Perception by Feedback Analysis of Objective Structured Clinical Examinations (OSCE) As An Assessment Tool in Competency Based Medical Education for Post Graduate Students in Teaching Institute

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Abstract: Context: There is an increasing tendency to use Objective Structured Clinical Examination (OSCE) as an assessment tool of clinical performance in competency based medical education. Aims: To determine the perception of faculty and learner for OSCE as an assessment tool by feedback analysis. Settings and Design: A quantitative, analytical research design was used. A well-organized comprehensive OSCE stations were arranged to assess the clinical skills of post graduates medicine students of the teaching hospitals. Methods: The practical performance skill of a randomly selected 10 medicine post graduate student were assessed by OSCE after subjected to clinical based 10 OSCE stations. The clinical tasks chosen for the OSCE was mapped in to the learning objectives of the postgraduate course. Statistical analysis: Statistical analysis was done by using the SPSS version 16. Results: We assessed feedback by structured questionnaires (5-point Likert scale) from the examiners and students for their individual perception of about OSCE. Among the students, total 70% were strongly agree and 30% were agree for OSCE as a better assessment tool than traditional methods. Among examiners (observer), total 60% were strongly agree, 30% were agree and 10% were undecided for conduct of OSCE. Conclusions: The OSCE was rated strongly in favor as clinical assessment tool in present study and yields dependable information about the performance capabilities of competencies of post graduate student and can be utilized as an assessment tool in both formative and summative assessment. [Virendra P NJIRM 2017; 8(6):46-54]

Key Words: Objective structured clinical examination, Feedback analysis, Likert scale, Formative assessment, summative assessment, competency based medical education

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Introduction: Over last two decades lot of new learning, teaching and assessment methodology has emerged and tested for their feasibility, reliability and reproducibility. Competency based medical education includes designing and implementing medical education curriculum and assessment, that focuses on the desired and observable ability in the real life situations. The methods of student assessment in medical education have changed over few decades.[1] The education of health professionals has been evolving almost continuously over the past century, most recently with the call for transformative reforms in health professions education in competency based curriculum.[2] We are moving toward a learner centric competency based medical education. The objective structured clinical examination (OSCE) is being widely used for assessment of skills in medical education around the world. In India, OSCE awareness is rising, and a few attempts have been made in its implementation. The use of OSCEs for assessing clinical competence has become widespread in the field of undergraduate and postgraduate medical education. This is an assessment format in which the candidates rotate around a circuit of stations, where they asked for specific tasks to be performed, involving a clinical skill, history taking and or examination and decision making of a patient management.[1, 2]The traditional method of clinical assessment methods has its own disadvantages like lack of objectivity, examiner biased, limited learning domain and topics are covered, there is need of hour to overcome these drawbacks for in competency based medical education. So far not much published data is available about routine use of OSCEs in their undergraduate and postgraduate medical examination. This study was conducted to analyze perception of students and examiners by feedback analysis of OSCE as an assessment tool.

Subjects and Methods: This is the observational study conducted in the OSCE session conducted on 16th November 2015, in the department of medicine. Total ten post graduate students from the department of medicine were enrolled for OSCE session. The study is approved by the ethical and protocol committee KIMSDU Karad.

Aims and objectives: To find out the perception of faculty and postgraduate students for Objective Structured Clinical Examination OSCE as an

assessment tool by feedback analysis and to discuss its pros and cons over traditional methods of assessment.

Study Design: This was an observational, retrospective and analytical study. This research study was retrospective in the sense that the students were required to comment on OSCE assessments that had already been completed and to give their perceptions regarding these assessments. The analytical part of the study strived to determine for feedback analysis and difference between students and examiners.

Total ten examiners were assigned for this OSCE session evaluation. Total 10 stations were arranged for the OSCE session in advance, according to the standard protocol. Present OSCE was setup to observe clinical competence of the enrolled post graduate students so as to cover all the domains (cognitive, psychomotor and affective) and topics of medicine subject. The clinical tasks chosen for the OSCE was mapped in to the learning objectives of the postgraduate course in subject of medicine and the candidate level of learning. We tested candidates on what they have been taught, which was appropriate for postgraduate learners. We have instructed the particular system to postgraduate 2nd year students to read two weeks prior to OSCE session. The feasibility of testing a particular task was considered while formatting the questions at each OSCE station. Real patients were used to test clinical examination skills where ever possible. All stations were well structured in advance of examination date. Instruction regarding conduct of OSCE sessions was given to all patients participated in OSCE session, students and examiners, prior to examination. The blueprint of OSCE session was made and stations were written so as to ensure, different domains of skill can be tested. The stations were written so as to cover systems assigned for assessment in medicine post-graduation curriculum. All candidates were given clear instructions like, exactly what task they should perform at each station. The required clinical patient or simulated /trained patients and other material [laboratory data, imaging, videos] were provided at the respective stations. Each station was given 15 minutes and 30 sec. were given in between station (cross-over time).

Each station was structured in to three subsets of observation carrying five marks each with additional five marks were given for global assessment (total 20 marks were allotted for each station). [Table 1]

Practical Arrangements: The venue for OSCE was arranged in OSCE laboratory, where ten stations were arranged with adequate distance with portions. There was space for examiner at each station. The counter was arranged were examiner and students can give their feedback form of OSCE. At the beginning of the examination attendance and signature of all the students and examiners were taken. All the students and examiners were requested to switch off their mobile and other gazettes etc. After consecutive five stations each student was given rest for five minutes before he/she proceeds for the next station. All the examiners were recruited from the medicine department faculty. All the stations were numbered one to ten. The OSCE was arranged so that all students can go round in a circuit (curricular). [Figure 1] Mark sheet were prepared for ten students and distributed to all ten examiners (observer), which includes checklist to cover observation of all clinical skill in structured manner. The sign board were displayed indicating station number and arrow in which student should go for the next station. All the stations were numbered on large signs to assist the candidates to follow the circuit successfully. The stopwatch and loud manual bell was used for timing the stations promptly every ten minutes. The departmental peon was taken as a helper for the smooth running of OSCEs so that, everyone is in the right place at the right time. The examiners were given instructions of giving marks at the station according to the checklist provided to them and to understand their role in conducting the session properly. At the end of OSCE session examiners were requested to do recounting of marks and to make final score of individual candidate. [Table 1] Snacks were provided in the end of examination to all the patients, students and examiners participated in the OSCE examination.

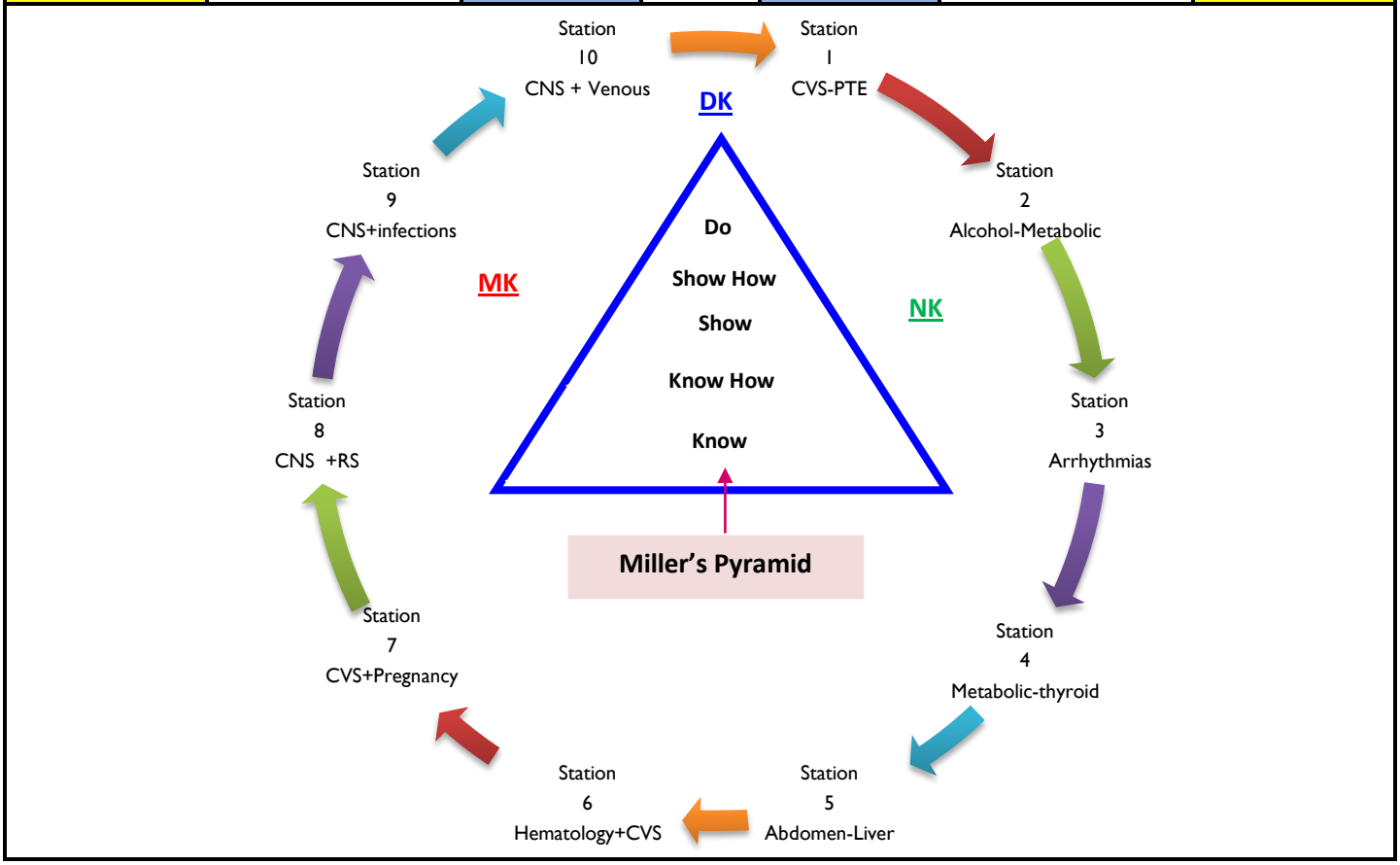
The 12-item questionnaire included questions based on a 5-point Likert scale to assess the students' and examiners/observers awareness and to evaluate their overall satisfaction for OSCE based on the level of agreement. The agreement scale included five categories ranging from strongly agree, agree, undecided, disagree and strongly disagree with numerical values assigned to each. We also collected their subjective pros and cons and interpreted collectively.

Table 1: Mark sheet template for OSCE station

Skill to be observed	1	2	3	4	5	6	7	8	9	10
	Students									
History taking communication skills (5 marks)										
Clinical examination/Lab report /imaging (5 marks)										
Diagnosis and treatment (5 marks)										
Global assessment (5 marks)										
Total (20 marks)										

Figure 1: Conduct of OSCE to assess the practical skills of the Medicine Post graduate student

Observer 10	Station 10 CNS + CVST	Student	Rest	Student	Station 1 CVS-PTE	Observer 1
Observer 9	Station 9 CNS + infections	Student		Student	Station 2 Alcohol	Observer 2
Observer 8	Station 8 CNS +RS	Student		Student	Station 3 CVS-arrhythmias	Observer 3
Observer 7	Station 7 CVS + Pregnancy	Student		Student	Station 4 Metabolic-thyroid	Observer 4
Observer 6	Station 6 Hematology + CVS	Student	Rest	Student	Station 5 Abdomen-Liver	Observer 5



MK: must know, DK: desirable to know, NK: nice to know

Table 2: Feedback questioners for students and observers/ examiners

No.	Questioners	SA	A	Ud	DsA	SdsA
1	Orientation of OSCE session was adequate					
2	OSCE stations were well organized, fair and unbiased					
3	OSCE stations covered topic taught/syllabus					
4	Sufficient time was given for each station					
5	Questions given in the stations were comprehensible					
6	Stations were observed objective type					
7	OSCE is unbiased, educative and interesting					
8	OSCE stations were objective and better for assessing cognitive, psychomotor and affective domain					
9	OSCE session conduct environment was comfortable					
10	OSCE helps in scoring better than traditional assessment methods					
11	OSCE helps in learning as well as assessment in CBME					
12	OSCE is feasible and should be introduced in medicine as an assessment tool					

[Abbreviations: SA: strongly agree, A: agree, UD: undecided, DsA: disagree, SdsA: strongly disagree]

Statistical design: Statistical analysis was done by using the Statistical Package for Social Science (SPSS version 16) trial version. The obtained data were coded, analyzed and tabulated. Basic descriptive statistical analysis of the Likert items was performed in the form of frequencies, means, percentage, standard deviations and chi-square test.

Results: Total ten 2nd year postgraduate medicine residents were enrolled and ten examiners/observers from faculty of medicine were assigned for formative assessment by OSCE in present study. The observers were provided with checklist for awarding marks in structured manner for individual station. The each station had objective and structured questions/tasks to be completed by students. Each station was allotted 20 marks with subtotal marks of 200 for ten stations. The mean score of total 10 OSCE stations for 10 student was 126 (±6.22; maximum: 137; Minimum: 115) [Table 3 and Graph 1].

Table 3: Mean and standard deviation of total OSCE score

	St-1	St-2	St-3	St-4	St-5	St-6	St-7	St-8	St-9	St-10	Mean	SD	Total
Sd-1	15	14	11	12	14	17	14	12	11	9	12.45	2.1	129
Sd-2	14	12	11	11	17	11	12	9	14	12	12	2.2	123
Sd-3	14	14	12	12	12	12	14	12	14	14	12.38	1.1	130
Sd-4	11	11	15	14	11	14	12	14	12	14	12.08	1.4	128
Sd-5	12	12	14	12	14	14	14	11	12	14	12.15	1.4	129
Sd-6	9	14	14	11	14	12	12	12	14	11	12.15	1.5	123
Sd-7	12	11	14	12	12	11	14	11	11	12	11.48	1.2	120
Sd-8	14	12	14	17	12	14	12	11	12	12	12.53	1.6	130
Sd-9	15	14	14	17	14	11	12	12	14	14	12.68	1.9	137
Sd-10	11	9	12	12	14	12	14	9	11	11	11.33	1.6	115

The highest subtotal score was achieved in station 3rd (128) and 4th (128) and lower score was achieved in station 8th (111) with mean of subtotal 121 (±6.84). The highest score mean for station 3rd (13.1±1.45), 4th (13 ±2.74) and 5th (13.4±1.71) and lowest mean for station 8th (11.3±1.494). [Table 4]

Graph 1: Correlation of OSCE station score for students

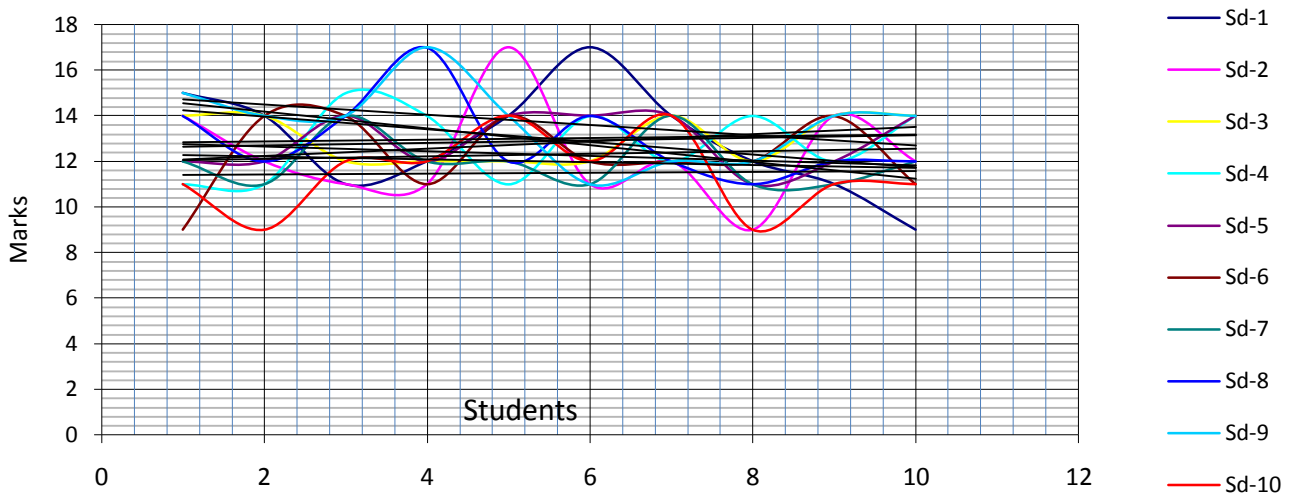


Table 4: OSCE station subtotal score of individual student

	St-1	St-2	St-3	St-4	St-5	St-6	St-7	St-8	St-9	St-10
Sd-1	15	14	11	12	14	17	14	12	11	9
Sd-2	14	12	11	11	17	11	12	9	14	12
Sd-3	14	14	12	12	12	12	14	12	14	14
Sd-4	11	11	15	14	11	14	12	14	12	14
Sd-5	12	12	14	12	14	14	14	11	12	14
Sd-6	9	14	14	11	14	12	12	12	14	11
Sd-7	12	11	14	12	12	11	14	11	11	12
Sd-8	14	12	14	17	12	14	12	11	12	12
Sd-9	15	14	14	17	14	11	12	12	14	14
Sd-10	11	9	12	12	14	12	14	9	11	11
Sub Total	125	120	128	128	131	125	128	111	122	120
Mean	12.7	12.3	13.1	13	13.4	12.8	13	11.3	12.5	12.3
SD	2	1.7	1.45	2.26	1.71	1.93	1.05	1.49	1.35	1.7

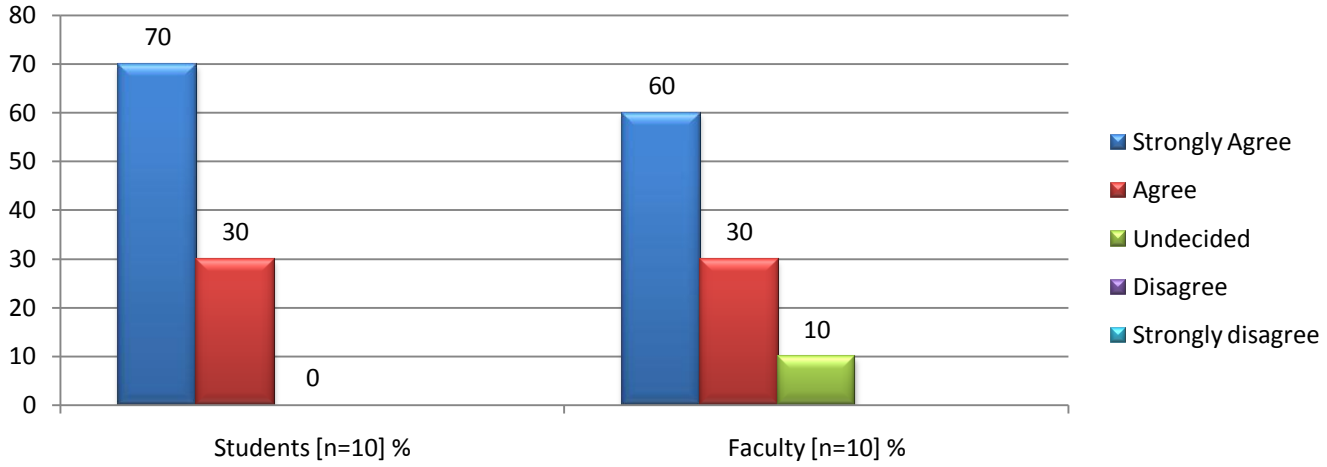
The individual student's total marks and percentage is shown in table 5.

Table 5: OSCE score of 10 stations among ten students (Sd: student) [%]

Students	Total Marks	Percent Marks
Sd-1	129	64.5
Sd-2	123	61.5
Sd-3	130	65
Sd-4	128	64
Sd-5	129	64.5
Sd-6	123	61.5
Sd-7	120	60
Sd-8	130	65
Sd-9	137	68.5
Sd-10	115	57.5

We collected the feedback structured questionnaire from examiners and students and were analysed. Total 7 (70%) and 3 (30%) students were strongly agree and agree respectively as per their perception for conduct, utility acceptability and feasibility of OSCE as an assessment tool in subject of medicine. Statistically significant numbers of students were favoring OSCE as a good assessment tool in subject of medicine in postgraduate curriculum ['p' <0.0001]. Total 6 (60%), 3 (30%) and 1 (10%) examiners/observers were strongly agree, agree and undecided respectively as per their perception for conduct, utility, acceptability and feasibility of OSCE as an assessment tool in subject of medicine. Statistically significant numbers of students were favoring OSCE as a good assessment tool in subject of medicine in postgraduate curriculum ['p' <0.0001]. [Graph 2]

Graph 2: Five point Likert scale feedback response of students and examiners



There was no significant difference of perception among students and observer/examiners in present study. The feedback results and ground level observations were quite impressive and positive to for implementation of OSCE as a tool of addition examination to measure competence in post graduate medical education. The collective, summative and consolidated opinion and views of students and examiners were converted into pros and cons of the OSCE method.

Pros of OSCE examination:

1. Objective Structured Clinical Examination (OSCE) as a multidimensional tool for assessing clinical skill and competence
2. OSCE is a performance-based unbiased assessment methodology
3. Practical and procedural skill like cardio-pulmonary resuscitation better assed with OSCE than traditional methods of examination
4. OSCE is better tool of assessment of average student
5. OSCE is better tool of assessing different topics of syllabus than discussing on single case by traditional practical methods
6. OSCE is unbiased as all students are having same patient and questionnaires
7. At each station, examiner assesses the performance of the examinees using checklists that are uniformly used for examinees, which makes it easier to measure these competencies
8. Simulated subject can be kept as a patient if true patient is not available

Cons of OSCE examination:

1. OSCE require good and man power in the form of examiner/observer
2. Good OSCE requires clinical material in the form of real patients / standardized patient and requires training
3. Preparation of OSCE session time consuming
4. Examiner may not get proper opportunity to tell the areas of improvement to the student compared to the traditional methods of assessment
5. As OSCE is structured and formatted depth of knowledge cannot be tested in to the depth
6. Require time to make good quality comprehensive question bank for conducting OSCE stations
7. Discrimination between average and brilliant student may be difficult
8. Patient may become uncooperative because of repeated same question. Linguistic and writing skill cannot be tested in depth

Discussion: Medical students today are tested and assessed on knowledge, attitudes, and skills across multiple settings and methods, which are often triangulated to reach summative decisions. Current educational and assessment strategies include problem-based learning, computer simulations, faculty global ratings and checklists, standardized patients, and team-based learning. Conceptualizing the acquisition of knowledge, skills, and attitudes as competencies is important because it implies a developmental progression of a medical student from a novice to, ultimately, a proficient and expert clinician. Objective structured clinical examinations (OSCEs) have become popular and now are part of the

US Medical Licensing Examination for all US medical graduates. Despite general acceptance of this method, there is debate over the value of OSCE testing compared to more traditional methods.[2]Objective structured clinical examination (OSCE), defined as a well-structured method of assessment to evaluate clinical competence, focuses on the outcomes through observable behaviors. OSCEs can be combined with other methods of assessment to enhance reliability; anintegral part of a medical curriculum is an appropriate assessment of the students' clinical competencies as assessment drives learning.[4]A need of a more competence based assessment method led to introduction of OSCE which assesses the 'shows how' level of the Miller's pyramid of clinical competence as Traditional Clinical Examination (TCE) focuses on the "knows" and "knows how" aspects. Assessment for practical skills in medical education needs improvement from subjective methods to objective ones, OSCE has been considered as one such method. OSCE was introduced in 1975 as a standardized tool for objectively assessing clinical competencies including history taking, physical examination, communication skills, data interpretation etc. It consists of a circuit of stations connected in series, with each station devoted to assessment of a particular competency using pre-determined guidelines or checklists. Students were observed by examiners who stayed in each station (observed stations) throughout the session, scored the performance on a structured marking sheet and merely interacted with the students for providing instructions or asking about predetermined operations.[3]OSCE has been used as a tool for both formative and summative evaluation of medical graduate and postgraduate students across the globe. The traditional clinical examination has been shown to have limitations in terms of its validity and reliability. The OSCE provides some better answers to these limitations and has become popular. Many variants on the original OSCE format now exist and much research has been done on various aspects of their use. This paper focuses particularly on the organization, conduct, and feedback analysis of student and examiners perception, acceptability and feasibility of OSCE as an assessment tool. The use of OSCE for formative assessment has great potential as the learners can gain insights into the elements making up clinical competencies as well as feedback on personal strengths and weaknesses. The success of OSCE is dependent on adequacy of resources, including the number of stations, construction of stations, method of scoring (checklists and or global scoring), the number of students assessed, and adequate time.[5] Presently, the Indian experiences with OSCE are limited and there is a need to sensitise the Indian faculty and students. This study is an attempt to evaluate the feasibility of OSCE as an assessment tool through student and examiners perception for the formative assessment of Post-graduate medical education in Medicine. We compared our results of OSCE with various studies from India and overseas. Abdullah j et alstudied the practical performance skill of a randomly selected sample of 21 interns was assessed by OSCE on emergency medicine procedures performance and observed that, the OSCE is valid and reliable practical assessment tool and yields dependable information about the performance capabilities of individual interns ['p' < 0.001)[6] These findings are comparable with our study where majority of faculty and students were favored OSCE as an assessment tool over traditional methods ['p' <0.0001]. Mani Mirfeizi, Zahra et al in their descriptive-analytic study conducted on 39 midwifery students on10 different OSCE stations and favored OSCE as a reliable and valid means of evaluating knowledge and clinical practice of midwifery students.[7]Similarly in our study of OSCE assessment, 137 (68.5%)marks was the highest and 115 (57.5%) was the lowest score. The overall mean of score of assessment was 126.5 (±6.22). HafsaRaheel et al, Sadia S et al andP A Mossey et al concluded that, the OSCE was perceived very positively and welcomed. OSCE was interesting and educative. OSCE was useful in the examination of diagnostic, interpretation and treatment planning skills.[8, 9, 10]Similarly majority of faculty and students were favoring OSCE by 5 point Likert scale, as they were exposed to the stations with different clinical real life situation and testing all domains with critical thinking aspect. Siddiqui F Get al quoted that 70% of the students felt that OSCE helped them identify areas of weakness in their practical and clinical skills, 56.5% felt that the stations dealt with practical skills. Seventy nine percent students were happy with the attitude of the examiners. The students perceived OSCE as a better assessment tool as compared to viva voce.[11] Similarly in our study students were positive towards attitude of the examiners, contents and structure of stations and organization of OSCE session. GhonaAbd El-Nasser Ali et al in their study quoted that, student and feedback favored OSCE as an evaluation tool for their clinical

skills due to its fairness and unbiased, cover a wide range of knowledge and comprehensive, provide opportunities to leaning. The examinees were satisfied with organization and administration of the OSCE exams than other assessment.[12]These findings are fairly comparable with our observations. Similarly Nadia Jabeen et al, Small, L.F. et al and Iqbal M et al stated that, OSCE is considered as fair and better method of examination by students as it covers wide range of skill and improves the clinical knowledge and clinical skills of medical students[13, 14, 15]In present study we quoted consolidated pros and cons of OSCE, Lele SM et alreported similar observation that, OSCE requires more planning, preparation, and resources than other means of assessment.[3]Lele SM et al described use of a five-station mini-OSCE for formative assessment of dental diagnostic and radiographic skills in an undergraduate curriculum. The mini-OSCE was found to be a fairly valid and reliable tool for formative assessment. The majority of students perceived it to be a meaningful examination and a fair method due to uniformity of tasks and time allocation; they found the scoring to be transparent and objective. The specific and immediate feedback received was appreciated by both students and faculty members.[3]These observations are comparable with our results in which 70% students, 60 % examiners and 30% students, 30% examiners were strongly agree and agree respectively in favor of OSCE. Similar to our study Chandra PS et al studied the performance based on the 14-item checklist assessing common elements of any patient-related interaction in 34 different OSCE tasks. They concluded that, OSCE is a convenient, cost-effective training method in psychiatry, with limited demands on resources.[16]Townsend AH et al stated that, problem-solving and focused physical examination skills need to be targeted by all undergraduate clinical departments. The department's post-attachment OSCE and total assessment results are predictors of final examination OSCE and total results. The use of pre- and post-attachment OSCEs facilitates both students' formative learning processes and the department's evaluation of its educational program.[17]Simon SR et al studied the relationship between students' scores by OSCE given in the second year of medical school and their subsequent performance on Step 2 of USMLE. OSCEs early in medical school can be useful in the early assessment of clinical competence[18]Dong T et al studied the correlation between second-year and third-year OSCE scores, as well as the associations between OSCE scores and several other typical measures of students' medical school performance and found that, the second- and third-year OSCE scores were strongly correlated with USMLE scores or medical school grade point average.[19] The last three studies support the reliability, reproducibility of OSCEs as an assessment tool in medical education. To summarize our results and comparison with other studies, we favor to conduct OSCE as an additional assessment tool in medicine postgraduate students.

Conclusions: Assessment of clinical skills of medical students has a central role in medical education. We found that, OSCE was a good assessment tool for assessing core and non-core competency in postgraduate students in era of competency based medical education. Objective Structured Clinical Examination (OSCE) was perceived to be fairer, uniform, structured and unbiased assessment method by students and examiners and can be used as an additional tool for assessment in both formative and summative assessment. OSCE was reliable, reproducible and feasible assessment tool for assessing clinical skill, which cover cognitive, psychomotor and affective domains adequately in medical examination. The requirement of more number of examiners (observer), infrastructure and clinical material are challenges for OSCE should not be overlooked but also should not be a limitation for using OSCE as an assessment tool. We favor to introduce this method of examination (OSCE) in our setup. Presently, the Indian experiences with OSCE are limited and there is a need to sensitize the faculty and students. Most of the students and examiners strongly favored the OSCE in present study. Present study favors OSCE as an additional examination tool for postgraduate examinations, accepting and improving its limitations in Indian contest.

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