Realistic simulation and its attributes...



# **ORIGINAL ARTICLE**

# REALISTIC SIMULATION AND ITS ATTRIBUTES FOR NURSE TRAINING SIMULAÇÃO REALÍSTICA E SEUS ATRIBUTOS PARA A FORMAÇÃO DO ENFERMEIRO SIMULACIÓN REALISTA Y SUS ATRIBUTOS PARA LA FORMACIÓN DEL ENFERMERO

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#### **ABSTRACT**

**Objective:** to compare the perceptions among the undergraduate nursing students about the skills acquired from the realistic simulation of low complexity. **Method:** this is a quantitative, transversal and analytical study with 55 students. A realistic simulation was applied and then the participants answered a questionnaire. Statistical tests were used for the analysis and data were presented in tables. **Results:** we identified the statistically significant difference on the perception of Nursing Care Systematization (NCS) (p = 0.039). It was found that fourth-graders had a greater perception that realistic simulation develops the skills and knowledge required to perform procedures (p < 0.001). It was verified that the fourth period felt more confident when compared to the ninth period (p < 0.001). **Conclusion:** it is observed that the simulation of low complexity appropriate to the different Nursing semesters contributes to the professional formation, helps in the application of logical reasoning and helps to develop teamwork. **Descriptors:** Nursing; Nursing Education; Simulation; Training by Simulation; Professional Training; Technology.

#### **RESUMO**

Objetivo: comparar as percepções entre os alunos do curso de graduação em Enfermagem acerca das competências adquiridas a partir da simulação realística de baixa complexidade. *Método*: trata-se de um estudo quantitativo, transversal e analítico com 55 estudantes. Aplicou-se uma simulação realística e, em seguida, os participantes responderam a um questionário. Utilizaram-se testes estatísticos para a análise e os dados foram apresentados em tabelas. *Resultados*: identificou-se a diferença estatisticamente significativa sobre a percepção da aplicação da Sistematização da Assistência de Enfermagem (SAE) (p=0,039). Constatou-se que os alunos do quarto período tiveram uma maior percepção de que a simulação realística desenvolve as habilidades e conhecimentos necessários para a execução de procedimentos (p<0,001). Verificou-se, quanto ao domínio do conteúdo da atividade, que o quarto período se sentiu mais confiante, quando comparado aos alunos do nono período (p<0,001). *Conclusão*: observa-se que a simulação de baixa complexidade adequada aos diferentes semestres de Enfermagem contribui para a formação profissional, auxilia na aplicação do raciocínio lógico e ajuda a desenvolver o trabalho em equipe. *Descritores*: Enfermagem; Educação em Enfermagem; Simulação; Treinamento por Simulação; Capacitação Profissional; Tecnologia.

#### RESUMEN

Objetivo: comparar las percepciones entre los alumnos del curso de graduación en Enfermería acerca de las competencias adquiridas a partir de la simulación realista de baja complejidad. *Método:* se trata de un estudio cuantitativo, transversal y analítico con 55 estudiantes. Se aplicó una simulación realista y, a continuación, los participantes respondieron a un cuestionario. Se utilizaron pruebas estadísticas para el análisis y los datos se presentaron en tablas. *Resultados:* se identificó la diferencia estadísticamente significativa sobre la percepción de la aplicación de la Sistematización de la Asistencia de Enfermería (SAE) (p = 0,039). Se constató que los alumnos del cuarto período tuvieron una mayor percepción de que la simulación realista desarrolla las habilidades y conocimientos necesarios para la ejecución de procedimientos (p <0,001). Se verificó, en cuanto al dominio del contenido de la actividad, que el cuarto período se sintió más confiado, cuando comparado a los alumnos del noveno período (p <0,001). *Conclusión:* se observa que la simulación de baja complejidad adecuada a los diferentes semestres de Enfermería contribuye a la formación profesional, auxilia en la aplicación del raciocinio lógico y ayuda a desarrollar el trabajo en equipo. *Descriptores:* Enfermería; Educación en Enfermería; La Simulación; Entrenamiento por Simulación; Capacitación Profesional; Tecnología.

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INTRODUCTION

The development and improvement of theoretical-practical skills, as well as crisis management and free decision-making, are promoted in a meaningful way, based on simulations-based teaching methodology. Continuous learning has been observed under the control of the complex conditions that would be a real environment as a result of practical training through realistic simulation.

It favors the experience of realistic clinical situations and, at the same time, the improvement of the techniques and skills in Nursing, when training activities are carried out based on simulation in the academic environment. Ιt is added that other strategies educational can be simultaneously to realistic simulations to strengthen the skills and attitudes required for professional practice.<sup>2</sup>

It is possible to analyze and reflect on possible clinical situations when inserting university students in interactive environments, with clinical scenarios similar to those that will be found in the work fields. It is also possible to safely implement the practices to solve a problem, and the simulation can be applied at different levels of health care. <sup>1-3</sup>

As an advantage of the simulation-based methodology, the patient-safe learning is emphasized, since, in performing procedure in order to correct the errors, the student will perform a more precise attention in the real environment. It is also possible to predict the reduction of teaching costs, since the greater the skill in the actions, the less the required use of the material.<sup>4</sup> Therefore, it is recommended a broad application of technology as a form of motivation for studies and the possibility of encouraging critical thinking, as well as aid in problem solving. 5-8 It is also possible to develop leadership skills and other essential skills in the training of nurses, since, during the simulation, the academics need to work in a team.

The adoption of simulation-based learning by nursing education professionals at an unprecedented pace is currently identified. It should be noted, however, that the need for infrastructure quality, the acquisition of simulators and the hiring of trained personnel is a limiting factor in the implementation of this form of education.<sup>3</sup> It should be emphasized that the number of learning opportunities may not be enough to practice the expected technique.<sup>6</sup> Therefore, it is questioned the interference of these aspects in the small number of studies about the

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contributions of the realistic simulation in the academic environment.

It is also emphasized that interprofessional simulation exercises are time-consuming to prepare, require significant financial and capital resources and present logistical problems, for example, the scheduling of multiple clinical practitioners, which could make it unfeasible to develop and implement successful.<sup>9</sup>

It is noted, however, that favorable issues overcome the challenges and are supported by recent literature reviews.<sup>10-1</sup> It is therefore important to verify if the knowledge acquired with the simulation remains in the course of evolution in the course.<sup>11</sup>

It is considered, therefore, the expansion of the level of knowledge and learning through the elaboration of simulations more appropriate to the context of each student. We explore, in this sense, the unique attributes of the realistic simulation in the undergraduate course in Nursing.

In view of the above, the following questions are asked: "Is realistic simulation a useful tool for the different semesters of undergraduate?"; "Is there a difference between the perception of skills acquired between students at the beginning of their practical experience and at the end of their training, from the realistic simulation of low complexity?".

#### **OBJECTIVE**

• To compare the perceptions among undergraduate nursing students about competencies acquired from the realistic simulation of low complexity.

#### **METHOD**

It is a quantitative, cross-sectional and analytical study. The study population was composed of 25 students enrolled in the fourth period and 40 students enrolled in the ninth period. The final sample was composed by 55 undergraduate students in Nursing. The students were divided into two groups: group A (fourth period) and group B (ninth period), totaling 22 students in group A and 33 in group B, although there is a recommendation of ten students per group. 12

Fourth-semester students were chosen because they studied Nursing Fundamentals, which allows the first approach to Nursing procedures, while the ninth-graders were chosen because they had already completed all the disciplines of the curriculum. As an exclusion criterion, students absent on the

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scheduled date of the simulation were established.

The data was collected in the nursing laboratory by means of a realistic simulation. The Nursing laboratory is described as a place equipped with facilities, equipment and products necessary for manipulations, experiments and examinations carried out in the context of scientific research, technical and clinical analyzes and tests, as well as teaching.<sup>13</sup> In this space, objects such as mannequins, beds, equipment, instruments and consumables suitable for teaching and innovative methodologies are identified. Three different scenarios were organized for each simulation, in a single day, with an average duration of 40 minutes.

The clinical scenario simulation guidelines for nurses' training proposed by Waxman were used, involving the following steps: first stage - defining learning objectives and managing Nursing care to a patient in a medical-surgical clinic; second stage - identification of the level of fidelity, being the simulation of the study of low complexity and low fidelity; third stage - use of evidence-based references and Nursing fundamentals books and, finally, the fourth step - incorporation of instructions, facilitator and suggestions. It is pointed out that this stage involves the simulation of basic practices of Nursing fundamentals. administration of medications, care with delayed and nasogastric and curative vesical probes. The fifth step is added in continuity: time for debriefing.14

Before the simulation, the objective of the simulation by the facilitator was presented, students' atmosphere and the in laboratory occurred. lt was requested. immediately after debriefring, the completion of the instrument elaborated based on the skills and the development of abilities, from the National Curricular Guidelines of the Undergraduate Nursing Course, as well as ten items of the Student Satisfaction Scale and Self-confidence in Learning, to understand the

analysis of the simulation in the learning process in the student's vision. 15-6

Descriptive data was analyzed for the variables related to the sociodemographic characteristics, through frequency and percentage distribution, and analytical, using chi-square, likelihood and t-test. In all statistical tests, it was emphasized that the level of significance adopted was p <0.05. The data were processed through the Statistical Package for the Social Sciences (SPSS, Chicago, USA), version 22.0. Data were presented in tables.

For the development of the research, approval was obtained from the Research Ethics Committee of the Federal University of Ceará, under the Certificate of Presentation for Ethical Appreciation (CAAE) 71186817.5.0000.5054.

#### **RESULTS**

It was verified the prevalence of female among the students of the initial and final semesters, the two groups being homogeneous in the number of male students.

There were more Nursing technicians (18.2%) and students with another graduation (6.1%) in the ninth period; in the first group, none of the students had any other training. Homogeneity between the two groups is demonstrated, as no statistically significant differences were observed between them. It was also verified the regularity of the frequency of almost all the students in the respective semesters, which shows a high rate of student achievement during the course.

A significant statistical correlation was detected between the groups with respect to age, with approximate averages of 20 to 23 years. It is confirmed, however, that the age group is not a significant variable for the results found (Table 1).

Table 1. Academic characterization of students in the fourth and ninth periods of the Nursing course. Fortaleza (CE), Brazil, 2018.

Variables	4 <sup>th</sup> Semes	4 <sup>th</sup> Semester(n=22)		9 <sup>th</sup> Semester (n=33)	
	n	%	n	%	·
Sex					
Male	5	22.7	5	15.2	$0.479^{2}$
Female	17	77.3	28	84.8	
Nursing Technical Course	1	4.5	6	18.2	0.114 <sup>2</sup>
Regular student	20	90.9	30	90.9	$1.0^{2}$
Other graduation	-	-	2	6.1	0.511 <sup>1</sup>
Age	Average	(±SD)	Average	(±SD)	
	20.00	$(\pm 2.16)$	23.07	$(\pm 1.48)$	<0.013

Key: <sup>1</sup> Fisher, <sup>2</sup> Likelihood, <sup>3</sup> t Test.

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A statistically significant difference was observed in the perception of the application of Nursing care systematization (NCS), since, for the students of the fourth period, NCS was effectively applied to 86.4% of the students, while, for the ninth, the use of systematization was perceived by only about 60.6% (p = 0.039).

It was found that the other items did not present statistically significant differences, including the means of concordance of the affirmations, so the acquisition of competences from the simulation was similarly perceived between the two groups.

It is thus assessed that there is a homogeneity between the responses of the two groups, and the fourth period has a more positive perception about the competence range with the use of the simulation, with response rates higher than 81.8%, reaching maximum agreement on the fact that the simulation exercises ethical conduct (100%). It is also noted that this was also the perception of the ninth period students, whose agreement was 93.9%.

It is also worth noting the agreement between the two groups regarding the assertion that the low complexity simulation assists in the application of logical reasoning and helps to develop teamwork, with a percentage higher than 90% between the two groups. It is also worth noting that, in the opinion of more than 90% of the students in the fourth period and more than 80% of the ninth, realistic simulation assists in the execution of Nursing techniques procedures, in the exercise of professional posture and autonomy.

It is estimated that more than 90% of fourth-graders believe that realistic low-complexity simulation provides the highest theoretical scientific knowledge, whereas for more than 80% of the ninth-semester students, the simulation clearly relates theory and practice, helps to organize and plan activities, and facilitates effective relationship with patient and staff (Table 2).

Table 2. Perception of competence attainment of the fourth and ninth period of the Nursing course from the realistic simulation of low complexity. Fortaleza (CE) Brazil, 2018.

	4 <sup>th</sup> semester		9 <sup>th</sup> semester		P
	n	%	n	%	
Knwledge					
Provided theoretical-scientific					
knowledge					
Yes	20	43.5	26	56.5	0.219 <sup>2</sup>
No	2	22.2	7	77.8	
Clearly related theory and					
practice					
Yes	19	40.4	28	59.6	0.876 <sup>2</sup>
No	3	37.5	5	62.5	
Applied clinical and logical					
reasoning					
Yes	20	39.2	31	60.8	0.876 <sup>2</sup>
No	2	50	2	50	
Ability					
Performed nursing techniques					
and procedures					
Yes	20	40.8	29	59.2	0.721 2
No	2	33.3	4	66.7	
Applied to NCS					
Yes	19	48.7	20	51.3	0.039 1
No	3	18.8	13	81.3	
Organized and planned activities					
Yes	19	40.4	28	59.6	0.876 <sup>1</sup>
No	3	37.5	5	62.5	
Made decisions/leadership		40.0	•		2 -22 3
Yes	18	40.9	26	59.1	0.782 <sup>2</sup>
No	4	36.4	7	63.6	
Developed teamwork					
Yes	20	38.5	32	61.5	0.338 <sup>2</sup>
No	2	66.7	1	33.3	
Administered conflicts	40	4 4	20	<b>50</b> /	0.0051
Yes	18	47.4	20	52.6	0.095 <sup>1</sup>
No	4	23.5	13	76.5	
Administered material resources	40	42.2	25	<b>5</b> 4.0	0.224.3
Yes	19	43.2	25	56.8	0.326 <sup>2</sup>
No	3	27.3	8	72.7	
Attitude					
Exercised the professional					

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position					
Yes	20	41.7	28	58.3	0. 501 <sup>2</sup>
No	2	28.6	5	71.4	
Was effectively related to					
patient / team					
Yes	19	41.3	27	58.7	0. 652 <sup>2</sup>
No	3	33.3	6	66.7	
Exercised the autonomy					
Yes	21	43.8	27	56.3	0. 114 <sup>2</sup>
No	1	14.3	6	85.7	
Exercised creativity					
Yes	18	40.9	26	59.1	0.782 <sup>2</sup>
No	4	36.4	7	63.6	
Exercised ethical conduct					
Yes	22	41.5	31	58.5	0.511 <sup>2</sup>
No	0	0.0	2	100.0	
Exercised teamwork					
Yes	21	42.0	29	58.0	0.318 <sup>2</sup>
No	1	20.0	4	80.0	
	Average	(SD)		(SD)	P <sup>3</sup>
			Average		
Total	18.77	3.638	20.88	3.998	0.053 <sup>3</sup>

Key: <sup>1</sup> Chi-square test, <sup>2</sup> Likelihood, <sup>3</sup> t Test.

A divergence between the opinions of the two groups was found when analyzing the contribution of the simulation to the learning process in the student's view, since 81.8% of the students of the fourth period agreed that the simulation allows the improvement of the content and only 33.3% of the ninth grade students agreed with the affirmative (p <0.001).

It was verified that, for 90.9% of the students of the fourth period, the simulation includes both the content necessary for the mastery of the basic Nursing practices, as well as developing the skills and knowledge necessary to perform the procedures, which is the opinion of only 30.3% and 45.4% of the students of the ninth period, respectively (p <0.001).

It was noticed that, in the fourth period, the perception that the realistic simulation of low complexity develops the skills and knowledge required to perform the procedures (90.9%) contrasts with the ninth period, where less than half of the students agreed with this idea (45.4%) (p <0.001).

It should be noted that, in both groups, the level of agreement regarding the other items was 80%. It is assessed that, for both groups, the teaching methods used were generally useful and effective; in addition, students liked the way they learned and the resources used were useful to teach, and the level of agreement obtained in relation to these statements was higher than 94% (Table 3).

Table 3. Analysis of the simulation in the learning process in the student's vision. Fortaleza (CE), Brazil, 2018.

Variables	4 <sup>th</sup>		9 <sup>th</sup> Semester		р
	Semester(n=22)		(n=33)		
	n	%	n	%	
The teaching method used was useful and effective	21	95.4	32	97.0	1.0
Provided variety of materials for my learning	18	81.8	31	94.0	0.1622
I liked the way I learned	21	95.4	31	94.0	$0.806^{2}$
The materials were motivating and helped me to learn	18	81.8	30	91.0	0.3272
I control the content of the activity	18	81.8	11	33.3	<0.001 <sup>1</sup>
The simulation includes mastery of basic nursing practice	20	90.9	10	30.3	<0.001 <sup>1</sup>
I am developing skills	20	90.9	15	45.4	$0.0001^{1}$
Resources are useful for teaching	21	95.4	31	94.0	$0.806^{2}$
I know how to get help	19	86.4	30	91.0	$0.600^{2}$
I know how to use the activity to develop skills	18	81.8	32	97.0	$0.055^{2}$
	Average	(±SD)	Average	(±SD)	
	11.18	1.893	12.33	3.934	$0.013^{3}$

Key: <sup>1 1</sup> Chi-square test, <sup>2</sup> Likelihood, <sup>3</sup> t Test.

DISCUSSION

From the use of low complexity simulation as a teaching strategy, the acquisition of knowledge, the improvement of communication skills, the increase of confidence and satisfaction, the reduction of anxiety, the increase of critical thinking and clinical reasoning, the development of psychomotor skills and the improvement of teamwork.<sup>2</sup>

The similarity with a quantitative-qualitative study carried out with 133 Nursing students is recognized, which identified that 62% of the students considered that they presented a greater learning with the realistic simulation and 97% affirmed that they prefer the simulation, when compared to the methodology traditional teaching. 17

Based on simulation-based learning, it is provided a valuable tool for teaching the Nursing curriculum at graduation, accompanied by many desired results. One should consider the compulsory learning based on simulation as part of the Nursing undergraduate curriculum.<sup>2</sup>

It is reported that health care delivery systems are inherently complex, consisting of several levels of subsystems and interdependent processes that are adaptable to changes in the environment and behave in a non-linear fashion. Note the neglect of the impacts of the teaching process on the formation of a critical professional capable of achieving the goals desired by the health system, dealing with environments whose care is considered complex.<sup>9</sup>

It is understood that researchers and health decision makers may underestimate disregard interactions between people, processes, and technology in the workplace and during the training process. It is argued, however, that interventions in the health care delivery system need to incorporate the dynamics and complexities of the context of the healthcare system in which they are performed. Thus, realistic simulation is highlighted as an appropriate methodology to respond to the challenges of inserting students into care settings.9

It is argued that in the era of patient-centered care, personalization of individual care, taking into account the needs of each patient, further increases the complexity of health care delivery systems.<sup>18</sup>

It is possible to simulate the impact of system interventions on health care provision without direct, costly and time-consuming experimentation from the use of dynamic Realistic simulation and its attributes...

simulation modeling, since it is an effective strategy in vocational training that meets the new demands and presents advantages for recent advances in education.<sup>19</sup>

It was possible, through simulation-based teaching, to create environments with the opportunity to practice the necessary skills and effectively manage the demands for reinforcement in teaching. It is emphasized that simulation effectively enhances the technical and non-technical skills of health care providers in a variety of disciplines. <sup>20-2</sup>

Thus, from a security-conscious mentality, the opportunity to operate proactively, as opposed to acting reactively, is mitigated by excessive use of the cognitive structure, which can lead to constant improvement behaviors of the student's own performance.<sup>18</sup>

It should be noted that, as semesters progress, students become aware of the importance of living in professional environments, which may reflect students' sense of responsibility and ethical commitment to the process of acquiring knowledge, skill and attitude required.

It reveals the utility of the simulation strategy for the different semesters of Nursing graduation and for the training of nursing students. However, the divergence regarding the application of Nursing care systematization in simulation activities by the ninth semester is highlighted, highlighting the challenge of implementing the strategy in the state in which this study was applied.

It was found that the ninth grade students were more critical in the evaluation because they already had practical experience. It is emphasized that the students were not confident in the domain of Nursing practices and skills through the simulation. It is therefore necessary to reflect on pedagogical practices that further.

It is considered, for the acquisition of specific skills, that the use of simulation activities generates a high satisfaction index, both for the students involved in the simulation and for the teachers involved in the process. It was observed, from the comparison between the perceptions of the two academic groups that, as the semesters progress, there is an increase in students' perception that the realistic experiences provide a more effective clinical reasoning.

A high level of agreement was observed in both groups about the contributions of realistic low complexity simulation to the best preparation for real clinical scenarios. A similar study was carried out to evaluate student satisfaction and self-confidence in

learning, as well as the analysis of the design of the scenarios, with 51 students, through the application of questionnaires at the end of the simulation. It was found that students were satisfied with the activities carried out and with the structuring of the scenarios (71%), and that teaching with clinical cases only achieved a lower level of satisfaction (38%).<sup>23</sup>

In a meta-analysis carried out with studies that used realistic simulation based on a problem, a high positive effect of simulation in Nursing education was found in all studies. It was also verified that the simulation interferes positively in the domains of satisfaction with training, clinical education and ability.<sup>24</sup>

In a prospective comparative study conducted with 55 Nursing students, in which the students responded to an instrument based on the Likert scale for verifying the effectiveness of the teaching strategy, 69.0% fully agreed that the simulation consolidated the teaching-learning process.<sup>25</sup>

understood is that the active participation of the student in the simulation activities thinking enables critical reflection on the various practical situations. Due to the previous experience of the practice, it is possible to increase safety in the real clinical settings, as it allows Nursing students an approximation with the possible cases that they may find in the different contexts of Nursing practice.<sup>26</sup>

It is pointed out that the realistic simulation methodology is a technology that provides the students with learning how to handle clinical situations in a controlled and safe environment, since the possibility of errors will not cause negative repercussions to the patients.

It is noticed that the use of the simulation allows the repeated practice of clinical skills and the presentation of different risk scenarios, often unknown to the students, reduces the inconvenience of using real patients for teaching purposes and can also be used in assessments of academic competencies and performance.<sup>27</sup>

#### CONCLUSION

It is concluded that realistic simulation presents itself as an effective teaching and learning strategy, since it allows the previous experience of Nursing practice, which allows the reflection about the role of nurses in different contexts.

It is determined, through this study, that nursing students perceive realistic simulation Realistic simulation and its attributes...

as a tool that contributes to professional training. However, it is important to emphasize the adequacy of the contents and activities proposed in the simulation to the level of knowledge of the students and their respective semesters in the Nursing course, aiming at a better use of this technology.

It is pointed out that the discussion about the nursing students' perception about the application of simulations for the acquisition of competencies can lead to the adequate use of this technology and, consequently, to the increase of manual skills and content domain, contributing to the training of professionals able to perform a high quality Nursing care and that meet the diverse needs in the health sectors.

Therefore, the importance of the understanding on the theme for the expansion of the application of realistic simulation in the educational institutions is highlighted, since there is still a limited use of this type of teaching technology.

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