

## SIMULATION OF BASIC PROCEDURES FOR STUDENTS OF THE FIRST SEMESTERS OF UNDERGRADUATE NURSING

## SIMULACIÓN DE PROCEDIMIENTOS BÁSICOS PARA ESTUDIANTES DE LOS PRIMEROS SEMESTRES DE PREGRADO EN ENFERMERÍA

## SIMULAÇÃO DE PROCEDIMENTOS BÁSICOS PARA ALUNOS DOS PRIMEIROS SEMESTRES DA GRADUAÇÃO EM ENFERMAGEM

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**ABSTRACT**

To evaluate the perception of nursing students about the use of realistic simulation of basic Nursing procedures for first-year undergraduate students to acquire skills. This is a quasi-experimental study. The study sample consisted of 49 participating students. Data analysis was performed using the Shapiro-Wilk normality test and Student's t test. When analyzing the knowledge category, it can be seen that both in simulation 1 and in simulation 2, the item related to action planning had the highest average. The skill category in simulations 1 and 2 had the highest average related to skill in nursing techniques and procedures, showing that even in the initial semesters, through the simulation students felt able to perform the procedure. In the attitude category, in both simulations, the highest average was for the item interest in learning. Comparing the means of knowledge, skill and attitude in simulation 1 and 2, it can be inferred that although there is a difference between the means, from the first to the second moment, described by the t value. The p-value confirms that there is no statistically significant difference between the means. The simulation proved to be an effective teaching tool, facilitating the consolidation of knowledge and arousing greater interest on the part of students. The use of simulated practices requires permanent training of teachers to strengthen the use of this methodology.

**Keywords:** Nursing; Simulation; Nursing education.

**RESUMEN**

Evaluar la percepción de los estudiantes de enfermería sobre el uso de simulación realista de procedimientos básicos de Enfermería para estudiantes de primer año de graduación. Este es un estudio cuasi-experimental. La muestra del estudio estuvo conformada por 49 estudiantes participantes. El análisis de datos se realizó mediante la prueba de normalidad de Shapiro-Wilk y la prueba t de Student. Al analizar la categoría de conocimiento, se puede observar que tanto en la simulación 1 como en la simulación 2, el ítem relacionado con la planificación de la acción tuvo el promedio más alto. La categoría habilidad en las simulaciones 1 y 2 tuvo el promedio más alto relacionado con la habilidad en técnicas y procedimientos de enfermería, demostrando que incluso en los semestres iniciales, a través de la simulación los estudiantes se sintieron capacitados para realizar el procedimiento. En la categoría actitud, en ambas simulaciones, el promedio más alto fue para el ítem interés por aprender. Comparando las medias de conocimiento, habilidad y actitud en la simulación 1 y 2, se puede inferir que si bien existe una diferencia entre las medias, desde el primer hasta el segundo momento, descrita por el valor t. El valor p confirma que no hay diferencia estadísticamente significativa entre las medias. La simulación demostró ser una herramienta didáctica eficaz, facilitando la consolidación de conocimientos y despertando un mayor interés por parte de los estudiantes. El uso de prácticas simuladas requiere de una capacitación permanente de los docentes para fortalecer el uso de esta metodología.

**Palabras clave:** Enfermería; Simulación; Educación en enfermería.

**RESUMO**

Avaliar a percepção dos estudantes de enfermagem acerca do uso de simulação realística de procedimentos básicos de Enfermagem para alunos do primeiro ano da graduação para aquisição de competências. Este é um estudo quase-experimental. A amostra do estudo foi composta por 49 discentes participantes. A análise dos dados foi realizada por meio do teste de normalidade Shapiro-Wilk e o teste t de Student. Ao analisar, a categoria conhecimento pode-se perceber que tanto na simulação 1 como na simulação 2, o item relacionado ao planejamento das ações obteve maior média. A categoria habilidade nas simulações 1 e 2, obteve maior média relacionada a habilidade em técnicas e procedimentos de enfermagem, mostrando que mesmo nos semestres iniciais, por meio da simulação os alunos se sentiram capacitados a realizar o procedimento. Na categoria atitude, em ambas simulações a maior média foi no item interesse em aprender. Comparando as médias de conhecimento, habilidade e atitude na simulação 1 e 2, pode-se inferir que embora haja diferença entre as médias, do primeiro para o segundo momento, descritas pelo valor t. O p-valor confirma que não há diferença estatisticamente significativa entre as médias. A simulação mostrou-se uma ferramenta eficaz de ensino, facilitando a consolidação do conhecimento e despertando maior interesse por parte dos discentes. O uso de práticas simuladas requer capacitação permanente dos docentes para fortalecer o uso dessa metodologia.

**Palavras-chave:** Enfermagem; Simulação; Educação em enfermagem.

## INTRODUCTION

Realistic simulation is an active methodology that allows participants to experience the representation of a situation similar to reality in order to practice, learn, evaluate and/or understand these situations, being considered a strategy that stimulates critical-reflective teaching processes in which students become protagonists of their learning<sup>(1)</sup>.

The use of active methodologies brings the possibility of building new models for health education. One of these methods consist of realistic simulations, which are a strategy that contributes to the acquisition of skills that will reflect on professional performance<sup>(2)</sup>.

The National Curriculum Guidelines for the undergraduate Nursing course emphasize that the structure of the course must ensure, among other demands, in article 14, item V, “the implementation of a methodology in the teaching-learning process that encourages the student to reflect on the reality and learn to learn”<sup>(3)</sup>.

Thus, the use of realistic simulation comprises an active methodology capable of inducing a closer understanding of the

application of the skills developed during the disciplines, in addition to reducing the possibility of errors during professional practice; it becomes the target of research in different scenarios of practice with different levels of complexity<sup>(4)</sup>.

This study aimed to assess the perception of nursing students about the use of realistic simulation of basic Nursing procedures for first-year undergraduate students to acquire skills.

## METHOD

Quasi-experimental study of the type before and after simulated practices. The research was carried out at the Skills Laboratory of the Nursing Department of the Federal University of Ceará (UFC), on two occasions, in October and November 2019.

The population consisted of students regularly enrolled in the first and second semesters of the UFC Nursing course, with a sample of 49 students participating in the first simulation and 38 in the second; It is noteworthy that the audience in both simulations was variable as the students participated according to their availability.

The inclusion criteria were: being regularly enrolled in the first year of the UFC Nursing course and properly filling out the assessment instrument. Incomplete assessment instruments were excluded from the research.

The realistic simulation of the study was aimed at students who had not yet taken courses focused on Nursing procedures, for this reason, the participants observed the simulation performed by the facilitator who performed basic procedures contextualized to problematization. The first simulation involved a venipuncture and medication administration scenario. In the second simulation, it involved changing the first intention dressing on the second postoperative day.

The simulations were planned according to the document “The Development of Evidence-Based Clinical Simulation Scenarios: Guidelines for Nurse Educators”<sup>(5)</sup>, which divides the process into five stages: 1) Define the learning objectives; 2) Measure the level of fidelity of the simulation in relation to the real situation and its degree of complexity; 3) Establish the references that support the theoretical basis of the learning objectives; 4) Guidelines on carrying out the activity; and 5) Time for debriefing.

After the debriefing, the students responded to an instrument, prepared from the competences, being classified using a Likert scale, where the numbers reflect in increasing order the development of the competence, ranging from 1 to 5, with the grade 5 being the expected maximum. The competencies were taken from the National Curriculum Guidelines for the undergraduate Nursing course<sup>3</sup>.

The collected data were organized in the Statistical Package for the Social Sciences (SPSS, Chicago, United States), version 21. The analysis was performed using a descriptive statistical approach and an agreement index. The Shapiro-Wilk normality test was applied to the means of the competence assessment in the simulation 1 and 2; both presented normal distribution ( $p=0.317$ ), giving the possibility of applying parametric tests. The one with  $p$ -value  $<0.05$  was considered significant. The student's  $t$  test was used to compare the means of knowledge, skill and attitude.

The study was approved by the Research Ethics Committee, according to the CAEE protocol: 71186817.5.0000.5054 and opinion number: 3,577,232. All participants signed the Informed Consent Term - ICT, as clarified by the

provisions of Resolution 466/2012 of the National Health Council.

## RESULTS

Forty-nine (49) students participated in the simulations, 41 female (83.7%) and 08 male

(16.3%). In relation to the semester, 29 students from the first semester (59.2%) and 20 students from the second semester (40.8%) participated. Of the total number of participants, only six took a technical course in nursing (12.2%).

**Table 1** – Distribution of means and standard deviation attributed by the participants to the competence KNOWLEDGE in simulation 1 (n=49) and simulation 2 (n=38).

Knowledge	Simulation 1		Simulation 2	
	Mean	SD*	Mean	SD*
<b>Mean and standard deviation Knowledge</b>	<b>4.68</b>	<b>0.522</b>	<b>4.57</b>	<b>0.596</b>
Theoretical-scientific knowledge	4.71	0.500	4.56	0.598
Relationship Theory and Practice	4.78	0.511	4.74	0.498
Clinical-logical reasoning	4.78	0.511	4.56	0.598
interdisciplinary knowledge	4.22	0.848	4.33	0.806
Action planning	4.94	0.242	4.92	0.270
Technology	4.65	0.522	4.33	0.806

Source: Prepared by the authors. \*Standard deviation.

The mean that was most prominent in simulation 1 was knowledge related to action planning 4.94 ( $\pm 0.24$ ) and the lowest mean in this category was interdisciplinary knowledge

4.22 ( $\pm 0.84$ ). In simulation 2, the highest mean knowledge competence was for action planning 4.92 ( $\pm 0.27$ ) and the lowest mean was in interdisciplinary knowledge 4.33 ( $\pm 0.80$ ) and technology 4.33 ( $\pm 0.80$ ).

**Table 2** – Distribution of means and standard deviation attributed by the participants to the competence SKILL in simulation 1 (n=49) and simulation 2 (n=38).

Skill	Simulation 1		Simulation 2	
	Mean	SD*	Mean	SD*
<b>Mean and standard deviation Ability</b>	<b>4.45</b>	<b>0.621</b>	<b>4.39</b>	<b>0.631</b>
Nursing techniques and procedures	4.90	0.306	4.95	0.223
Systematization of Nursing	4.65	0.481	4.54	0.600

Care				
Organization and planning of activities	4.86	0.354	4.92	0.270
Decision making/leadership	4.33	0.718	4.13	0.951
Teamwork development	4.02	0.854	3.49	0.970
Conflict management	3.63	0.809	3.41	1.117
Material resource management	4.82	0.391	4.74	0.498
Time management	4.27	0.974	4.64	0.537
Communication	4.59	0.705	4.69	0.521

Source: prepared by the authors. \*Standard deviation.

As for skill in simulation 1, the item with the lowest rating was related to skill in conflict management 3.63 ( $\pm 0.80$ ), showing indecision about whether or not to agree with the conflict management approach in this simulation. The item with the highest mean was related to skill in nursing techniques and procedures 4.90 ( $\pm 0.30$ ).

Among the skill means in simulation 2, the lowest mean was 3.31 ( $\pm 1.11$ ), showing indecision regarding conflict management. The highest mean in this category was related to skill in nursing techniques and procedures 4.95 ( $\pm 0.22$ ).

**Table 3** – Distribution of means and standard deviation attributed by participants to the competence ATTITUDE in simulation 1 (n=49) and simulation 2 (n=38).

Attitude	Simulation 1		Simulation 2	
	Mean	SD	Mean	SD
<b>Mean and standard deviation Attitude</b>	<b>4.453</b>	<b>0.627</b>	<b>4.485</b>	<b>0.714</b>
Professional attitude	4.78	0.468	4.74	0.503
Patient/team relationship	4.73	0.491	4.55	0.645
Autonomy	4.43	0.764	4.42	0.858
Creativity	3.92	0.886	3.87	1.044
Ethical conduct	4.69	0.508	4.53	0.830
Humanized care	4.67	0.555	4.68	0.574
Interest in learning	4.82	0.441	4.87	0.414
Flexibility	4.31	0.769	4.32	0.739
Sense of initiative	4.47	0.767	4.39	0.823

Source: prepared by the authors. \*Standard deviation.

Finally, the competence attitude had a lower mean of 3.92 ( $\pm 0.88$ ) in the item creativity in simulation 1, evidencing indecision regarding creativity in simulation 1 and the highest mean in the item interest in learning 4.82 ( $\pm 0.44$ ).

In simulation 2, the highest mean in the attitude category was interest in learning 4.87

( $\pm 0.41$ ) and the item with the lowest mean was creativity 3.87 ( $\pm 1.04$ ), demonstrating that students were undecided about this variable, as well as in simulation 1. In general, in Simulation 1 and 2, it appears that the students showed, in most of their answers, agreement with the assessed competences.

**Table 4** – Comparison between the means of knowledge, skill and attitude, simulation 1 and simulation 2.

INDIVIDUAL MEAN	Mean	t	p	
Mean	4.652	1.661	0.108	
<b>KNOWLEDGE</b>				
Simulation 1				
Mean	4.5486			
<b>KNOWLEDGE</b>				
Simulation 2				
Mean <b>SKILL</b>	4.4700	0.843	0.407	
Simulation 1				
Mean <b>SKILL</b>	4.4059			
simulation 2				
Mean <b>ATTITUDE</b>	4.5075	0.16	0.869	
Simulation 1				
Mean <b>ATTITUDE</b>	4.4918			
simulation 2				

Source: prepared by the authors. Student's t p-value.

Comparing the means of knowledge, skill and attitude in simulation 1 and 2, it can be inferred that although there is a difference between the means, from the first to the second moment, described by the *t value*, the *p-value* confirms that there is no statistically significant difference between the means.

## DISCUSSION

Nursing training has sought to add an effective methodology that offers the acquisition of technical-scientific knowledge throughout the entire undergraduate course<sup>(6)</sup>. In this way, the simulation allows students to have a

differentiated experience of practice that cannot be achieved only with lectures.

In this study, it can be seen that most of the participants were female students (83.7%), in line with other studies that used realistic simulation in the context of nursing training, in which most participants also were female, with a mean age ranging between 23 and 24 years<sup>(7)</sup>. The prevalence of women can be explained by the fact that the Nursing course is composed mostly of females.

Only 12.2% of students took a technical course in nursing, which shows that most students had no previous contact with the teaching of Nursing procedures. An experiment with nursing and medical students showed that there was no significant association between previous experience, among students who were in the initial semesters of the course, and the use of simulation<sup>(8)</sup>.

In this research, the participants had no previous experience with the methodology. As they are from the first semesters of graduation and do not have technical skills, the simulation was approached in a different way, bringing a new possibility, where the facilitator performed

the simulated practice and the students participate as spectators.

For some authors, the use of simulation in undergraduate courses includes numerous essential requirements for the construction of knowledge, which are often not experienced during the course, thus providing a unique experience and active reflection on the contents covered<sup>(9)</sup>.

When analyzing the knowledge category, it can be seen that both in simulation 1 and in simulation 2 the item related to action planning had the highest mean. This shows that the students considered the simulations as a source of knowledge on how to plan nursing care.

The insertion of students in the realistic simulation enables the development of competences unexplored in theory, which are exercised through the identification of health needs, care planning and the improvement of cognitive skills<sup>(10)</sup>.

In the context in which the simulations were inserted, they presented only a cut of the reality with a focus on the practice of nurses, thus, it cannot be disregarded that to perform a technique, there is a whole theoretical and

interdisciplinary framework related. In a study with nursing and medical students, simulation made it possible to expand team formation and develop leadership skills when working on human relationships with interdisciplinary actions, reducing human error when applied in the health area<sup>7</sup>.

Interdisciplinary simulations are capable of creating the integrality that is so necessary for patients' care. The simulation prepares the students for clinical practice, shows the importance of teamwork and values the different interdisciplinary practices<sup>(11)</sup>.

The technology item obtained a lower mean in simulation 2, which is somewhat expected, considering that the procedures demonstrated were of low complexity to facilitate understanding by the students.

The low-fidelity simulation allows the execution of simple tasks, while the high-fidelity simulation uses mannequins with sophisticated interactive capacity, reflecting more closely the reality proposed by this teaching method<sup>(12)</sup>. Therefore, low-complexity simulations can be disseminated and widely used because they require less technological resources.

In addition, the association of realistic simulation with the evolution of other health technologies makes it possible to permanently update content, improve technical and non-technical skills, in addition to clinical reasoning, replicating in a safe way and much closer to the real critical situations that may be faced in real life of these future professionals<sup>(13)</sup>.

Self-assessment at the end of the simulated experience allows students to analyze their action and thought processes, emotional state and other information that can enhance their performance in real situations and help to consolidate knowledge<sup>(14)</sup>.

One can perceive the satisfaction of the students in having participated in the simulations, which is extremely relevant for their motivation in relation to the course, in the identification with the profession and in the reduction of factors that contribute to drop out of the university.

The skill category in simulations 1 and 2 had the highest mean related to skill in nursing techniques and procedures, showing that even in the initial semesters, through simulation, students felt that simulation is a means of

enabling them to perform a procedure. In the skill category, it can also be seen that some competencies are directly related and these obtained similar means. An example of this is the organization and planning of activities and the management of material resources, which had low dispersion and shows us a good use of students in this aspect.

The development of these skills has a high impact on Nursing care, as they influence care management, minimize errors and reduce unnecessary costs with material resources.

In this context, the development of technical skills is related to specific procedures and their execution. Non-technical skills go beyond practice, as they involve cognitive and social skills that complement the technique and influence the performance of the professional's practice with quality and safety<sup>(15)</sup>.

At the end of the simulation, there is an increase in students' confidence and greater involvement in relation to their conduct, resulting from the experience of common situations in care, but often impossible in real clinical practice during graduation. Simulation adds dexterity, mental ability, assertive response

capacity, enabling the improvement of skills, combined with the gain of cognitive and psychomotor skills<sup>(16)</sup>.

The item with the lowest mean in the skill category of the two simulations was on conflict management. The simulation proposal had more targeted objectives and some competences were not as developed in this study.

The attitude category in both simulations had the highest mean in the item interest in learning, which demonstrates that the simulation achieved the learning objectives and motivated the students, enabling a more pleasant way of learning.

In relation to the mean of creativity, the students were undecided about the development of this competence. This situation can be explained by the fact that the simulation is observational, where the facilitator provided all the necessary materials and resources, and the students were not responsible for the creative planning of the simulation.

In the simulations, it can be observed, in general, that in the categories knowledge, skill and attitude, in the competences related to individual factors the means were higher and in

the competences that involved the collectivity or interprofessional relationship, such as interdisciplinary knowledge and management of conflicts there was greater variation in the answers and consequently greater dispersion.

Thus, it is relevant to emphasize that although the simulations have not favored the development of these skills, as they are performed by only one facilitator, it is necessary that they be worked on throughout the undergraduate course, so that students can relate theory and practice and know how to resolve conflicts that may arise in their professional practice, the simulations having been an initial immersion for these students who have recently joined the course.

The proposal of the new curricular guidelines is to generate radical changes in academic formation, aiming at the inclusion of new methodologies in the teaching-learning process, where the students play a more active role in the construction of knowledge. This demand also generates the need for teachers to adapt, bringing a challenge that remains to this day<sup>(17)</sup>.

It is essential that educational institutions commit to changing the profile of health professionals, using proposals that bring the development of skills; therefore, realistic simulation is a methodology that can be implemented as a new pedagogical and technological approach, as it allows participants to develop from different perspectives, inducing professional growth<sup>(18,19,20)</sup>.

## CONCLUSION

In the knowledge category, it can be seen that both in simulation 1 and in simulation 2, the item related to action planning had the highest mean. The skill category in simulations 1 and 2 had the highest mean related to skill in nursing techniques and procedures, showing that even in the initial semesters, through the simulation students felt able to perform the procedure. In the attitude category, in both simulations, the highest mean was for the item interest in learning. Comparing the means of knowledge, skill and attitude in simulation 1 and 2, it can be inferred that although there is a difference between the means, from the first to the second moment, described by the t value, the p-value

confirms that there is no statistically significant difference between the means.

The simulation proved to be an effective teaching tool, facilitating the consolidation of knowledge, in addition to arousing greater interest on the part of students. For practices with simulation to take place in a satisfactory way, they must be planned and structured, based on scientific evidence, so they require permanent training of teachers and insertion of students in research to strengthen the use of simulation in teaching practice from the first semesters of the course.

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#### **Author contributions**

1, 2, 3. Contributes substantially to the design and/or planning of the study; 4, 5. Obtaining, analyzing and/or interpreting data; 6. In writing and/or critically reviewing and final approval of the published version.

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