

Original Research Article

Effectiveness of objective structured practical examination as a formative assessment tool as compared to traditional method for M. B. B. S students

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ABSTRACT

Background: Most of medical colleges in India follow Traditional Practical Examination for evaluation of practical or clinical skills wherein students are assessed only for knowledge and not for attitude and skill. Traditional methods have several flaws like inter-examiner marks variation, examiners subjectivity, varying difficulty level of different experiments, etc. which prevents uniform marking. These flaws could be minimized by newer methods like OSPE. Objective of the study was to know the effectiveness of objective structured practical examination (O.S.P.E) as a formative assessment tool as compared to traditional methods for M.B.B.S students and to know the perception of participating students and faculties towards OSPE.

Methods: A cross sectional comparative study was carried out on 63 MBBS students. Students were subjected to Traditional Practical Examination followed by OSPE. Mean marks for all students were calculated by both the methods. A Likert's scale based questionnaire on OSPE was distributed among the students and faculties to know their views and perceptions towards OSPE. The results were analysed by SPSS version 20.0.

Results: Average marks scored by the students in OSPE (18.74 ± 4.395) were higher as compared to Traditional Practical Examination (13.81 ± 3.814) which was statistically significant. 74.4% of the students and 65.4% faculties strongly agreed that OSPE is fairer in comparison to Traditional Practical Examination. 90.5% students strongly agreed that variability of examiner & patient can be removed to a large extent by OSPE.

Conclusions: OSPE was found to be a more effective assessment tool than traditional method. As regards perception, both students and faculties strongly agreed that OSPE is fairer assessment tool compared to traditional practical examination.

Keywords: Assessment tool, Effectiveness, OSPE, Traditional practical examination

INTRODUCTION

An integral part of a medical curriculum is an appropriate assessment of the student's clinical/practical competencies. Development of clinical competence in students at all levels is the main aim of medical education. The assessment of the students is done through

different type of examinations like multiple choice examinations (MCQ), short (SAQ) and long answer examination (LAQ). While theory examinations are typically used to assess the knowledge i.e. cognitive domain of students, the purpose of practical examination is to assess the cognitive, psychomotor and affective domain as well.

Majority of times the students are assessed only for knowledge. Assessment of attitude and skills is often ignored. It is a well-known fact that the students learn and study the subject for what they will be assessed for i.e. "learning is assessment driven". A single assessment method is not comprehensive in assessing a student. Viva Voce is traditionally used as an assessment tool in practical examinations. It is well known that conventional practical examination has several problems.¹

Assessments of practical skills in medical education are traditionally subjective in nature. Further the subjectivity associated with traditional methods also affects the correlation between marks awarded by different examiners and performance of same candidate negatively.² Thus there is a high degree of inter-examiner variation in traditional assessment methods. These need to be changed to objective ones.

An Objective Structured Practical Examination (OSPE) has been considered as one such method. In some institutions, oral / viva examinations has been replaced by objective structured practical examination (OSPE) and objective structured clinical examination (OSCE) in Basic Medical Sciences and Clinical Sciences respectively to overcome the problems which are faced in Traditional Practical Examinations.³ Historically, it has originated from medical education, and is now being adopted by many disciplines of healthcare education.

Students are given about 5 to 10 minutes at each station and are observed evaluating or are asked questions about a diagnosis or management of a particular condition. Examination is meant mainly for student's interpersonal skills, history taking skills, physical and diagnostic skills. It evaluates student's knowledge base and problem solving ability. Assessment is performed at each station with a predetermined checklist made with the consensus of all examiners. It has demonstrated reliability and validity for assessing clinical performance, though it is labour and time intensive and requires some expertise.⁴

The objective of OSPE is to reduce the chances of examiner bias and assess the students' skills. Though this concept was introduced by Ronald Harden more than thirty five years ago; still it is not implemented in many of Health universities and medical colleges in India.⁵ Thus, this study is an attempt to evaluate the feasibility of using OSPE as a tool for the formative assessment of undergraduate M.B.B.S. students. As OSPE is a new experience for most students and teachers, it is important as educators, that we explore this assessment from the perspective of the participating students and faculties. Considering all this, the study is also aimed to know the perceptions of students' regarding OSPE.

Aim of the study was to study effectiveness of Objective Structured Practical Examination (O.S.P.E) as a formative assessment tool as compared to traditional methods for M.B.B.S students.

Objectives of the study

- To know the effectiveness of Objective Structured Practical Examination (O.S.P.E) as a formative assessment tool as compared to traditional methods for M.B.B.S students.
- To know the perception of participating students and faculties towards OSPE

METHODS

A cross- sectional comparative study was conducted at Department of Community Medicine of MGM Medical College, Kamothe, Navi Mumbai, Maharashtra, India. The study was conducted for a period of 5 months. Students belonging to 6th Semester were included in the study. Out of the 6 batches attending clinical posting in community medicine, 3 batches were selected randomly by lottery method. All students from these 3 batches were included in the study. Those students who were not willing to participate were excluded from the study. Thus a total of 63 M.B.B.S. students (6th Semester batch) and 7 trained faculties were included in the study.

All the 7 faculties who were trained in Medical Education Technology and participating students were sensitized about the concept of OSPE with the help of lecture using power point presentation. Approval was taken from Institutional Ethics Committee. Written informed consent was taken from participating students & faculties. Trained faculties were involved to prepare the stations for conducting examination with OSPE. A total of 9 stations were finalized out of which 2 were Rest stations. The duration for each station was eight minutes. Checklist was prepared with full participation of the faculties & it was validated by 2 senior faculties. Thus, OSPE was conducted for a total of 35 marks.

Examination was conducted with prior information to the students so that they come well prepared. The confidentiality of the stations was maintained till the end of examination. Volunteers acted as simulated patients during examination. The entire 63 MBBS students first underwent a viva voce examination. The same 7 trained faculties which were involved in viva voce took OSPE. A model Viva Voce Question bank was prepared and questions were asked from the same. The question bank did not have questions asked in OSPE, other questions revolved around the theme used in OSPE. Since a total of 7 stations were used in OSPE, Model Question Bank for Viva Voce also contained 7 categories which were related to the 7 OSPE Stations. This was to ensure that bias is reduced. After Viva Voce examination students underwent OSPE. The students who had given OSPE and traditional methods were isolated in separate rooms. There could have been a possibility of discussion between the students later on. Since these extraneous factors were beyond my control, it may be considered as limitation of this study. The total marks obtained out of 35marks in Traditional Practical Examination Method

(Viva Voce) were compared with marks obtained in OSPE. Statistical software (SPSS 20.0) was used for statistical analysis. Analysis was done using descriptive statistics like frequency & percentage. Paired t-test was

applied to the results which were categorized into TDPE and OSPE, the. The p values obtained were <0.05 and where hence considered significant. The results were computed with 95% confidence interval.

Table 1: Stations used for the study.

Stations	Description	Domain Assessed	Materials Used
Station No.1	Demonstrate and Measure the mid-upper arm circumference of a child aged 3 years.	Psychomotor	Measuring tape for measuring M.U.A.C
Station No. 2	Measure and interpret the Blood Pressure of the subject according to classification used for hypertension	Cognitive and Psychomotor	Sphygmomanometer
Station No.3	REST	REST	REST
Station No. 4	From the ingredients given to you, prepare a home based ORS solution. What advice would you give to the mother of a breast feeding 2 year old child suffering from mild dehydration?	Affective and Psychomotor	1 liter Water, Sugar and Salt
Station No. 5	Identify the category of RNTCP patient wise box (PWB) and mention its constituents, dosage and frequency of administration.	Cognitive	Category I Patient Wise Box (PWB)
Station No. 6	A forty years old female weighing 80 kg with height of 1.8 meters comes to the OPD, Calculate her B.M.I and explain the classification used for interpreting B.M.I.	Cognitive	Calculator
Station No. 7	A G3P2L2A0 ANC mother with previous history of home delivery comes to ANC clinic. She is currently diagnosed with pregnancy induced hypertension. She is unwilling for hospital delivery and you are asked to counsel her.	Cognitive and Affective	Simulation
Station No. 8	Rest	Rest	Rest
Station No. 9	An HIV positive mother residing at Dharavi Slums, who is a daily wage worker, has just given birth to a child weighing 2 kg. Counsel her regarding whether she should or should not breast feed the child along with reasons for the same.	Affective	Simulation

The views and perceptions of students and faculties were noted with the help of a proforma which included questions regarding comparison of Traditional Method of Practical Examination i.e. Viva voce with OSPE. Likert's scale was applied to know their attitude towards OSPE. Immediate feedback regarding examination was given to the students.

RESULTS

The response rate of the students was 100% as all the students appeared for both the tests. As seen in Table 2,

the mean marks scored by the student by traditional method were 13.81 ± 3.814 as compared to score in OSPE which was 18.74 ± 4.395 . This difference of mean scores between the two tests was statistically significant ($p < 0.01$). Based on the response to the questionnaire, students' perception towards OSPE was analysed (Table 3). More than half i.e. 74.4% of the students strongly agreed OSPE to be fairer in comparison to Traditional Practical Examination. Only 4.7% students were not sure if OSPE was better than traditional method of examination. 59.3% students felt that OSPE was easier to pass than Traditional Practical Examination.

Table 2: Mean marks obtained by students in traditional method of practical examination and OSPE (n=63).

	Mean	Standard deviation	Standard error of mean	T value	P-Value
OSPE	18.74	4.395	0.553	8.7335	<0.01*
Traditional Method	13.81	3.814	0.480		

*Highly Significant

90.5% students strongly agreed that variability of examiner & patient can be removed to a large extent by OSPE. When asked whether OSPE should be included as a preferred tool for assessment over traditional method,

72.4% strongly agreed whereas 4.3% were not able to decide between OSPE and Traditional Practical Examination.

Table 3: Students perception regarding OSPE (n=63).

Questions	Strongly Agree	Agree	Neither Agree nor disagree	Disagree	Strongly disagree
OSPE is fairer compared with traditional practical examination.	74.4%	20.9%	4.7%	0%	0%
OSPE covered a wide range of knowledge compared with traditional practical examination.	67.1%	32.9%	0%	0%	0%
OSPE is easier to pass and score better when compared to traditional practical examination	59.3%	22.9%	17.8%	0%	0%
OSPE may be exhausting and lengthy if no. of stations will be increased	4.8%	71.9%	12%	10.3%	1%
Viva – Voce is better than OSPE	0%	10.5%	16.1%	39.6%	33.8%
OSPE should be followed as the method of assessment in CommunityMedicine henceforth	72.4%	23.3%	4.3%	0%	0%
Examiner bias & patient variability can be removed to a large extent by OSPE	90.5%	5%	4.5%	0%	0%
Attitude of examiners during OSPE was better as compared to traditional practical examination.	53.3%	38.1%	3.8%	4.8%	0%
The degree of emotional stress in OSPE was less as compared to traditional practical examination.	68.1%	17.5%	4.8%	4.8%	4.8%

Table 4: Faculties perception regarding OSPE (n=7).

Questions	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
OSPE is fairer compared with traditional practical examination.	65.4%	27.9%	4.7%	2%	0%
OSPE covered a wide range of knowledge compared with traditional practical examination.	20.9%	35.8%	30%	10%	3.3%
OSPE is easier to pass and score better when compared to traditional practical examination	39.1%	43.7%	10.8%	5%	1.4%
OSPE may be exhausting and lengthy if no. of stations will be increased	10.9%	80.1%	9%	0%	0%
Viva – Voce is better than OSPE	7.9%	12.4%	15.5%	42.7%	21.5%
OSPE should be followed as the method of assessment in community medicine henceforth	68.2%	19.7%	6%	4.3%	1.8%
Examiner bias & patient variability can be removed to a large extent by OSPE	20%	55%	15%	5%	5%
Attitude of students during OSPE was better as compared to traditional practical examination.	63.3%	32.1%	4.6%	0%	0%
The degree of students' emotional stress in OSPE was less as compared to traditional practical examination.	10.9	70.1%	6.4%	12.6%	0%

Analysis was also done for faculties' perception towards OSPE (Table 4). Even faculties perceived OSPE to be

fairer as compared to traditional practical examination. 65.4% of faculties strongly agreed towards the same.

When faculties were asked whether OSPE was easier to pass than Traditional Practical Examination, 43.7% agreed and 39.1% strongly agreed that OSPE was easier to pass. 35.8% of faculties agreed that OSPE covered a wide range of knowledge compared with traditional practical examination. One of the main concerns of faculties regarding OSPE was that it may become exhaustive and lengthy if number of stations will be increased. 80.1% of faculties agreed on this issue. However a positive aspect of OSPE was that 55% faculties felt that Examiners bias and patients' variability could be removed to a large extent by OSPE. Also 70.1% of faculties agreed that students' emotional stress in OSPE was less as compared to traditional practical examination. Additionally 63.3% of faculties strongly felt that attitude of students during OSPE was better as compared to traditional practical examination. Overall 68.2% of faculties strongly agreed that OSPE should be followed as the method of assessment in Community Medicine henceforth.

DISCUSSION

Most of the medical colleges in India are following the conventional (traditional) practical examination pattern which was designed many years ago. Over the years several attempts have been made worldwide to reduce the subjectivity in the examination process. Attempts are being made to make the practical examination more reliable and valid. This could be achieved by reducing the subjectivity and in turn increasing the objectivity of the practical examination. For this purpose, Harden et al (1975) first described the Objective Structured Clinical Examination as a means to assess the clinical skills of final year medical students.⁵ The benefits of the OSCE method to learners, faculty, institutions, and the public at large are great. The labor and resource intensive OSCE has become standard practice in modern assessment of clinical competence, and the results are used for high-stakes decision making at many levels.⁶ Hence it can be said that such type of examination has an international growing popularity with educational experts now recommending OSPE for both educational and assessment purposes. Thus educational experts are now recommending OSPE for both educational and assessment purposes.

The Objective Structured Practical Examination (OSPE) has been advocated for the practical assessment of clinical, preclinical and para-clinical subjects. An attempt was made to test the feasibility and acceptability of implementing this method in the internal assessment by comparing it with Traditional Practical Examination which mainly includes viva voce.

OSPE is a good tool to avoid examiners bias, to bring objectivity in exam, for standardization of questions and simultaneously the student has greater chances to express their knowledge. The shortcomings of oral examinations and other highly prevalent assessment approaches has

been thoroughly documented.⁷ Traditional Practical Examination has its own merits and demerits. It has subjectivity, chances of asking irrelevant questions, no uniformity for time. But important advantages are to judge interactive skills, assess depth of knowledge and it also provides flexibility to examiners.⁸ However when advantages are weighed against disadvantages it's safe to conclude that the demerits of Traditional Practical Examination outweigh its merits.

Students scored higher in OSPE than in traditional method. As seen in Table 1, the mean score out of 35 for OSPE was found to be 18.74 while the same for traditional method was 13.81. The t value of 8.73 was found to be statistically highly significant. Nigam R et al did a similar study to evaluate the competency of OSPE as an assessment technique compared to Traditional Practical Examination in subject of Community Medicine.⁹ Similar results was also put forward by Trivedi et al who concluded that by using OSPE as an assessment tool, the students get a chance to score better.¹⁰ Students rarely get more than 75% in conventional evaluation system as marks are given in subjective manner based on teacher's discretion. Thus keeping the scientific methodology followed in our study and results of statistical analysis we can safely conclude that students indeed score higher in OSPE than in traditional methods of assessment.

This study was also aimed to assess the students' and faculties perception towards OSPE. For this, students and faculties feedback was taken after OSPE. As seen in Table 2; more than 70% students strongly agreed that OSPE is fair method when compared to traditional method. They were also satisfied that examiners favoritism was negligible. They believed it would help them score better because of the uniformity in the evaluation pattern. The majority of faculties' i.e. 93.3% were also of the opinion that OSPE is fairer compared with traditional examination. 65.4% of faculties strongly agreed while 27.9% agreed on this aspect. In a study conducted by Gujjala Radhika et al, majority i.e. 94% faculties accepted that OSPE is fair method of assessment which is similar to present study.¹⁴ Thus we can say that in general faculties have a positive attitude towards OSPE and thus they may be amicable for OSPE implementation as a method of assessment. A sizable 55% of the respondents believed that variability of examiners and patients can be removed to be large extent by OSPE.

Findings from present study were almost similar to a study conducted by Vijay Mate et al, wherein 60% teachers agreed that inter examiner bias can be eliminated by OSPE.¹⁵ These opinions of our students and faculties are in congruence with literature.¹¹ Examiners subjectivity and favoritism are few of the important factors which negatively affect students' performance. These are effectively minimized to a great extent in OSPE which help the students score better. All the 63 respondents agreed that OSPE covered a wide range of

knowledge compared to Traditional Practical Examination. As shown in Table 3, 35.8% of faculties agreed that OSPE was more comprehensive and covered more knowledge as compared to traditional practical examination. Present finding was almost similar to study conducted by Wadde SK, et al where 30.77% faculties agreed that OSPE covered a wide range of knowledge when compared to TPE.¹ This is a fact as OSPE assesses cognitive, psychomotor and affective domains while Traditional Practical Examination usually is effective only in assessing cognitive domain and some aspects of psychomotor domain. Present finding is almost similar to study conducted by Jaswal Shivani, et al One of the important constraints in any assessment technique is time constrain.¹²

In Traditional Practical Examinations, examiners have to assess the knowledge levels of students within a very short period of time. Asking questions from all portion of syllabus in viva voce is indeed a challenge. OSPE on the other hand can assess not just the knowledge but also the skills and attitude of students in the same period of time. Thus not just cognitive but even psychomotor and affective domains get evaluated. Various stations used in OSPE can be tuned with different portions of syllabus and thus students can be assessed in a more comprehensive manner. However an important challenge that needs to be kept in mind is that OSPE may become more exhausting and lengthy if numbers of stations are increased. 80.1% of faculties agreed on the same. In present study 70.1% agreed that the degree of students' emotional stress in OSPE was less as compared to traditional practical examination which is similar to a study conducted by Wadde, et al showed that 30.77% teachers agreed that OSPE is more stressful compared to traditional practical examination.¹ Thus it can be said that faculties are well aware of the stresses that traditional examination system puts on the students and they see a ray of hope in newer assessment techniques like OSPE. A balance has to be maintained between covering maximum portion and increasing the number of OSPE stations for the same.

In present study, 68.1% students felt that OSPE was less stressful compared to traditional method of practical examination. A less stressful environment increases the student's ability to score better in exams. Similar findings were reported by Wani P et al who in their study of student's perception on OSPE reported that majority of students were relaxed.¹³ In present study, 39.6% students and 42.7% of faculties disagreed that viva voce is better than OSPE. This finding is similar to a study conducted by Wadde SK, et al where 36.36% students disagreed that viva voce is better than OSPE.¹

The very fact that students feel they are being objectively assessed gives them more confidence and makes them much less stressful. In modern times exam related stress is taking a heavy toll of students' psychic. Stress related students suicides are also on the rise. In such

circumstances less stressful methods like OSPE can really benefit the students both emotionally and psychologically.

After OSPE, we analysed the answers and were able to identify the common errors committed by the students. This helped us to recognize the areas or topic where more emphasis was needed in subsequent lectures. Thus to conclude most of the students and faculties were optimistic and positive towards OSPE and felt that it should be followed as a method of assessment in community medicine henceforth. Thus we feel that the time is right for a paradigm shift in the methods of assessment and evaluation in community medicine with newer holistic methods like OSPE being given their rightful position as effective and efficient method of assessment.

CONCLUSION

This study concluded that in comparison to Traditional Practical Examination, OSPE was more effective as inter-examiner variation and bias were eliminated. Both students and faculties were having a positive approach towards OSPE. Moreover the students were assessed with the same set of questions, thus eliminating any bias in the difficulty level.

Thus, OSPE was found to be a more effective assessment tool than traditional method. Many medical colleges in India use OSPE as a tool of assessing practical skills. OSPE should be further enforced in other Indian medical colleges. Use of OSPE as formative tool will help in modifying teaching - learning strategies so that both, the teachers as well as the students can derive maximum benefit.

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REFERENCES

1. Wadde SK, Deshpande RH, Pathan MB. Assessment of III MBBS Students using OSPE/OSCE in Community Medicine: Teachers' and students' Perceptions. *FJ Sch J App Med Sci*. 2013;1(4):348-53.
2. Ananthakrishnan N. Objective structured clinical / practical examination (OSCE / OSPE). *J Postgrad Med*. 1993;39(2):82-4.
3. Qureshi GS, Parveen S, Yasmeen T. Objective structured Practical Examination (OSPE): An experience at Dow University of Health Sciences (DUHS) Karachi. *Medical Channel*. 2012;18(1):5-8.
4. Townsend H, McIlvenny S, Miller CF, Dunn EV. The use of an objective structured clinical examination (OSCE) for formative and summative assessment in a general practice clinical attachment

- and its relationship to final medical school examination performance. *Medical Education*. 2001;35:841-6.
5. Harden RM. How to assess clinical competence-an overview. *Medical Teacher*. 1979;1:289-96,299.
 6. Turner JL, MD; Dankoski ME. Objective Structured Clinical Exams: A Critical Review. *Fam Med*. 2008;40(8):574-8.
 7. Ahad SM, Khani Z. An Objective Structured Practical Examination to test Students in Experimental Physiology. *J Pak Med Assoc*. 2001;89(6).
 8. Pallavi K. Introduction of OSPE (Objective Structured Practical Examination) Along with Traditional Practical Examination (TPE) for first MBBS Students. *Ind J App Res*. 2013;3(8):70-1.
 9. Nigam R, Mahawar P. Critical analysis of performance of M.B.B.S. students using OSPE & TDPE - a comparative study. *National Journal of Community Medicine*. 2011;2(3):322-4.
 10. Trivedi RS, Diwan JS, Shah CJ, Jani RD, Anand AK. The influence of objectively structured practical examination (OSPE) on scoring pattern. *Int J of Biomed & Adv Res*. 2014;5:87-9.
 11. Shaifali I, Ahsan M, Mallick A. A study on objective structured practical examination (OSPE) as a tool for assessment of medical students. *Indian J Bas App Med Res*. 2016;5(2):784-90.
 12. Jaswal S, Jugesh C, Kaur J, Gupta S, Singh T. Assessment for learning with Objectively Structured Practical Examination in Biochemistry. *Int J Bas App Med Res*. 2015;5(4):784-90.
 13. Wani PD, Dalvi VS. Objective structured practical examination vs. traditional clinical examination in Human Physiology: Student's perception. *Int J Med Sci Public Health*. 2013;2:543-7.
 14. Radhika G, Dara AK, Varalaxmi KP, and Bhavani C. Perceptions of the introduction of objective structured practical examination (OSPE) /objective structured clinical examination (OSCE): A pilot study carried out in Government Medical College, Ananthapuramu, Andhra Pradesh, India. *J NTR Univ Health Sci*. 2015;4:145-9.
 15. Mate VH, Sahasrabudhe RA, Pandit VA, Beri SG. OSPE as the tool to assess application of pharmacology knowledge of II MBBS students: teachers' perceptions. *Int J Health Sci Res*. 2016;6(6):117-22.

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