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## Simulation as an active methodology for the education of students in nursing: an integrative review

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### ABSTRACT

**Objective:** identify the knowledge produced and published about the types of simulations used as an active methodology, with nursing students for the teaching of pressure lesion (PL) evaluation. **Method:** study of the integrative literature review type. **Results:** although there are few studies on the subject, they showed that Brazil appears as a leader in clinical research publications on nursing education in PL evaluation, using simulation as an active methodology. **Conclusion:** educational institutions should encourage research to produce new strategies or enhance what already exists in the scientific community, generating an impact on nursing practice and care.

**Descriptors:** Simulation Training; Educational Models; Nursing Students.

## INTRODUCTION

The nursing teaching on pressure lesion (PL) begins during the theoretical and practical classes in Nursing, enabling the learning process of care for prevention and treatment of PL. This lesion is defined as an injury located on the skin and/or underlying tissue or structure, usually over a bone prominence, resulting from isolated pressure or pressure combined with friction and/or shear<sup>(1)</sup>.

In the process of training nurses during graduation, students in nursing should develop skills to provide qualified care to individuals at risk of developing PL or who have presented wounds during care practice.

The entire educational network, including nursing teachers, needs to introduce active methodologies and new strategies in teaching-learning, not excluding the traditional model of teaching<sup>(2)</sup>. Since the teaching of PL is sometimes complex, and in view of the differentiation of the tissue and the various actions that the nurse must know in order to intervene competently, the active methodologies can favor such learning, in addition to experimenting with the content.

Facing the evolution of nursing, with a practice based on scientific evidence that favors decision making in the various work environments, there is a need for a careful selection of active methodologies for teaching-learning in its training process, especially with regard to the qualification of students in PL evaluation. Such methodologies should stimulate dialogue, student participation and understanding of the various aspects involved in the content, promoting learning from a more liberating, creative, reflective, constructive and questioning approach to the content.

Thus, for these objectives to be achieved, the teacher needs to know the various active methodologies, such as simulation.

The simulation has been widely used in the nursing educational system, contributing to the improvement and dynamization of the teaching-learning process of several contents, such as the PL. Therefore, it has been required and stimulated in the training courses as a methodology capable of interfering positively<sup>(3)</sup>.

In the context of teaching and learning in nursing, simulation has the power to place students in an environment close to what they will face in the reality of injury care, generating reflection and problematization of content. This is because the students will be exposed to the problem and will be stimulated to solve it, besides integrating the complexities of practical and theoretical learning with the opportunity for repetition, feedback, evaluation, and reflection<sup>(4)</sup>.

In addition, the simulation can enable students to immerse themselves in interactive and safe environments to develop the Nursing Process (NP) and become familiar with the Systematization of Nursing Care (SNC), since its use facilitates the acquisition of skills for systematic and quality care for patients with PL. Furthermore, the simulation favors the reduction of learning costs in clinical fields, reduces patients' exposure to unnecessary risks and reduces the costs of hospitalizations resulting from the incorrect evaluation of injuries<sup>(5)</sup>.

When the student has previous contact with PLs through simulation, anxiety is reduced and he presents better self-confidence, attitudes and skills for clinical practice. In this

perspective, the role of the teacher/facilitator should be judicious in terms of originality, reality, complexity and resources available for the development of the simulation<sup>(6)</sup>.

To enhance simulated PL practice, teachers can use different artifacts, such as: games, anatomical models, puppets, written cases, three-dimensional models, computer software, standardized patients/actors, low and medium fidelity mannequins, or high fidelity patient simulators/mannequins<sup>(7)</sup>. Make-up techniques, blood plates and food can also be used, as they can demonstrate the characteristics of exudate and/or the smell of an infected lesion. These resources help the process of teaching, learning and updating professionals in injury prevention and treatment<sup>(2)</sup>.

In this context, simulation presents itself as an active methodology capable of positively transforming the PL teaching-learning process from the simulated scenarios and the resources employed. The simulated injury scenarios promote a reflective environment for the student, and may incorporate clinical elements essential to the treatment of the wound and/or prevention of its occurrence, not only focused on the development of technical skills in performing dressings and use of coverings, but intended for patient care<sup>(2)</sup>. Therefore, the objective of this study is to identify the knowledge produced and published about the types of simulations used as active methodology, with nursing students for teaching PL evaluation.

## **METHOD**

An integrative literature review-type study was carried out. This method makes it pos-

sible to analyze the existing literature, providing a comprehensive understanding of a given study object<sup>(8)</sup>. This review followed the PRISMA guidelines.

The selection of studies was made from the survey of works indexed in MEDLINE/PubMed, LILACS, BDNF, CINAHL and SCOPUS, using the following descriptors: *Tecnologia educacional/Educational technology OR Simulação/Simulation training AND Lesão por pressão/Pressure ulcer*. The search took place in December 2018, and the articles published from 2014 were included.

The guiding question considered was: what types of simulations are used as active methodology with nursing students in teaching PL evaluation? Articles that did not specifically address the types of simulations used as active methodologies in nursing teaching were excluded.

The analysis and interpretation of the data were carried out through the exploratory reading of the studies, whose purpose was to verify the relevance of the scientific material. Then, a selective reading was performed for the composition of a theoretical framework that answered the guiding question and the objective of the study. The process culminated in the extraction of the articles described in this study.

The evidence-based practice advocates classification systems, depending on the methodological approach adopted, which is based on the study design. In this study, publications were evaluated according to the Oxford Centre for Evidence-Based Medicine classification<sup>(9)</sup>.

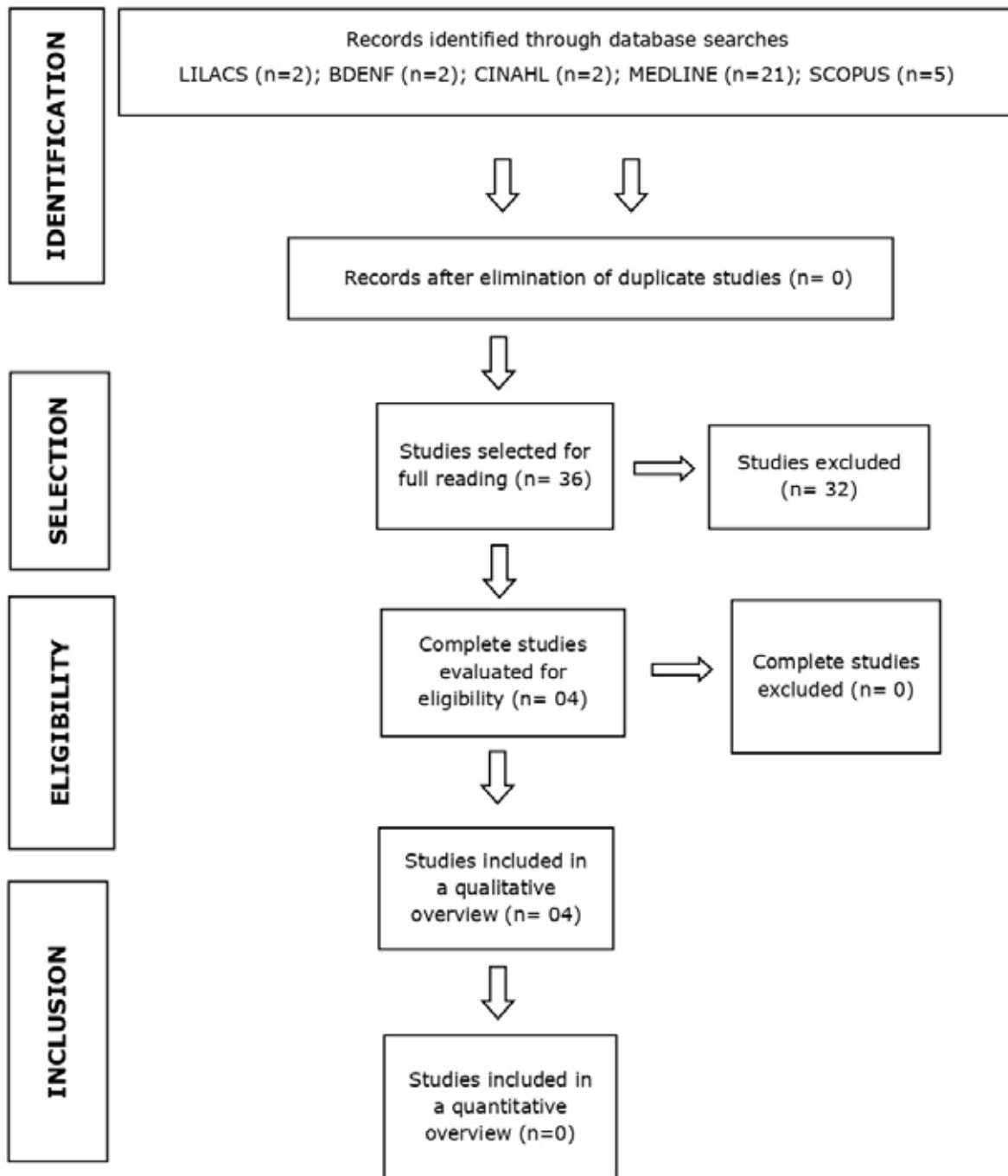
The studies were divided into two categories for analysis: High-fidelity simulation as an

active methodology for teaching nursing; and Qualification of nursing students for PL evaluation through simulation.

## RESULTS

The sample comprised four studies, as shown in the publication selection flowchart (Figure 1).

A total of 36 articles were identified, six at LILACS, two at BDNF, two at CINAHL, 21 at MEDLINE/PubMed, and 05 at SCOPUS. Of these, 32 were excluded because they did not refer to the subject under study or did not answer the guiding question. There was no duplication of articles. Thus, 04 articles



**Figure 1** – Selection flowchart of the articles analyzed. Niterói, RJ, Brazil, 2018

Source: Elaborated by the authors, 2018.

were selected that constituted this integrative review<sup>(10-13)</sup>.

Figure 2 below characterizes the articles in title, journal, year of publication, country, and level of evidence.

Regarding the origin of the studies, one was developed in Spain<sup>(12)</sup> and three were developed in Brazil<sup>(10,11,13)</sup>, of which two were in the state of São Paulo. This greater recurrence in Brazil, especially in the state of São Paulo, is justified by the interest of Brazilian universities in the subject and the simulation methodology.

Two studies<sup>(10-11)</sup> were found to be case reports with level of evidence 4. A randomized clinical trial type study (level of evidence 2)<sup>(12)</sup> and a study with applied descriptive research with level of evidence 4 were also observed<sup>(13)</sup>.

Two of these studies are aimed at teaching PL evaluation from a cost management perspective. The other studies focus on nursing students, in the development of knowledge, skills and attitudes fundamental to nursing care with PL.

An important fact regarding the type of simulator revealed that the four studies used

high fidelity or complexity simulation, and the virtual learning environment through computing is used by three studies as a way to simulate patients and pressure lesions for students<sup>(11-13)</sup>. It should be noted that only one study used scenic simulation with people playing the role of patient<sup>(10)</sup>.

The descriptors identified in the studies included a total of 19 terms, present in the Health Science Descriptors (DeCS) vocabulary. Among them, the most recurrent can be cited: nursing education, educational technology, nursing, and simulation.

The authors of the studies totaled 20 researchers. Of these, 14 were nurses, two were nursing students and four came from other professions. When explored the area of operation of the 14 nurses, 12 were teachers of higher education.

The review allowed identifying that there are few studies on the subject. However, in the scientific literature, among the four articles selected, three of them showed that Brazil appears as the leader of clinical research publications on nursing education in the evaluation of PL using simulation as an ac-

Title	Journal	Year	Country	Level of Evidence
Teaching of pressure injury prevention and treatment using simulation <sup>(10)</sup>	Esc. Anna Nery Rev. Enferm	2018	Brazil	4
Integration of digital technologies in nursing education: creation of a clinical case on pressure ulcers with the SIACC software <sup>(11)</sup>	Reciis – Rev Eletron Comun Inf Inov Saúde	2017	Brazil	4
Effectiveness of an e-learning tool for education on pressure ulcer evaluation <sup>(12)</sup>	Journal of Clinical Nursing	2014	Spain	2
Virtual learning environment on dressing cost management in pressure ulcers <sup>(13)</sup>	Revista Eletrônica de Enfermagem	2014	Brazil	4

**Figure 2** - Characterization of the articles. Niterói, RJ, Brazil, 2018

Source: Elaborated by the authors, 2018.

tive methodology<sup>(10,11,13)</sup>, followed by Spain, as revealed in the study<sup>(12)</sup>.

After reading, analysis and synthesis of the articles content, two thematic categories were identified about the types of simulations used as active methodology for the education of nursing students on PL evaluation: High Fidelity Simulation as active methodology for teaching nursing; and Qualification of nursing students for LP evaluation through simulation.

## DISCUSSION

### High-fidelity simulation as an active methodology for teaching nursing

Among all the studies analyzed, the effectiveness of the use of high-fidelity simulators, the scenic simulation as an active methodology in learning and the acquisition of nursing students' skills for clinical practice are highlighted. The studies demonstrate that simulation favors student learning in terms of SNC and the development of NP.

The choice of high-fidelity simulators presents a high degree of approximation to reality, including computerized simulators of human patients, interactive, with spontaneous breathing and physiopathological responses close to the real ones, different from the medium-fidelity simulators (intermediate technology, lung and heart sounds) and low fidelity simulators with static mannequins, without interaction<sup>(14)</sup>.

In the studies<sup>(10-13)</sup> of high fidelity simulation as an active methodology for teaching nursing, it was identified that the high fidelity scenario, when properly planned and implemented, provides benefits in learning by establishing a theoretical-practical correlation of contents, in addition to contributing to the

confrontation of situations that the student will face in clinical practice, different from the traditional model with expository classes. Such situation enhances their decision making, self-confidence and skills to promote qualified care, not exposing the patient to unnecessary risks.

In this perspective, it is suggested to train professionals with an integral and holistic vision of care. The integration of the simulation of high fidelity as an active methodology in the teaching of nursing can contribute as an alternative method to meet the new national curricular guidelines. The guidelines recommend professional training compatible with constitutional and international health promotion benchmarks, and that students who have graduated from the courses may act with quality, effectiveness and resolution in the Unified Health System (SUS — *Sistema Único de Saúde*)<sup>(15)</sup>.

In one of the studies, there is the demonstration of a scenic simulation for the development of the simulated scenario, in which a graduate student took the role of patient<sup>(10)</sup>. To build the scenario, some of the scenic simulation resources can be used, such as clothing and personal utensils of real patients (personal hygiene materials, books, religious articles, among others), bringing them closer to the real environment. Besides these resources, one can enhance the scenario's fidelity, the use of artistic makeup, body painting or even graphic printing to reproduce lesions, bruises, traumas, burns, among others<sup>(7)</sup>. Thus, the use of various resources allows portraying clinical cases of daily life of nurses and nursing care.

Nursing care, from the NP and the SNC, can reduce complications during treatment in order to facilitate the patient's adaptation and recovery. The elaboration of the clinical case, using simulation as an active methodology, allows students to develop critical thinking skills, using the SNC, defined as "a scientific methodology available to the nursing professionals to apply their technical-scientific and human knowledge in the care of patients"<sup>(16)</sup>. The implementation of the SNC is still a challenge in nursing. It should be stimulated since graduation with nursing students. Thus, it may contribute to the organization of the work of the nurse in terms of method, personnel and instruments, so that it is possible to operationalize the NP, which is organized by the stages of data collection, nursing diagnosis, care planning, implementation and evaluation of results<sup>(16)</sup>. During the clinical case, as seen in some studies, the students are inserted in the stages of the process, verifying the nursing diagnoses pertinent to the patients, besides the results and the corresponding interventions, facilitating the integration between the theoretical and practical knowledge in the disciplines of nursing fundamentals.

### **Qualification of nursing students for the evaluation of pressure injuries through simulation**

It was noted in the studies that the simulation was used in the teaching of nursing students throughout the evaluation of an injury as prevention, treatment and cost evaluation, in order to qualify the student to deal with real patients with PL in clinical practice<sup>(10-13)</sup>. The review allowed identifying that, in three

of the four studies<sup>(10-12)</sup>, the focus was on the theme of evaluation, prevention and treatment, in addition to the focus on the evaluation of costs with the treatment of patients with PL, as evidenced in one of the studies<sup>(13)</sup>. Therefore, some comments are relevant. The first concerns the insipience of clinical studies that address the assessment of characteristics in a broader way. The second observation is about the need for studies aimed at PL prevention.

Assessment of injury characteristics is performed by nurses within health care facilities and skills for such assessment should already be acquired during graduation to avoid misguided interventions and harm to patients. Nurses assess a wound, considering the type of bed tissue, location, extension (length and width, depth or tunnel), secretion/exudate (quantity, appearance, odor), edge (regular or not, macerated, hyperkeratosis, epithelialization), perilesional skin (integral, injured, resected, hyperpigmented, hyperemia, phlyctenas) and pain<sup>(17)</sup>. Thus, a good evaluation of PL is considered an essential parameter for its diagnosis and treatment<sup>(18)</sup>. However, the studies analyzed present limitations regarding the teaching of PL staging, characteristics of the different tissues and exudates that an injury may present.

In the treatment of PL, according to evidence from studies<sup>(10-12)</sup>, knowledge of the various types of coverage and the performance of dressings by students in the simulation environment is essential for learning. This will provide students with conditions to identify the treatment of patients with PL, qualifying them for clinical practice in which the evolution of wound healing influences the length of

stay of patients and the costs to health care institutions. Proper treatment depends on good evaluation; therefore, if this evaluation is wrong, it will result in a possible increase in the extension of the injury, as well as in the cost and time of treatment, generating pain<sup>(19)</sup>. Only one study cited PL prevention in nursing education, but with little data on how to avoid these injuries in the clinical case presented<sup>(11)</sup>. It is known that to avoid PL, measures such as changing decubitus and positioning, pressure relief in areas of bone prominence, skin care, nutritional intake and moisture control can be used. In addition to these, the nurse needs a systematic evaluation, with instruments available in the international domain, such as the Braden Predictive Scale.

The Braden Scale has the purpose of identifying people vulnerable to the development of PL, composed of six sub-scales that reflect the sensory perception, skin moisture, nutritional status, degree of activity and mobility, and exposure to friction and shear. The sum of the scores results in values between six and 23, and the lower the score, the higher the risk for the event to occur<sup>(17)</sup>.

In nursing care, the Braden Scale presents itself as an important step to avoid the development of PL. However, there is a lack of preparation of professionals for a systematic evaluation and a care plan aimed at preventing the problem. This situation highlights the need for qualification of nurses since graduation, in order to know and use means to help prevent PL. The understanding of the various pedagogical roles within the teaching and learning process only facilitates the approximation between theory and practice, and this

conduct should start from the subjects that are part of this reality<sup>(17)</sup>.

## CONCLUSION

In this integrative review, the authors identified different simulation application formats as an active methodology for qualification of nursing students for PL evaluation. The different materials that can be used in simulation make teaching more dynamic and enable the use of active learning methods, breaking with traditional teaching through expository classes, making the students problematizers, capable of making decisions and being subject to the (re)construction of knowledge. In the analysis of the articles, it was highlighted that, in all studies, the teaching of PL is done through the use of high-fidelity simulators, including computerized human patient simulators and the use of scenic simulation resources, with the use of actors, students and professionals. This characterization is what we call simulated patients. Thus, such formats contribute to the teaching of nursing skills, improving the theoretical-practical correlation.

It is clear the importance of the continuous training of teachers and the institutional support for the preparation of well outlined scenarios for an effectiveness of the objectives of the simulation, in which it allows students to enter the simulated reality and evaluate the different aspects needed in a patient with PL. Once the students have demonstrated ability and safety, they will be referred to perform the procedure in a real patient, allowing the reduction of the student's anxiety and improving their self-confidence, for a better quality of care.



The elaboration in the clinical case format was unanimously chosen by researchers in all studies, allowing students to develop critical skills and thoughts, favoring familiarization since graduation with PE and SAE. However, some studies analyzed are limited and do not allow a broader evaluation of some injury characteristics, such as the different types of tissues and exudates that a PL can present. In addition to these limitations, the structure of the educational institution, teaching staff, and the cost of acquiring or developing the active methodology should be analyzed.

The recommendations for teaching are based on the need for nursing degree courses to analyze the most adequate and effective resources to be used in their reality, associating the best methodology for qualification of students, as in the content of PL. Similarly, teaching institutions should encourage research to produce new strategies or improve what already exists in the scientific community about teaching nursing through simulation as an active methodology, generating impact in nursing practice and care.

As a limitation of this study, the authors highlight the small number of articles found that would enable a broader discussion and with greater scientific evidence on the subject investigated. This fact is justified by the process of development and knowledge regarding simulation as an active methodology, mainly in what concerns to teaching PL for the qualification of nursing students. The lack of standardization in nomenclature, both in descriptors and skills, has also restricted the range of searches.

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Received: 08/24/2019

Revised: 03/27/2020

Approved: 04/24/2020

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Brazilian Journal of Nursing



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