RESEARCH PAPER

Implementation of a Mini-Clinical Evaluation Exercise (Mini-CEX) Program to Assess the Clinical Competencies of Postgraduate Trainees in Pediatrics

SUMAIRA KHALIL, ANURAG AGGARWAL AND DEVENDRA MISHRA

From Department of Pediatrics, Maulana Azad Medical College, New Delhi, India.

Correspondence to: *Dr Devendra Mishra, Department of Pediatrics, Maulana Azad Medical College, Delhi 110002. India. drdmishra@gmail.com.*

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ABSTRACT

Objective: To implement Mini-CEX, a Workplace-based assessment tool, for formative assessment of clinical skills of final year pediatric post-graduate residents.

Methods: All final-year postgraduate residents at the Department of Pediatrics of a public medical college in India underwent mini-CEX assessment by rotation among six faculty members. Outcome was assessed by an anonymous questionnaire-based feedback from the participating students and faculty members collected after the completion of all the mini-CEX encounters.

Results: 20 final year postgraduate students (12 males, 15 MD and 5 DCH) were assessed. Data gathering (68.7%) and counseling (63.3%) were the most common areas assessed. 84% and 58% of the students and faculty, respectively were satisfied with their Mini-CEX encounter (score $\geq$ 8 on a 10-point Likert scale). 90% of the participating students felt that Mini-CEX should be included as a routine in postgraduate teaching. All (100%) faculty thought they had a good experience, but 50% were unsure whether it was a valid method of assessment.

Conclusions: The involved faculty and residents had high satisfaction levels with mini-CEX evaluation. Mini-CEX has a potential to be incorporated in the formative evaluation of postgraduate pediatric students as part of the workplace-based assessment.

Keywords: *Assessment, Competency-based medical education, Teaching methods, Workplace-based assessment*.

INTRODUCTION

The method of postgraduate medical student evaluation in our country is restricted to an annual examination [1], with or without evaluation of a log book/internal assessment. Eighty percent of the students are assessed more for their presentation skills rather than clinical skills as they are actually observed later during presentation, and not while taking history or carrying out physical examination [2]. Mini-Clinical Evaluation Exercise (Mini-CEX) is a brief and rapid observation of core clinical skills in a doctor-patient encounter lasting only 10-15 minutes [3]. It is a Workplace-based assessment (WPBA), in which the performance of the student is evaluated during a focused clinical interaction, followed by a focused feedback [1]. A variety of clinical skills like data collection, history taking, physical examination, clinical judgment, counseling, overall competence, organization and efficiency can be assessed by Mini-CEX. Mini CEX has shown to have a better reliability score than Objective Structured Clinical Examination (OSCE) or Long-case based examination of the same duration [4].

Published data across countries shows that less than 25% of the students are actually assessed during a clinical encounter with a structured format [5]; though very little data is available from India [6,7]. Thus, we planned this study with the primary objective to implement Mini-CEX as a tool for formative assessment of clinical skills of final year pediatric post-graduate residents. The secondary objectives were to sensitize our faculty and residents about Mini-CEX; and also to assess the feasibility of using Mini-CEX as formative assessment tool for pediatric post-graduate residents.

METHODS

This cross-sectional study was carried out from August 2015 to January 2016 in the Pediatric department of a teaching hospital in India, following approval from Institutional ethics committee. For the sake of uniformity in the theoretical and practical knowledge of the participants, only final year residents (III year Doctor of Medicine {MD} students and II year Diploma in Child Health {DCH} students) were enrolled in the study after an informed consent. Those who had attended less than 20 months (DCH students) or 30 months (MD students) of clinical training in the department, and those having pre-existing additional pediatric qualifications (DNB, DCh, MRCPCH) were excluded from the study.

An audio-visual presentation was shown to sensitize all the faculty and residents of the department about the basic principles and methodology of mini-CEX. Six faculty members interested in participating volunteered for conducting the mini-CEX and providing feedback. The faculty volunteers were trained in the conduct of the mini-CEX sessions. An external expert took a session on art of giving effective feedback.

One encounter with each of the six different teachers was planned for each student, thereby ensuring that all the students are rotated through all the teachers. A weekly schedule with the names of the student and teacher was displayed on the departmental notice board, and also mailed to all teachers. Two faculty members had the additional responsibility of coordinating the conduct of the sessions. The place of encounter and the types of cases were decided in advance by the student and the teacher together.

The standard nine-point scale format of mini-CEX was used for rating the students, employing the structured assessment form by the American Board of Internal Medicine [8]. The focus of the encounter, the complexity of the case to be discussed; and the competency on which the encounter will focus was informed to the student before each session by the concerned faculty. The focus areas assessed were Data-gathering, Diagnosis, Therapy and Counseling. Each student was assessed for seven competencies which were medical interviewing skills, physical examination skills, professionalism, clinical judgment, counseling skills, organization and overall clinical competence. The assessor provided an unstructured feedback to the resident immediately after the encounter, written feedback were provided on the form by both the resident and the faculty regarding their overall satisfaction with the encounter.

Students who missed any of the Mini-CEX evaluations were personally contacted for re-scheduling the encounter at a convenient time. No additional efforts were made if the student missed two such re-scheduled encounters (total three opportunities) during the study.

Data on satisfaction with the encounter was collected from the mini-CEX form. An anonymous questionnaire-based feedback was designed for participating students and faculty members, and was used after the completion of all the mini-CEX encounters. The data were entered in an Excel sheet, and the final data was analyzed with Microsoft Excel program. All continuous data was represented as mean (SD) and discrete data as proportions.

RESULTS

A total of 20 final year postgraduate students (15 MD and 5 DCH; 12 males) were assessed. There were 112 (93.3%) Mini-CEX encounters conducted by six faculty members (3 Assistant Professor, 2 Professors and 1 Senior professor); 7 (5.8%) of these encounters needed re-scheduling. Eighty-one sessions were conducted in the Outpatient department, 17 in Inpatient wards, and 14 in the Casualty department; all sessions were directly observed throughout by the faculty member. The complexity level of cases was rated as moderate in 61, low in 29 and high in 22 cases. The mean (SD) time taken for each encounter and observation time were 17.7 (2.57) min (range, 15-35 min) and 12.4 (2.13) min (range, 10-22 min), respectively.

Data-gathering (68.7%) and counseling (63.3%) were the most common areas assessed (***Table* I**). Out of the competencies assessed, students scored least in counseling (median score 3.9, range 3-7) and professionalism (median score 4.5, range 3-7), whereas they scored highest in medical interviewing skills (median score 5.3, range 4-8) and physical examination skills (median score 5.3, range 4-8). Eighty-four percent and 58% of the students and faculty, respectively were satisfied with their Mini-CEX encounter (score $\geq$ 8 on 10-point Likert scale).

Ninety percent of the participating students felt that Mini-CEX changed their attitude towards teaching and it should be included as a routine in postgraduate teaching. Only 25% thought that it induced anxiety in them (***Table* II**). On assessment of faculty perception of Mini CEX, all (100%) thought they had a good experience and the teacher's feedback would improve student's performance, whereas 50% were unsure whether it was a valid method of assessment (***Web Table* I**).

DISCUSSION

In this cross-sectional study of 112 mini-CEX encounters among six faculty and 20 final-year pediatric postgraduate students, the tool was found to be feasible to conduct with a high acceptability among both faculty and residents. Initial scheduling problems could be resolved with the use of additional faculty to coordinate the schedule.

Mini-CEX has been previously studied among a variety of settings in medical schools outside India and has shown good acceptability [9,10]. Indian experience with the tool is primarily limited to only four specialties, Ophthalmology [6], Dentistry [11], Obstetrics and Gynecology [12], and Pediatrics [5,7]; all reporting good acceptability by the participants. However, previous studies had certain lacunae like varying evaluator status (faculty and senior residents) [5,], low completion rates [5,12], limited to 1-2 settings [5,12], one faculty evaluating a single competency [12] or a single learner [6]. We obviated many of these and documented a high completion rate. The high acceptability by both the evaluators and the residents was similar to the previous studies [5-7,12].

One major advantage of Mini-CEX is that it has an in-built mechanism of providing instant feedback by evaluator on the performance of the learner, which is reportedly the single most important influence on achievement [13], in addition to building a strong student-teacher relationship [14]. In our study, all faculty members perceived that instant feedback has a positive impact on the students' future performance. This could be one of the major positives of incorporating this tool for formative assessment of postgraduate students.

The major limitation of this study was the small number of faculty members involved, as only volunteering faculty members were included. Another problem was the initial difficulties in scheduling the encounters, with either the student (patient-care, other academic activity or personal problems) or the faculty (administrative work or other academic responsibilities) missing the scheduled session. This was handled by deputing two faculty members as coordinators to ensure timely conduct of the sessions as per schedule. Thus, we could achieve a high rate of completion of planned encounters (93.3%), utilizing only faculty members as evaluators.

The high satisfaction with the mini-CEX tool by both faculty and residents in this and other Indian studies is an encouraging signal in the light of the thrust of MCI towards Competency-based medical education and Workplace-based assessment [15]. Adoption of Mini-CEX as a component of WPBA will have the additional advantage of immediate feedback for students, thereby enhancing learning and improving their future performance [15]. There is a need for feasibility and acceptability studies of this tool among residents and faculty of other specialties among Indian medical colleges.

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Contributors: SK: conceived the study-idea, coordinated and conducted the Mini-CEX sessions, did the literature search, analyzed the data, and prepared the initial draft of the manuscript; AA: conducted the Mini-CEX sessions, provided intellectual inputs and assisted in preparation of manuscript. DM planned

the study and supervised the conduct of the sessions, provided intellectual inputs in the preparation of the manuscript, and will be the guarantor. All authors approved for the version to be published.

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WHAT THIS STUDY ADDS?

- There is high acceptability among faculty and residents for Mini-CEX as a tool for formative assessment of Pediatric postgraduate students.

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TABLE I DETAILS OF MINI-CEX ENCOUNTERS

Focus-area Assessed	*No.(%) n=112 (%)*
Data Gathering	77 (68.7)
Diagnosis	68 (60.7)
Therapy	42 (37.5)
Counseling	71 (63.3)
All 4 areas assessed	14 (12.5)
Single area assessed	34 (30.3)
Competency Assessed	
Professionalism	112 (100)
Interviewing skills	99 (88.4)
Clinical judgment	94 (83.9)
Physical examination	86 (76.7)
Organization	96 (85.7)
Counseling skills	90 (80.3)
Overall competence	110 (98.2)

TABLE II PERCEPTIONS OF PARTICIPATING PEDIATRIC RESIDENTS REGARDING MINI-CEX (*N*=20)

*Feedback**	*Agree No. (%)*	*Disagree No. (%)*
Adequate time provided for the encounter	20 (100)	0
Improvement in residents' performance[#]	14 (70)	3 (15)
Adequate time provided for teacher feedback[#]	15 (75)	2 (10)
Conducted in a non-threatening environment	20 (100)	0
Induced excessive anxiety in the residents	5 (25)	15 (75)
Valid method of assessment of clinical skills	17 (85)	3 (15)
Changed my attitude towards teaching	18 (90)	2 (10)
Useful as a routine method in PG training	18 (90)	2 (10)

**The 'strongly agree' and 'agree', and 'strongly disagree' and 'disagree' responses have been clubbed as 'Agree' and 'Disagree', respectively. [#]'Unsure' responses have not been depicted.*

WEB TABLE I PERCEPTIONS OF FACULTY REGARDING MINI-CEX (*N*=6)

*Feedback**	*Agree, No. (%)*	*Disagree, No. (%)*
How was the overall experience (Good)	6 (100)	0
Time provided for encounter was adequate	5 (83.3)	1(16.7%)
Teacher's feedback will improve resident's clinical performance	6(100)	0
Time provided for teacher feedback was adequate	5 (83.3)	1(16.7%)
Exercise was conducted in a non-threatening environment	5 (83.3)	1(16.7%)
Direct observation induced excessive anxiety in the residents[#]	2 (33.3)	3 (50)
Changed my attitude towards teaching	5 (83.3)	1 (16.7%)
Valid method of assessment of clinical skills	3 (50)	3 (50)
Useful as a routine method in PG training and assessment	4 (66.6)	2 (33.4%)

**The 'strongly agree' and 'agree', and 'strongly disagree' and 'disagree' responses have been clubbed as 'Agree' and 'Disagree', respectively. [#]'Unsure' responses have not been depicted.*