

## Mini-CEX as an assessment strategy for nursing students: an integrative review

### ARTICLE

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### Abstract

This study aimed to evaluate the use of the Mini-Clinical Evaluation Exercise (Mini-CEX) as an evaluation tool in the training of nursing professionals. To this end, an integrative literature review was carried out, covering studies that applied Mini-CEX or adapted versions of the tool in nursing teaching contexts. The research showed that Mini-CEX has emerged in the training of nursing students as an alternative to the traditional assessment models previously used, in addition to guaranteeing good results in the ongoing training of professionals already in the job market. The positive impact of the feedback proposed at the end of the Mini-CEX application on student training was also observed, providing opportunities for critical and reflective learning. We concluded at the end of this study that the use of assessment tools based on the Mini-CEX can be advantageous in the training of nursing students and professionals and should be encouraged.

**Keywords:** Mini-CEX. Educational Assessment. Professional training. Nursing.

### Mini-CEX como estratégia de avaliação na formação de profissionais de enfermagem: uma revisão integrativa

### Resumo

Este estudo teve como objetivo avaliar a utilização do *Mini-Clinical Evaluation Exercise* (Mini-CEX) como ferramenta de avaliação na formação de profissionais de Enfermagem. Para isso, foi realizada uma revisão integrativa da literatura, abrangendo estudos que aplicaram o Mini-CEX ou versões adaptadas da ferramenta em contextos de ensino na Enfermagem. A pesquisa evidenciou que o Mini-CEX tem surgido na formação de estudantes de Enfermagem como uma alternativa aos modelos de avaliação tradicionais anteriormente utilizados, além de garantir bons resultados na formação permanente de profissionais já



inseridos no mercado de trabalho. Observou-se ainda o impacto positivo do *feedback* proposto ao final da aplicação do Mini-CEX, na formação dos estudantes, proporcionando oportunidades para a aprendizagem crítica e reflexiva. Concluímos ao final desse estudo que a utilização de ferramentas de avaliação baseadas no Mini-CEX pode ser vantajosa na formação de estudantes e profissionais de Enfermagem e deve ser estimulada.

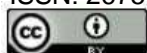
**Palavras-chave:** Mini-CEX. Avaliação Educacional. Formação Profissional. Enfermagem.

## 1 Introduction

Nursing requires nurses to have academic, practical and interpersonal skills in the health context. New nursing graduates face the challenge of engaging in practical activities right from the start of their professional career, prioritizing patient care, recognizing and managing the problems encountered, understanding the justifications for approaches to these problems and developing interprofessional communication skills (Liu *et al.*, 2019).

The National Curriculum Guidelines for the Nursing Course state that the profile of the nursing graduate should consider social, individual and collective health needs, and should have a critical-reflective, humanistic, political and ethically-based education (Brasil, 2001).

In this sense, nursing training, as in medical practice, should require the student to have the capacity and ability to demonstrate assimilation and interpretation of the content studied in practical situations. According to Megalel *et al.* (2009, p.167), "the construction of competencies in the individual is based not only on intelligence and knowledge, but also on their own schemes, intuitive processes, procedures for identifying and solving problems". For this acquired knowledge to be measured, assessment is used as a systematic method, which becomes effective when it considers learning competencies in the cognitive, psychomotor and affective aspects (Bertacchini *et al.*, 2015). To assess students' clinical skills, it is essential that teachers use direct observation of their practice so that the competencies required for the proposed learning can be identified in the student. In this way, assessment is part of the educational



process and signals both the student's progress and the teacher about the efficiency of the educational methodology used (Megalel *et al.*, 2009).

The Mini-CEX (Mini-Clinical Evaluation Exercise), created in 1972 by the American Board of Internal Medicine (USA) to improve the evaluation of medical residents, considers residents' clinical judgment and counseling skills based on their ability to obtain patient histories (Liu *et al.*, 2019). This assessment methodology is widely adopted in residency services and universities in the United States to assess students' clinical skills. It is an instrument for direct observation of performance, in which the teacher assesses the student during a consultation, in an environment that simulates the context in which the future professional will work (Megalel *et al.*, 2009).

The Mini-CEX assesses medical students according to history-taking skills, physical examination, critical thinking, counselling skills, management skills, organizational efficiency, professionalism and general clinical competence (Shahid *et al.*, 2024). According to Yang *et al.* (2013), the Mini-CEX is characterized by its ease of use in a wide variety of clinical settings, promoting feedback, good inter-rater reliability and correlating well with other performance-based assessments. Therefore, the study aimed to evaluate the use of the Mini-Clinical Evaluation Exercise (Mini-CEX) as an evaluation tool in the training of nursing professionals.

## 2 Methodology

To prepare this article, we decided to carry out an integrative literature review. This type of research allows for a complete analysis of investigations using a variety of methodologies, such as experimental and non-experimental studies published on a given topic. It can enable concepts to be developed, theories to be reviewed and existing biases on a topic to be identified (Whittemore; Knafl, 2005).

Although several authors suggest different stages in its preparation, Souza *et al.* (2010) developed, based on a literature review, stages that they consider fundamental to the construction of an integrative review, which are: preparation of the guiding question;



search or assembly in the literature; data collection; critical analysis of the studies included; discussion of the results, and presentation of the integrative review.

In this sense, the guiding question of this article is: what are the advantages of using Mini-CEX in the process of assessing nursing professionals?

In the second stage, we searched for the studies included in the review. Souza *et al.* (2010) suggest that all studies found on the subject should be included, unless the number of studies found makes the review unfeasible. At this stage, the criteria for including or excluding the studies were described precisely. Thus, studies involving the use of the Mini-CEX tool in the training of nursing professionals and whose full texts were freely available were included in this review.

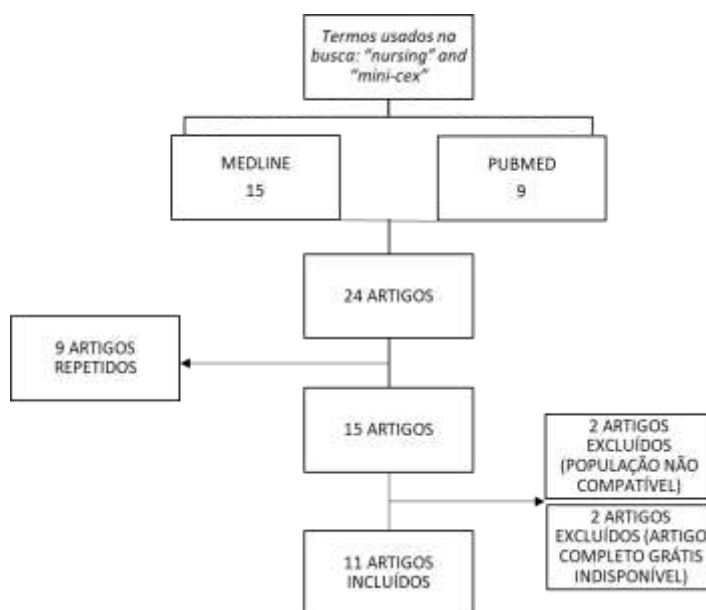
The studies were selected between August and September 2024, using the health descriptors (DeCS/MeSH) "*nursing*" and the term "*mini-cex*". Searches were carried out on the Medline and PubMed platforms.

The inclusion criteria were delimited using the following filters: original articles available in full and publications from the last 5 years. Repeated articles and studies that did not meet the objective of this study were excluded.

The articles returned in the Medline and PubMed databases totaled 24, but 2 of these had research subjects incompatible with the aim of this study and were excluded, as well as 2 others which, despite the filter applied, did not have their full version available. Another 7 articles were excluded because they were duplicates. At the end of the selection process, 11 articles were included in this study, according to the article selection flowchart shown in Figure 1.



**Figure 1 - Flowchart of article selection according to proposed descriptors and inclusion criteria**



Source: Prepared by the authors (2024)

After composing the sample, a data collection instrument was drawn up to organize the data objectively and efficiently. The data was analyzed and summarized succinctly to make it easier to compare subjects and categorize the information in terms of year of publication, country of origin of the study, journal of publication, research subjects and methodology used, and results found.

For the critical analysis and discussion of the results, the selected articles were read in full. The results considered relevant were grouped into categories according to the similarity of the themes. Finally, the data was discussed in the light of the literature, and organized in a descriptive manner for the preparation of the integrative review.

### 3 Results and Discussion

Box 1 shows the characterization of the sample according to title, author, year of publication, journal, research subjects, objective and methodology, organized in

numerical order. The studies evaluated were published between 2019 and 2023, with 36.36% (4) coming from Iran; 27.27% (3) from China; 9.09% (1) from Pakistan; 9.09% (1) from Ireland; 9.09% (1) from India and 9.09% (1) did not identify its origin. Thus, no study on the use of the Mini-CEX to evaluate the training of nursing professionals published in Brazil was found in the literature.

As for the research subjects, 63.63% (7) of the studies were carried out with undergraduate nursing students, 27.27% (3) with postgraduate students and 9.09% (1) with specialists in nursing education.

Of the studies found, 3 (27.27%) were published by *Medical Educational -BMC*; 2 (18.18%) by the *Journal of Family Medicine and Primary Care*. The other papers were published in the following journals: *BMJ Open*, *Contemporary Nurse*, *Journal of Education and Health Promotion*, *Journal of Clinical Nursing Wiley*, *International Journal of Nursing Sciences*, one paper in each.

## Box 1 – Characterization of the articles according to title, authorship, year of publication, journal, research subjects and methodology.

Title	Authors, year and country of origin	Journal	Research subjects	Methodology used
1.Development of a nursing-specific Mini-CEX and evaluation of the core competencies of new nurses in postgraduate year training programs in Taiwan	Yueh-Ping Liu, Dana Jensen, Cho-yu Chan, Chung-jen Wei, Yuanmay Chang, Chih-Hsiung Wu e Chiung-hsuan Chiu / 2019 / China	<i>BMC Medical Educational</i>	Newly qualified nurses	The tool was built through interviews with experts and a literature review; a workshop was held with the evaluators for a pilot test.
2.The impact of the evaluations made by Mini-CEX on the clinical competency of nursing students	Sanaz Motefakker, Azam Shirinabadi Farahani, Manijeh Nourian, Maliheh Nasiri e Fatemeh Heydari / 2022 / Iran	<i>BMC Medical Educational</i>	Undergraduate nursing students	Application of the questionnaire (Mini-CEX) in the intervention group and evaluation of the control group through a common portfolio.



3. Development of a tool for assessing the clinical competency of Chinese master's nursing students based on the mini-CEX - a Delphi method study.	Yan Gao Qian Peng, Xiuni Gan Na Liu / 2023 / China	<i>BJM OPEN</i>	Experts from universities with high expertise in nursing education	Questionnaire to be applied among the experts.
4. Are workplace-based assessment methods (DOPS and Mini-CEX) effective in nursing students' clinical skills? A single-blind randomized, parallel group, controlled trial	Madineh Jasemi, Soheila Ahangarzadeh Rezaie, Masumeh Hemmati Maslarpak e Naser Parizad / 2020 / Iran	<i>Contemporary nurse</i>	Undergraduate nursing students	Six evaluators were trained to apply the Mini-CEX and DOPS. In the second phase, undergraduate students were assessed using traditional methods (control group) and the Mini-CEX and DOPS methods (intervention group) during their internship in a medical clinic, emergency room and ICU.
5. Formative assessment in practical for Indian postgraduates in health professions education: A strategic initiative towards competency-based education.	Alka Rawekar, Sonali G. Choudhari, Vedprakash Mishra, Sunita Vagha / 2020 / India	<i>Journal of Family Medicine and Primary Care</i>	Students, professors and supervisors of the postgraduate programs at the Datta Meghe Institute of Medical Sciences	Training for program faculty and raising student awareness of formative assessment. Application of the tools at the end of each semester for 1 year and 3 months.
6. Self-efficacy impact of the Mini-CEX among nursing students in North Sumatera, Indonesia.	Siska Evi Martina, Ivan Elisabeth Purba, Janno Sinaga, Eva Hotmaria Simanjuntak / 2021 / Pakistan	<i>Public Health Res</i>	Undergraduate nursing students	25 trainees made up the intervention group (assessed using the Mini-CEX) and 24 the control group. The trainees were assessed 9 times over a period of 2 months.



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| 7.Design and implementation of clinical competency evaluation system for nursing students in medical-surgical wards.   | Forough Rafii, Tahereh Najafi Ghezaljah, Sepideh Nasrollah / 2019 / Iran                     | <i>Journal of Family Medicine and Primary Care</i> | Undergraduate nursing students and their instructors | The DOPS, Mini-CEX and CWS tools were defined as appropriate tools for assessing the learning objectives of the internship program in clinical-surgical wards.  |
| 8.The effect of direct observation of procedural skills/mini-clinical evaluation exercise on the satisfaction and clinical skills of nursing students in dialysis. | Hasanali Jafarpour, Meimanat Hosseini, Maryam Sohrabi, Masoomah Mehmannaavazan / 2021 / Iran | <i>Journal of Education and Health Promotion</i>   | Undergraduate nursing students                       | A group of dialysis trainees was separated into a control and an intervention group. The former was assessed on a single occasion using a form and the latter was assessed continuously using the Mini-CEX. |
| 9.Evaluation of a nurse practitioner clinical practicum module using a capability education framework: A case study design   | Mary Ryder, Rita Smith, Eileen Furlong / 2022 / Ireland                                      | <i>Journal of Clinical Nursing Wiley</i>           | Undergraduate nursing students                       | Case study. Data was extracted from the module handbooks on the use of Mini-CEX in the assessment of students in classes over 2 consecutive academic years.   |
| 10.Application of flipped classroom based on CDIO concept combined with mini-CEX evaluation model in the clinical teaching of orthopedic nursing.                  | Xinyang Su, Huaxiu Ning, Fang Zhang, Xiaoling Zhang e Hongmei Xu / 2023 / Not identified     | <i>BMC Medical Educational</i>                     | Undergraduate nursing students                       | In the control group (traditional method). In the intervention group, (flipped classroom method). In the fourth week, the students' of clinical practice was assessed by applying Mini-CEX.                 |







11.Effects of the mini-clinical evaluation exercise teaching mode based on nurse-faculty cooperation in Fundamentals of Nursing course: A quasi-experimental study

Yangguang  
Chen, Xiaomang  
Li, Jia Zhao,  
Yunyun Dai, Zili  
Zhou / 2023 /  
China

*International  
Journal of  
Nursing  
Sciences*

Undergraduate  
nursing students

The students were separated into a control group (studied for a practical lesson using conventional methods) and an intervention group (studied using simulation scenarios, based on the Mini-CEX structure).

Source: Prepared by the authors (2024)

Among the studies, 27.27% (3) deal with the process of adapting the Mini-CEX tool for application among nursing professionals and students. Also, in 3 studies (27.27%) there is an explicit relationship between the use of Mini-CEX and DOPS (*Direct Observation of Procedural Skills*), another active assessment methodology.

Regarding the design of the studies, 6 (54.5%) of them were experimental or quasi-experimental studies, comparing intervention groups, in which the Mini-CEX tool was used as an assessment strategy and, in the control groups, other more traditional assessment methodologies were used.

Box 2 shows the main results found in the studies selected for analysis, according to the numerical order in which the articles were identified.

## Box 2 – Main results found in the selection.

Order number	Main results
1	The Mini-CEX, especially if it is the only assessment method, may not be able to fully demonstrate all aspects of a newly graduated nurse's competencies. Supervisors can easily use this tool to assess the strengths and weaknesses of a newly graduated employee and to give timely formative feedback.
2	The implementation of the Mini-CEX assessment approach leads to an improvement in the clinical skills of nursing students.
3	Established evaluation indices of essential competencies for a master's degree in nursing; created a valid and reliable tool for evaluating the clinical practice competencies of postgraduate students.



- 4 The tools evaluated in the study significantly improved the undergraduates' ability to learn. The use of these tools leads to the promotion of students' clinical skills. The authors recommend the use of the tools and consider the feedback proposed by the tools to be the "key point" of the assessment.
- 5 The response of students and teachers to the formative assessment was good. The study showed a significant improvement in the score from one semester to the next, as the student progressed through the course.
- 6 88% of trainees showed an increase in self-efficacy in relation to clinical skills, compared to previous periods.
- 7 Students and teachers agree that using these tools makes the evaluation process more reliable, useful and practical. The method used has the ability to conduct an evaluation that is linear with the goals of the educational system.
- 8 The results of this study showed that students who were assessed by DOPS and Mini-CEX obtained higher clinical skills scores. The authors suggest that the use of these tools should replace traditional assessment methods for nursing procedures.
- 9 Assessment using DOPS and Mini-CEX was more effective in terms of improving skills among nursing students compared to the traditional method. The authors also reinforce the relevance of feedback in the student assessment process.
- 10 The author states that the students' ability to learn and think clinically and their skills have improved with the application of the flipped classroom and can be a way of preparing students to carry out clinical work.
- 11 This study confirmed the use of Mini-CEX as a method for improving the competence and performance of nursing students. The authors state that it can build a positive, harmonious and open classroom climate.

Source: Prepared by the authors (2024)

Research shows that Mini-CEX contributes to the development of practical competencies and clinical skills (Motefakker *et al.*, 2022; Jafarpoor *et al.*, 2021). Another point worth highlighting in the studies in this review was that Mini-CEX was considered an educational strategy of significant value for assessment, mainly because it provides *feedback* on student performance (Liu *et al.*, 2019; Jasemi, 2019; Ryder *et al.*, 2023).

Researchers have shown that Mini-CEX plays an important role in the students' learning process because it is an active, reliable and meaningful assessment method that enables them to act in real scenarios and thus improve their clinical skills (Liu *et al.*, 2019; Ryder *et al.*, 2023; Su *et al.*, 2023).

## 3.1 Using *Mini-CEX* as a formative assessment tool

In Brazil, the National Curriculum Guidelines for the Nursing Course encourage the structure of undergraduate courses to ensure training that encourages students to reflect on social reality, seeking to transform it, and that there is what is called "learning to learn" and "learning to be".

Despite this, Vasconcelos *et al.* (2011) state in their integrative review that, in America in general, the assessment of undergraduate students tends to follow more traditional methods, despite efforts to make learning more critical. This assessment continues to prioritize the reproduction of content transmitted accurately and in quantity.

Another study states that, in Brazil, traditional assessment remains the predominant form of assessment in undergraduate nursing courses, despite being considered inadequate, even by students (Bertacchini *et al.*, 2015). This may help us understand the lack of published work on the subject in Brazil.

In the studies found, the authors point out that Mini-CEX is a tool that can help in the transition process from the traditional method to formative assessment. Rawekar *et al.* (2020) state that Mini-CEX is not formative, but the use of the information collected from it, as well as the possibility of generating immediate feedback, can provide an opportunity for formative education.

According to Santos *et al.* (2021, p. 4), the teaching assessment process must be continuous and consider various aspects such as "commitment, participation, motivation, capacity for reflection and critical thinking". Different competencies cannot be assessed in just one way, but with various tools that allow for the synthesis of student assessment in their various capacities (Liu *et al.*, 2019).

Interpersonal skills, also included in these important training roles, have been pointed out from the outset as one of the crucial points in the training of nursing

professionals, given that it consists of an activity performed mostly in teams (Santos *et al.*, 2017).

However, it is becoming increasingly clear that interpersonal relationships are a skill that can and should be developed, especially in undergraduate courses. It is therefore necessary to create tools that make it possible to assess this aspect of training as well (Horwitz *et al.*, 2013).

### 3.2 Adaptation of the tool to evaluate nursing professionals and students

Another aspect to be noted in the studies is the fact that a considerable number of the studies pointed out the need to adapt the tool for application among nursing professionals and students, because they understood that the Mini-CEX was designed to assess doctors and medical residents and does not fully cover that audience. Also understand that, although they share common points in assisting users of health systems, many skills, attitudes and practices are different between the professions and should be assessed by a customized tool for nurses (Liu *et al.*, 2019).

Peng *et al.* (2023) stated that adapting the tool is necessary in order to clarify the priorities in training nurses, however there is still no standardized or consolidated tool for this purpose.

Liu *et al.* (2019, p.2) carried out what appears to be the main adaptation of the tool, which has served as a model for several of the studies found. In their adaptation, the authors include dimensions for evaluation that involve "clinical knowledge and skills, communication, teamwork, ethical, political and managerial consideration, and public health duties".

Authors have been talking about adapting tools for some time, stating that cross-cultural differences must be considered, which can influence the application of these instruments in different locations. The use of instruments that have already been validated in other countries is recommended, despite the creation of new instruments, as

it is practical and allows for the identification of biases related to cultural diversity between countries (Camargo; Contel, 2004).

### 3.3 Perception of evaluators and students regarding the use of Mini-CEX

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The creation of a comprehensive and multidirectional evaluation system has been the goal of educational and evaluation researchers in recent years, but regarding nursing, some researchers claim that existing evaluation methods still lack reliability and validation. In addition, the importance of analyzing the satisfaction of the stakeholders in this process, the evaluators and the nursing students, is evident from the process of creating the evaluation method (Rafii *et al.*, 2019).

A study by Motefakker *et al.* (2022) identified the effectiveness of Mini-CEX in assessing nursing students' clinical competence and that students' clinical skills scores increased over time with the use of this assessment methodology, when compared to the use of previous methods. In addition, the implementation of this evaluation methodology has led to an improvement in the clinical skills of nursing students, resulting in future nurses who are better trained and have better clinical competence, which is reflected in the improvement of the nursing care provided.

Rafii *et al.* (2019) found, in their study, a high level of satisfaction among many teachers and students regarding the implementation of a clinical evaluation system that uses multiple methods simultaneously, including Mini-CEX, in the training of nursing students. In line with this, the study carried out by Rawear *et al.* (2020) found that, cumulatively, 88.27% of postgraduate students and teachers rated the use of formative assessment as good or excellent, and that formative assessment was feasible, acceptable and effective in improving overall learning.

### 3.4 Mini-CEX as a means of evaluating the continuing education of nursing professionals

The use of tools derived from the Mini-CEX was also pointed out in the review articles as a way of facilitating the evaluation of professionals already in the job market by their supervisors.

Bearing in mind that nursing professionals are the largest workforce in health systems and that their constant training results in the strengthening of work operations, continuous evaluation is directly related to positive results in the quality-of-care practices (Bastos *et al.*, 2013).

To this end, it is necessary to apply evaluation tools to improve the practice of nursing professionals. In addition, the feedback provided by the tools derived from the Mini-CEX can also facilitate the evaluation of professionals by their supervisors (Horwitz *et al.*, 2013).

### 3.5 Other advantages of using Mini-CEX as an assessment tool for nursing students

All the selected studies point to the Mini-CEX's ability to assess the clinical competencies intended for nursing students (undergraduate or postgraduate), especially when used in conjunction with other active methodologies. In addition, students assessed using Mini-CEX have been observed to increase their performance in the teaching-learning process, especially during the assessment process (Rafii *et al.*, 2019), improve their clinical skills, as well as their communication skills (Rawear *et al.*, 2020) and encourage critical and reflective thinking.

Another factor cited by the authors of this review was the improvement of harmony in the learning environment, making the assessment process more relaxed for students, especially during the assessment process.

The Mini-CEX also offers a good opportunity for nursing students to self-assess their practical knowledge. The key point in using the Mini-CEX, according to the authors,



is providing immediate feedback at the end of the assessment, as they consider the comments provided after the Mini-CEX to be "valuable and critical" and that they are enriching and indispensable tools in the teaching-learning process of clinical skills (Jasemi *et al.*, 2020).

According to Martina *et al.* (2021), the Mini-CEX has been used to effectively increase self-efficacy among nursing students and is suggested as a mandatory method for assessing these students. Self-efficacy can promote individual independence and confidence, increasing the satisfaction of these students in professional practice and their intention to remain in the profession.

### 3.6 Limitations in the use of Mini-CEX in the assessment of nursing students

As for the challenges of using Mini-CEX, studies show that students' stress levels increase when they undergo modern assessment methods, due to their fear of unfamiliar situations. However, these obstacles can be overcome by promoting a culture of feedback on student performance during assessments (Jasemi *et al.*, 2020).

In a study, Jasemi *et al.* (2020) presented the need for an authentic environment, as similar as possible to the work contexts and internships of these students or professionals, preferably in real work environments. Thus, the use of Mini-CEX outside of health institutions requires additional equipment, infrastructure and resources for the organization of the environment.

One study cited some obstacles faced by graduate students and professors during the implementation of formative assessment in the department, namely: shortage of time, shortage of space, need for more teacher assessors available in the department; meticulous preparation of the checklist by staff with expertise; greater availability of time, especially in the feedback phase (Rawear *et al.*, 2020).

In most of the selected studies, the assessors were trained to carry out the assessment using Mini-CEX. Despite this, some studies report biases in the assessment



of students related to intrinsic factors of the assessors, such as: expressing their concerns in assessment practices, mental exhaustion and training to act through the ethics of their profession (Jasemi *et al.*, 2020).

## 4 Final considerations

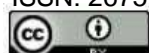
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This review enabled a synthesis of scientific studies on the available evidence on the advantages of using Mini-CEX in the process of assessing nursing professionals. It can be seen from the literature that the use of Mini-CEX in the formative assessment of nursing students and professionals, especially when combined with other active methodologies, has advantages, such as: it is useful in the assessment of clinical competencies, especially interpersonal skills.

Another advantage highlighted in the study was the feedback provided at the end of the application of the tool, considered one of the main elements of the assessment. This moment favors the development of students' critical-reflective thinking in relation to their practices, in line with the objectives of the teaching-learning process in health. In addition, there was an improvement in the clinical skills of nursing students, contributing to the training of more qualified professionals with greater clinical competence. Given the results presented, it can be said that the study question was answered, highlighting the advantages of using Mini-CEX in the process of assessing nursing professionals.

We observed that the literature on the use of Mini-CEX in the assessment of nursing students and professionals is still limited, especially in Brazil, which points to the persistence of the traditional model of banking education in undergraduate courses in this country.

This makes it clear that there is a need to develop an adapted, validated and standardized tool based on the Mini-CEX, aimed at nursing education in the country. From this, studies on the evaluation and implementation of the use of Mini-CEX in nursing education in Brazil could be promoted.



It is important to highlight the need for more studies to evaluate the results of the importance of Mini-CEX in teaching, to demonstrate its effects on consolidating the learning process. Finally, it is important to carry out further research to enable new discoveries to be made about the benefits associated with Mini-CEX, as well as to carry out studies on other bases so that Mini-CEX can be verified as a viable and useful assessment tool in the teaching-learning process.

Although the study on the benefits of Mini-CEX has presented relevant results, it is important to recognize some limitations. The quality of the studies included in the integrative review was variable, and many had methodological weaknesses, such as small sample size, scarcity of studies with control groups and lack of randomization. These limitations can impact on the robustness of the evidence obtained and reduce the reliability of the review's conclusions. Critical evaluation of the quality of studies is essential to minimize these impacts, but it is not always sufficient to eliminate all sources of bias.

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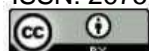
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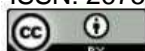
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