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Development of MiniCEX to assess nurses' clinical skills concerning medication

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Abstract

The clinical practice of nurses requires the development of skills that directly imply the safety and quality of care. The Mini Clinical Evaluation Exercise (MiniCEX) is a tool for evaluating clinical practice in real contexts that helps the self-regulation aspect of the learning experience based upon feedback at the end of each evaluated moment. This study aimed to build a MiniCEX for nurses and undergraduate nursing students, on clinical skills in the process of preparing, administering, and monitoring medications. This is developmental research. The theories that supported the methodological route were: Patricia Benner's model for the development of clinical skills in nursing; David Kolb's Experiential learning theory; the Medication System described by Cassiani et al.; the Patient Classification Instrument per complexity of nursing care, according to the area of care, proposed by Fugulin, Gaidzinski and Kurcgant; and, the assumptions of the National Patient Safety Program, focusing on safety in medication practice. Thus, three competencies were organized: preparation, administration, and monitoring of patients using drugs. As feedback is essential in MiniCEX, the studies by Hattie and Timperley, and Hattie and Clarke on feedback in the teaching-learning processes were considered. Thus, it is possible to characterize the MiniCEX outlined as an instrument for educational assessments, capable of developing specific nursing skills, which can be used both for nursing students during the practice of internships, as well as for monitoring and assessing the medicating skills of novice nurses to a given clinical setting.

Keywords: Skill-Based Education. Educational Evaluation. Clinical procedures. Clinical skill. Nursing.

INTRODUCTION

Nursing professionals perform multiple tasks with specific skills and knowledge. Therefore, in their training process, they need to be prepared and encouraged to develop a diversity of competences, defined as a complex of knowledge on how to act, combining skills, knowledge, attitudes, and available resources, as well as the ability to apply this knowledge in a given situation[1]. In this sense, the role of nurses requires the acquisition of clinical skills, which underlie their actions and decision making during their practice, and which directly involve the quality and safety of the care provided.

In the 1990s, the American Board of Internal Medicine (ABIM) developed a practical and quick tool to support the educational assessment of medical residents, the Mini Clinical Assessment Exercise (MiniCEX). The instrument consisted of a scale that assessed six essential skills of students: 1) interviews and clinical history skills;

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2) physical examination skills; 3) humanistic and professional qualities; 4) reasoning and clinical judgment; 5) communication and counseling skills; 6) organization and efficiency[2].

The model above was known to be the first assessment tool of its kind; however, MiniCEX can be adapted according to the needs of each situation and applied to assess the skills previously established in the course plan, based upon the proposed pedagogical objectives[2]. The MiniCEX, therefore, consists of a performance evaluation applied to measure the clinical skills developed by students from various areas of health, such as nursing[3], pharmacy[4], medicine[5], dentistry[5] and veterinary medicine[5], while considering the different contexts of professional practice. Regarding the training of nurses, the use of MiniCEX is still incipient, and other tools have been used[6].

In relation to the assessment instruments on skills concerning medication administration by nurses, the target audience must be nurses[7], as well as nursing students[8,9]. The construction of these tools was based upon pharmacology[7], theoretical support of simulation[8], and the institutional protocol[9]. However, there was little articulation between the fields of nursing, education, and pharmacology in the development of these instruments. Thus, the construction of a MiniCEX and its use in the specific assessment of skills concerning medications can contribute to safe nursing care, preventing and mitigating incidents related to medications, which are among the most common issues in health services[10,11].

Therefore, the objective was to build a MiniCEX for nurses and undergraduate nursing students, on clinical skills in the process of preparing, administering and monitoring medications.

METHODS

It was a developmental study[12] that focused on the detailed description of the construction of a product or process, as well as on the theoretical foundation acquired along the way. MiniCEX was created in the second half of 2019.

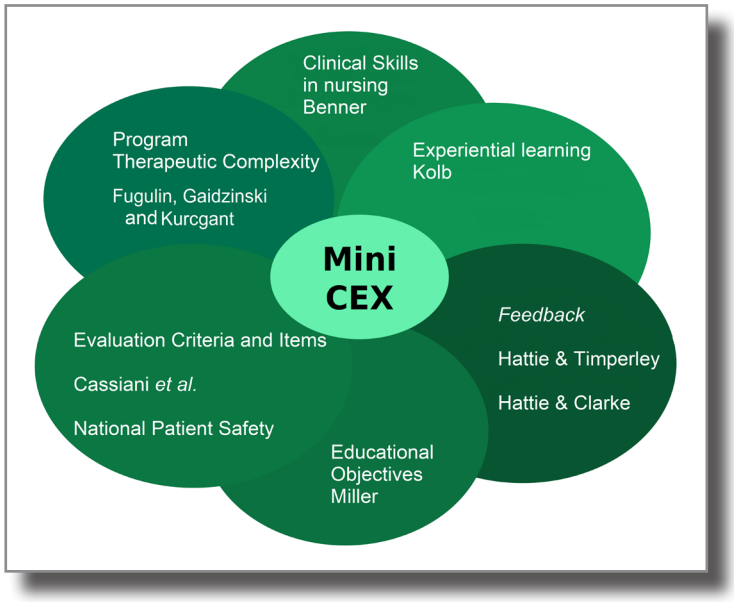
MiniCEX is an instrument for evaluating clinical practice with real patients. Thus, the development of a specific instrument for the medication process carried out by nurses passed through the theories of the clinical competences development model in nursing by Patricia Benner[13], of experiential learning by David Kolb[14], as well as by the studies of Hattie and Timperley[15] and Hattie and Clarke[16] on Feedback, considering that this is essential in a MiniCEX. We emphasize that the construction process of this MiniCEX, occurred from the outline of these theoretical frameworks, that is, we went through these references in the process of developing the instrument, which will be addressed in the results section.

Regarding the medication process, we chose the contributions of Cassiani *et al.*[17] who investigated the medication system and its relationship with medication errors. The authors conceived the term Medication Process, which is developed in phases, namely: prescription, dispensation, administration, and monitoring. It is worth mentioning that, in this MiniCEX, we focus on the phases that involve nursing professionals: administration and monitoring. We also understand that the administration phase includes preparation, which, although it is not described in the study by Cassiani *et al.*[17], is pertinent to

mention that it was used in this study.

In addition to the study by Cassiani *et al.*[17], we delimit the research by Fugulin, Gaidzinski and Kurcgant[18], which proposes a patient classification instrument, stratifying the complexity of nursing care according to the area of care, covering the area of therapy; as well as the assumptions of the National Patient Safety Program[19] (PNSP), focusing on safety in the medicating practice as they converge with the scope of this MiniCEX.

Furthermore, the development process of this MiniCEX was guided by an educational objective, and as a theoretical approach for this purpose, we chose the Miller Pyramid framework[20]. Figure 1 presents a summary of the route taken by the authors of this instrument.



Source: The authors, 2019.

Figure 1 – MiniCEX developmental research diagram for the assessment and development of nurses' skills in the use of medications.

RESULTS

Patricia Benner's Model for the Development of Clinical Skills in Nursing

Patricia Benner is a theorist in the field of nursing, with research on the development of knowledge in practice. And in her research, she brought the Dreyfus Model of skill development to nursing, initially developed for other practical professions, such as airline pilots and chess players. This model describes five levels of competence: novice, advanced beginner, competent, proficient, and expert. Thus, the professional can advance through the levels of competences, as he/she learns with practice, reflecting on it and developing a more

elaborate and intuitive reasoning[13].

For Benner[13], skills refer to nursing care and clinical judgment, developed in real situations. Therefore, 31 clinical competences were described, identified in the narratives of nurses surveyed, that is, from their own practices, that were permeated with complexity and meaning. The skills identified were grouped into seven major domains, according to similarities in function and intention. However, using this model, it is still possible that a nurse may have different levels of competence in different areas of practice[13].

The novice or beginner nurse is one who has no experience in a given clinical situation, meets the standards and has difficulty prioritizing the most relevant aspects[13]. The advanced beginner has already had some experience to compare with previous situations with new ones, they are more aware of the feedbacks, identifying in practice the orientations they received[13]. The competent nurse establishes his/her goals and plans the work needed to achieve them, manages to define priorities, and they have more confidence in decisions regarding routine clinical problems[13]. A proficient nurse perceives the overall situation, has greater ability to recognize patterns and respond to them, such as identifying a worsening in the patient's condition, before changes in vital signs, for example[13]. The specialist or expert nurse has a more intuitive understanding of clinical situations and makes decisions according to theoretical knowledge and practical wisdom[13].

The nurse progresses in the level of skills as he/she learns from their experiences. However, not everyone reaches the level of developing intuitive reasoning. It is at the competent level that the nurse is able to conduct assistance more safely. While beginners and advanced beginners do not reach the competent level, they need to be followed up in clinical practice, with guidance from more experienced colleagues as advisors or preceptors, for greater safety in patient care[13].

Therefore, the proposal of this MiniCEX consisted in the construction of an evaluative and constructive instrument, in which feedbacks guide experiential learning, and the consequent development of nurses at the competent level. Thus, it is intended for the public of graduated nurses, and can be used in graduate programs, or in health organizations with programs for monitoring and professional development, such as when a nurse is admitted to a new care unit. It can also be used in undergraduate nursing, in scenarios of practical classes or internships. It is important to adjust the expectations of the level of skills to be developed according to the time of practice and previous knowledge that subsidize experiential learning.

Benner's framework[13] guided the choice of skill domains to be assessed and scored in MiniCEX. Thus, three of the seven domains described by Benner[13] were selected, which are close to the theme of medication, which are: to ensure and monitor the quality of health care; administration and monitoring of therapeutic protocols; effective decision-making in rapidly evolving situations[13].

From the domains, the competences to be evaluated in MiniCEX were defined, considering the good practices of nursing in three processes involving medication: preparation, administration, and monitoring.

Experiential learning theory

The purpose of this work was to develop a MiniCEX as a educational assessment resource, which helps advance skill levels when considering theoretical and practical knowledge. Thus, we sought an andragogical framework[21] capable of elucidating how experience can be transformed into knowledge and learning, and how knowledge is capable of transforming experience, since we intended to develop skills for safe drug assistance.

David Kolb's Experiential learning theory[14] considers adult learning to be dynamic, in which knowledge involves abstract and concrete dimensions, both in terms of

understanding reality and transforming reality. These dimensions combined in the dialectic of transforming and knowing form the cycle of experiential learning.

The cycle of experiential learning has four axes: concrete experience, reflective observation, abstract conceptualization, and active experimentation. In the concrete experience (CE), there is involvement in new situations, allowing to feel and experience them. In reflective observation (RO), reflection and observation of experiences take place, from various perspectives. In abstract conceptualization (AC), concepts are created that integrate observations in a logical way. In active experimentation (AE), theories formulated in the other axes are used in decision making and problem solving[14].

Learning arises from the tension between these four modes of learning. Concrete experiences are the basis for observations and reflections. These reflections are assimilated and refined into abstract concepts from which new implications for action can be extracted. These implications can be actively tested and serve as guides in creating new experiences. There is no order to start learning in this spiral. The most comprehensive learning involves all the bases of the spiral, resulting in different ways of understanding and transforming reality.

To apply the Experiential learning theory in MiniCEX, the expected results of educational assessment and feedback need to introduce the professional or student into the experience of the four modes of learning in the experiential learning cycle. As MiniCEX is applied in practical scenarios, the concrete experience will already be covered. For other modes of learning, we outline as expected results for nurses to develop the following skills: the ability to relate theoretical knowledge to the reality of the practice; to recognize the need to learn continuously and through experience; the ability to make safe decisions regarding nursing care in the use of medications.

Feedback

Feedback is an essential and compulsory element that makes up the MiniCEX evaluation process, and is characterized by assuming a fundamental character of evaluation, that is, teachers provide feedback to the student, along the multiple learning opportunities in order to improve the assimilation of students[15,16].

In this research, we chose the theory investigated and proposed by Hattie and Timperley[15], and later by Hattie and Clarke[16], concerning feedback as an instrument of fundamental evaluation, since the referred authors have contributed in recent years with their expertise on the topic in the area of education, and also due to the proximity to the teaching area and the rigor of the evaluation method, indicated in this manuscript.

Hattie and Timperley[15] define feedback as an informed opinion/response concerning aspects of the performance of a task and/or work performed by the student, which were the assigned by an agent, such as a teacher, with the scope of reducing the discrepancy between the student's current understanding and learning objectives.

The authors point out that, the essence of effective feedback requires that the teacher captures the student's misconceptions about the development or understanding of a task/subject and/or activity/work and, based on these nuances, plans and provides informed feedback that allows reflection and comparison of past experiences with new information, making the restructuring of knowledge possible[15,16].

With this perspective, Hattie and Timperley[15] developed a feedback model guided by 3 questions: “Where am I going? ", "How am I doing?” and “Where to go next?”. They claim that the appropriation of these issues in an integrated manner favors the reduction of the disparity between, “where I am” and “where I need to be”, giving power to feedback. Furthermore, they claim that there are four main levels of feedback, which are develop based

upon each of those issues. The influence on learning effectiveness depends on the level at which feedback is directed[15,16].

Thus, feedback can be about a task or product (FP) with a focus on correcting misinterpretations in the development of a task. It can be directed to a process (FP), focusing on the creation of a product or completion of a task, that is, directed to the processing of information or tasks. There is also feedback directed at the level of self-regulation (FR) that involves the student's self-confidence, self-regulation, and self-efficacy, which must be encouraged and informed for achieving greater robustness in the performance of a task. Finally, feedback can be personal and directed at the self (FS) level and, frequently, it is not related to the performance of a task, and is, therefore, the least effective among the four levels[15].

Educational and evaluation objectives

The planning of a teaching-learning process requires the definition of educational objectives, from which teaching strategies can be defined. Evaluation is part of the teaching process, allowing for the identification of whether educational objectives are being achieved[22].

Still, it is necessary that the plans and execution of the evaluation consider its purpose, with emphasis on the educational intention that allows the regulation of learning along an educational path. What and how to evaluate needs coherence in relation to the competences capable of being developed in each phase of clinical learning.

The development of this MiniCEX was based on the "do" level of the Miller pyramid[20], with the aim of developing skills for safe practice in medication processes. Therefore, the educational objective of this MiniCEX was: to evaluate nurses and undergraduate nursing students regarding the domain "to do" in the practice of preparing, administering, and monitoring the use of medications, contributing to the development of skills necessary for safe care.

MiniCEX Structure

MiniCEX was developed with the following structure: header (identification), body (performance evaluation), and footer (feedback data). Table 1 clarifies the organization and what makes up the instrument.

Considering that some items of activity characterization are important in the evaluator's records, the heading was created in order to identify the clinical encounter. In this place, the teacher/evaluator will record data such as: identification of the evaluator and the evaluated, patient data (initials, sex, and age), therapeutic complexity (route of administration of the procedure to be observed), and clinical scenario (location where the clinical intervention is fulfilled). To substantiate the fields of "therapeutic complexity", the authors used the Patient Classification Instrument as a reference[18], which stratifies the complexity of nursing care according to areas of care, and the "therapeutic" area considers the administration routes and the need for vasoactive drugs.

Next, there is the performance evaluation itself, in which the evaluator makes an observation not participating in the therapeutic intervention, evaluating the conduct of the trainee/professional.

The definitions of the skills to be evaluated in this MiniCEX are based on Benner's framework[13]. First, the domains that comprise drug therapy were identified: ensuring and monitoring the quality of health care; administration and monitoring of therapeutic protocols; effective decision-making in rapidly evolving situations. From these domains, nursing skills concerning medication were established, guided by the three moments of practice: preparation, administration, and monitoring, that is, the medication process.

Each of the three skills, in a macro perspective, was structured by micro-skills, in which each one was assigned a score represented by the scale of 1 to 9, according to the performance of the evaluated individual. The final evaluation

of each macro skill is the integrated evaluations of the micro-skills that compose it, reflecting the overall evaluation.

In addition, micro-skills are based on and in accordance with the premises of PNSP[19], focusing on safety in drug practice. On the back of the instrument proposed herein, the performance expected by students in each of the evaluated micro-skills is described, in order to guide the evaluator (chart 2).

In order to clarify doubts and guide the assessment in the most direct way possible, the back of the instrument has descriptors, which are guidelines to facilitate the understanding of what is expected for each skill.

The last, but not least, phase of this evaluation is the feedback that the evaluator provides to the subject. The items in the instrument are: considerations, observation time, feedback time, and signatures of both. Norcini[23] advises that this moment lasts approximately 5 to 10 minutes, and that the feedback is objective in order to guide the evaluated person regarding his/her potentials and/or learning gaps.

Quadro 1
MINI EXERCÍCIO CLÍNICO AVALIATIVO (MINI-CEX) PARA ENFERMAGEM – MEDICAMENTOS

Avaliador:
Avaliado:
Data: ___/____/_____
Paciente (Iniciais): Idade: Sexo:
Complexidade terapêutica: ( ) IM, SC, VO ( ) EV intermitente ( ) EV contínua ou Via Sonda ( ) drogas vasoativas ( ) Outros: _____
Cenário clínico: ( ) UTI ( )Enfermaria e UCI ( )Pronto-atendimento ( ) Bloco operatório ( ) Ambulatório/Unidade básica ( ) Domicílio ( ) Outros: _____

Preparo ( ) não observado	**Insatisfatório**			**Satisfatório**			**Superior**		
Adota medidas de controle de infecção e de saúde ocupacional	1	2	3	4	5	6	7	8	9
Avalia as condições e necessidades do paciente para a terapia medicamentosa	1	2	3	4	5	6	7	8	9
Planeja e organiza o serviço/cuidado	1	2	3	4	5	6	7	8	9
Utiliza barreiras de prevenção de erro de medicação	1	2	3	4	5	6	7	8	9
NOTAL GLOBAL	1	2	3	4	5	6	7	8	9

Administração ( ) não observado	**Insatisfatório**			**Satisfatório**			**Superior**		
Adota medidas de controle de infecção e de saúde ocupacional	1	2	3	4	5	6	7	8	9
Comunica-se com o paciente	1	2	3	4	5	6	7	8	9
Aplica medidas de conferência e checagem	1	2	3	4	5	6	7	8	9
Avalia condições da via de administração	1	2	3	4	5	6	7	8	9
Avalia incompatibilidades medicamentosas	1	2	3	4	5	6	7	8	9
Administra de forma segura	1	2	3	4	5	6	7	8	9
NOTAL GLOBAL	1	2	3	4	5	6	7	8	9

Monitoramento ( ) não observado	**Insatisfatório**			**Satisfatório**			**Superior**		
Avalia a resposta clínica /efeito (in)esperado	1	2	3	4	5	6	7	8	9
Avalia a rede venosa durante a terapia intravenosa	1	2	3	4	5	6	7	8	9
Monitora sinais vitais durante e após administração	1	2	3	4	5	6	7	8	9
Interrompe a infusão do medicamento quando percebe efeito inesperado.	1	2	3	4	5	6	7	8	9
Documenta o monitoramento durante e após a administração	1	2	3	4	5	6	7	8	9
Identifica e toma decisões sobre efeitos adversos	1	2	3	4	5	6	7	8	9
NOTAL GLOBAL	1	2	3	4	5	6	7	8	9
Considerações/feedback/ações acordadas									

Tempo de observação: _____ min Tempo de "feedback": _____ min

Assinatura do avaliado Assinatura do avaliador

Frente do mini-CEX – ver descritores no verso

Chart 1 – MINI CLINICAL EXERCISE EVALUATION (MINI-CEX) FOR NURSING - MEDICATION

Quadro 2 - MINI EXERCÍCIO CLÍNICO AVALIATIVO (MINI-CEX) PARA ENFERMAGEM – MEDICAMENTOS

Competências e descritores

Preparo de medicamentos
Higieniza as mãos, adota medidas de proteção universal, adota técnicas assépticas, usa equipamentos de proteção individual/coletivo.
Procura identificar o estado geral do paciente (sinais e sintomas), história de alergias medicamentosas, presença e condições de dispositivos das vias de administração.
Identifica e usa corretamente os recursos materiais e tecnológicos para o preparo, administração e monitoramento. Toma decisões sobre a não disponibilidade dos recursos. Reduz fontes de distração. Planeja o tempo. Estabelece prioridades conforme necessidades dos pacientes
Prepara um medicamento por vez. Confirma a identificação completa do paciente com prescrição médica, realiza a identificação do paciente no rótulo do medicamento preparado. Checa medicamento certo. Avalia se forma farmacêutica é compatível com a via de administração prescrita e com as condições do paciente. Confere os cálculos de dosagem. Calcula o tempo de infusão. Atenta-se ao aspecto, validade e estabilidade do medicamento. Avalia incompatibilidades.

Administração de medicamentos
Realiza lavagem de mãos, medidas de assepsia e antissepsia. Usa equipamentos de proteção individual.
Apresenta-se ao paciente, comunica o procedimento e fornece orientações necessárias
Confere prescrição, identificações, checa alergias antes de administrar
Avalia se a via prescrita é passível de administração (condições de rede venosa/ escolha de cateter/ equipamentos necessários/ condições de deglutição/ densidade muscular)
Avalia incompatibilidades medicamentosas previamente. Busca soluções ou alternativas quando as identifica.
Realiza o procedimento observando orientações como tempo de infusão, fotossensibilidade, riscos potenciais de cada medicamento

Monitoramento do paciente
Monitora os Sinais Vitais e reconhece alterações que possam indicar efeitos indesejáveis relacionados àterapia medicamentosa, tais como: alterações da frequência cardíaca e respiratória, pressão arterial.
Mantém vigilância durante e após a administração do medicamento, atentando-se para o reconhecimento de sinais e sintomas que caracterizam efeitos inesperados.
Inspeciona o sitio de inserção e áreas adjacentes ao cateter venoso (periférico e/ou central) quanto à presença de drenagem de secreções, pontos hiperemiados, ruborizados e/ou doloridos.
Interrompe, com agilidade, a infusão de medicamento intravenoso na ocorrência de efeitos inesperados, atentando-se para desprezar o equipo utilizado na ocasião do efeito adverso, em caso de solução administrada por bomba de infusão contínua ou equipo macrogotas.
Registra no prontuário do paciente as ações de monitoramento do paciente realizadas durante e após administração do medicamento
Identifica efeitos adversos. Assiste o paciente. Realiza gestão do dano. Procede a comunicação efetiva com equipe multiprofissional. Realiza documentação em prontuário. Notifica evento adverso conforme fluxo da instituição.

Verso do mini-Cex – utilize o outro lado para avaliar

Chart 2 – Mini Clinical Exercise Evaluation (MINI-CEX) for nursing - medication

DISCUSSION

MiniCEX was initially developed in the medical field to be a method of assessing clinical competencies in real contexts with dynamism, which is, at the "bedside" and systematized to be shorter and more punctual than traditional long cases, focusing on specific skills for a meeting with the patient. For greater reliability of this method, which has an educational characteristic of evaluation, several evaluation moments are necessary with feedback provided by experienced evaluators who agree on the scoring standards. In the case of nursing, the MiniCEX must adapt to the specific clinical skills of this professional area.

In Indonesia, a MiniCEX was developed and validated for assessing the skills of nursing students. The validated instrument was applied in a quasi-experimental study, concluding that MiniCEX is effective for improving clinical skills in the neurological examination of nursing students[24]. This result is related to the fact that the student understands the educational and evaluation objectives, knows the criteria for observation and, consequently, is committed to the clinical encounter and the self-regulation of learning based upon feedbacks[25].

A specific nursing MiniCEX was developed in Taiwan. The essential skills to be developed in the

novice nurses of a graduate program were listed according to Benner's model of development of clinical skills in nursing, in order for them to reach the level of skill. The competences were defined according to the existing scientific literature, opinions of councils, and class associations, as well as by social contracts with the general public[3].

An experience report on the familiarization of nurse advisors with MiniCEX as an evaluation found that its use allows integrating an entire educational process based on educational objectives, content, and teaching-learning strategies. As a result, the advisors considered the MiniCEX to be valid for the improvement of nursing skills and clinical nursing education, which will contribute to the development of nursing students[26].

The construction of a specific MiniCEX for nursing within the topic of medication, sought to guide the development of skills with Benner's theory[13], as well as other references in the field of education that create a dialogue with existing scientific literature, national legislation, and professional council documents in medical field.

Thus, in addition to being an instrument that favors the self-regulation of learning by allowing the learner to seek to improve skills between assessments and feedbacks, MiniCEX can be used in the evaluation and improvement of the teacher or professional development program itself, as it is in the apex of the Miller Pyramid[20], evaluating the "doing" that requires "knowing" and "knowing how".

CONCLUSION

The construction of the MiniCEX on drug skills was achieved after reviews and responses between different areas of knowledge such as: clinical skills in nursing, education theory, educational objectives, didactic and evaluative methods, and patient classification systems according to drug therapeutic complexity. Thus, it was possible to build a specific evaluation tool with a selected theme and audience, converging with the purpose of the study.

This created MiniCEX is capable of being applied both in nursing students during the practice of internships, as well as for monitoring and assessing the medication skills of nurses who are new to the experience because of admission to a service or moving to a new sector. It is up to the evaluator to define the number of observations that will be necessary to compose the evaluation report.

As for the educational dimension of the evaluation, the application of MiniCEX is recommended. In order to verify if it helps develop the nurse in the rising through the levels of clinical skills during his/her experiential learning, the feedback carried out in an appropriate way helps the apprentice reflect on their practices and seek mechanisms to improve care.

Despite this, some challenges must be listed and carefully worked on, such as the need to train evaluators, in order to align the judgment criteria. Another issue to be addressed is the ability to provide feedback that instigates the learner to live the experience, reflect on perspectives, elaborate concepts, comparisons, generalizations, and make decisions.

This developmental research proposed building an evaluative instrument, however new studies need to be developed in order to validate the developed material and test its applicability in populations of undergraduate and novice nurses.

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REFERENCES

1. Aued GK, Bernardino E, Peres AM, Lacerda MR, Dallaire C, Ribas EN. Competências clínicas do enfermeiro assistencial: uma estratégia para gestão de pessoas. Rev Bras Enferm. 2016; 69(1):130-7. http://dx.doi.org/10.1590/0034-7167.2016690119i.
2. Amin Z, Chong YS, Khoo HE. Practical Guide to Medical Student Assessment. Hackensack (NJ): World Scientific; 2006. https://doi.org/10.1142/6109.
3. Liu Y-P, Jensen D, Chan C-Y, Wei C-J, Chang Y, Wu C-H, et al. Development of a nursing-specific Mini-CEX and evaluation of the core competencies of new nurses in postgraduate year training programs in Taiwan. BMC Med Educ. 2019; 19(270):1-10. https://dx.doi.org/10.1186/s12909-019-1705-9.
4. Wei C-J, Lu T-H, Chien S-C, Huang W-T, Liu Y-P, Chan C-Y, et al. The development and use of a pharmacist-specific Mini-CEX for postgraduate year trainees in Taiwan. BMC Med Educ. 2019;19(165):1-8. https://dx.doi.org/10.1186/s12909-019-1602-2.
5. Lörwald AC, Lahner F-M, Nouns ZM, Berendonk C, Norcini J, Greif R, et al. The educational impact of Mini-Clinical Evaluation Exercise (Mini-CEX) and Direct Observation of Procedural Skills (DOPS) and its association with implementation: A systematic review and metaanalysis. PLoS ONE. 2018; 13(6): e0198009. https://doi.org/10.1371/journal.pone.0198009.
6. Immonen K, Oikarainen A, Tomietto M, Kääriäinen M, Tuomikoski A , Kau□i□ BM, et al. Assessment of nursing students' competence in clinical practice: A systematic review of reviews. Int J Nurs Stud. 2019;100:103414. https://doi.org/10.1016/j.ijnurstu.2019.103414.
7. Hemingway S, Baxter H, Smith G, Burgess-Dawson R, Dewhirst K.
Collaboratively planning for medicines administration competency: A survey
evaluation. J Nurs Manag. 2011; 19(3):366–376. https://doi.org/10.1111/j.1365-2834.2011.01245.x
8. Goodstone L, Goodstone MS. Use of simulation to develop a medication administration safety assessment tool. Clin Simul Nurs. 2013; 9(12): e609-e615. http://dx.doi.org/10.1016/j.ecns.2013.04.017.
9. Cancino KD, Arias M, Caballero E, Escudero E. Desenvolvimento de um instrumento de avaliação da administração segura de medicamentos para estudantes de enfermagem. Rev Latino-Am Enfermagem. 2020; 28:e3246. http://dx.doi.org/10.1590/1518-8345.2989.3246.
10. World Health Organization. Medication without harm: global patient safety challenge on medication safety [Internet]. Geneva: WHO, 2017 [acesso em 20 janeiro 2020]. Disponível em: https://www.who.int/patientsafety/medication-safety/medication-without-harm-brochure/en/
11. Conselho Regional de Enfermagem de São Paulo (BR). Uso seguro de medicamentos: guia para preparo, administração e monitoramento [Internet]. São Paulo: COREN-SP, 2017 [acesso em 20 janeiro 2020]. Disponível em: https://portal.coren-sp.gov.br/wp-content/uploads/2010/01/uso-seguro-medicamentos.pdf
12. Teixeira PMM, Megid Neto J. Uma proposta de tipologia para pesquisas de natureza interventiva. Cienc Educ Bauru. 2017; 23(4):1055-76. http://dx.doi.org/10.1590/1516-731320170040013.
13. Benner P. De iniciado a perito: excelência e poder na prática clínica de enfermagem. Edição Comemorativa. Coimbra: Quarteto Editora; 2001.
14. Kolb DA. Experiential learning: experience as the source of learning and development. 2ª ed. Upper Saddle River (NJ): Pearson Education, Inc.; 2015.
15. Hattie J, Timperley H. The Power of Feedback. Rev Educ Res. 2007; 77(1): 81-112. https://doi.org/10.3102/003465430298487.
16. Hattie J, Clarke S. Visible Learning: Feedback. Abingdon (Inglaterra): Routledge; 2019. https://doi.org/10.4324/9780429485480
17. Cassiani SHB, Teixeira TCA, Opitz SP, Linhares JC. O sistema de medicação nos hospitais e sua avaliação por um grupo de profissionais. Rev Esc Enferm USP. 2005; 39(3):280-7. http://dx.doi.org/10.1590/S0080-62342005000300005.
18. Fugulin FMT, Gaidzinski RR, Kurcgant P. Sistema de classificação de pacientes: identificação do perfil assistencial dos pacientes das unidades de internação do HU-USP. Rev Latino-Am Enfermagem. 2005; 13(1):72-8. http://dx.doi.org/10.1590/S0104-11692005000100012.
19. Brasil. Ministério da Saúde (BR), Portaria nº 529, de 1º de abril de 2013. Institui o Programa Nacional de Segurança do Paciente (PNSP). Diário Oficial [da] República Federativa do Brasil. Brasília (DF); 2013 [acesso em 20 de janeiro de 2020]. Disponível em: http://bvsms.saude.gov.br/bvs/saudelegis/gm/2013/prt0529_01_04_2013.html.
20. Miller GE. The assessment of clinical skills/competence/performance. Acad Med. 1990; 65(9):S63-7. https://dx.doi.org/10.1097/00001888-199009000-00045
21. Draganov PB, Andrade AC, Neves VR, Sanna MC. Andragogia e seu uso na enfermagem: uma revisão da literatura. Invest Educ Enferm [Internet]. 2013 [acesso em 20 novembro 2019];31(1):86-94. Disponível em http://www.scielo.org.co/pdf/iee/v31n1/v31n1a11.pdf.
22. Panúncio-Pinto MP, Troncon LE de A. Avaliação do estudante: aspectos gerais. Medicina (Ribeirão Preto). 2014; 47(3):314-23. https://doi.org/10.11606/issn.2176-7262.v47i3p314-323
23. Norcini J, Burch V. Workplace-based assessment as an educational tool: AMEE guide no. 31. Med Teach. 2007; 29(9):855-71. https://dx.doi.org/10.1080/01421590701775453
24. Djuria SA, Moh. A. Development of Measurement Tool Mini-CEX (Mini Clinical Evaluation Exercise) as an Evaluation Tool of Nursing Students in Teaching Hospital of Universitas Muhammadiyah Yogyakarta. GSTF J Nurs Health Care [Internet]. 2013 [acesso em 20 janeiro 2020]; 1(1):127-33. Disponível em http://dl6.globalstf.org/index.php/jnhc/article/view/170
25. Amila A, Hasibuan EK, Sinurat LR. The Effectiviness of Mini-Cex Towards Clinical Competency Achievement in Neurological Examination of Clinical Practice Nursing Students. INJEC. 2017;2(2):208-15. http://dx.doi.org/10.24990/injec.v2i2.159
26. Huang SY. The Experience of Mini-Clinical Evaluation Exercise (Mini-Cex) of Nursing Education for Clinical Preceptors. BMJ Open. 2015;5(Suppl1):A1–A53. http://dx.doi.org/10.1136/bmjopen-2015-forum2015abstracts.89

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