
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Sample: Plan for the objective structured practical examination

- There are 12 OSPE stations
- Each student is given 5 minutes per station.
- Questions in each station carries 5 marks each
- The stations are designated as 6 Procedure, 2 Response, 2 Spotter and 2 Rest.
- Always move in the direction of the arrow when the bell rings.
- No talking or discussions allowed in the laboratory



STATIONS	SPECIFIC GUIDELINES
Action /Procedural station	Perform the specific procedure with the resources available. The details of the procedure would be provided.
Response stations	Interpret the patient history, calculate the given data, and give the appropriate responses.
Spotter station	Identify and write the appropriate response
Rest stations	You can complete any incomplete work from the previous stations. No discussions and talking with peers allowed

Sample tasks for OSPE:

- A. Response B. Procedure C. Spotter stations.

A. Response Station:

In a 39 year-old woman who just gave birth, chorionic villus sampling was performed, and a battery of genetic panels was assessed on the newborn. One marker indicated a defective Cystathionine beta synthase. Answer the following for the above case:

1. What is your probable diagnosis for the above case? (1Mark)

Answer:

2. If the mother was not treated properly which sulphur containing compounds would you most likely expect to be elevated? (1Mark)

Answer:

3. Name the diseases responsible with increase in homocysteine? (1.5Mark)

Answer:

4. Maternal hyper homocysteinemia causes neural tube defects this is due to decrease synthesis of which metabolite? (1.5Mark)

Answer:

B. Procedure and observer station:

Perform the following test with the procedure given in the response sheet and record your observation, inference and interpret your findings after comparing with that of normal urine.

Procedure	Observation	Inference	Interpretation
To 2.0 ml of urine add 1.0 ml of ammonical silver nitrate and boil for 1 minute	Abnormal urine observed the brownish colour change	colour change is due to reducing property of homogentisic acid	homogentisic acid oxidase and the disease is Alkpatonuria

Sl.No	Steps	Marks
1.	Checked the cleanliness of the test tube	0.25
2.	Checked the name of the reagents	0.25
3.	Prepared for handling biological sample	0.5
4.	Taken the appropriate amount of sample	0.5
5.	Pipetted out the required volume of the reagent	0.5
6.	Observed no colour change formation	0.5
7.	Recorded the inference as normal urine	0.5
8.	Repeated the same with abnormal urine observed the brownish colour change	0.5
9.	Recorded the inference as: colour change is due to reducing property of homogentisic acid	0.5
10.	Mentioned the defect in the enzyme as homogentisic acid oxidase and the disease is Alkpatonuria	0.5
11.	Mentioned the essential amino acid deficient in the above disorder as phenylalanine	0.5

C. Procedure and Non-observer station:

A new born baby presented with abdominal distention, excessive crying and diarrhea after being fed with milk. Baby was investigated for reducing sugar and found to be positive.

1. Name the 2 chief nutrient of milk.
2. List and perform the tests to identify the presence of milk components in a given biological sample.

D. Spotter:



With the help of the pictures given above answer the following?

1. Identify the in born error of metabolism? (1.5Mark)
Answer:
2. What is the enzyme deficiency? (1.0Mark)
Answer:
3. Deposition of which substance takes place in the above picture pointed with an arrow in the ear, vertebrae and eye? (1.5Mark)
Answer:
4. The condition due to deposition of the above substance is called? (1.0Mark)
Answer:

OSPE SESSION IN PROGRESS PAYING ATTENTION FOR THE INSTRUCTIONS



OSPE SESSION IN PROGRESS PERFORMING THE TASKS

OSPE SESSION IN PROGRESS PERFORMING THE TASKS



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