



A FORMATIVE ASSESSEMENT FOR THE SURGICAL RESIDENTS, USING MINI CLINICAL EVALUATION EXERCISE (MINI-CEX) - A PROSPECTIVE INTERVENTIONAL STUDY

General Surgery

Dr Hosni Mubarak Khan* Associate professor/Unit head, Department of General surgery, SABVMC&RI-B&LCH.
*Corresponding Author

Dr Ravikiran H V Assistant professor, Department of General surgery, SABVMC&RI-B&LCH.

Dr Bharath M Naik Assistant professor, Department of General surgery, SABVMC&RI-B&LCH.

Dr Siddesh Hiremath Assistant professor, Department of General surgery, SABVMC&RI-B&LCH.

Dr Seshagiri Rao Associate professor, Department of General surgery, SABVMC&RI-B&LCH.

ABSTRACT

Background - The mini clinical evaluation exercise (mini CEX) is a formative assessment tool designed to provide feedback on skills essential to good medical care by observing an actual clinical encounter. However, the bigger advantage of mini CEX is the structured feedback that it provides to the students as well as the faculty, thus helping them to make better decisions. **Materials & Methods** - It was a prospective interventional study conducted at Shri Atal Bihari Vajpayee Medical College & Research Institute – Bowring & Lady Curzon Hospital, bangalore (SABVMC&RI – B&LCH) in the department of general surgery from March 2024 – August 2024. The sample size and Study population were, 15 Final year surgical residents respectively who were subjected to or assessed by the MINICEX tool. Seven core clinical skill assessments were done, and the performance was rated on a 9 point scale (grouped into *unsatisfactory*, *satisfactory*, and *superior*). Immediate feedback to the residents was given by the faculty. Delayed feedback from faculty and residents regarding the perception of mini CEX was taken. Statistical analysis was done using SPSS version 20 and analysis of variance (ANOVA) for inferential statistics. **Results** - There were a total 45 (100%) mini CEX encounters in our study. **The surgical residents were subjected to MINICEX and the Competencies were assessed on a 9 point scale.** On a 9 point scale. The marks from 1 to 3 were considered in the group unsatisfactory, a score of 4 to 6 was included in the satisfactory group, and a 7 to 9 score was considered superior. Statistically significant improvement scores were seen in physical examination skills, professionalism, and counselling skills from first to last session, which lead to improvement in the learning attitude of the residents. Mean time - for observation by the faculty – 16.31 (12-20 MINS), feed back by the faculty – 10.97 (7-12 MINS), evaluator satisfaction – 6.04 (3-9), resident satisfaction – 7.85 (5-9) **Conclusion** - MINICEX improves the learning environment in residency and leads to improvement in medical interviewing skills, physical examination skills, humanistic qualities/professionalism, and counseling skills. It also helps the residents to modify their learning behaviour and identify the gaps in their knowledge. Hence Mini CEX can thus be considered as an acceptable and practical tool for the formative assessment of residents.

KEYWORDS

Clinical competence, Medical interviewing skills, Professionalism, Surgical residents, MINICEX.

INTRODUCTION

Despite an increasing emphasis on workplace-based assessment (WPBA) during medical training, we still Lack or give less value to a formative structured assessment and feedback for a given clinical encounter. This inturn under assess the clinical competence of a trainee and also delays in making descisions and progressive improvisation by them due to lack of immediate feedback.

Various tools have been described for workplace based assessment, mini clinical evaluation exercise (mini CEX) being one of them. mini CEX is well accepted in western countries; however, it is scarcely used in India.¹

Mini CEX conforms to the highest level of Miller's pyramid, that is, “Does.”²

In the mini-CEX, a single faculty member observes the trainee interact with a patient in any of a variety of settings including the hospital, outpatient clinic, and A&E. The trainee conducts a focused history and physical examination and after the encounter provides a diagnosis and treatment plan. The faculty member scores the performance using a structured document and then provides educational structured feedback which is the biggest advantage of mini CEX, thus helping the students and faculty to make better decisions. It is called MINI as the encounters are intended to be relatively short, about 15 minutes, and to occur as a routine part of the training programme.^{3,4}

AIMS/OBJECTIVES

1. To estimate the difference in scores obtained over 3 sessions in MINICEX among final year surgical residents.
2. To assess the perceptions of faculty and final year surgical residents about the utility of MINI-CEX.

METHODOLOGY –

It was a prospective interventional study conducted at Shri Atal Bihari Vajpayee Medical College & Research Institute – Bowring & Lady Curzon Hospital, bangalore (SABVMC&RI – B&LCH) in the department of general surgery from March 2024 – August 2024. The sample size and Study population were, 15 Final year surgical residents respectively who were subjected to or assessed by the MINICEX tool. (Fig–1)

Mini-Clinical Evaluation Exercise (CEX)									
Evaluator: _____	Date: _____								
Resident: _____	R-1		R-2		R-3				
Patient Problem/Dx: _____									
Setting: ☐ Ambulatory ☐ In-patient ☐ ED ☐ Other _____									
Patient: Age: _____ Sex: _____	New		Follow-up						
Complexity: ☐ Low ☐ Moderate ☐ High									
Focus: ☐ Data Gathering ☐ Diagnosis ☐ Therapy ☐ Counseling									
1. Medical Interviewing Skills (☐ Not observed)									
UNSATISFACTORY SATISFACTORY SUPERIOR									
2. Physical Examination Skills (☐ Not observed)									
UNSATISFACTORY SATISFACTORY SUPERIOR									
3. Humanistic Qualities/Professionalism									
UNSATISFACTORY SATISFACTORY SUPERIOR									
4. Clinical Judgment (☐ Not observed)									
UNSATISFACTORY SATISFACTORY SUPERIOR									
5. Counseling Skills (☐ Not observed)									
UNSATISFACTORY SATISFACTORY SUPERIOR									
6. Organization/Efficiency (☐ Not observed)									
UNSATISFACTORY SATISFACTORY SUPERIOR									
7. Overall Clinical Competence (☐ Not observed)									
UNSATISFACTORY SATISFACTORY SUPERIOR									
Mini-CEX Time: Observing _____ Min. Providing Feedback: _____ Min.									
Evaluator Satisfaction with Mini-CEX									
LOW 1 2 3 4 5 6 7 8 9 HIGH									
Resident Satisfaction with Mini-CEX									
LOW 1 2 3 4 5 6 7 8 9 HIGH									
Comments: _____									
Resident Signature _____ Evaluator Signature _____									

Fig – 1MINICEX Tool

Inclusion Criteria

-Final year surgical residents who gave consent

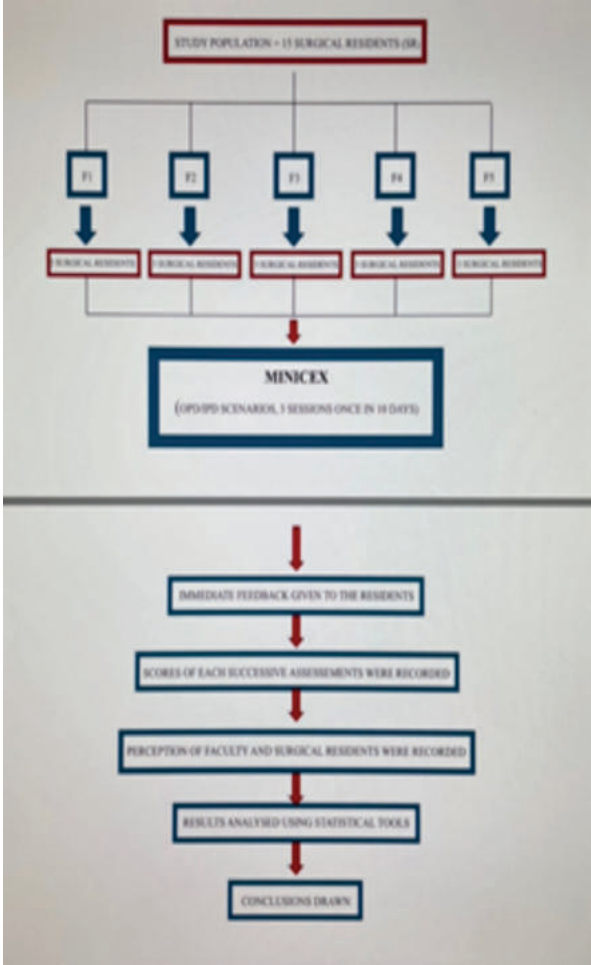


Fig – 3. Flow Chart Of The Study Protocol.

STATISTICAL ANALYSIS of all components of mini CEX

- Analysis was done by SPSS version 20 to calculate the descriptive statistics
- P value of <0.05 was taken to be significant
- Repeated measures Analysis of variance (ANOVA) was used to calculate inferential statistics.

Ethical Consideration

The study was conducted only after approval from the institutional ethics committee (IEC/RP/227/2024) and after obtaining due consent from participating faculty and surgery residents.

RESULTS-

There were a total 45 (100%) mini CEX encounters were in our study. We had 5 staff from the department of general surgery in the study who were allocated 3 final year surgical residents each. Where they conducted 3 sessions in 2 settings (OPD/IPD) for each student.

There were a total 90 patients in our group, of which 45 patients (50%) were encountered on OPD basis and another 45 patients (50%) on IPD basis. The focus areas during the evaluation were (according to the evaluating professor) Data gathering 100% (90), Diagnosis 61% (55), Therapy 46.6% (42), Counseling (55.8% (62). With regards to Complexity of cases 49 (49%) were in the low category, 31 (28.5%) were in the moderate category, 13 (11.4%) were in the high category.

The Surgical Residents Were Subjected To MINICEX And The Competencies Were Assessed On A 9 Point Scale.

On a 9 point scale. The marks from 1 to 3 were considered in the group unsatisfactory, a score of 4 to 6 was included in the satisfactory group, and a 7 to 9 score was considered superior. The change in the number of students in all categories for each competency from the initial to the final session is represented in Table 1.

Table-1. Competency Assessment

Competency	Sessions	Unsatisfactory	Satisfactory	Superior
MEDICAL INTERVIEWING SKILLS	FIRST SESSION	7 (46.6%)	9 (60%)	0
	LAST SESSION	1 (6.6%)	13 (86.6%)	2 (13.3%)
PHYSICAL EXAMINATION SKILLS	FIRST SESSION	5 (33.3%)	10 (66.6%)	0
	LAST SESSION	2 (13.3%)	12 (80%)	1 (6.6%)
PROFESSIONALISM	FIRST SESSION	8 (53.3%)	7 (46.6%)	0
	LAST SESSION	1 (6.6%)	11 (73.7%)	3 (20%)
CLINICAL JUDGEMENT	FIRST SESSION	2 (13.3%)	12 (80%)	1 (6.6%)
	LAST SESSION	1 (6.6%)	12 (80%)	2 (13.3%)
COUNSELLING SKILLS	FIRST SESSION	6 (40%)	9 (60%)	0
	LAST SESSION	0	12 (80%)	3 (20%)
ORGANISATION SKILLS	FIRST SESSION	2 (13.3%)	12 (80%)	1 (6.6%)
	LAST SESSION	1 (6.6%)	12 (80%)	2 (13.3%)
OVERALL CLINICAL COMPETENCE	FIRST SESSION	2 (13.3%)	13 (86.6%)	0
	LAST SESSION	1 (6.6%)	13 (86.6%)	1 (6.6%)

MEAN TIME FOR OBSERVATION BY THE FACULTY – 16.31 (12-20 MINS)

MEAN TIME FOR FEED BACK BY THE FACULTY – 10.97 (7-12 MINS)

MEAN SCORE FOR EVALUATOR SATISFACTION – 6.04 (3-9)

MEAN SCORE OF RESIDENT SATISFACTION – 7.85 (5-9)

After the completion of the sessions, both faculty and residents feedbacks were collected and the results are depicted in Fig - 4

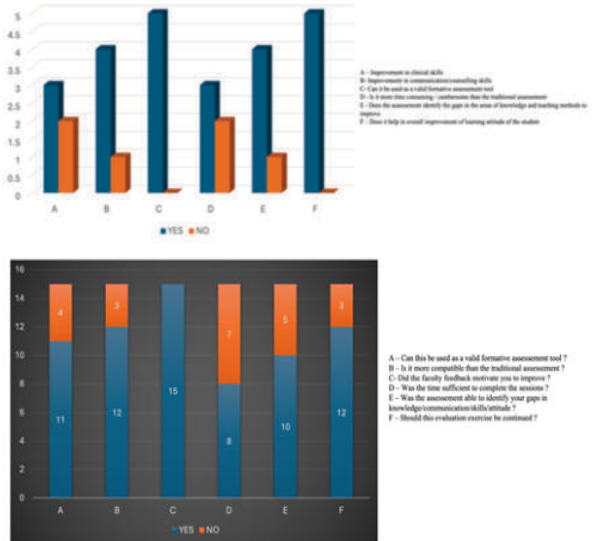


Fig – 4. Faculty and residents feedbacks

Table – 2. Median Scores Of Competency Assessed.

COMPETENCY	MEDIAN SCORE
MEDICAL INTERVIEWING SKILLS	7
PHYSICAL EXAMINATION SKILLS	5
PROFESSIONALISM	6
CLINICAL JUDGEMENT	6
COUNSELLING SKILLS	5
ORGANISATION SKILLS	4
OVERALL CLINICAL COMPETENCE	6

DISCUSSION

Our study had 50% of our sessions conducted with ambulatory patients, and another 50% of sessions were conducted for the inpatients, in the department of general surgery. These results were comparable with those of Singh and Sharma^[5] where 75% of sessions were conducted in the ambulatory setting (OPD) and 25% of sessions were conducted in the IPD setting.

The focus areas during the evaluation were (according to the evaluating professor) Data gathering 100% (90), Diagnosis 61% (55), Therapy 46.6% (42), Counselling 55.8% (62). Similar results were reported by Goel and Singh,^[6] where data gathering was 92%, diagnosis 60%, therapy 45%, and counseling was 30%.

With regards to the Complexity of cases, 49 (49%) were in the low category, 31 (28.5%) were in the moderate category, 13 (11.4%) were in the high category, whereas Singh and Sharma^[5] reported 51.5% in the low category, 44% in the moderate category, and 4.5% were in the high category.

Statistically significant improvement scores were seen in physical examination skills, professionalism, and counselling skills from first to last session, which lead to improvement in the learning attitude of the residents. Such sentiments were also echoed by Joshi *et al.*^[1] But At the same time there was no statistically significant improvement seen in scores of clinical judgements, organization efficiency, and overall clinical competence. The median score was 7 for medical interviewing skills, 6 for professionalism, clinical judgement, overall clinical competence, 5 for physical examination/counselling skills which was comparable to studies from Holmboe *et al.*^[7]

In our study the mean time taken by the assessor for observation was 16.31 (12-20 MINS) min, whereas the mean time taken for feedback to the resident by the assessor was 10.97 (7-12 MINS) which was in comparison to a study Liao *et al.*^[8] observed that the mean time taken by the assessor for observation was 19.18 min, whereas the mean time taken for feedback to the resident by the assessor was 14.99 min.

The mean score of evaluator satisfaction was 6.04 (3-9) in our study, whereas it was 7.98 in the study done by Liao *et al.*^[7] And the mean score of resident satisfaction was 7.85 (5-9) in our study whereas it was 7.96 as reported by Liao *et al.*^[7] A study found that feedback content could make mini CEX a rich evaluation instrument, and it was of great value in terms of critical and supportive feedback.^[9]

The overall impact of our study lies in the fact that mini CEX can be used as a tool for assessment as well as teaching clinical skills as a part of the workplace based assessment. It can be used as a teaching method because it involves immediate feedback by the assessor, which can lead to improvement in various skills of the resident in further clinical encounters.

Limitations Of Study

There are certain limitations of this study such as fewer residents, time constraints (small duration of the study), and non consideration of the relationship between the complexity of cases and scoring.

CONCLUSION

MINICEX improves the learning environment in residency and leads to improvement in medical interviewing skills, physical examination skills, humanistic qualities/professionalism, and counseling skills. It also helps the residents to modify their learning behaviour and identify the gaps in their knowledge. Hence Mini CEX can thus be considered as an acceptable and practical tool for the formative assessment of residents.

REFERENCES

1. Joshi MK, Singh T, Badyal DK. Acceptability and feasibility of mini clinical evaluation exercise as a formative assessment tool for workplace based assessment for surgical postgraduate students. *J Postgrad Med* 2017;63:100-5.
2. Tejinder S, Anshu. The Mini Clinical Evaluation Exercise (Mini CEX) in Principles of Assessment in Medical Education. 1st ed. Jaypee; 2012. p. 156-65.
3. John J. Norcini The Mini Clinical Evaluation Exercise (mini-CEX). *THE CLINICAL TEACHER* June 2005; Volume 2: No 1 : 25-30
4. Norcini JJ, Blank LL, Arnold GK, Kimball HR. The Mini-CEX (Clinical Evaluation Exercise): A preliminary investigation. *Ann Intern Med* 1995; 123: 795-99
5. Singh T, Sharma M. Mini clinical examination (CEX) as a tool for formative assessment. *Natl Med J India* 2010;23:100-3.
6. Goel A, Singh T. The usefulness of Mini clinical evaluation exercise as a learning tool in different pediatric clinical settings. *Int J Appl Basic Med Res* 2015;5(Suppl 1):S32-4
7. Holmboe ES, Yepes M, Williams F, Huot SJ. Feedback and mini clinical evaluation exercise. *J Gen Intern Med* 2004;19:558-61.
8. Liao KC, Pu SJ, Liu MS, Yang CW, Kuo HP. Development and implementation of a

mini Clinical evaluation exercise (mini CEX) program to assess the clinical competencies of internal medicine residents: From faculty development to curriculum evaluation. *BMC Med Educ* 2013;13:31

9. Jafarpour H, Hosseini M, Sohrabi M, Mehmannaavaz M. The effect of direct observation of procedural skills/mini clinical evaluation exercise on the satisfaction and clinical skills of nursing students in dialysis. *J Educ Health Promot* 2021;10:74.