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Clinical simulation and training for Advanced Nursing Practices: an integrative review

Simulação clínica e treinamento para as Práticas Avançadas de Enfermagem: revisão integrativa
Simulación clínica y capacitación para las prácticas avanzadas de enfermería: revisión integrativa

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Keywords

Simulation training; Simulation; Teaching; Advanced practice nursing

Descritores

Treinamento por simulação; Simulação; Ensino; Prática avançada de enfermagem

Descriptores

Entrenamiento simulado; Simulación; Enseñanza; Enfermería de práctica avanzada; Revisión

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Abstract

Objective: Analyze the contribution of clinical simulation use as a teaching and training strategy of advanced nursing practices.

Methods: An Integrative Review was undertaken through a search in the databases Embase, LILACS, PubMed, and e Scopus, using the descriptors and key words *Advanced practice nursing AND simulation*.

Results: Sixty-eight articles were identified; after the exclusion of repeated articles and studies that did not answer the guiding question, 11 articles were analyzed. The data evidenced that simulation permitted an in-depth investigation to assess the students' performance in advanced practice nursing, concerning the approach of the patient and leadership; this method helped the student to take responsibility in decision making, to guide patient care, direct the team, interact with the family, besides demonstrating leadership, prioritization, delegation, collaboration and professionalism.

Conclusion: The studies analyzed evidenced that clinical simulation contributed to the teaching of advanced practice nursing, enhancing the clinical awareness and competency building for advanced clinical management, leadership and teamwork skills; most studies involved postgraduate students.

Resumo

Objetivo: Analisar a contribuição do uso da simulação clínica como estratégia para o ensino e treinamento das práticas avançadas de enfermagem.

Métodos: Foi realizada uma Revisão Integrativa e feito as buscas nas bases de dados Embase, LILACS, PubMed, CINAHL e Scopus, com os descritores e palavras-chaves *Advanced practice nursing AND simulation*.

Resultados: Foram identificados 68 artigos; após serem excluídos os duplicados e os que não respondiam à questão norteadora, foram analisados 11 artigos. Os dados evidenciaram que a simulação permitiu um exame aprofundado para avaliar o desempenho dos alunos nas práticas avançadas em relação a abordagem do paciente e liderança; este método auxiliou o aluno a assumir responsabilidade nas tomadas de decisões, a conduzir os cuidados com o paciente, a direcionar a equipe, interagir com a família, além de demonstrar liderança, priorização, delegação, colaboração e profissionalismo.

Conclusão: Os trabalhos analisados evidenciaram que a simulação clínica contribuiu para o ensino das práticas avançadas de enfermagem aumentando a consciência clínica e o desenvolvimento de competências para manejo clínico avançado, habilidades de liderança e de trabalho em equipe; a maioria dos trabalhos foram realizados com pós-graduandos.

Resumen

Objetivo: Analizar la contribución del uso de simulación clínica como estrategia de enseñanza y capacitación en prácticas avanzadas de enfermería.

Métodos: Se realizó una revisión integrativa con búsquedas en las bases Embase, LILACS, PubMed, CINAHL y Scopus, con los descriptores y palabras clave *Advanced practice nursing AND Simulation*.

Resultados: Se identificaron 68 artículos; luego de excluirse los duplicados y los que no respondían a la pregunta orientadora, fueron analizados 11 artículos. Los datos evidenciaron que la simulación permitió un examen profundizado para evaluar el desempeño de los alumnos en las prácticas avanzadas respecto al abordaje del paciente y el liderazgo; este método ayudó al alumno a asumir la responsabilidad en la toma de decisiones, a encargarse de la atención del paciente, a dirigir al equipo, interactuar con la familia, además de demostrar liderazgo, priorización, delegación, colaboración y profesionalismo.

Conclusión: Los trabajos analizados evidenciaron que la simulación clínica contribuyó a la enseñanza de las prácticas avanzadas de enfermería, aumentando la consciencia clínica y el desarrollo de competencias para manejo clínico avanzado, habilidades de liderazgo y de trabajo en equipo. La mayor parte de los trabajos fue realizada con alumnos de posgrado.

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Introduction

Advanced Practice Nursing (APN) constitutes a look at the professional practice that is expanding, both in terms of the number of people and areas of practice. The concept of ANP arose in the early twentieth century in the United States, in response to a series of sociopolitical events that generated new demands on nursing professionals.^(1,2)

Similarly, experience in the development of APN in different countries indicates that its implementation occurred in response to a need to reduce costs, improve access to health care, and reduce the waiting time of health service users.⁽³⁾ The incorporation of APN in these countries required drastic changes in the legislation and regulation of professional practice though, as well as transformations of scenarios for professional action and changes in the characteristics of nurses' training.⁽⁴⁾

Currently, the way APN is carried out throughout the world varies among the countries and their respective legislations, and places such as the United States and Canada present this well-founded practice. In Brazil, on the other hand, the agreement for its implementation and creation of strategies to train nurses for APN started only in 2016.^(3,5-7)

Because of this varied state of development and the range of practices involved, defining the term "Advanced Practice Nursing" is a complex task.^(3,5) The different definitions rest on the considerations of the International Council of Nursing (ICN), in particular as regards the peculiarities of each context.⁽⁵⁾

According to this Council, the concept of APN involves a specialized knowledge base, the gaining of skills such as critical thinking and the ability to make complex decisions and technical skills. In addition, nurses are recommended to obtain a master's degree in order to be able to exercise APN.⁽⁶⁾ The attributes of this concept involve clinical expertise, leadership, autonomy and role development, the latter recognizing and presenting both the extension and expansion of the nurse's functions.⁽⁸⁾

The contributions of APN are well documented and internationally acknowledged, the benefits being focused on increasing the quality of care pro-

vided to health service users, expanding the access of users to health resources and coverage, cost reduction, strengthening of nursing work, obtaining good outcomes from nurses' activities, qualification of health promotion practices, disease prevention and rehabilitation, in addition to being associated with high satisfaction levels of the users these professionals cared for.^(4,9,10) In addition, APN has the potential to contribute significantly in the provision of quality care to patients and families, whether in acute care or in the community.⁽¹¹⁾

The nature of APN, as structured by ICN, includes the following elements: integration of research, education, care practice and management; high degree of professional autonomy for independent use of care practice, case management/own case load, advanced health assessment skills, decision making and diagnostic reasoning, acknowledged advanced clinical skills, provision of consulting services to health providers, planning, implementation and evaluation of health programs and being recognized as the first point of contact for patients.⁽⁶⁾

The results obtained with the activities developed by advanced practice nurses showed an improvement in patients' perceived health and functional status, as well as glucose control, blood pressure and control of dyslipidemia, decreased visits to the emergency department, hospitalization and mortality rates. Also, reduction of cesarean section, episiotomy, labor analgesia and perineal lacerations and reduction of the cost of care.⁽¹²⁾

Considering the dimension of the concept of APN, the Brazilian trend to consider this model of professional nursing care and the skills required from nurses for the actual establishment of this practice, investments are crucial, especially in the training of these professionals to provide for the professionalization of advanced practice nursing.^(13,14)

The recommendations of the International Council of Nurses (ICN) reinforce the importance of investments in the qualification of nurses' advanced practice training, by delimiting that professional training be obtained in postgraduation programs recognized for this function.^(4,6) As a differen-

tial of the curricula focused on APN training, the incorporation of clinical simulation stands out, in the training process as well as in the formative and summative evaluations.⁽¹⁵⁾

Simulation can be understood as an imitation or representation of a simple or complex act or process. Clinical simulation, according to Oliveira, Prado and Kempfer,⁽¹⁶⁾ “comprises strategy, technique, process and tool. To implement it, more than effective simulators are needed; their use needs to be adapted to the simulation method”. In clinical situations, the simulations can contain different goals, including education, evaluation, research and patient safety, beyond the student’s integration into the health system. Besides the intended improvement of health service efficacy and efficiency.⁽¹⁷⁾

For its application in teaching, low, medium or high-fidelity mannequins (patient simulator) can be used, people playing the patient’s role (simulated patient), virtual learning objects (educational software), mixed methods and role-play.⁽¹⁶⁾

The simulated clinical experience can offer greater support to clinical learning, guiding the simulated activities towards specific learning needs and in performance assessment.⁽¹⁸⁾ In addition, it permits the application of clinical judgment and critical thinking towards successful diagnostic and therapeutic reasoning, offers another way of teaching clinical management in primary health care programs, increases the student’s knowledge and confidence in the management of a range of health problems;^(15,19) its advantages characterize clinical simulation as an important tool for the teaching and training of skills related to APN. Hence, the objective in this study was to analyze the contribution of using clinical simulation as a strategy for teaching and training advanced nursing practices.

Methods

The literature review is a type of research that synthesizes results from earlier studies, and thus provides conclusions within a specific theme.⁽²⁰⁾

First, in line with the recommendations of the Joanna Briggs Institute (JBI)⁽²¹⁾, for the items title description, objective, research question, search strategies, inclusion criteria, data extraction and synthesis, the protocol of this review was elaborated (Chart 1). Two researchers carried out the searches separately; then, the results were compared to minimize disagreements.

Chart 1. Integrative review protocol: use of clinical simulation in teaching and training Advanced Nursing Practices

Title: The contribution of clinical simulation in the teaching and training of Advanced Nursing Practices.

1) Objective: Identify and evaluate the use of clinical simulation as a strategy for the teaching and/or training of advanced nursing practices.

2) Guiding question: How has clinical simulation been used for the teaching and/or training of advanced nursing practices?

3) Search strategies

3.1. Database

Database 1: Embase
Database 2: LILACS
Database 3: PubMed
Database 4: CINAHL
Database 5: Scopus

3.2. Search for descriptors and key words – executed in March 2018

Database 1: Embase
Advanced practice nursing (Emtree) AND simulation (Emtree) = 10 articles
Database 2: LILACS
Práticas avançadas em enfermagem (descriptors) AND simulação (descriptors) = 0
Práticas avançadas em enfermagem (words) AND simulação (words) = 0
Database 3: PubMed
Advanced practice nursing (Mesh Terms) AND simulation (Mesh Terms) = 0
Advanced practice nursing (Text words) AND simulation (Text words) = 26 articles
Database 4: CINAHL
Advanced practice nursing (Exact subject) AND simulation (Exact subject) = 0
Advanced practice nursing (Word in subject) AND simulation (Word in subject) = 18 articles
Database 5: Scopus
Advanced practice nursing (Index Terms) AND simulation (Index Terms) = 14 articles.

4) Inclusion criteria:

Population: people who used clinical simulation for the teaching and/or training of advanced nursing practices;
Intervention: use of clinical simulation for teaching and/or training of advanced nursing practices;
Comparison: use of other strategies for teaching and/or training advanced nursing practices;
Results: background for appropriate conducts and decision making;
Studies: original articles and theses presenting the use of simulation for teaching and/or training of advanced nursing practices;

5) Data extraction:

Two researchers fully read the selected studies, when information was extracted on the study design, participants, definition of advanced practice, context and clinical simulation. The disagreements between the extracted results were solved by consensus, including the presence of a third researcher. The extracted information was arranged in a database.

6) Information synthesis:

Each study was analyzed to identify the use and contribution of clinical simulation to the teaching and/or training of advanced nursing practices. The goal is to evaluate how simulation is used in advanced nursing practices.

Source: Elaborated by the authors based on the considerations of The Joanna Briggs Institute, Reviewers’ Manual 2015.⁽²¹⁾

The selection process of the studies was based on the initial reading of the titles and abstracts, studies related to the theme being fully read. When they answered the research question, they were included in the study. This process has been illustrated in figure 1.

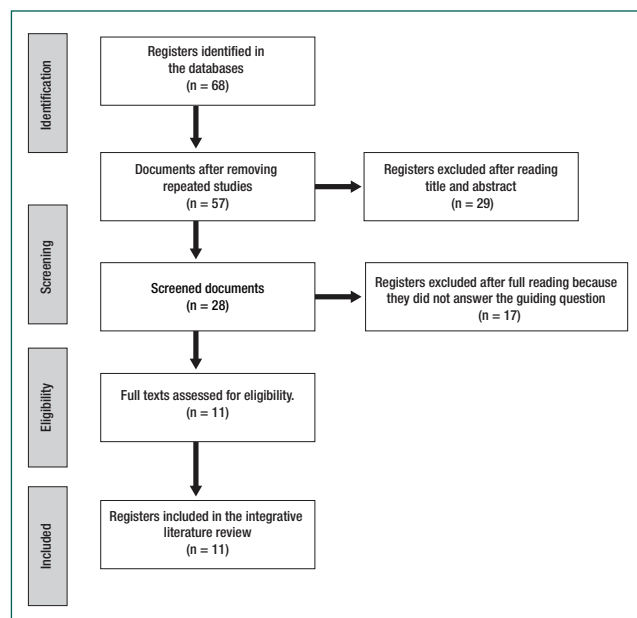


Figure 1. Flowchart of study selection according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses – PRISMA recommendations.⁽²²⁾

Results

In this integrative review, 11 articles were analyzed that complied with the criteria established in the protocol; all were written by nurses and published between 2009 and 2017.

As for the articles' indexation in the databases, seven (63.3%) are indexed in PubMed, three (27.2%) in CINAHL and one in Scopus (9.0%). In the other databases, LILACS and Embase, no articles were found that answered the review question. Concerning the country of origin, ten articles (90.9%) were developed in the United States and one in Singapore (9.1%).

About the research design of the selected articles, three (27.7%) are qualitative studies,⁽²³⁻²⁵⁾ one (9.0%) is an experience report,⁽²⁶⁾ two (18.1%) are pilot studies,^(27,28) one (9.0%) is a quasi-experimental study,⁽²⁹⁾ one (9.0%) descriptive,⁽³⁰⁾ one methodological (9.0%)⁽³¹⁾ and two (18.1%) randomized and controlled clinical trials.^(32,33)

In chart 2, a synthesis of the studies included in the review is displayed.

The highest concentration of articles (83.3%) was in nursing education journals, evidencing the

importance of simulation for learning advanced practice nursing in teaching. The simulation was used to teach and evaluate the specific skills of APN nurses, using dramatic (with standardized patients) and robotic simulations (with high- and medium-fidelity simulators). The simulations were used to train and assess nurses for communication skills, specific for critical care, emergency and medical clinical situations. Of the 11 articles included, ten (90.9%) discussed the use of simulation for teaching and skills training with postgraduate nurses; only one study was focused on the training of advanced practical skills for undergraduates, which supports the definition of advanced practice nursing established by ICN. Furthermore, among the studies analyzed, the definition of APN was pointed out in only two articles (18.2%). The simulation was performed in different scenarios with clinical cases in several specialties, such as gastrointestinal and neurological, neonatal intensive care, postoperative pneumonectomy, chest pain and cardiac evaluation, mechanical ventilation and home care. As for the strategies used in the simulations, in six (54.5%) articles, actors were used in the roles of patients during the scenarios and, in five (45.45%), high-fidelity mannequins were used.

Most of the simulations were evaluated based on what the participants mentioned during the debriefing. In two studies, after the scenario, pre-established guiding questions were asked to determine the contributions of the simulation. In seven studies, the debriefing was essential to assess clinical judgment, cognitive, procedural and leadership skills. The assessment of cognitive knowledge before and after the scenario was performed in two studies, while another evaluated self-satisfaction; and another, physical examination and self-confidence. In view of this, among the studies analyzed, the contributions of simulation to APN were related to the increase of knowledge; development of cognitive, procedural and clinical judgment skills; leadership; collaboration in teamwork and communication skills. This evidences that simulation is a strategy to be used for the teaching and training of Advanced Practices in Nursing in several specialty areas.

Chart 2. Description of studies included in the review by authors, years of publication, participants, context and study design

n	Reference	Design	Participants	Context	Contributions
1	Defenbaugh, Chikotas, 2016 ⁽²³⁾	Qualitative study	Master's students in an APN course (n=15).	Assessed the impact of simulations with actors and facilitators specialized in communication in APN teaching.	The use of simulations with actors permitted learning in a safe and supported environment, improved clinical awareness and communication skills.
2	Benbenek, Dierich, Wyman, Avery, Juve, Miller, 2016 ⁽²¹⁾	Methodological	Nurses studying APN.	Developed, applied and assessed a tool (C-OSCE) to assess training during three years of APN training.	The C-OSCE showed to be a valuable assessment method for clinical competency building and permitted identifying weaknesses in the APN training curriculum.
3	Kowitlawakul, Chow, Salam, Ignacio, 2015 ⁽²⁴⁾	Qualitative, descriptive, exploratory study	Master's students in an Acute Care Program (n=7).	Assessed the students' perception on the use of actors and mannequins in simulation.	Simulation involving actors contributed to realistic development, data collection, communication; but was limited to provide the patients' signs and symptoms when compared to simulations using mannequins.
4	Kesten, Brown, Meeker, 2015 ⁽²⁸⁾	Pilot study (effectiveness/feasibility)	Students from a specialization course in critical care with at least two years of clinical experience.	Assessed the feasibility and effectiveness of simulating complex cases in advanced practice competency assessment. The simulation involved mannequin use.	Simulation using complex cases and mannequins permitted improvements in clinical management competencies, use of scientific evidence, patient safety, leadership skills, communication, cooperation and professionalism.
5	Blackburn, Harkless, Garvey, 2014 ⁽³⁰⁾	Descriptive study	Advanced practice professionals in oncology (n=14).	Assessed the best method to measure the professionals' performance of APN in specific oncology situations. Used simulations and practicum.	The simulation demonstrated benefits in knowledge gaining, skills and teamwork, but is limited; although mannequins are easy to use, expertise is required and implementation costs are high.
6	Walton-Moss, O'Neill, Holland, Hull, Marineau, 2012 ⁽²⁷⁾	Pilot study	Newly graduated nurses in APN in the specialties: Primary Health Care and Adult/Elderly Health Care (n=6).	Described the construction, elaboration of a pilot test of a simulation scenario for clinical assessment of adult patient with chest pain and preliminary tests in this scenario.	Simulation permitted encouraging the students to describe the lessons learned before actual patient care practices, granted conditions to develop a clinical history focused on the problem, identification/distinction of clinical changes based on physical examination focused on complaint; development of clinical reasoning and clinical judgment; promotion of patient safety, infection control and effective communication.
7	Jeffries, Beach, Decker, Dlugasch, Groom, Settles, O'donne, 2011 ⁽²⁹⁾	Quasi- experimental	APN students in cardiology (n=36).	Assessed a curriculum based on simulation for postgraduate nursing students in cardiology from four schools, which use simulation for cardiovascular skills training and assessment of cardiovascular skills using OSCE.	The APN students were able to accomplish precise cardiovascular assessments after completing the simulation-based curriculum. Self-confidence increased, as well as technical skills. The strategy was considered important for technical and diagnostic reasoning skills.
8	Corbridge, Robinson, Tiffen, Corbridge, 2010 ⁽³²⁾	Experimental pre and post-test	APN students in adult health, geriatrics and acute care (n=20).	Verified the difference in knowledge gained and satisfaction of APN students about mechanical ventilation using two educational method, high-fidelity simulation and an online class with PowerPoint presentation.	The study appointed that learning was equivalent, independently of the teaching method, but simulation offered greater satisfaction with the learning experience.
9	Richardson, Resick, Leonardo, Pearsall, 2009 ⁽²⁵⁾	Qualitative study	Undergraduate nursing students (n=22) and postgraduate students (n=20).	High-fidelity simulation with standardized actors for clinical skills assessment of APN students through OSCE. The objective was for nursing students to discover the benefits of being a standardized patients. The scenarios consider the competencies for data collection, diagnostic skills and communication.	The study highlighted that the students, as standardized patients, and APN students presented development in the cognitive and psychomotor domains. Being a standardized patient allowed the students to understand what nursing practice and the activities of APN are like.
10	Tiffen, Graf, Corbridge, 2009 ⁽³³⁾	Experimental before and after	Nurses studying APN (n=32).	Assessed the use of low-fidelity simulators for teaching heart and lung assessment skills.	The simulation experience increased the confidence and improved the health assessment skills in the group of nursing students in advanced practice training.
11	Aronowitz, Aronowitz, Mardin-Small, Kim, 2017 ⁽²⁶⁾	Experience report	Undergraduate nursing students enrolled in APN course.	Assessed the use of OSCE to teach communication skills at a medical institution in the USA, in teaching nursing undergraduates enrolled in APN course.	The OSCE showed to be a tool with benefits for advanced practice teaching and assessment, promoted effective learning with situations similar to clinical practice; training in stations reduced anxiety about reality. In addition, it appointed that the implementation starts with basic cases and evolves with increased complexity, which permitted better critical thinking.

Discussion

The articles studied highlighted clinical simulation as an effective strategy for the teaching and evaluation of APN in the past ten years. This strategy allows the individual to experience a situation similar to the practice through laboratory activities, which stimulates the use of clinical reasoning, decision making and team management.

A study conducted with postgraduate nursing students evaluated the care management competencies, revealing that the simulation allows a more in-depth examination to assess students' performance in advanced practices in relation to patient approach and leadership; pointed out that the student was able to take responsibility in decision making and patient care, directed the team, interacted with the family and demonstrated lead-

ership, prioritization, delegation, collaboration and professionalism.⁽²⁹⁾

The same happened in another study from Singapore, also involving graduate students, in the evaluation of the physiological, neurological and gastrointestinal alterations in severe patients, represented by actors; the participants affirmed that this is a very useful strategy, mainly for the development of data collection and communication skills and for preserving realism, as the actors acted similarly to the real patients.⁽²⁴⁾

The use of actors in simulation of advanced practices has been effective, not only for the nurse acting in the scenario, but for the actors, as the learning acquired during the scene is valid. Nursing undergraduates who participated in a simulation interpreting patients reported that the experiments were successful, providing preparation for clinical practice.⁽²⁵⁾

Simulators are often used in clinical simulations. With the purpose of developing a simulation scenario of advanced practice nursing, postgraduate students in the advanced health assessment course used SimMan®, a high-fidelity dummy, for primary care, in which the student should evaluate if the chest pain was cardiac or non-cardiac. In each simulation, three students participated and the participants reported the feeling of being in a real situation⁽²⁷⁾. The use of high-fidelity simulation enhances patient safety and favors the teaching of advanced nursing practice.⁽³⁴⁾

Another study, with the objective of evaluating technical and non-technical skills in advanced nursing practices in cancer patients, used a simulator. Participants reported being an excellent way to provide real-time scenarios.⁽³⁰⁾

The Harvey cardiology simulator, a remote-controlled torso with cardiopulmonary sounds, was used to evaluate an educational intervention. Therefore, postgraduate students received a CD-ROM with sounds of cardiologic alterations; before going to the simulated scenario, they took two pre-tests evaluating cardiovascular cognitive knowledge, physical assessment skills and a self-confidence questionnaire. Two weeks after the educational intervention, each participant answered two post-

tests with the same variables. The study demonstrated that this intervention increased self-confidence in the participants' ability to perform cardiovascular assessment and clinical reasoning skills ($p < 0.05$) as measured by the Cardiopulmonary Assessment Skills Verification instrument.⁽²⁹⁾

The study by Corbridge et al. (2010)⁽³²⁾ compared simulation and online class in teaching students advanced nursing practices in the use of mechanical ventilation. The students in the control group attended an online class, while those in the experimental group made use of the simulation; this group, at the end of the activity, presented greater student satisfaction ($p < 0.0001$) with the learning method. The same result was also obtained in the study by Richardson et al. (2009),⁽²⁵⁾ when comparing simulation with distance learning, as in Tiffen, Graf, Corbridge (2009),⁽³³⁾ who compared it to traditional classes.

The heterogeneity of the scenarios used in the simulations demonstrates that, despite being initially developed for primary care services, advanced practice nursing has been used in more complex scenarios, which emphasizes the expansion and extension of activities, characteristics of these practices.⁽⁸⁾

It is important to mention that only two of the 11 papers analyzed presented some definition of APN. This data is relevant when considering the complexity of this concept and its variations around the world. One American study points to APN as the practice in which nurses take on the direct or indirect management of patient care, which can be developed by nurse practitioners, clinical nurse practitioners, obstetric nurses.⁽²⁷⁾ The other study, also North-American, does not clearly describe APN, but presents it as a deliberate practice, a teaching method based on evidenced and on the processing of information and behavioral theories for skills gaining and maintenance.⁽³²⁾

Simulation is an efficient way used in continuing education and it is important for nursing staff to remain competent in high-risk, low-frequency procedures.⁽³⁵⁾ Along with clinical simulation, the OSCE (Objective Structured Clinical Examination) tool is

a viable, acceptable and valuable strategy as an assessment method to ensure that Advanced Practice Nursing students find the skills needed for teaching and evaluation, commonly used in nursing.⁽³¹⁾

In view of the complexity of APN, simulation shows itself as an appropriate tool for teaching these skills, being dynamic, providing a real view of clinical situations within a protected and controlled environment.

This review is limited by the restricted number of studies with research designs that provide results with strong evidence, besides including studies with reduced information as to the number of participants included. The findings presented are able to answer the guiding question, to know how clinical simulation has been used for teaching and/or training of advanced nursing practices.

Conclusion

The study aimed to identify how the use of clinical simulation contributes as a strategy for teaching and training advanced nursing practices through an integrative literature review. Clinical simulation contributed to the teaching of APN with better clinical awareness, development of advanced clinical management competencies, including leadership and teamwork skills. In addition, it contributed to the filling of learning gaps, stimulated the use of scientific evidence and the development of clinical reasoning. Thus, it was evidenced that simulation is an effective teaching tool and enhances student safety during care, which in turn favors the teaching of advanced practice nursing. The precise definition of APN remains a challenge, as the concept needs to be better explored in its different activity areas, in various countries, thus contributing to the development of the practice.

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