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Implementation Of Mini Clinical Evaluation Exercise & Directly Observed Procedural Skills In Orthopedic Postgraduate Residency: An Institutional Evaluation In A Rural Teaching Hospital Of South India

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INTRODUCTION

Ensuring the competence of healthcare professionals, particularly in specialized fields such as Orthopedics, is critical for high-quality patient care. The Mini Clinical Evaluation Exercise (Mini-CEX) and Directly Observed Procedural Skills (DOPS) are two well-established assessment tools used in medical education to evaluate clinical competencies.

Mini-CEX assesses a trainee's clinical reasoning, communication, professionalism, and technical skills through brief, focused interactions with multiple assessors.[1] DOPS, on the other hand, focuses specifically on procedural skills and technical competence through direct observation and structured feedback.[2] These tools facilitate formative assessment and provide constructive feedback, which is essential for skill development and competency-based medical education (CBME).[3]

This study explores the implementation and effectiveness of Mini-CEX and DOPS in assessing and enhancing the clinical skills of orthopedic postgraduate trainees in a rural teaching hospital in South India.

Rationale

Despite the growing demand for highly skilled orthopedic professionals, there is a gap in the application of structured assessment tools in postgraduate training. Studies suggest that the inclusion of structured assessments in medical education leads to improved clinical skills, better patient outcomes, and enhanced professional development.[4,5] However, limited research exists on the effectiveness of Mini-CEX and DOPS in orthopedic residency programs, particularly in rural teaching hospitals. This study aims to evaluate whether the systematic use of Mini-CEX and DOPS can improve clinical competencies, provide meaningful feedback, and shape better orthopedic specialists.[6,7]

Objectives

The primary objective of this study is

To analyze the effectiveness of implementing Mini-CEX and DOPS in a one-year postgraduate residency program. Specifically, the study aims to:

- Assess the impact of Mini-CEX and DOPS on the clinical competencies of orthopedic residents.
- Evaluate the reliability and feasibility of these tools in routine clinical practice.
- Provide structured feedback to trainees for skill improvement.

MATERIALS AND METHODS

Study Design and Setting

This study is a secondary data analysis conducted at R.L. Jalappa Hospital, Tamaka, Kolar, between September 2023 and October 2024.

The study focuses on eight orthopedic postgraduate residents undergoing training at this tertiary care teaching hospital.

Study Tools

- **Mini-CEX**: Used to assess clinical reasoning, communication, professionalism, and technical skills through structured, real-time evaluations.[8]
- **DOPS**: Used to evaluate procedural skills by directly observing trainees during clinical procedures.[9]

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Data Collection and Analysis

Two assessment questionnaires were administered at five time points: at admission, after one month, three months, six months, and one year of training. The assessments were conducted by orthopedic faculty members who rated the residents' competencies using structured checklists.

Data collected from Mini-CEX and DOPS were analyzed using SPSS version 22. Descriptive statistics, including frequencies, proportions, mean, and standard deviation, were used for categorical data. Paired t tests were employed to determine statistical significance, with a p-value of <0.05 considered significant.[10]

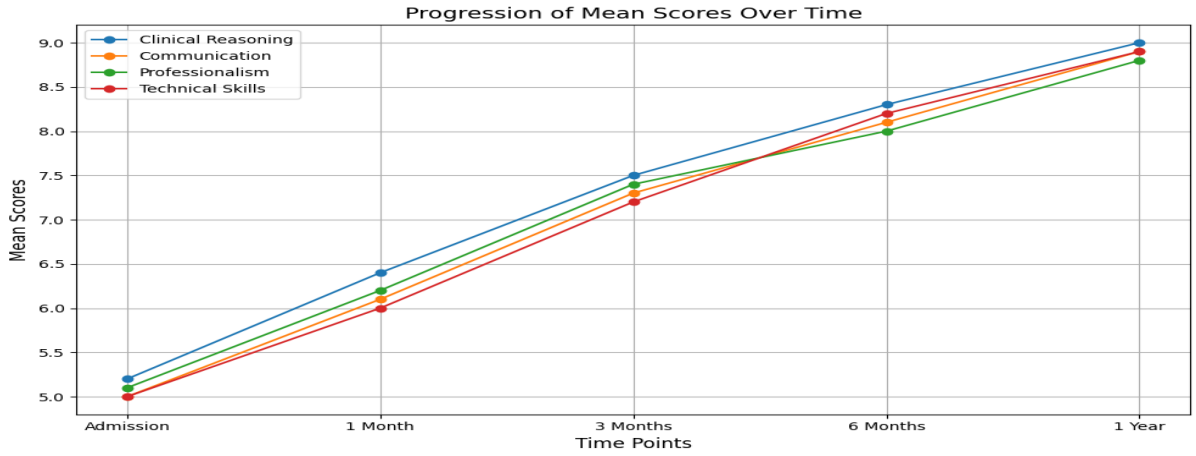
RESULTS

A total of eight orthopedic postgraduate trainees were assessed over one year. Their performance was measured in terms of clinical reasoning, communication, professionalism, and technical skills.

Table 1: Mean Scores Across Different Assessment Periods

Time Point	Clinical Reasoning (Mean ± SD)	Communication (Mean ± SD)	Professionalism (Mean ± SD)	Technical Skills (Mean ± SD)
Admission	5.2 ± 0.8	5.0 ± 0.7	5.1 ± 0.6	5.0 ± 0.8
1 Month	6.4 ± 0.7	6.1 ± 0.6	6.2 ± 0.5	6.0 ± 0.7
3 Months	7.5 ± 0.6	7.3 ± 0.6	7.4 ± 0.5	7.2 ± 0.6
6 Months	8.3 ± 0.5	8.1 ± 0.5	8.0 ± 0.4	8.2 ± 0.5
1 Year	9.0 ± 0.4	8.9 ± 0.4	8.8 ± 0.3	8.9 ± 0.4

Graph 1: Mean Scores Over Time



(A line graph showing the progression of scores for each competency category over time)

Paired t-tests were used to determine the significance of improvements at different time points.

Table 2: Statistical Significance of Improvements

Comparison Period	Clinical Reasoning (p-value)	Communication (p-value)	Professionalism (p-value)	Technical Skills (p-value)
Admission vs 1 Month	0.002	0.005	0.004	0.003
1 Month vs 3 Months	0.001	0.002	0.002	0.001
3 Months vs 6 Months	0.002	0.003	0.003	0.002
6 Months vs 1 Year	0.004	0.005	0.004	0.003

All comparisons showed statistically significant improvements ($p<0.05$), indicating that Mini-CEX and DOPS effectively enhanced the clinical competencies of the trainees.

DISCUSSION

The study findings provide evidence that implementing Mini-CEX and DOPS significantly improves orthopedic trainees' clinical competencies. The structured assessments and real-time feedback allowed trainees to progressively enhance their skills. Similar findings have been reported in other medical specialties.[11,12] These results align with the competency-based medical education model, which emphasizes continuous formative assessments to ensure skill mastery.[13,14]

The findings of this study demonstrate that the systematic implementation of Mini-CEX and DOPS in an orthopedic postgraduate residency program significantly enhances trainees' clinical competencies. The progressive improvement in scores across all domains—clinical reasoning, communication, professionalism, and technical skills—validates the efficacy of these tools in improving skill development within competency-based medical education (CBME) frameworks. The statistically significant improvements ($p < 0.05$) observed at each assessment interval underscore the transformative potential of structured, real-time feedback, aligning with global trends in workplace-based assessments (WBAs).[17,20]

The repeated application of Mini-CEX and DOPS to trainees provided opportunity to provide feedback, enabling proper refinement of competencies. This aligns with Burgess et al.[19], who emphasize that feedback quality directly correlates with skill acquirement.

The steady rise in mean scores (Table 1) are similar to findings by Al Ansari et al.[17], who reported similar improvements in postgraduate trainees exposed to longitudinal WBAs. Notably, the implementation of structured checklists helped to construct alignment, avoiding assessment biases and enhancing reliability.[20]

Contrary to assumptions that WBAs are valid only in well-resourced institutions, this study demonstrates that successful implementation of this in a rural teaching hospital is also possible. Trainees perceived Mini-CEX and DOPS as valuable for skill development rather than just exercises which contain tick boxes.[18] This is also well demonstrated in anesthesia training by Weller et al..[26] However, faculty training emerged as a critical factor, as expertise of assessors significantly influences assessment outcomes.[21] Therefore, investment in faculty development programs is very much essential to standardize feedback quality and ensure reliability in diverse settings.[22]

The results support CBME models, where formative assessments replace episodic summative evaluations. Since this is a longitudinal study, it allowed tracking of skill retention. Similar findings can be found in a study by Pell et al.[25] on remediation efficacy.

Trainees' progressive mastery of orthopedic procedures via DOPS underscores its utility in technical skill assessment as seen in Lörwald et al.'s[23] meta-analysis on Mini-CEX/DOPS effectiveness across specialties.

Limitations

Despite its successes, the study has certain limitations. The small sample size (n=8) may limit generalizability, though similar studies in internal medicine by Malhotra S et al.[24] and surgery by Al Ansari et al.[17] validate broader applicability.

Time constraints for faculty and trainees were notable, a common challenge in WBA implementation.[18, 26]

Digital platforms could streamline assessments, as suggested by Driessen et al.[21], by automating feedback documentation and reducing administrative burdens.

CONCLUSION

This study underscores the importance of integrating Mini-CEX and DOPS into routine orthopedic postgraduate training. By providing structured, real-time feedback and measuring key clinical competencies, these tools significantly enhance trainee skill development. The findings could serve as a model for other medical specialties implementing competency-based assessment methods.[15,16]

Mini-CEX and DOPS as indispensable tools for orthopedic training, particularly in resource-constrained settings. By embedding these assessments into routine practice, institutions can cultivate a culture of continuous learning, ultimately improving patient care. Future efforts must address faculty training and technological integration to maximize their potential.

REFERENCES

1.Norcini JJ. The Mini Clinical Evaluation Exercise (Mini-CEX). Clin Teach. 2005;2(1):25-30.
2.Wilkinson TJ, Wade WB. Direct observation of procedural skills (DOPS): the assessment of performance. Med Educ. 2003;37(12):1276-80.

3.Holmboe ES, Sherbino J, Long DM, Swing SR, Frank JR. The role of assessment in competency-based medical education. Med Teach. 2010;32(8):676-82.
4.Miller A, Archer J. Impact of workplace-based assessment on doctors' education and performance: a systematic review. BMJ. 2010;341:c5064.
5.Khan K, Ramachandran S. Conceptual framework for performance assessment: competency, competence and performance in the context of assessments in healthcare. AMEE Guide No. 85. Med Teach. 2012;34(7):e140-8.
6.Durning SJ, Hemmer PA. Assessing clinical reasoning: moving from in vitro to in vivo. Diagnosis. 2016;3(2):111-7.
7.Wang Y, Chen G, Chen J, et al. Application of Mini-CEX combined with DOPS in standardized training of community outpatient residents. BMC Med Educ. 2024;780.
8.Kogan JR, Holmboe ES, Hauer KE. Tools for direct observation and assessment of clinical skills of medical trainees: a systematic review. JAMA. 2009;302(12):1316-26.
9.Norcini J, Burch V. Workplace-based assessment as an educational tool: AMEE Guide No. 31. Med Teach. 2007;29(9-10):855-71.
10. Archer JC. State of the science in health professional education: effective feedback. Med Educ. 2010;44(1):101-8.
11. Regehr G, Eva K. Self-assessment, self-direction, and the self-regulation of learning in medical education. Acad Med. 2006;81(10 Suppl):S78-81.
12. Watling CJ, Driessen EW, van der Vleuten CP, Lingard L. Learning culture and feedback: an international study of medical athletes and musicians. Med Educ. 2014;48(7):713-23.
13. Black P, Wiliam D. Assessment and classroom learning. Assess Educ Princ Policy Pract. 1998;5(1):7-74.
14. Epstein RM. Assessment in medical education. N Engl J Med. 2007;356(4):387-96.
15. Schuwirth LW, van der Vleuten CP. Programmatic assessment: From assessment of learning to assessment for learning. Med Teach. 2011;33(6):478-85.
16. Boud D, Molloy E. Rethinking models of feedback for learning: the challenge of design. Assess Eval High Educ. 2013;38(6):698-712.
17. Al Ansari, A., Ali, S. K., & Donnon, T. (2013). The use of the Objective Structured Clinical Examination (OSCE) and the Mini-Clinical Evaluation Exercise (Mini-CEX) in undergraduate and postgraduate medical education. Medical Teacher, 35(6), 503-511.
18. Bindal, T., Wall, D., & Goodyear, H. M. (2011). Trainee doctors' views on workplace-based assessments: Are they just a tick box exercise? Medical Teacher, 33(11), 919-927.
19. Burgess, A., van Diggele, C., & Mellis, C. (2020). Feedback in the clinical setting. BMC Medical Education, 20(Suppl 2), 460.
20. Crossley, J., Johnson, G., Booth, J., & Wade, W. (2011). Good questions, good answers: Construct alignment improves the performance of workplace-based assessment scales. Medical Education, 45(6), 560-569.
21. Driessen, E., Scheele, F., & van der Vleuten, C. P. M. (2013). Workplace-based assessment: Effects of rater expertise. Advances in Health Sciences Education, 18(5), 901-914.
22. Hauer, K. E., Ten Cate, O., Boscardin, C., Irby, D. M., Iobst, W., & O'Sullivan, P. S. (2014). Understanding trust as an essential element of trainee supervision and learning in the workplace. Academic Medicine, 89(4), 632-639.
23. Lörwald, A. C., Lahner, F. M., Greif, R., Berendonk, C., Norcini, J., & Huwendiek, S. (2018). Factors influencing the educational impact of Mini-CEX and DOPS: A qualitative synthesis. Medical Teacher, 40(4), 414-420.
24. Malhotra, S., Hatala, R., & Courneya, C. A. (2017). Internal medicine residents' perceptions of the Mini-Clinical Evaluation Exercise (Mini-CEX). Medical Teacher, 39(3), 287-293.
25. Pell, G., Fuller, R., Homer, M., & Roberts, T. (2013). Is short-term remediation after OSCE failure sustained? A retrospective analysis of the longitudinal attainment of underperforming students. Medical Education, 47(6), 592-600.
26. Weller, J. M., Jones, A., Merry, A. F., Jolly, B., & Saunders, D. (2012). Investigation of trainee and specialist reactions to the mini-Clinical Evaluation Exercise in anaesthesia: Implications for implementation. British Journal of Anaesthesia, 109(4), 572-577.