

STUDENTS' PERCEPTIONS OF OSCE IN DENTISTRY: A STUDY FROM KHYBER COLLEGE OF DENTISTRY, PAKISTAN

Muslim Khan¹, Sahibzada Mahmood Noor², Minhaj us Siraj³

ABSTRACT

BACKGROUND The Objective Structured Clinical Examination (OSCE) requires that examinees rotate through a series of stations and perform a variety of clinical tasks. OSCE was introduced at Khyber Medical University and Khyber College of Dentistry in 2010.

AIM This study was conducted to explore the perceptions of the students regarding OSCE at Khyber College of Dentistry.

METHODS In this cross-sectional study, a validated and pretested questionnaire, developed by Russell et al. was distributed to 74 final year students immediately after the completion their OSCE. Questions were asked about any pre-exam orientation regarding OSCE, exam content, the incorporation of knowledge, skills, attitude in exam and its comparison with current exam systems.

RESULTS In this study, 67.6% of students considered the exam as fair and comprehensive and 64.9% students rated exam as very stressful. About the quality of test, 29.7% were fully aware of the nature of exam, 52.7% thought that tasks reflected those taught, while 58.1% were satisfied about the length of stations. Moreover, 58.1% students expressed that OSCE provided true measure of skills in oral and maxillofacial surgery. OSCE system was rated to be the fairest by 73% of students.

CONCLUSION Students view OSCE as a fair and standardized way to assess clinical competencies. Students thought that OSCE tests skills of students fairly. Thus the element of chance and bias was less in OSCE compared to other practical exams.

KEY WORDS OSCE, Students' perceptions, Pakistan, Dental

This article may be cited as: Khan M, Noor SM, Siraj MU. Students' perceptions of OSCE in dentistry: A study from Khyber College of Dentistry, Pakistan. *Adv Health Prof Educ.* 2015;1(1):30-36

INTRODUCTION

The Objective Structured Clinical Examination (OSCE) has been designed to assess clinical competence. The advent of the OSCE has offered a strikingly new and exciting way of making valid assessments of the clinical performance of medical students, residents, and fellows. Since its introduction by Harden and colleagues in 1975, the technique

has gained steady and widespread acceptance around the world.¹

Medical students' clinical competencies are traditionally assessed by written examinations, oral examinations, and direct observation of their performance, although these procedures have their own limits. Written examinations can be used to test students' knowledge of clinical and procedural skills, but over-reliance on this method may lead students to

focus on memorizing these skills instead of practicing them.²

Oral examinations (long and short cases) are based on a limited number of patient cases that the students encounter, and usually have an unstructured process. The variability of the cases and the student-examiner interactions can result in unfair judgment.^{3,4} The OSCE was therefore developed to improve the effectiveness of the assessment process at 'the shows how' level of Miller's Pyramid.⁵

Educationists have long recognized the need for valid assessment in skill based subjects like Medicine, Surgery and Dentistry. In order for this to take place, it is important to understand how students undergoing exam feel about it. The recording of students' perceptions provides an

¹ Associate Professor Oral and Maxillofacial Surgery, Khyber College of Dentistry Peshawar.

² Associate Professor, Dermatology, Lady Reading Hospital, Peshawar.

³ Project Director, Tobacco Smoke Free Capital, Islamabad, Govt. of Pakistan.

Address for correspondence:

Muslim Khan

Associate Professor Oral and Maxillofacial Surgery, Khyber College of Dentistry Peshawar. E-mail: muslim177@hotmail.com

Date Received: September 24, 2014

Date Revised: November 1, 2014

Date Accepted: December 27, 2014

opportunity for positive criticism and reflective thinking all of which helps in acquisition of skills and knowledge in a practical manner. Moreover it also encourages the teachers to adjust their teaching strategies in ways that would better benefit students.

Besides medical education, fields like midwifery, physiotherapy, chiropractic and even police education started to adopt this format in their assessment systems. Globally, OSCE is getting popularity in dental colleges at undergraduate and postgraduate levels.^{5,6,7,8} Ever since the introduction of OSCE, educationists are trying to improve its content and organization so that its acceptability can be increased. Students and teacher remain important stakeholders in any assessment system. Understanding the perceptions of teachers and students about OSCE help in developing a system that is more transparent and reliable and thus acceptable to the stakeholders. Fidment stated that as educators' exploration of assessment from the perspective of students is very important if the system is to evolve and flourish.⁹

In Pakistani medical and dental colleges, MCQs started getting popularity in the late 80s and OSCE was introduced in early 90s. Till the introduction of OSCE in Pakistan, assessment methods such as long cases, short cases and instruments and specimen based oral interviews were the most popular forms of competence assessment with questionable validity and reliability. The OSCE was first introduced by the College of Physician and Surgeons of Pakistan (CPSP) in postgraduate education. Later on the Pakistan Medical and Dental Council (PMDC) tried to implement it at undergraduate level as well. Khyber Medical University took a step forward, devalued traditional viva examination and introduced OSCE in 2010 in the province of Khyber Pakhtunkhwa (KPK).¹⁰ As per this initiative, all medical and dental schools in KPK embraced OSCE as a part of final exam for assessing clinical competencies of students.

As OSCE is a relatively a new entity for educators in Pakistan, different aspects of the system need to be researched for its acceptance and effective implementation. It is thus important to note how students as important stakeholders, perceive this exam format at its early stages of introduction in the country. Very few studies have been conducted on perceptions of students about OSCE in Pakistan, particularly in the province of KPK. This study was conducted to answer the following research question: What are the perceptions of final professional Bachelor in Dental Surgery (BDS) students regarding OSCE in Oral and Maxillofacial Surgery Department of Khyber College of Dentistry, Peshawar? This study was performed to:

Explore the perceptions of final year students about OSCE in the Department of Oral and Maxillofacial Surgery;

Review the OSCE process and develop strategies to improve the examination.

METHODS

This is a quantitative, cross-sectional descriptive survey based on the questionnaire developed by Russell et al.¹¹ A total of 74 students from the final professional BDS class at Khyber College of Dentistry formed the accessible population and all of them were included in the

study. Ethics Review Board at Khyber Medical University granted permission to conduct the study. Data was collected from the final professional BDS students of 2013 session just after the completion of their OSCE in Department of Oral and Maxillofacial Surgery. Participants were explained the purpose of the study and a written informed consent was obtained.

The OSCE circuit comprised of 12 stations, with 8 static stations, 3 interactive and 1 observed station. No Rest station was placed in the OSCE circuit. OSCE stations involved completion of tasks like, history taking, clinical examination, counseling of the patients, clinical problem solving scenarios, patient clinical lab data and photographic materials. The areas assessed included, basic principles of oral and maxillofacial surgery, basic principles of diagnosis and differential diagnosis, oral implantology, endodontic surgery, complicated and uncomplicated exodontias, instrument identification, management of benign and malignant maxillofacial lesions, maxillofacial trauma patient management, dental management of patients with compromising medical conditions and medical/dental emergencies. Each station comprised of five minutes duration. Table 1 provides the distribution of OSCE stations.

Face and content validity of the examination and the answer key

TABLE 1: PLAN OF OSCE CIRCUIT

Station	Skill	Type of Station
1	Clinical scenario	(Static)
2	Radiographic interpretation	(static)
3	Clinical scenario	(Static)
4	Radiographic Diagnosis	(static)
5	Counselling for Surgery	(Observed)
6	Clinical Scenario	(Static)
7	Clinical Scenario	(Interactive)
8	Clinical Scenario	(Interactive)
9	Clinical scenario	(Static)
10	Clinical Scenario	(Interactive)
11	Instrument identification	(static)
12	Clinical scenario	(Static)

checklists were developed in pre-examination meetings, by a group of senior faculty members. An orientation meeting was organized with the facilitators in the examination. Orientation sessions were also conducted with the final professional BDS students regarding the format of the examination. At the completion of one circuit/round, the students were segregated to avoid cross-over and safeguard against leaking the OSCE stations to un-examined students who are still waiting for their turn.

The Russell et al. Questionnaire 2004 is a valid and reliable instrument, used in various countries, to measure perceptions of students about OSCE.¹¹ For confidentiality reasons, the questionnaire was kept anonymous. This questionnaire is a 32-Item self-administered instrument. Students were asked to evaluate the content, structure and organization of the OSCE stations, rate the quality of performance and objectivity of the process, and give their opinion regarding OSCE as an assessment tool compared to other assessment formats that they have experienced over the period of time. Questions were asked about pre exam orientation, exam content, in-

corporation of knowledge, skills and attitude in exam and its comparison with conventional exam systems. Students' perceptions regarding exam environment, understanding of command/question stem and matching of exam content and syllabus were also recorded.

The students' participation in the study was on voluntary basis. Face and content validity of the instrument was established by consulting specialist doctors and educationists at Khyber College of Dentistry. Minor adjustments were made in the instrument based on the opinions of local experts. The questionnaire was pilot tested to find out if it works with the local students. Five final year students from another dental college already exposed to OSCE exam were asked to fill the questionnaire in the presence of the investigator. Pilot testing helped the investigator to estimate the time required to fill the questionnaire and identify any difficult terms pointed by the students.

Before administration of the questionnaire, students were briefed about the purpose of the study, the questionnaire and the data collection process. The questionnaire was distributed to the students immedi-

ately after the completion of their OSCE. It took the students 15 to 30 minutes to fill the questionnaire. The questionnaire was filled in the presence of investigator to clarify any difficult terms. Since all the students included in the sample (n=74) appeared in the exam and filled the questionnaire, 100% response rate was achieved through this approach. Data was analyzed using SPSS version 17. Percentages of mean score \pm SD were calculated for the numerical variables.

RESULTS

The study sample consisted of 33 (45%) male and 41 (55%) female students. Results of the study have been divided into following four sections including: OSCE evaluation; quality of performing test; students' perceptions of validity and reliability and students' ratings of assessment formats.

Evaluation of OSCE by students

OSCE evaluation was based on 13 questions, covering a range of issues related to the examination, such as fairness, characteristics and the structure and administration of examination. Table 2 provides the distribution of student responses about the examination. Over two third of

TABLE 2: DISTRIBUTION OF STUDENT RESPONSES ABOUT OSCE EVALUATION

S. No	Question	Agree		Neutral		Disagree		No comment	
		N	(%)	N	(%)	N	(%)	N	(%)
1	Exam was fair	50	(67.6)	20	(27)	2	(2.7)	2	(2.7)
2	Wide knowledge area covered	50	(67.6)	18	(24.3)	6	(8.1)	0	
3	Needed more time at stations	20	(27)	17	(23)	37	(50)	0	
4	Exams well administered	57	(77)	13	(17.6)	2	(2.7)	2	(2.7)
5	Exams very stressful	48	(64.9)	12	(16.2)	13	(17.6)	1	(1.4)
6	Exams well structured & sequenced	54	(73)	13	(17.6)	7	(9.5)	0	
7	Exam minimized chance of failing	38	(51.4)	21	(28.4)	12	(16.2)	3	(4.1)
8	OSCE less stressful than other exams	24	(32.4)	16	(21.6)	34	(45.9)	0	
9	Allowed students to compensate in some areas	58	(78.4)	13	(17.6)	3	(4.1)	0	
10	Highlighted areas of weakness	40	(54.1)	16	(21.6)	12	(16.2)	6	(8.1)
11	Exam intimidating	33	(44.6)	29	(39.2)	9	(12.2)	3	(4.1)
12	Student aware of level of information needed	33	(44.6)	25	(33.8)	15	(20.3)	1	(1.4)
13	Wide range of clinical skills covered	48	(64.9)	16	(21.6)	8	(10.8)	2	(2.7)

TABLE 3: QUALITY OF PERFORMANCE TESTING

S. No	Question	Not at all		Neutral		To great extent	
		N	(%)	N	(%)	N	(%)
1	Fully aware of nature of exam	17	(23)	25	(47.3)	32	(29.7)
2	Tasks reflected those taught	7	(9.5)	28	(37.8)	39	(52.7)
3	Time at each station was adequate	7	(9.5)	24	(32.4)	43	(58.1)
4	Setting and context at each station felt authentic	3	(4.1)	34	(45.9)	37	(50)
5	Instructions were clear and unambiguous	5	(6.8)	24	(32.4)	45	(60.8)
6	Tasks asked to perform were fair	6	(8.1)	28	(37.8)	40	(54.1)
7	Sequence of stations logical and appropriate	5	(6.8)	30	(40.5)	39	(52.7)
8	Exam provided opportunities to learn	6	(8.1)	13	(17.6)	55	(74.3)

TABLE 4: STUDENT PERCEPTION OF VALIDITY AND RELIABILITY OF OSCE

S. No	Question	Not at all		Neutral		To great extent	
		N	(%)	N	(%)	N	(%)
1	OSCE exam scores provide true measure of essential clinical skills in maxillofacial surgery	7	(9.5)	24	(32.4)	43	(58.1)
2	OSCE scores are standardized	4	(5.4)	32	(43.2)	38	(51.4)
3	OSCE practical and useful experience	4	(5.4)	22	(29.7)	48	(64.9)
4	Personality, ethnicity and gender will not affect OSCE scores	11	(14.9)	17	(23)	46	(62.2)

students reported that the exam was fair (67.7%), covered comprehensive content (67.7%), was well administered (77%) and well-structured and sequenced (73%). Regarding stress, almost 46% respondents rated the exam as stressful as other exam formats.

Quality of performance testing

When students were asked about how they rated the quality of test, majority of them gave favorable responses. However, only 29.7% were fully aware of the nature of exam, 52.7% thought that tasks reflected what was taught, while 58.1% were satisfied with the length of stations. Almost 50% stated that setting and context was authentic, 54.1% thought that tasks were fair and 74.3% learned from OSCE exam. Results are depicted in Table 3.

Students' perceptions about validity and reliability of OSCE

More than 60% students mentioned that OSCE was a practical and useful experience and was not affected by gender and ethnicity.

Over 58% students stated that OSCE provided true measure of skills in oral and maxillofacial surgery. Regarding standardization 51.4% students thought that scores were standardized. Table 4 provides detailed results about the reliability and validity of OSCE.

Students' perceptions about different assessment formats

When students were asked to rate four assessment formats, that is, MCQs, essays, OSCE and viva. More than half rated essay exam to be the easiest (54%). However OSCE system was rated to be the fairest by 73% of students. Majority of students (68.9%) learnt more from MCQ system of exam. Also 66.2% students thought that essay system should be used more often for assessment. Table 5 provides detailed results about the rating of different assessment formats.

DISCUSSION

Regarding perceptions of students about OSCE evaluation (see Table 2),

the exam proves to be a fair and acceptable method of assessment. In a study by Belay et al.,¹² 54.9% of the examinees reported this method of assessment to be most fair. Similar attitude of students was seen in University of West Indies and New Castle Medical School where a large proportion of students accepted OSCE as a fair (68%) and well-structured (82%) exam system.^{13,14} Another study conducted in Jordan showed 72% of students had the same opinion.¹⁵

Probable reason for high levels of satisfaction is because traditional methods of assessment test the clinical skills and competencies poorly. They are mostly based on one or two segments and most commonly result in a brief session with one or two examiners. Thus there is a greater element of 'chance' involved in such methods. Most often students with increased knowledge but poor skills excel in such exam systems. All these factors tend to reduce variation and interpersonal favors to the students.¹⁶

Regarding evaluation of content tested in OSCE, majority of students thought OSCE covered wide range of knowledge and clinical skills, allowed them to compensate in some areas, and highlighted areas of weaknesses and gaps in their skills. The results are in line with the study done on perceptions of psychiatric nurses about OSCE, where all the nurses consistently appraised OSCE by stating it to have a very diverse

TABLE 5: STUDENTS' PERCEPTIONS ABOUT DIFFERENT ASSESSMENT FORMATS

A-Question	Difficult		Undecided		Easy	
	N	(%)	N	(%)	N	(%)
Which of the following formats is easiest						
MCQ	36	(48.6)	23	(31.1)	15	(20.3)
Essay/SAQ	10	(13.5)	24	(32.4)	40	(54.1)
OSCE	17	(23)	24	(45.9)	33	(31.1)
VIVA	40	(54.1)	20	(27)	14	(18.9)
B-Question	Unfair		Undecided		Fair	
	N	(%)	N	(%)	N	(%)
Which of the following formats is fairest						
MCQ	7	(9.5)	18	(24.3)	49	(66.2)
Essay/SAQ	8	(10.8)	24	(32.4)	42	(56.8)
OSCE	8	(10.8)	12	(16.2)	54	(73)
VIVA	39	(52.7)	24	(32.4)	11	(14.9)
C-Question	Learn very little		Undecided		Learn a lot	
	N	(%)	N	(%)	N	(%)
From which of the following formats do you learn most?						
MCQ	12	(16.2)	11	(14.9)	51	(68.9)
Essay/SAQ	20	(27)	27	(36.5)	27	(36.5)
OSCE	10	(13.5)	18	(24.3)	46	(62.2)
VIVA	26	(35.1)	24	(32.4)	24	(32.4)
D-Question	Used much less		Undecided		Used much more	
	N	(%)	N	(%)	N	(%)
Which of the following formats should be used more often?						
MCQ	19	(25.7)	11	(14.9)	44	(59.5)
Essay/SAQ	9	(12.2)	16	(21.6)	49	(66.2)
OSCE	26	(35.1)	23	(31.1)	25	(33.8)
VIVA	39	(52.7)	16	(21.6)	19	(25.7)

content.¹⁷ In this study, majority of students (44.6%) stated that they were aware of the level of information needed (Table 2). In this OSCE, all students had received pre-exam orientation. Yedidia et al. state that pre-exam training of students to have a positive influence on students' performance.¹⁸

Regarding exam stress, majority of students regarded OSCE to be very stressful (64.9%) and intimidating (44.6%). Few other studies have shown OSCE to be more stressful as compared to traditional exam systems.¹⁹ In a study by Shitu et al. majority of students stated OSCE to be intimidating. However in contrast, in the same study, students report-

ed OSCE to be less stressful.¹² Allen et al. reported increased anxiety among students during exam and the level of anxiety remained constant through all the stations.²⁰ Stressful and tense exam environment with no rest stations and autocratic and apathetic attitude of assessors during the exam may increase student anxiety and adversely affect student performance. Students in the Pakistani culture are competitive and fear failure or losing marks, which might have added a stress burden during the OSCE.

Regarding the quality of performance testing, majority of students stated that they were fully aware of the nature of exam, tasks asked to

perform were fair and time at each station was adequate (see Table 3). Moreover the exam provided them with opportunities to learn. Students in our study were fully informed and aware of the nature of exam. They also knew what was expected of them during different OSCE stations. Their high level of awareness was due to the pre-exam briefing they had received. Majority of the students in current study found OSCE stations to be well sequenced and logical. Instructions were clear to students and content tested in exam was authentic. These results are similar to reflections in study by Shitu et al.¹³ In other studies as well, a similar positive attitude was seen among the students and they were well satisfied with sequencing of the stations.²¹

Students in this study stated that OSCE provided them with opportunities to learn. Using OSCE as an assessment method stimulates learning in the long run. This has a positive effect on students since independent self-assessment by students about their performance enables them to overcome the short comings and improve their skills further. Thus OSCE highlights weak areas of students and motivates them to work and improve their overall performance to be effective and better clinicians.²² In this study 60.8% of the students were fully aware of exam instructions. This is in contrast with another study from Pakistan which showed that students were not clear about exam instructions and indicated a need for better training.²³

Students' perceptions about OSCE validity and reliability were found to be positive. Majority of them (58.1%) thought that OSCE provided true measure of their skills and that it was a practical and useful experience (see Table 4). More than 60% of students thought that gender and ethnicity did not affect OSCE scores and that scores were highly standardized. These results are in line with studies done by Russell et al., Selim and Shitu.^{12, 13} Contrary to that

it has often been reported that OSCE has a poor reliability and the predictive value of this form of assessment is not strong. In a systematic analysis of ten OSCE studies, van der Vleuten and Slawson indicated the major source of measurement error was due to variation in student performance from station to station.²⁴ OSCE has been regarded as a valid tool for assessment of clinical competency in other medical fields.²⁵

The final segment of questionnaire dealt with students' perceptions about different test systems. Essay type exam was stated to be the easiest while OSCE was stated to be the second easiest (see Table 5, Section A). In a study done in Pakistan on rating of different exam formats, OSCE was the perceived to be the easiest exam format. Similar findings are reported in other studies as well.²⁶

This paradoxical finding may be due to the fact that the students were subjected to this exam format for the first time. On the contrary they had adjusted well with essay type examinations in the past and thus regarded this examination as difficult.

Students were asked to rate the exam formats according to fairness. In this regard 73% of students stated OSCE to be the fairest exam while VIVA exam was perceived to be the most unfair (see Table 5, Section B). This is in line with findings reported by Russell et al., Dadgar and Selim.¹² The fair nature of OSCE is regarded as its biggest strength. In VIVA type examination students are subjected to one or two examiners and there is an element of luck involved there. Thus most often, few students get favored and there is a greater assessors' bias associated with these exam types.²⁷

When the students were asked, which exam system helped them learn the most? Majority of students opted for MCQ system (68.9%), while OSCE was regarded as second best medium of learning (62.2%, Table 5,

Section C)). This finding is similar to study by Russell et al. where OSCE was considered as the second most educative program. However the results are contradictory to study done by Dadgar, where 70% of students mentioned OSCE to be most educative and this difference was significant between OSCE and MCQ type of examination. Similar findings were reported in another study by Salintri et al. where majority of students rated OSCE to be effective tool for Problem Based Learning (PBL) and useful in measuring knowledge, skill and attitude.²⁸ The disparity among our study and other studies may be due to the fact that MCQ exam tests wide range of content. Moreover there is more variation in this exam system and clinical scenarios, and problem based questions can be constructed easily.

Lastly the students were asked about, which exam system should be used more often in clinical years. Majority of the students (66.2%) stated that essay type questions should be used more in clinical years, followed by MCQs (59.8%) and OSCE (33.8%, Table 5, Section D). This is in contrast with the study done by Russell et al.¹³ Probably the students are still not acquainted well with the new system due to limited exposure to OSCE. On the other hand they are well aware of essay type questions and that exam format has been in use for decades. Situation is however likely to change once OSCE is systematically and progressively introduced in the assessment system.

CONCLUSION

Students perceive OSCE as a fair, valid and reliable examination in Maxillofacial Surgery. It is perceived to be the easiest exam format by the students. OSCE provides more learning opportunities than other exam formats. Given the choice between OSCE and other skills assessment methods, students will prefer OSCE over other formats of exams. It is evident from this study that the util-

ity of OSCE as an effective tool of assessment depends on how well the exam has been planned and executed. Appropriate blueprinting of the skills to be tested, the preparation of the exam, the training of faculty and the orientation of students about the exam are some of the factors that would help in conducting an exam with high validity and reliability.

ACKNOWLEDGEMENT

We acknowledge the study participants who took time out for this study and shared their views.

NOTES ON CONTRIBUTORS

The study was part of MK Masters in Health Professions Education. SMN supervised the dissertation, and was involved in every part of the analysis, idea's development, and write-up. MUS significantly contributed in idea development, editing and reviewing the manuscript.

CONFLICT OF INTEREST

Authors declare no conflict of interest.

ETHICS APPROVAL

The approval/permission was obtained from Khyber Medical University Research and Ethics Board.

REFERENCES

1. Harden, R.M. Stevenson, M. Downie, W.W, Wilson, G.M., Assessment of Clinical Competence Using Objective structured Examinations. *BMJ*.1975;1: 447-451
2. Conn J, Elliott S. Harry Potter and assessment. *Clin Teach* 2005; 2: 31-6.
3. Smee S. Skill based assessment. *BMJ* 2003; 326: 703-6.
4. Hodges B. OSCE! Variations on a theme by Harden. *Med Educ* 2003; 37: 1134-40
5. Siddiqui FG. Final Year MBBS Students' Perception for Observed Structured Clinical Examination. *J Coll Physicians Surg Pak*. 2013; 23 (1): 20-24
6. Chambers DW. Toward a competency-based curriculum. *J Dent Educ*. 1993; 57:790-93.
7. Norcini JJ, Blank LL, Duffy FD, Fortna GS. The mini-CEX: a method for assess-

- ing clinical skills. *Ann Intern Med* 2003; 138: 476-81.
8. Harden RM, Gleeson F. Assessment of clinical competence using an objective structured clinical examination (OSCE). *Med Educ.* 1979; 13: 41-54.
 9. Fidment, S. 'The Objective Structured Clinical Exam (OSCE): A qualitative study exploring the healthcare student's experience', *Student Engagement and Experience J.* 2012; 1(1): 37-47.
 10. Achievements of KMU [online] 2012 [cited 2012 Feb 13]. Available from: URL: <http://www.statesman.com.pk/newhafiz/hafiz> 2013.htm
 11. Rao D, Reddy PK, Reddy R , Hanumiah, Sunder S, Reddy N etal. Student evaluation of an OSCE in general medicine at Mamata medical college, Andhra Pradesh. *Int J Med Res Health Sci.* 2014;3(2):342-345
 12. Shitu B, Girma T. Objective structured clinical examination (osce): examinee's perception at department of pediatrics and child health, Jimma university. *Ethiop J Health Sci.* 2008; 18(2):47-52.
 13. Russell BP, Andrea W, Michelle B, J Michael B, and Celia DC. Student evaluation of an OSCE in paediatrics at the University of the West Indies, Jamaica. *BMC Med Educ.* 2004; 4: 22.
 14. Duffield KE, Spencer JA. A survey of medical students' views about the purpose and fairness of assessment. *Med Educ.* 2002; 36:879- 86.
 15. Omari AL, Shawagfa ZM. New experience with objective structured clinical examination in Jordan. *Rawal Med J.* 2010; 35(1): 78-81
 16. Alinier, G., Hunt, B., Gordon, R., Harwood, C. Issues and innovations in nursing education: effectiveness of intermediate-fidelity simulation training technology in undergraduate education. *J Adv Nurs.* 2006; 54 (3): 359- 69.
 17. Selim AA, Ramadan FH, El-Gueneidy MM, Gaafer MM. Using Objective Structured Clinical Examination (OSCE) in undergraduate psychiatric nursing education: Is it reliable and valid? *Nurs Educ Today.* 2012;32: 283-8.
 18. Yedidia MJ, Gillespie CC, Kachur E, Ockene J, Chepaitis AE, Synder CW etal. Effects of communications training on medical students performance. *JAMA.* 2003; 290(9): 1157- 65
 19. Imani M, Hosseini MT. Is OSCE successful in pediatrics? *J Med Educ.* 2005;6(2):153- 8.
 20. Allen R, Heard J, Savidge M, Bittengle J, Cantrell M, Huffmaster T. Surveying students' attitudes during the OSCE. *Adv Health Sci Educ.* 1998; 3: 197-206.
 21. El-Nemer, A., Kandeel, N. Using OSCE as an assessment tool for clinical skills: nursing students' feedback. *Aust. J. Basic Appl. Sci* 2009; 3 (3):2465-72
 22. Lindemann RA, Jedrychowski J. Self-assessed clinical competence: a comparison between students in an advanced dental education elective and in the general clinic. *Eur J Dent Educ.* 2002;6:16-21.
 23. Iqbal M, Khizar B, Zaidi Z. revising an OSCE in a resource limited Pakistani Medical school. *Educ Health.* 2009; 22: 209-12.
 24. van der Vleuten CPM, Swanson DB. Assessment of clinical skills with standardized patients: state of the art. *Teach Learn Med.* 1990;2(2):58-76.
 25. Wallace, J., Rao, R., Haslam, R. Simulated patients and objective structured clinical examinations: a review of their use. *Adv Psychiatr Treat.* 2002; 8: 342-48.
 26. Kahan K, Wilson L, Midmer D, Borsoi D, Martin D. Randomized controlled trial on the effects of a skill-based workshop on medical students' management of problem drinking and alcohol dependence. *Subst Abuse.* 2003;24:5-16
 27. McKnight, J., Rideout, E., Brown, B., Cileska, D., Patton, D., Rankin, J., Woodward, C. The objective structured clinical examination: an alternative approach to assessing student clinical performance. *J Nurs Educ.* 1987; 26 (1): 39-41.
 28. Salinitri FD, Connell MB, Garwood CL, Lehr VT, Abdallah K. An OSCE exam to assess PBL. *Am J Pharm Educ.* 2012; 76: 1-10