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Comparing Satisfaction of Undergraduate Nursing Students`: Mini-CEX vs CIM in Assessing Clinical Competence

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ABSTRACT

Assessing clinical competence is crucial to medical education, ensuring that future nurses possess the necessary skills and knowledge to provide high-quality patient care. Two widely utilized assessment methods in this domain are the Clinical Integrated Map (CIM) and the Mini-Clinical Evaluation Exercise (Mini-CEX). Both approaches offer valuable insights into the clinical performance of health professionals. **Objective:** To assess the satisfaction level of the students between the Mini-CEX assessment versus the CIM assessment. **Methods:** A total of 12 BSN second-year semester-IV nursing students were enrolled in the project. The participants were randomly divided into two groups, with six students in each group. One group was assessed on the CIM tool, whereas the other group was assessed on the Mini CEX tool. The study was carried out at a private nursing college. **Results:** The age of the participants was between 18-25 years and most were between 18-20 years of age. Most of the participants were female and all were undergraduate's students of semester four year two of Shifa College of Nursing. The results revealed that most students are satisfied while using Mini-CEX compared to CIM. **Conclusions:** Students' abilities and interests are vital for implementing Mini-CEX successfully. It has been highlighted as a useful formative assessment tool that provides timely feedback and enhances learning outcomes.

INTRODUCTION

Assessing clinical competence is crucial to nursing education, ensuring that future nurses possess the necessary skills and knowledge to provide high-quality patient care. Two widely utilized assessment methods in this domain are the Clinical Integrated Map (CIM) and the Mini-Clinical Evaluation Exercise (Mini-CEX). Both approaches offer valuable insights into the clinical performance of health professionals [1, 2]. Mini-CEX and CIM are exceptional methods for evaluating clinical competence, each with its unique approach. Mini-CEX involves meticulous real-time assessment of clinical performance by experienced supervisors, covering various aspects of competence [3, 4]. Conversely, CIM focuses on visually representing interconnected clinical concepts, requiring critical thinking and knowledge synthesis. Assessors evaluate the completeness, accuracy, communication clarity, and depth of understanding at the conceptual level of the learners [5]. These methods epitomize the pursuit of clinical excellence, combining direct observation and visual representation to nurture comprehensive competence in healthcare education [6, 7]. Clinical Integrated Maps support critical thinking,

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clinical reasoning, and decision-making for healthcare professionals, including nurses. They visually depict relationships and connections between elements, aiding understanding complex clinical situations. By promoting the integration of knowledge, they facilitate a comprehensive and holistic approach to patient care [8]. In contrast, the Mini-CEX is a focused assessment method that evaluates specific clinical skills through direct observation of nurses' interactions with patients. It assesses information gathering, communication, clinical reasoning, decision-making, and procedural abilities in a single encounter [9]. Furthermore, it provides immediate feedback, fostering self-reflection and targeted skill development. This enables nurses to enhance their competence and deliver high-quality patient care [10]. Mini CEX, which was established to assess the competencies of specialist physicians, has been proven in studies to be effective [11, 12]. However, it has been introduced in other health professions, such as Dentistry and nursing [10]. The review and meta-analytical study highlight that assessment and evaluation methods like Mini-CEX and Direct Observation of Procedural Skills (DOPS) positively impact educational outcomes. It emphasizes the importance of involving health professionals in training via Mini CEX and DOPS. This approach enhances the learning experience and supports the development of competent healthcare professionals [11]. Moreover, A randomized study concluded that using mini-CEX as a formative evaluation method significantly improves nurse clinical skills and receives positive feedback from them [13]. Similarly, a quasi-experimental study concluded with the results that undergraduate midwifery trainees expressed a high level of satisfaction with the use of mini-CEX [14]. Consequently, besides assessing clinical skills, the utilization of this method enhances student-evaluator interactions, as reported in this study. Trainees, trainers, and evaluators all expressed a high level of satisfaction when employing this evaluation method. Positive feedback from all stakeholders emphasizes the effectiveness and acceptance of this evaluation method, highlighting its beneficial impact on student-evaluator dynamics and satisfaction [15]. Clinical competency is a requirement for nursing practice and is defined as one's knowledge, attitude, and practice capabilities. Without evaluation, it would be impossible to assess the effectiveness of the educational process. Taking into account the peculiarities of clinical education, its effects on students' clinical competency, and the need of conducting thorough assessments of students utilizing cutting-edge, scientific methods [3]. The fundamental goal of formative assessments is to enhance learning by recognizing the strengths and shortcomings of learners, making them one of the most crucial tools for enhancing learning. Clinical educators, however, find it difficult to utilize evaluation techniques in a morally sound manner [13]. In addition to assessing challenging situations in the traditional assessment of students, the clinical assessment methods coupled with feedback encourage learning [16]. This comparative analysis explored and highlights the strengths, limitations, and potential applications of the CIM and Mini-CEX methodologies in assessing clinical competence in nursing education. Additionally, based on the findings of the students' satisfaction level educators and program directors can make informed decisions when selecting the most appropriate tool to evaluate and enhance the clinical performance of nursing students. If the nursing students are satisfied with the assessment strategy, they are better able to perform. Therefore, before implementing the strategy it is necessary to check their satisfaction. Ultimate goal is to ensure the development of competent and skilled nurses who can provide optimal patient care in diverse clinical settings. Question: Does the Mini-CEX assessment improve the satisfaction level of the students compared to the CIM assessment?

METHODS

An Evidence-based Project (EBP) was performed at the Shifa College of Nursing, Islamabad from 15th April to 10th May of 2023. CIM and Mini-CEX tools were used in the teaching, learning, and assessment phase in the inpatient area. Calculation of sample size was done through software G Power version-3.1 using match pair. Effect size 0.5, alpha 0.05, and power 80% of the test, the final sample size of this study was 12. Non-probability consecutive sampling technique method was utilized to recruit the participants. A total of 12 BSN second-year semester-IV nursing students participated in this project at a private nursing college. Participants were divided randomly into two groups 6 each. In one group: the participants were assessed through Mini-CEX. However, students were given a chance to understand the mini CEX and facilitators were open to the clarity question. In contrast, another group was assessed on CIM for which they were well familiarizes from the year II, semester III. The inclusion criteria of the study was undergraduate nursing students who were studying in second-year semester-IV working with the same faculty who is supervising in the clinical. And those students excluded who was Post RN students, all student other than second-year semester-IV, and students who absent on the day of assessment. The primary investigators adopted the tool from the literature and modified it according to the level of the students. The tool was discussed within the team. Extensive literature was reviewed for developing satisfaction tools. The tool was sent to experts. A group of

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five experts—three clinical instructors and two educators—evaluated the satisfaction tool. Experts were instructed to not only delete the items but also to include or add relevant points. Moreover, they have to assign the scores to each point based on the importance of the point. After the first round, all the expert feedback was integrated into one modified list. All the suggestions/ changes in the scores were highlighted. In round two, this was sent back to the experts to confirm whether the added items should retain or not and to have an agreement on the scoring. The tool was finalized after the expert consensus. Internal consistency and inter-rater reliability were maintained. Face, construct, and content validity was maintained by faculty member were having 5 years of teaching experience in theory, skills, and clinical. The satisfaction tool was pilot tested on 10% of the population. Mini CEX involves direct observation of the learner's performance in a clinical setting, which provides them with a concrete experience of their clinical skills and competencies. After the observation, the learner receives feedback from an experienced clinician, which can lead to a reflective observation of their performance. Reflective observation is an important part of experiential learning theory, as it allows the learner to analyze their experience, identify areas for improvement, and develop new strategies for future practice. Through this process, the learner can engage in abstract conceptualization, which involves developing new ideas and concepts based on their observations and experiences. Finally, mini CEX also provides the opportunity for active experimentation, as the learner can take the feedback they receive and apply it to their future clinical practice, testing out new strategies and techniques to improve their performance. A grading rubric for both assessments was already developed and traditionally used in the BSN program. The one group was informed one day in advance about their upcoming clinical assessment, allowing them to come prepared with a CIM. The facilitator assessed their performance using a rubric specifically designed for CIM. In contrast, another group was assigned to work with their patients directly. The facilitator provided them with a 30-minute orientation period to familiarize themselves with their assigned patient. After the orientation, their performance was assessed using the Mini-CEX rubric. In the clinical setting, students were closely observed by faculty members. The group utilizing CIM had the autonomy to select their own patients and gathered data from various sources, including patients, their relatives, doctors, and medical files. They came prepared on the following day and engaged in discussions with the faculty regarding their CIM findings. Moreover, they were marked/ graded on the standard rubric which was already used in an institute. However; before that faculty members familiarized themselves with the patients' cases by reviewing the medical files in order to assure the correctness of the information which will be provided by the students during the discussion. In contrast, the mini-CEX group participated in patient interactions lasting approximately 15 to 20 minutes. During this time, their skills were evaluated using a structured assessment rubric. The mini-CEX scores were derived from actual patient encounters and assessed by an experienced faculty member. Students underwent assessment using a structured rubric provided by the institution, which served as the basis for evaluating their performance. Alongside the rubric assessment, students were provided with valuable verbal and written feedback throughout and after the evaluation process. To gauge their satisfaction with the assessment tools, a dedicated satisfaction tool was created and shared via Google Classroom. Both the CIM and mini-CEX groups were given access to the tool, allowing them to fill out the forms. Prompt responses to their submissions were ensured, with feedback provided within a reasonable timeframe of 2-3 hours after the completion of the clinical sessions. Following the assessments, both groups were requested to provide feedback using a satisfaction tool, which was shared with them via Google Forms. Data were analyzed by using the SPSS version 21.0. The normality of data was maintained. Percentages were used to show the responses of CIM and Mini-CEX group.

RESULTS

A total of 12 participants participated in the study; 6 in each both groups. Table 1.0 is showing is the sociodemographic data of the participants. All the participants were Bachelor of Science in Nursing Program students, and all the students were related to the second year and fourth semester. 75 % of all the participants were 15-20 years of age and 25 % of the participants were 20-25 Years of age while talking about the gender; 25 % were males and 75 % were females. All the participants were selected from the same class, Year Two semester four of the Bachelor of Science in nursing program (Table 1).

Table 1: Sociodemographic characteristics of the participants

Sample	CIM N (%)	(Mini-CEX) N (%)
Age		
18-20 Years	4(66.67)	5
20-25 Years	2(33.33)	1
Gender		
Male	1(16.67)	2
Female	5(83.33)	4
Education		
*Undergraduate Student	(100)	(100)

*Year II, Semester IV Students

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Table 2 is the comparison of the satisfaction level of the students from CIM versus Mini CEX in the form of percentages. It was found that most of the students were satisfied form the Mini-CEX as compared to CIM. Most of the students reported that Mini-CEX is easy to follow and CIM is time-consuming and tough to follow. It was found out that the students are more satisfied with Mini-CEX as compare to CIM. As shown in table 2, percentage of satisfaction of Mini-CEX is higher than CIM.

Table 2: Comparison of satisfaction level between CIM and Mini-CEX

Questions	CIM %	Mini-CEX %
It is a fair assessment strategy	90.0	96.7
It is consistent with my learning	73.3	93.3
It covers the main learning objectives of the course	83.3	93.3
It is a suitable method for my learning	76.7	86.7
I had enough time to complete the assessment	63.3	93.3
It is feasible to implement this strategy in the clinical setting	66.7	93.3
I found it helpful in promoting skills	73.3	90.0
It provides an objective evaluation of my performance	80.0	40.0
It is a stressed clinical assessment	66.7	93.3
I am interested to apply this strategy in the future	70.0	93.3
It is helpful in an adequate number of assessments	80.0	93.3

DISCUSSION

The results of this study showed that; Students are more satisfied with Mini-CEX as compared to CIM. Students' abilities and interests are vital for the successful implementation of Mini-CEX. It has been proven a useful formative assessment tool that provides timely feedback and enhances learning outcomes. Incorporating low-cost modalities ensures equitable access to education. Directly engaging students with patients, instead of focusing on extensive written work like CIM, promotes active learning and critical thinking skills. By valuing abilities, utilizing formative assessments, embracing low-cost modalities, and prioritizing direct patient engagement, the strategy implementation becomes student-centered and effective. Similarly, a study conducted at Aga Khan University Karachi, Pakistan, has also shown the effectiveness and feasibility of using the Mini-CEX tool for medical students at Aga Khan University. A total of 199 students in Years 3 and 4 were selected, and faculty members underwent training on Mini-CEX and feedback strategies. The Mini-CEX assessed four domains: Data Gathering, Communication, Diagnosis/Differential, and Management Plan and Organization. Student performance significantly improved between the first and second assessments, especially in Year 3. Both students and faculty found the exercise beneficial for interaction. However, challenges in implementation were reported, including time constraints and subjective assessment. Strategic placement of Mini-CEX could enhance its utility in measuring student competency [17]. The results of this study are congruent with the study conducted in Aga Khan University. Moreover, the results of this study are congruent with a study conducted in Northwest Ethiopia which concluded that the main focus of contemporary preregistration nursing educational programs is the requirement to generate competent, self-assured, critical thinkers who are capable of leading, challenging, and being challenged [16]. Moreover, the results of another study by Kim *et al.*, are also similar with our study, implemented a mini-CEX requirement across all 3rd-year clerkships to assess its impact on direct observation and clinical skills of medical students. The mini-CEX requirement resulted in high adherence, with 92% completion and 78% providing specific feedback. Significant increases in faculty and student direct observation were reported across all clerkships, particularly in physical examination in surgery. The implementation also led to a decrease in failure rates on the summative OSCE. Overall, the study highlights the feasibility and positive impact of mini-CEX in promoting direct observation and enhancing clinical skills in medical education [18]. Furthermore, one more study result is also congruent with our results that aimed to assess the validity of self-assessed mini-CEX scores compared to ratings from clinical supervisors. Medical students conducted mini-CEX assessments in various clerkships, and both students and supervisors rated performance in different domains. The study found moderate correlations between student and supervisor ratings, ranging from 0.29 to 0.51. Factor analysis revealed that mini-CEX domain scores did not effectively capture specific strengths and weaknesses of students' clinical competence. These findings raise concerns about the validity of mini-CEX domain scores for formative purposes in assessing individual clinical competence [19]. Additionally, another bibliometric analysis examined by Sharma *et al.*, the publication trends of the mini-CEX as an assessment tool in nursing education. A total of 59 eligible articles published between 1995 and 2022 were analyzed. The articles covered various specialties and involved undergraduate and specialty trainees in medical and allied fields. The University of Bern in Switzerland contributed the most to the research on mini-CEX. The analysis revealed a reduced impact and growth of published articles, but reasonable quality evidence from mostly prospective studies. The findings highlight the potential for further exploration of the mini-CEX in clinical teaching [20]. In conclusion, the mini-CEX

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has shown promise as an effective assessment tool in medical education. Students generally express higher satisfaction with mini-CEX compared to traditional assessment methods like written work. It promotes active learning, critical thinking skills, and direct patient engagement. Studies have demonstrated its positive impact on student performance, particularly in enhancing clinical skills and promoting direct observation. However, challenges in implementation, such as time constraints and subjective assessment, have been reported. Validity concerns have also been raised regarding self-assessed mini-CEX scores. Despite these considerations, the mini-CEX holds potential for further exploration and refinement in clinical teaching.

CONCLUSIONS

In conclusion, the utilization of Mini-CEX in nursing education offers numerous benefits that contribute to its effectiveness and student-centered approach. By incorporating Mini-CEX as a formative assessment tool, educators can provide timely feedback to students, enabling them to make continuous improvements in their clinical competence. The emphasis on direct patient engagement within Mini-CEX promotes active learning, critical thinking, and the development of essential communication skills. Moreover, the implementation of low-cost modalities ensures equitable access to education, allowing all students to actively participate and benefit from the assessment process. By valuing students' abilities and interests, Mini-CEX creates a supportive learning environment that enhances motivation and engagement. Ultimately, the student-centered nature of Mini-CEX fosters the development of competent and compassionate nursing professionals who are well-prepared to provide high-quality patient care.

Authors Contribution

Conceptualization: SS
Methodology: SU
Formal analysis: UB, RU
Writing-review and editing: SS, AAA, KK, ZK, TK

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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