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INTRODUCING MINI CLINICAL EVALUATION EXERCISE FOR ASSESSING PREVENTIVE PROCEDURE - 1.23% ACIDULATED PHOSPHATE FLUORIDE GEL APPLICATION BY FINAL YEAR DENTAL STUDENTS

Sailee Patankar* and Ketaki Bhor

Sinhgad Dental College and Hospital, Pune

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ABSTRACT

Introduction: The Mini-CEX (clinical evaluation exercise) is an objective assessment tool which is reliable and valid in the clinical setting as, the traditional tools of assessment are time consuming and neither assess communication skills nor provide feedback to the students. **Aim:** To introduce Mini Clinical evaluation Exercise (Mini-CEX) for assessing preventive procedure - 1.23% acidulated phosphate Fluoride (APF) gel application by final year dental students. **Methodology:** Thirteen final year dental students posted in the department of Public Health Dentistry were assessed by two assessors, on two different occasions using the standardized Mini-CEX rating profroma. Immediate structured feedback was then provided to the students. Experience regarding the Mini-CEX exercise of both students and assessors, was recorded using questionnaires consisting of 8 and 6 question respectively, on a 5-point Likert scale. **Results:** Overall clinical performance of students showed both statistically significant and clinically appreciable improvement from borderline to 'meets expectation'. Of the 7 areas assessed by the Mini-CEX exercise, students demonstrated an improvement in 4 areas – history taking, communication skills, clinical judgment and professionalism on comparison of average scores between the two encounters. Although, physical examination skills and organization efficiency scores were found to be statistically significant between the two encounters, the improvement was not clinically appreciable – category remained unchanged – 'borderline'. Both students and assessors were positive regarding the Mini-CEX exercise, as it boosted their confidence in performance during examination and assessment respectively.

Conclusions: Mini-CEX was found to be a useful alternative to traditional methods of assessments currently available in dental clinics.

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INTRODUCTION

Assessment of clinical competence is receiving increasing attention in educational research, yet it has not yielded a single 'gold-standard' performance assessment tool that can confidently be said to be both reliable and valid. The traditional method of assessment only considers the final outcome, not how the students have reached it. This impacts both the 'validity' and the 'reliability'. Moreover, communication skills are rarely assessed, there is very little scope for direct feedback, and some important skills may not be tested at all. Students may also feel dissatisfied by not receiving personal attention from the faculty and be confused about which particular skill is being tested. (Lohe *et al*, 2016)

Millar's pyramid is one good way to conceptualize assessment of clinical competence. This model provides a framework from

'knows', to 'knows how', to 'shows', to 'shows how'. The mini-CEX clinical evaluation exercise (mini-CEX) developed in 1995 is one of the assessment tool designed to conduct work based assessment of clinical performance of Internal Medicine residents' clinical skills. The principal characteristics of mini-CEX are direct observation of real patient encounters, applicability in a broad range of settings and immediate structured feedback to the learner after the encounter. (Norcini JJ *et al*, 1995 and Norcini JJ *et al*, 2003)

Mini-CEX involves a "snapshot" of trainee - patient interaction which observes seven competencies - interviewing skills, physical examination, professionalism, clinical judgment, counselling, organization and efficiency, and overall competence. The structured nature of the Mini-CEX rating form means that teachers give feedback across a broader range of topics and are more inclined to address issues that otherwise

*Corresponding author: Sailee Patankar
Sinhgad Dental College and Hospital, Pune

may not be addressed in evaluation by traditional methods. (Lohe *et al*, 2016)

In the department of Public Health Dentistry, patients come for preventive procedures such as pit and fissure sealants, and topical fluoride application. As there is no tool currently, for objective assessment of these preventive procedures, a need is felt to introduce one such assessment tool. Thus, this study was conducted to introduce Mini-CEX for assessing preventive procedure - 1.23% Topical Fluoride gel Application by final year dental students in Public Health Dentistry and study the perception of both students and faculty towards this method of assessment.

MATERIALS AND METHODS

A prospective, interventional study was conducted among 13 final year dental students posted in the Department of Public Health Dentistry, with the aim to introduce Mini-CEX as a formative assessment tool for assessing preventive procedure - 1.23% Topical Fluoride gel Application.

Appropriate permissions were obtained from the Scientific Advisory Committee and Institutional Ethics Committee prior to the start of this study. The final year dental students posted and trained in application of 1.23% APF topical fluoride gel, in the department during regular posting schedule and willing to give written informed consent were included by convenience sampling.

Mini-CEX sensitization session

An orientation sensitization session with the students and the staff members who were to be using the Mini-CEX form was carried out, wherein a detailed discussion was done by the principal investigator. A presentation was made and standardized video of the Mini-CEX evaluation procedure was shown. The faculty was made familiar with the mini-CEX rating form.

The 1.23% acidulated phosphate fluoride gel clinical procedure (covered in theory class) was discussed, a standardized video shown and then demonstrated to the students by the investigator, during their clinical posting.

Two assessors assessed each student using Mini-CEX form on two different occasions, and the average of their scores was taken as the score for the area stated in the mini-CEX form for each encounter. After the 1st Mini-CEX encounter each student was given a feedback by both the assessors separately, regarding their performance. At the end of the two assessments pre-validated and pretested feed-back forms were given to the students and the assessors.

The assessment tools used in this study

- Mini-CEX form - to assess the students' clinical performance
- Feed-back forms designed for students
- Feed-back form designed for the examiners

Data analysis

Scoring was done using a 7 point scale for assessment of each area. The data was compiled in MS-Excel work sheet and subjected to statistical analysis using SPSS version 21 (Chicago IL). Preliminary data on the Mini-CEX form was analysed using descriptive statistics and paired t-test was applied to compare students' performance between their first and second encounter.

RESULTS

All 13 students posted in the Department of Public Health Dentistry, underwent mini-CEX sessions in clinical settings focusing on management of preventive procedure - 1.23% acidulated phosphate fluoride gel, on two different occasions observed by two assessors, with all cases being of average complexity.

History taking

The mean score of two assessors during the first assessment session was 3.37 ± 0.43 which showed an increase to 4.00, which corresponded to an improvement from borderline to 'meets expectations' this increase was found to be statistically significant ($p=0.047$).

Physical examination skills

The mean score of two assessors during the first assessment session was 3.23 ± 0.43 which showed an increase to 3.92 ± 0.27 , though this increase was found to be statistically significant it did not correspond to an improvement clinically in the area.

Communication skills

The mean score of two assessors during the first assessment session was 3.65 ± 0.47 which showed an increase to 4.00, which corresponded to an improvement from borderline to 'meets expectations' this increase was found to be statistically significant ($p=0.022$).

Clinical judgment

The mean score of two assessors during the first assessment session was 3.73 ± 0.43 which showed an increase to 4.00, which corresponded to an improvement from borderline to 'meets expectations' this increase was found to be statistically significant ($p=0.047$).

Table 1 Comparison of 1st and 2nd Mini-CEX sessions in all 7 areas

	Mean 1 st session	Std. Deviation	Mean 2 nd session	Std. Deviation	t-value	Sig. (2-tailed)
History taking	3.731	.4385	4.00	.000	2.214	.047*
Physical examination skills	3.23	.439	3.92	.277	5.196	.000*
Communication skills	3.654	.4737	4.00	.000	2.635	.022*
Clinical judgement	3.731	.4385	4.00	.000	2.214	.047*
Professionalism	3.538	.4770	4.00	.000	3.488	.004*
Organization efficiency	3.31	.480	3.808	.3840	3.606	.004*
Overall clinical care	3.38	.506	4.00	.000	4.382	.001*

*($p < 0.05$)

The mean score of two assessors during the first assessment session was 3.53 ± 0.47 which showed an increase to 4.00, which corresponded to an improvement from borderline to 'meets expectations' this increase was found to be highly statistically significant ($p=0.004$).

Organization efficiency

The mean score of two assessors during the first assessment session was 3.31 ± 0.48 which showed an increase to 3.80 ± 0.38 , though this increase was found to be statistically significant it did not correspond to an improvement clinically in the area.

Overall clinical care

Overall performance reflected an improvement from borderline to 'meets performance, expectations and this clinical improvement was also found to be highly statistically significant ($p=0.001$). The average scores of the assessors after the first session increased from 3.38 ± 0.50 to 4.00 in the second session.

Time taken for feedback and Mini-CEX sessions

The average time for the structured and documented feedback was 10 minutes and 6 minutes, for session 1 and 2 respectively. The average time taken for 1st session was approximately 28-30 minutes as recorded on a stop watch by the assessors and approximately 25-28 minutes for the 2nd Mini-CEX session.

Feedback from students

The feedback form of students consisted of 8 questions to be answered on a 5 - point Likert scale. All students gave a positive feedback regarding the Mini-CEX sessions (Strongly agree or Agree). They felt the sensitization of session to Mini-CEX was satisfactory and Mini-CEX examination schedule was informed in advance, also time allotted for the Mini-CEX examination was sufficient. They felt that the Mini-CEX helps to develop the dialogue between student and assessor to put views of both into forefront and results in an open discussion between the two. They also felt confident that the Mini-CEX examination method helped them in preparing for the university examination.

Feedback from assessors

The feedback form of assessors consisted of 6 questions to be answered on a 5 – point Likert scale. Both the assessors were positive regarding their Mini-CEX assessment sessions and felt that the sensitization of session to Mini-CEX was satisfactory, the Mini-CEX examination schedule was informed in advance and time allotted for the Mini-CEX examination was sufficient. They concurred with the students in feeling that the Mini-CEX helps to develop the dialogue between student and assessor to put views of both and that immediate feedback offered to the students helps to improve performance. They strongly agreed that Mini-CEX examination method will help in objective assessment during the university examination.

DISCUSSION

The mini-CEX combines the 'prove' and 'improve' function of assessment, by not only grading the performance of the post-graduate students, but also offering them a developmental feedback based on direct observation. It has been found to be

effective for assessing medical students. (Malhotra S *et al*, 2008; Kogan JR *et al*, 2002; Durning SJ *et al*, 2002)

A prospective, interventional study was conducted among 13 final year dental students posted in the Department of Public Health Dentistry, with the aim to introduce Mini-CEX as a formative assessment tool for assessing preventive procedure - 1.23% Topical Fluoride gel Application.

The results of this study showed an overall improvement in the performance of the students performing 1.23% Topical Fluoride gel Application procedure. This can be attributed to the structured and immediate feedback provided to the students for an average 8-10 minutes by the assessors. The areas that showed improvement both statistically and clinically were – history taking, clinical judgement, communication skills and professionalism. This may be attributed to the presence of the assessor chair-side - making the session more supervised and formal, as well as to the feedback provided.

However, physical examination skills and organization efficiency did not show a corresponding improvement clinically, though the scores were found to be statistically significant. This lack of significant change might be due to insufficient training and/or strictness on part of teachers in routine clinical postings.

These results are similar to the study by (Lohe *et al*, 2016) wherein a statistically significant improvement was seen across all 7 areas of the Mini-CEX among 15 final year dental students from the department of Oral Medicine.

The feedback of both students and assessors towards the Mini-CEX exercise was favourable. Students felt the Mini-CEX exercise helped them to develop the dialogue between student and assessor to put views of both into forefront and resulted in an open discussion between the two. They also felt confident that the Mini-CEX examination method helped them in preparing for the university examination. Since the Mini-CEX offers immediate feedback to the student, indicating the strengths of the performance and the areas for development, the students felt they got clear and precise points for improvement and facilitated an honest and uninhibited clarification session.

This was in line with the study conducted by Pande N *et al* (Pande *et al*; 2014) among postgraduates in the department of Prosthodontics and Behere (Behere, 2014), who found similar perceptions and 12 final year dental students who underwent a single Mini-CEX session in the department of Oral medicine.

The assessors concurred with the students in feeling that the Mini-CEX helps to develop the dialogue between student and assessor to put views of both and that immediate feedback offered to the students helps to improve performance. They strongly agreed that Mini-CEX examination method will help in objective assessment during the university examination.

Though similar results were shown by Behere (Behere, 2014) two of the assessors of the study found it to be a tiring exercise and said that it required a bit more effort than the traditional assessment methods.

CONCLUSION

Mini-CEX is a unique combination of formative assessment and feedback. Mini-CEX provided a reliable data and helped in

learning from perspectives of staff as well as students. This ultimately induced confidence and reduced examination fear among the 13 final year dental students from the department of Public Health Dentistry performing the preventive procedure - 1.23% Topical fluoride gel application as well as more objective assessment by two assessors.

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