

MINI-CEX- A RELIABLE AND DOABLE WORKPLACE-BASED ASSESSMENT TOOL

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ABSTRACT

Objective: To evaluate the quality of the observed mini-CEX scores by estimating reliability coefficients and standard errors.

Study Design: Quasi-experimental, co relational study.

Place and Duration of Study: Pak Emirates Military Hospital Rawalpindi from Sep 2016 to Oct 2017.

Material and Methods: This Quasi-experimental, correlational study was conducted with the OBGYN residents through non probability convenience sampling at Pak Emirates Military Hospital with sample size of 40. Twenty residents underwent Mini CEX (in addition to the existing teaching) while 20 had training through existing traditional teaching methods (lectures, SGDs, OPD, ward rounds, journal clubs, CPCs). Before commencing the study both faculty and Resident trainees were introduced to Mini-CEX. The faculty (CPSP accredited supervisors), were given face to face training in conducting and rating Mini-CEX by a workshop. Each of the 20 trainees took four Mini-CEX sessions over a period of one year. The clinical skills were rated on a standard adapted Mini-CEX proforma. The trainees were given immediate feedback. Action plan was made and documented on the proformas.

Results: The Trainees were assessed for improvement in clinical skills over the period of 12 months; and a trend of increased performance was observed amongst the trainees with each subsequent evaluation, supporting the construct validity of the instruments.

Conclusions: The study showed that the mini-CEX is a potentially powerful tool to provide high-quality, interactive feedback that could contribute to improvement in trainees' clinical skills.

Keywords: Mini-CEX, Teaching methods, Trainee, Workplace assessment.

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INTRODUCTION

Traditionally, training is defined in terms of time spent in training in different clinical posts or attachments. It was assumed that learning occurs automatically while doing routine clinical work. There were structured training programs with clear objectives but the involvement of senior doctors was haphazard and little attention paid to the educational needs of the trainee. Concern has been there that, trainees are seldom observed, assessed, and given feedback during their workplace based education. As doctors are expected to diagnose, manage, carry out practical procedures, and demonstrate positive humanistic attitude; a move towards competency based medical training took place. This has led to an

increasing interest in a variety of formative assessment methods that require observation and offer the opportunity for feedback. It is well established that assessment drives learning. Workplace based assessments (WBAs) are being used increasingly during postgraduate medical training as a method of assessing competence; to aid learning through objective feedback there by improving student's skills; and to provide evidence that the competencies required to progress to the next level of training have been achieved. Feedback which is constructive immediate, interactive, specific, focused and consistent with the needs of the learner helps trainees improve and develop professionally. Postgraduate OBGYN trainees must acquire the core clinical skills required for patient care and be able to demonstrate them on direct observation. Summative ratings fail to provide students with timely feedback regarding their clinical skills.

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Their validity is questionable when assessment is inferred rather than directly observed. In-training evaluations have been used for formative assessment with varying degrees of success. Multisource feedback does not involve direct peer observation of physician performance¹. Standardized patient examinations and OSCEs are reliable and valid clinical assessment tools but are time consuming and expensive. Using a "feasible" tool that promotes observation of medical students' clinical skills and can be used for summative assessment is important¹. The mini clinical evaluation exercise (mini-CEX) is a performance based assessment method for simultaneously assessing the clinical skills of trainees by direct observation, offering them feedback on their performance with action plans tailored to the needs of the learner. Mini-CEX does not require standardized patients and evaluates the trainee's performance with a real patient by clinician educators² in different clinical settings in the hospital. Advantages of using mini-CEX in formative assessment of trainee's include:

1. Mini-CEX presents trainee with a complete and realistic clinical challenge.
2. The trainee is observed by a skilled clinician-educator who both assesses the performance and provides educational feedback. This enhances the validity of the results ensuring that the trainee receives constructive criticism resulting in a reduction of errors and an improvement in quality of patient care⁴.
3. Observing each trainee with several patients by multiple trained faculty is desirable from an educational perspective, since different patients require different skills from trainees and this significantly broadens the range and richness of feedback they receive³⁻⁶.
4. Not only facilitates learning but also helps align teaching program.
5. The mini-CEX is a workplace-based evaluation tool of probable value in OBGYN, to evaluate and develop clinical performance. Its reliability and practicability have been

reported in other international clinical surroundings, but not to date, in Pakistan. The rationale of this study was to appraise the value of the observed mini-CEX scores by estimating reliability coefficients and standard errors.

Operational Definitions'

1. **Feasibility:** Feasibility was defined by a minimum number of completed observations and in terms of cost and time for Military Hospital.
2. **Reliability:** Joppe (2000) defines reliability as: The extent to which results are consistent over time and an accurate representation of the total population under study. If the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable.
3. **Mini-CEX:** The mini-CEX (mini clinical evaluation exercise) is a tool for the assessment of professional performance of residents through direct observation of a focused, brief, observed resident-patient encounter, in real clinical situations; evaluating clinical skills and providing subsequent feedback in the work setting using a structured rating form⁷.
4. **Competence:** Southgate (1999) defined competence in a doctor as being "composed of cognitive, interpersonal skills, moral and personality attributes. It is in part the ability, to consistently select and perform relevant clinical tasks in the context of the social environment in order to resolve health problems of individuals in an efficient, effective economic and humane manner"
5. **Clinical skills:** Clinical skills to be assessed include
 - Medical interviewing/history taking skills
 - Physical examination skills
 - Humanistic skills and Professionalism
 - Diagnostic skills
 - Therapeutic skills

- Counseling skills.
 - Organizational skills
6. **Formative assessment:** Formative assessment is used to identify future learning needs and gaps in learning. Formative assessment is designed to help learners learn more effectively by giving them feedback on their performance and on how it can be improved and/or maintained. Self- reflection by students contributes to improvement in learning⁷.

MATERIAL AND METHODS

This quasi-experimental, correlational study was conducted with the OBGYN residents through non probability convenience sampling at Pak Emirates Military Hospital with sample size of 40. Twenty underwent Mini-CEX (in addition to the existing postgraduate teaching) as a normal teaching routine; while 20 had training by existing teaching practices. CPSP approved supervisors at Pak Emirates Military hospital were employed as raters for mini-CEX. Training the faculty was considered as key to the successful implementation of mini-CEX. Supervisor/faculty members first went through one day workshop on mini-CEX focusing on their training in using global rating scale and in providing effective feedback. Rater training was to improve the mini-CEX ratings, inter-rater reliability, and accuracy.

Research Question

What is the reliability of scores produced through mini-CEX and standard error of measurement?

Delimitations and limitations

Delimitations

1. OBGYN year 2 residents at PEMH Rwp were participants
2. Correlational study design.
3. Mini-CEX Questionnaire.

Limitations

1. Despite training assessors' bias may produce skewed results compromising reliability of scores. The observations of faculty may be

influenced by their stakes and their relationships with trainees.

2. The study was a single specialty and single institution study and results may not be generalizable across other schools with different faculty and student characteristics and experience (it is difficult to assure equivalence across institutions.)
3. Limited sample size
4. How other methods in ambulatory settings for structured observation compare with the mini-CEX is unknown, and more research is needed in this area.
5. The mini-CEX alone may be insufficient to reflect trainees' mastery of each competency.
6. Finally, this study does not address whether mini-CEX in the long run helps students improve their skills.
7. Other factors beyond our control

Data Collection Procedure

Forty PG year 2 trainees were enrolled. They were divided into two groups Mini-CEX and traditional. Trainees in traditional group had training through existing teaching methods in the department (lectures, OPD, ward rounds, journal clubs, CPCs). In Mini-CEX group in addition to the existing teaching practices the trainees underwent Mini-CEX. Each trainee in Mini-CEX group was issued 04 mini CEX proformas in the beginning of year 2 of residency program as a part of their clinical routine. They were required to complete 04, fifteen minutes mini CEX encounters, one every 10-12 weeks over a period of 12 months with different faculty and in different clinical situations). The trainee saw a new or a follow up patient. The assessor ensured that the patient is typical of the trainee's workload. In each mini-CEX, a single faculty member directly observed the clinical encounter, in real clinical settings (outpatients, inpatients and A&E. The trainee had to take a focused history, perform relevant physical examination, provide a diagnosis, outline investigation and treatment plans and counsel the patient. The

faculty member scored the performance using a structured mini-CEX proforma (attached in appendix 1) using a 9-point rating scale where 1-3 is unsatisfactory, 4-6 is satisfactory and 7-9 were superior. The parameters evaluated included: interviewing skills, physical examination skills, professionalism, clinical judgment, counseling, organization and overall clinical competence. Mini-CEX is more than a box ticking exercise and has educational value. After observing and scoring, assessor immediately provided educational feedback, discuss strengths and weaknesses and devise an action plan to address the deficiencies identified. Both trainee and assessor signed the proforma and rated their satisfaction with the encounter. Mini-CEX dually filled proformas (for each trainee) were collected and turned in after feedback. Results of Mini-CEX for each trainee were analyzed to see whether showing improvement in clinical skills over the period of 12 months. Secondary outcome measure was how many passed the CPSP, IMM examination in the two groups.

Mini-CEX Descriptors¹⁰⁻¹²

Description of Grades

- **Unsatisfactory:** Questionable methodologies, sometimes neither defensible nor justified. Supervisor is uncomfortable with some of the resolutions and/or collaborations. Some apprehensions over patient safety. Substantial gaps in knowledge and/or skills.
- **Satisfactory:** A candidate categorized by firmness rather than magnificence. Good methodology to patient and staff, generally skilled for level of training.
- **Superior:** Inspiring trainee. Generally exceptional methodology, well well-versed in most areas. Excellent methodology to patient and staff. Surpasses prospects for level of training.

Competence Descriptors of a Satisfactory Trainee^{11,12}

- **Patient assessment:** Stimulates pertinent evidence from history and investigation of the patient, collects information from patient records and inquiries including treatment history and allergies. Appropriately guidelines further inquiries.
- **Physical Exam:** Follows efficient, logical sequence; examination. Appropriate to clinical problem, explains to patient; sensitive to patient's comfort, modesty.
- **Management plan:** Articulates an applicable strategy for handling the patient.
- **Communication skills:** Creates connection discovers patient's viewpoint, jargon free, open and authentic, recommends and approves on a administration plan with patient.
- **Communication skills:** Staff: connects organization plan to applicable staff, preserves open communication with all team members intricate in patient care. Communicates efficiently with anesthesia team. Cultivates operational team communication (open, two-is, clear, concise, closes communication twist).
- **Technical skills:** Expertise in various analytic and beneficial procedures suitable to level of training.
- **Clinical judgment:** Screens patient, practice, progress. Responds appropriately to changes in patient status/unanticipated events. Makes suitable identify and articulates appropriate plans. Instructions/performs suitable diagnostic studies or involvements, deliberate risks assessment. Anticipates and prepares for future events. Plans for and appropriately manages transition to discharge.
- **Organization/efficiency:** Highlights, acts timely, is concise. Well-planned workspace, effective use of time and assets without negotiating patient upkeep. Good standard of record keeping.
- **Professionalism:** Shows esteem, kindness, and empathy for patient, and creates trust. Appears to patient's requirements and well-being. Compliments confidentiality. Performs

in an ethical method, conscious of lawful frameworks for consensus. Establishes truthfulness. Are of own limitations including risk of tiredness, damage. Assurance to excellence and safety (e.g. practices to reduce medical error, fulfills with hospital protocols). Accountable use of resources.

- **Overall clinical care:** During period of observation demonstrates satisfactory clinical decision, production of information, and clinical efficiency. Validates efficiency, suitable use of resources, balances risks and profits, good communication and teamwork, attentive of own limitations.

subsequent evaluation, supporting the construct validity of the instrument. Sixteen (80%) in Mini-CEX group cleared the IMM exam in comparison to 6 (30%) in traditional group. Trainee satisfaction with Mini-CEX was high was high from the beginning. The assessor satisfaction with Mini-CEX rose as the faculty experience with Mini-CEX improved (table).

DISCUSSION

Direct observation of the trainee performance in a clinical encounter with the patient around a focused clinical task by a trained faculty member is desirable^{10,11}. The study clearly identifies that Mini-CEX is a doable and feasible

Table: Mini-CEX evaluation.

Skills	N	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Medical Interviewing Skills	20	5.45 ± 0.887	5.60 ± 0.821	6.21 ± 0.631	7.10 ± 0.852
Physical Examination Skills	20	5.40 ± 0.754	5.70 ± 0.979	6.30 ± 0.801	6.90 ± 0.718
Humanistic Qualities and Professionalism	20	5.35 ± 0.875	5.85 ± 0.745	6.15 ± 0.813	6.95 ± 0.887
Diagnostic Skills	20	5.80 ± 0.696	5.65 ± 0.988	6.20 ± 0.696	7.10 ± 0.968
Therapeutic Skills	20	5.10 ± 0.912	5.60 ± 0.598	6.30 ± 0.979	7.05 ± 0.945
Counseling Skills	20	5.00 ± 0.725	5.70 ± 0.923	6.10 ± 0.912	6.80 ± 0.894
Organization and Efficiency	20	5.30 ± 0.979	5.85 ± 0.813	6.45 ± 0.945	7.25 ± 0.967
Overall Clinical Competency	20	4.85 ± 1.040	3.75 ± 1.45	3.50 ± 0.513	3.85 ± 0.366
Satisfaction Level					
Assessor's Satisfaction with Mini_CEX	20	7.90 ± 1.553	7.05 ± 1.67	7.55 ± 1.43	8.55 ± 1.146
Student Satisfaction with Mini_CEX	20	8.45 ± 1.23	7.95 ± 1.35	8.1 ± 1.12	8.65 ± 1.09

Data Analysis Procedure

Mini-CEX rating proformas were analyzed through SPSS version 17 and mean and SD of trainee's scores were calculated and standard error of measurement is determined. Reliability coefficient was calculated through Cronbach's alpha.

RESULTS

A total of 80 Mini-CEX evaluations were completed for 20 trainees by 08 faculty members over a period of one year. Average observation time was 15 minutes. Feedback was given in 05 minutes. A trend of increased performance was observed amongst the trainees with each

workplace based formative assessment tool. It requires minimal faculty time- 20 minutes in total. Mini-CEX has high satisfaction rates both for students and assessors (table). The main rate limiting step is the faculty training. At MH faculty was trained first in conducting and rating Mini-CEX, use of global rating scale and in providing effective feedback. Without formal training, assessment would tend to be influenced by comments and reflections from personal experience, and from peers. Mini-CEX is a unique WPBA format, has the provision to directly observe the resident clinical skills and provide effective feedback in one sitting by more than one faculty member and with more than one

patient. The Mini-CEX is reliable, had better reproducibility as shown by SD, SEM and Cronbach's alpha (table). Using Mini-CEX for trainee evaluation on routine basis introduced a culture of directly observing trainee performance and providing timely effective feedback. The gaps in teaching and learning were identified and modifications were made in instructional strategies. Individual trainee needs were addressed. High satisfaction rates of both trainees and assessors (table) endorse the construct and face validity of Mini-CEX. The introduction of Mini-CEX in the OBGYN department helped in the professional development of the faculty.

CONCLUSION

The mini CEX is a feasible, reliable, structured format for direct observation and provision of effective feedback to OBGYN residents. It contributes to improvement in clinical skills and helps learn/ reinforce desired clinical behaviors. Mini-CEX also identifies deficiencies, problems, and gaps in teaching training.

Consent

The study was approved by the Institution ethical review board. The participants were informed about the study and were assured about confidentiality. All accorded their consent.

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CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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