

ORIGINAL ARTICLE

Faculty Development: Mini-CEX as Workplace-Based Assessment

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Abstract

Background: Competence-based curriculum has become the need of medical education to meet the objectives of institutions aiming to produce skilled physicians. To achieve the optimal competence and performance of graduates a number of traditional evaluation exercises have been practiced. Some of these e.g. OSCE although meet the acceptable standard of reliability and validity is the assessment done in a controlled environment. This leaves the room for performance-based assessment in real clinical situation such as mini clinical evaluation exercise (Mini-CEX). To practice and meet the challenges of Mini-CEX it is vital to undertake faculty development program with a comprehensively chalked down Mini-CEX protocol and its objectives to achieve the intended outcome.

Objective: To undertake faculty development on Mini-CEX for its feasibility and acceptability as a method of formative assessment to evaluate the clinical competence of trainees in postgraduate program of Otolaryngology and Head-Neck Surgery.

Method: 25 trainees from the four classes of master of surgery program of 2009 in Otolaryngology and Head-Neck Surgery (ORL-HNS) undertook Mini-CEX encounters and assessed by 9 supervisors in a 12-week period of study. Faculty development program was carried out through prior lectures deliberating on background, concept and procedure of Mini-CEX followed by demonstrations using video clip of Mini-CEX encounter recorded in own clinical environment. Students were also exposed to similar settings to take up the Mini-CEX encounter without any hesitation. Trainees were assessed in outpatient clinical setting. Program was evaluated for its feasibility and acceptability with respect to patient's factors, clinical attributes, supervisor and trainee's performance and their reported level of satisfaction.

Result: Faculty development and trainees orientation in Mini-CEX was achieved as feasible and acceptable. Higher rating of satisfaction was reported by majority assessors and trainees as they found Mini-CEX acceptable for formative assessment. Among clinical skills highest rating was received in physical examination and lowest rating in therapeutic skills.

Conclusion: A motivated faculty and organized approach towards a comprehensive knowledge on Mini-CEX for its background communication, demonstration of procedure and method to complete the rating forms is the useful guide to adopt Mini-CEX. The faculty and trainees in department of ORL-HNS found Mini-CEX as feasible and acceptable assessment tool to monitor educational activity of postgraduate program through performance-based evaluation in a real clinical situation.

Keywords: Mini-CEX, Postgraduate, Workplace-Based Assessment, Otorhinolaryngology, Head and Neck, Surgery

Introduction

Medical education aims at providing quality health care to community, which evidently needs professionally competent physicians. The core clinical skills for undergraduate as well as postgraduate medical education has widely been established and elaborated in most of the curriculum practiced in medical education. The quality of health care depends upon acquisition of competence in a controlled environment and its performance in real life situation by the medical graduates. Competence-based curriculum has become necessary to meet the objectives of medical education. To achieve the optimal competence and performance of students a number of methods of assessments have been developed.

Student's assessment provides a feedback to faculty on curriculum to see whether outcome is achieved or not. These initiatives have expanded the assessment of student's competency and performance beyond the traditional methods practiced in medical education. Objective structured clinical examination (OSCE) has been claimed to meet the acceptable standard of reliability and validity (1). Though feasible, setting up of a series of OSCE stations involves huge logistics, which is expensive to afford. Besides, competencies assessed through OSCE are limited in predicting how student will actually perform in work situation particularly in humanistic skills and professionalism. The need to explore a reliable and valid instrument to assess performance in clinical skills at work place led to another feasible method of multiple mini clinical evaluation examination known as Mini-CEX.

Mini-CEX was originally developed by the American Board of Internal Medicine USA to assess the medical residents in real life clinical setting (2). This tool can be employed to assess the core competencies of trainees during their routine clinical practice. This assessment tool offers a reliable measure of

trainee's performance through being observed a number of brief encounters over a period, with a number of different assessors and in different clinical settings. For Mini-CEX to be reliable at least four encounters per year is needed during trainee's on-the-job performance if the measure is to be used as summative assessment for evaluating trainee's abilities (3).

There are many standardized and reliable tools available to optimally measure the core clinical skills. The clinical skills tested include interviewing and communication skills, physical examination skills, diagnostic and therapeutic skills, counseling and professionalism. A number of other traditional methods to assess trainee's competence and performance are available. These are oral examination using clinical scenarios, patient work-up followed by oral examination as long case and multiple short cases focused on diagnosis and objective structured clinical examination. However, problem with these traditional methods are that these are time consuming and takes long hours to accomplish the task and is uninfluenced by any time constraints relevant to real life clinical practice (4). It has a random case specific performance, which is usually checked through one case that is often unobserved (long case assessment). Results are difficult to be generalized and there is always a subjective bias of the supervisors. Since the rating involves single evaluator or a panel of evaluators rating with consensus, the scores are less reliable for assessment.

To address all those criticism American Board of Internal Medicine proposed Mini-CEX. In this kind of assessment, a faculty member evaluates a resident in 15-20 minutes and several of these assessments are conducted throughout the year. Mini-CEX is a method of assessing the clinical skills, which is task focused and quick to perform in a broader set of routine clinical practice (5). It is administered as multiple encounters with variable patient problems and different examiners. Multiple patient clinical evaluation

exercise works within the context of real clinical practice. In each Mini-CEX, encounter procedure involves an examiner observing the resident to conduct a focused interview or physical examination in an inpatient, outpatient, emergency or any other setting. After asking the residents for diagnosis or therapeutic decisions, the examiner completes the rating form and provides the feedback.

For each encounter the examiner records the date, the complexity of patient's problem on a 3-point scale (low, medium and high), the sex of the patient, the type of visit (new or follow up), the setting (outpatient, inpatient or emergency) the number of minutes spent observing the encounter and the number of minutes spent giving the feedback. Examiner will also note whether the encounter was data gathering, diagnosis, treatment or counseling. Using 1-9 point scale table (1-3 unsatisfactory, 4 marginal, 5-6 satisfactory and 7-9 superior) examiner will rate the students on interviewing, physical examination, professionalism, clinical judgment, counseling and organizational efficiency. Finally, students and the examiner will also record their satisfaction with the method on 1-9 point scale table from 1 dissatisfied to 9 most satisfied.

Material and Methods

Mini-CEX has been introduced to postgraduate program in Otolaryngology and Head and Neck Surgery in June 2009 to complement formative assessment in surgical skills training of students from year I to IV. Each student was required to undertake at least one Mini-CEX encounter during every three months of his rotational sub-specialty posting in ORL-HNS in School of Medical Sciences (SMS), Universiti Sains Malaysia (USM). A user friendly rating form (see appendix A) for faculty to document the Mini-CEX encounter was adopted from the rating form proposed by American College of Physicians and American Society of Internal

Medicine. Instruction for evaluator as a checklist (see appendix B) was also developed to indicate how to complete the rating form. A comprehensive faculty development and trainees orientation in Mini-CEX was organized. Faculty development program was carried out through prior lectures deliberating on background, concept and procedure of Mini-CEX followed by demonstrations using video clip of Mini-CEX encounter recorded in own clinical environment. Students were also exposed to similar settings to take up the Mini-CEX encounter without any hesitation.

Each Mini-CEX encounter was focused on a limited number of competencies in a given attribute of clinical skills such as history taking, physical examination and patient's diagnostic or therapeutic problems. All but one encounter were held in outpatient clinical setting administered by the supervisor without affecting his outpatient clinic. Each encounter was for about 15-20 minutes for the observing and 10-15 minutes for giving feedback by the supervisor. Supervisor was trained to complete the rating form in each clinical attribute besides rating the overall competence of the trainees. Mini-CEX data were collected for formative assessment to evaluate the ongoing educational activities.

Video recording of first two encounters of Mini-CEX by every supervisor was done. These videotapes were reviewed by the coordinator of Mini-CEX together with head of the department to do the rating on 1-9 points scale table as unsatisfactory (1-3), borderline (4), satisfactory (5-6), superior (7-8) and excellent (9). These videotapes were also carefully evaluated by the coordinator for an instructional feedback and faculty development of supervisor in areas showing deficiencies in undertaking the standardized Mini-CEX encounters for faculty development.

Each Mini-CEX encounter was also allowed a feedback sessions of 10-15 minutes. Both, the trainee and the supervisor were asked to rate their satisfaction for Mini-CEX and sign the

form. A hard copy of the form completed by the supervisor was provided to trainees for their record of formative assessment. Supervisor also placed a copy on the head of the department file besides maintaining his own record of Mini-CEX encounters with various trainees during their clinical posting.

Result

Total number of in-campus trainees in 4 classes of year I to IV during 2009 were 25, whereas the total number of supervisors in various sub-specialty units were 11 with a student supervisor ratio of 1: 2.27 (see table 1). Total Mini-CEX encounters comprising of different clinical attributes were 26 in reported 4 sub-specialties (see table 2).

All trainees were assessed in outpatient clinical setting except one (0.26%) assessed in emergency setting. The mean age of the patients was 35 years and out of a total 21 patients 33.33% were male and 66.66% were female. 7 cases were new and 14 cases were followed up patients. Of these 5 (19.23%) patients were repeated for more than once. The complexity of patient problem were

rated as, low in 7 (26.92%) encounters, moderate in 6 (23.07%) encounters and high in 13 (50.00%) encounters.

Of clinical attributes 11 encounters 42.30% required the history taking, 7 (26.92%) required physical examination, 5 (19.23%) required diagnostic work up, 2 (7.69%) required therapeutic and management strategies and 1(3.84%) required counseling. The mean time examiner spent to observe the trainee's interaction with patient was 14 minutes and the mean time spent providing feedback to the trainees was 9 minutes. The ratings in these clinical competencies ranged from 5 to 9 (see table 3).

Among the supervisor's majority were satisfied with Mini-CEX and the level of satisfaction ranged from 6 to 9 (see table 4). Among the trainees the level of satisfaction was less varied than the supervisors and majority have shown interest with high level of satisfaction for Mini-CEX ranging from 7-9 (see table 4). All supervisors filled up the patient diagnosis and the number of problems presenting to gauge the nature of patient's complexity.

Table 1: Number of trainees, supervisors and sub-specialties in Department of ORL-HNS

Year	No of Trainees (25)		No of Sub-specialties (4)		No of Supervisors (11)	
	Numbers	No	Sub-specialty	Sub-specialty	Numbers	
One	7	1	Otology	Otology	3	
Two	5	2	Rhinology	Rhinology	3	
Three	5	3	Head-Neck Surgery	Head-Neck Surgery	3	
Four	3	4	Pediatric ORL	Pediatric ORL	2	

Table 2: Contribution of Sub-specialties for clinical attributes vs. encounters in Mini-CEX

No	Sub-specialty	Attributes of Clinical Competence	No of Encounters
1	Pediatric ORL	History taking, physical examination and diagnostic skills.	6
2	Head and Neck Surgery	History taking, physical examination, diagnostic skills, therapeutic skills and counseling skills.	8
3	Otology	History taking, physical examination, diagnostic skills and therapeutic skills.	6
4	Rhinology	History taking, physical examination and diagnostic skill.	6
Total		6	26

Table 3: The outcome of Mini-Cex encounters as supervisors differences in rating scores.

Mini-CEX	Principal Assessor	Second Assessor	Third Assessor	Mini-CEX	Principal Assessor	Second Assessor	Third Assessor
1	8	7	7	14	6	6	7
2	7	7	8	15	8	8	8
3	6	6	7	16	9	8	9
4	5	6	6	17	7	6	7
5	8	8	7	18	6	6	7
6	9	8	8	19	5	5	6
7	5	6	7	20	5	6	6
8	8	7	9	21	6	6	7
9	7	6	7	22	8	7	8
10	6	6	6	23	7	8	8
11	8	8	8	24	7	7	7
12	5	6	7	25	6	6	6
13	9	8	9	26	8	9	9

Table 4: Level of satisfaction reported by supervisors and trainees in Mini-CEX encounters.

No	Sub-specialty	Rang of supervisor's level of satisfaction (out of 1-9)	Range of trainee's level of satisfaction (1-9)
1	Pediatric ORL	6 -9	8-9
2	HNS	8-9	8-9
3	Otology	7-9	7-9
4	Rhinology	8-9	8-9

Discussion

Mini-CEX compared to Traditional-CEX evaluates trainees with multiple encounters, greater variety of clinical settings and diverse set of patient problems carried out in an environment similar to that of a clinical practice and this produces more reliable ratings and evaluation. Increased opportunity for observation and just-in-time feedback from the supervising role models produces a positive educational impact on resident's learning. This also provides trainees with formative assessment to monitor their learning objectives. Centers planning to acquire this method of assessment can capitalize on a well-trained faculty delivering the Mini-CEX and meeting its objectives. Before embarking on faculty development to introduce Mini-CEX, center needs to develop a user friendly rating form and the checklist (see appendices A and B), elaboration of clinical competence and its attributes, procedural guidelines for practice and the precise role of Mini-CEX in assessment of the postgraduate program practiced to evaluate and monitor trainee's progress.

A number of clinical attributes to evaluate specific competence have been undertaken in 26 Mini-CEX encounters in 4 sub-specialties of ORL-HNS (see table 1 and 2). All encounters took place in ambulatory setting of the ongoing clinic except one in which patient was picked up from the emergency setting. Both, new and followed up patients were employed in these encounters however, trainees were exposed to all those cases for the first time. The time spent observing and giving feedback was noted to be increased with complex patient problems.

The ratings in these clinical competencies ranged from 5 to 9. The mean rating was highest for physical examination skills followed by history taking, diagnostic skills, counseling and therapeutic skills respectively. Inter rating score among the three evaluators for the same case also varied on point scale however, the difference was minor in term of

level of satisfaction and feasibility. The rating score varied among the supervisors undertaking various cases in those encounters, were close to consensus on decisions for categories as unsatisfactory, satisfactory or superior. Supervisor's rating score though often different on point table scale (ranging between 6-9) is in agreement for one of those categories clustered as unsatisfactory, marginal, satisfactory and superior (see table 3).

Inter rating score among the three evaluators for the same case also varied on point scale however, the difference was hardly any in term of level of satisfaction.

Most of the trainees and the supervisors have found Mini-CEX a satisfactory assessment tool (see table 4) for practice of formative assessment.

All supervisors filled up the patient diagnosis and the number of problems presenting. The problem caused a broad range of presenting symptoms explored in history taking encounters as, neck masses, sore throat, solitary and multinodular goiters, nasal masses, nasal block, epistaxis, ear discharge, hearing impairment and hoarseness of voice. Physical examination included a broad range of ear, nose, throat and head and neck examinations for various lesions.

In this study Mini-CEX encounter took place in normal working environment of clinical setting. Trainees were found motivated with instigating approach to undertake their Mini-CEX encounter whenever called during their on-job practice. However, they were informed that the Mini-CEX encounters are primarily meant for their formative assessment. Each supervisor was given the freedom to decide the venue of Mini-CEX encounter either in clinic, ward or emergency setting. It was also left to their discretion to choose the focus of specific attributes for testing and time to invite the trainee for clinical encounter in this study. However, one authentic way recommended by the Royal Australian College of Physicians is to choose

the last patient visiting the clinic or last patient in the ward round (6). This is found to be less disruptive to the flow of the clinical workload as well as it allows more time to offer structured feedback to trainees. Preferences were given to employ new patients for each encounter or follow up patients with new angle for clinical judgment if possible.

Feedback sessions were considered the most important aspect of Mini-CEX, equally by the supervisors and trainees. For trainees it was an excellent source to provide structured instruction as just-in-time feedback by some role model clinicians. Besides it also provide opportunity for students to gauge their progress of clinical skills learning.

Mini-CEX encounter provided a good experience both to supervisors and to trainees as a real life encounter between trainee and patients in an on-going clinic besides, observing and giving feedback by supervisors. The entire exercise had achieved the objectives of faculty development in this new method of assessment practiced for the first time in this medical school. Supervisors and the trainees, both have shown their satisfaction and cooperation (9 of 11 supervisors involved) to induct Mini-CEX as part of formative assessment to gauge their progress in clinical skills learning., Supervisor enthusiasm to undertake more Mini-CEX encounters was shown by their high rating of satisfaction, providing prompt feedback and returning of completed rating form to coordinator and a copy to trainee. Supervisors became consistent with Mini-CEX promptly and some of them even enjoyed observing the encounter assessed by other supervisors. Trainee's development to undertake Mini-CEX encounter was equally encouraging shown as high rating of satisfaction. For instance few trainees who were reluctant to undertake first Mini-CEX encounter were asking for more encounters with in the same posting.

Comparing the rating of trainee's performance it varied from minimum 5 score to maximum 9 score on point table from 1-9. Areas performed well were physical examination followed by history taking, diagnostic skills, therapeutic skills and counseling. Humanistic qualities and professionalism were also rated quite well in this study compared to those shown in other study (7). Although clinical setting was the only venue for all encounter except one but supervisors were found keen to practice Mini-CEX in inpatient and emergency setting after achieving the hand-on experience and confidence to run this evaluation method. Multiple encounters provide evaluation of trainees in greater varieties of patient problems with different assessors and clinical attributes. Educational impact was positive as the trainees appreciated Mini-CEX for multiple opportunities to interact with patient in the presence of supervisors and just-in-time instructional feedback in clinical competence of real clinical practice.

This study however, has several limitations such as a very small number of encounters, trainees and supervisors involved, lack of experience both for trainees and assessors, more complex cases, more controlled setting in the presence of coordinator. However, with multiple encounters in assessment using Mini-CEX was expressed as superior to traditional CEX and all the supervisors and the trainees were satisfied with this new format of assessment. Educational impact was also considered more effective for teaching and learning as it provides more frequent encounter over time, role model observers for feedback and broad range of patient problems. However, many supervisors found it difficult to mark the students below average for their borderline or unsatisfactory performance with face-face rating in this study. This situation might have been due to close association of supervisors and students in training. Inviting assessors off and on from other units (of same discipline) or institutions may overcome this problem. Limited time for discussion was also viewed as the

shortcoming of this assessment tool employed for formative assessment of postgraduate medical education.

Conclusion

Mini-EX is a method of assessing the clinical skills, which is task focused and quick to perform in a broader set of routine clinical practice administered as multiple encounters with variable patient problems and different examiners. Mini-CEX is a workplace-based assessment of performance, which has been reported to be reasonably reliable and valid to confer structured clinical skills learning in medical education.

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Appendix A-The Mini Clinical Evaluation Exercise (Mini-CEX) rating form adopted from ABIM.

Evaluator _____										Date ____/____/____				
Candidate _____										Year ____ Phase ____				
Clinical Setting of Discipline _____				Ambulatory <input type="radio"/>			In-patient <input type="radio"/>			Emergency <input type="radio"/>				
Complexity of Case				Low <input type="radio"/>			Moderate <input type="radio"/>			High <input type="radio"/>				
Patient's Data				Age ____ Years			Sex ____			New <input type="radio"/>		Follow up <input type="radio"/>		
Focus		History <input type="radio"/>		Examination <input type="radio"/>		Diagnosis <input type="radio"/>		Therapy <input type="radio"/>		Counseling <input type="radio"/>				
Medical Interviewing Skills <input type="radio"/>				1	2	3	4	5	6	7	8	9		
				Unsatisfactory			Satisfactory			Superior				
Physical Examination Skills <input type="radio"/>				1	2	3	4	5	6	7	8	9		
				Unsatisfactory			Satisfactory			Superior				
Humanistic Qualities and Professionalism <input type="radio"/>				1	2	3	4	5	6	7	8	9		
				Unsatisfactory			Satisfactory			Superior				
Diagnostic Skills <input type="radio"/>				1	2	3	4	5	6	7	8	9		
				Unsatisfactory			Satisfactory			Superior				
Therapeutic Skills <input type="radio"/>				1	2	3	4	5	6	7	8	9		
				Unsatisfactory			Satisfactory			Superior				
Counseling Skills <input type="radio"/>				1	2	3	4	5	6	7	8	9		
				Unsatisfactory			Satisfactory			Superior				
Organization and Efficiency <input type="radio"/>				1	2	3	4	5	6	7	8	9		
				Unsatisfactory			Satisfactory			Superior				
Overall Clinical Competency			Unsatisfactory 1-3 <input type="radio"/>			Marginal 4 <input type="radio"/>		Satisfactory 5-6 <input type="radio"/>			Superior 7-8 <input type="radio"/>		Excellent 9 <input type="radio"/>	
Evaluator Satisfaction with Mini-CEX			Low	1	2	3	4	5	6	7	8	9	High	
Candidate Satisfaction with Mini-CEX			Low	1	2	3	4	5	6	7	8	9	High	
Mini-CEX Time			Observing _____ Minutes						Feedback _____ Minutes					
Other Comments			Time of Encounter _____			No of Encounter _____			Main Diagnosis _____			No of Problems _____		
Signature			Candidate _____						Evaluator _____					

Appendix B: Evaluator's checklist employed in assessment using Mini-CEX in ORL-HNS.

No	Checklist for Evaluator
A	About the Form
1	Mark the appropriate boxes using sign (√) for tasks accomplished or observed.
2	For those tasks not performed or observed mark the relevant boxes using sign (X)
3	Declare the allocated time for each task or overall tasks to be undertaken
4	Observe and record the time consumed by the candidate
5	Note down the duration of time for which the feedback is given to candidate
6	Encircle the appropriate marks scored by the candidates in its relevant column
7	Fill-in evaluator and candidate's satisfaction rating with this Mini-CEX session
8	Ensure that the form is duly signed by the evaluator as well as the candidate
9	Pass on the duly completed forms to the coordinator program Mini-CEX
B	About the Program
1	Otology
2	Head and Neck Surgery and Laryngology
3	Rhinology
4	Pediatric ORL
C	About the Encounter
1	The number/s of encounter undertaken
2	Number of clinical attributes assessed in an encounter
3	Time of encounter during sub-specialty posting (? weeks after posting)
D	About the Patient
1	Patient's response to volunteer for encounter (happily agreed / reluctantly agreed)
2	Patient's feeling after the encounter (enjoyed/ did not enjoy)
3	Patient's willingness to be part of encounter again (yes / no)
E	About the Resident
1	Resident undertaking Mini-CESX was informed (few hours prior / suddenly called)
2	Revealed the score to resident as part of formative assessment (yes / no)
3	Resident was comfortable to be assessed in the presence of peer (yes / no)