

Realistic simulation in immunization: satisfaction, self-confidence and performance of nursing students

Simulação realística em imunização: satisfação, autoconfiança e desempenho de estudantes de enfermagem

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ABSTRACT

Objective: to analyze satisfaction, self-confidence and performance of nursing students in realistic immunization simulation. **Methods:** quasi-experimental study, using the Immunization Checklist and Student Satisfaction and Self-confidence in Learning Scale, with 72 students, divided into Group 1 (38 seventh semester students who have not yet been in the field of practice in the Child Health discipline) and Group 2 (34 ninth semester students). **Results:** there was no difference between groups in terms of immunization performance (t-test: 1.701; $p=0.096$), as well as in terms of the degree of performance (Likelihood Ratio: 1.939; $p=0.164$). There was a significant difference when assessing satisfaction and self-confidence in learning (t-test: 2.346; $p=0.023$). **Conclusion:** the previous practice of immunization in the field of practice did not influence the performance of nursing students during the realistic simulation, but it did interfere with satisfaction and self-confidence in learning.

Descriptors: Nursing; Education, Nursing; Simulation Technique; Educational Technology; Professional Training; Immunization.

RESUMO

Objetivo: analisar satisfação, autoconfiança e desempenho de estudantes de enfermagem em simulação realística de imunização. **Métodos:** estudo quase experimental, no qual se utilizaram da Lista de Verificação de Imunização e Escala de Satisfação de Estudantes e Autoconfiança na Aprendizagem, com 72 alunos, divididos em Grupo 1 (38 alunos do sétimo semestre que ainda não estiveram em campo de prática na disciplina Saúde da criança) e Grupo 2 (34 alunos do nono semestre). **Resultados:** não houve diferença entre os grupos quanto ao desempenho em imunização (Teste t: 1,701; $p=0,096$), bem como no tocante ao grau de desempenho (Razão de Verossimilhança: 1,939; $p=0,164$). Houve diferença significativa ao avaliar a satisfação e autoconfiança no aprendizado (Teste t: 2,346; $p=0,023$). **Conclusão:** a prática prévia de imunização em campo de prática não influenciou no desempenho de estudantes de enfermagem, durante a simulação realística, mas interferiu na satisfação e autoconfiança na aprendizagem.

Descritores: Enfermagem; Educação em Enfermagem; Simulação; Tecnologia Educacional; Capacitação Profissional; Imunização.

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Introduction

Realistic simulation is a proposal for an active methodology and a training method that aims to enable guided experiences that replicate aspects of real situations, interactively, and that seeks to insert the student in an active role for understanding and solving problems, as well as it allows the exchange of knowledge between peers: student and teacher⁽¹⁾.

This strategy brings more safety to the patient and excellence in teaching and learning processes, since it allows the student's previous contact with nursing practice, in a safe and controlled environment, enabling training and knowledge acquisition, through repetition, before the real experience⁽²⁾. Realistic simulation is a teaching strategy with the potential to develop clinical competences, skills and leadership⁽³⁾.

Often, the practice of the skills necessary for the training of nurses occurs with the patient, without prior simulation, a factor that causes anxiety and insecurity in students. When developing skills, through realistic simulation, students will be able to review errors, assess performance and feel closer to the reality of the profession⁽⁴⁾.

When considering this assertion, one of the areas of Nursing practice is immunization, which is a proven tool to control and eliminate infectious diseases with potential for mortality, since it is the process by which individuals become immune to an infectious disease. Immunization prevents at least 2 to 3 million deaths per year, being a cost-effective investment in health, as it reaches several populations⁽⁵⁾.

During the training of nurses, pedagogical practices that are contextualized to the immunization work process can enable them to work in this area more safely. Thus, it is important to investigate whether students at boarding schools and who had immunization practices in loco have better performance and evaluation of realistic simulation than students who performed only the theoretical module of the discipline Nursing in child health. Given the above, this study

aimed to analyze the satisfaction, self-confidence and performance of nursing students in realistic immunization simulation.

Methods

It is a quasi-experimental study, in which a non-randomized intervention was applied and evaluated⁽⁶⁾. Held at the Nursing Skill Laboratory, located in the Nursing Department of the Federal University of Ceará, using the materials available in that laboratory, from September 2017 to April 2018.

The study sample was of the census type, composed of 72 undergraduate students, having as inclusion criteria: having attended the discipline Fundamentals of Nursing and being enrolled in the discipline of Nursing in the process of caring for children in primary care (seventh semester) or Internship in Nursing I (ninth semester). For comparative purposes, the following division was established: Group 1 (38 students in the seventh semester) and Group 2 (34 students in the ninth semester). Group 1 students were attending theoretical classes on the mother and child binomial (without previous experience of immunization in children, during the curricular internship), and Group 2 students were only in a practical field, as they had previously had contact with the life cycle in previous subjects. It is worth noting that the simulation happened only once with each student and was not recorded, having completed a checklist, consisting of 23 items, for each participant, during the simulation.

The guidelines for simulating clinical scenarios for the training of nurses were used as a theoretical framework⁽⁷⁾. The first stage consisted of defining the learning objective: to develop the management of child immunization care. In the second stage, the level of loyalty was established: simulation of immunization in children, with low complexity and high fidelity. For this, they used synthetic dolls that had structures and body dimensions common to an infant. The simu-

lation was the closest to reality and aimed to stimulate critical thinking and communication skills, thus being of high fidelity. The third stage consisted of the use of evidence-based references: in the simulation analyzed, the recommendations of the Health Department of Brazil on management with immunobiologics were adopted⁽⁸⁾.

The fourth stage of the theoretical framework was based on the incorporation of instructions, facilitators and suggestions. The professor or scholarship student welcomed the academics and provided a brief explanation of the operation of the simulation methodology, as well as presenting the scenario. The scholarship students had experience in the vaccination room and prior training to conduct the simulation. The simulation replicated a vaccination room in a Basic Health Unit and had the purpose of vaccinating a four-month-old child and scheduling subsequent vaccinations. The simulation participants were three scholarship students, previously trained to represent the unit's nurse, who presented her and provided guidance on the location of the materials; the mother of the child who held a dummy and questioned the student during the simulation; and the evaluator who, at times, was a professor of the Nursing Graduation.

To start the simulation, the nurse presented the student with the vaccination room and asked the mother to enter. This asked some questions to the academic, during the simulation: what are the vaccines that he will take today? Will these vaccines give any reaction? What to do? He spit out the vaccine (Rotavirus), do you need to give it again?

Thus, the student should administer the second dose of the rotavirus vaccine; the second dose of Pneumococcal 10v conjugated vaccine, scheduling the booster for the child's 12th month; the second dose of Polio Inactivated Vaccine, dating the third dose to the child's sixth month; and the second dose of the pentavalent vaccine, making the third dose for the child's sixth month. In addition, the previous knowledge should be applied for the correct administration of vaccines,

the filling of maps and the vaccination booklet and the correct use and disposal of materials, including biosafety measures, since the scenario allowed the student to perform all these activities. The scenario consisted of two coolers, ice coils, two thermometers, supplies (syringe, needles; alcohol gel, cotton; autoclaved vaccine bottles; procedure gloves), kidney vat, sharps collection box, common waste, stretcher, table, chair, vaccine maps, vaccination card, pen, pencil and eraser.

The fifth stage proposed by the referential is the time for debriefing⁽⁹⁾, not performed in the present research. Therefore, as a form of later analysis, feedback was carried out, which was guided by the checklist that was filled out during the simulation by the evaluator.

It is worth mentioning that the checklist was developed by the researchers of the study and was developed based on the recommendations of the Health Department for immunization. This list had 20 items to be evaluated in the observation that referred to the cognitive, behavioral and affective aspects. For the purposes of analysis, the performance with minimum accuracy in 80.0% of the questions, that is, 16 items, was considered satisfactory. Hitting 15 items or less was considered unsatisfactory performance.

Then, the students answered an instrument, elaborated from 11 items of the Student Satisfaction and Self-confidence in Learning Scale (SSSLS)⁽¹⁰⁾, which is composed of two subscales: satisfaction and self-confidence, totaling thirteen items. The satisfaction subscale consists of five items (statements 1 to 5); in the self-confidence subscale, eight items are included (statements 6 to 13). Both are composed of a five-item Likert scale, namely: 1 = strongly disagree with the statement; 2 = disagree with the statement; 3 = undecided - neither agree nor disagree with the statement; 4 = I agree with the statement; and 5 = strongly agree with statement⁽¹⁰⁾. For the present study, the answers were dichotomized, with statements 1, 2 and 3 being classified as "no" and answers 4 and 5 being classified as "yes".

The present study ended with the score obtained by the student in the practice of immunization (obtained from the checklist). The independent variable was the previous experience of immunization in children in loco, during the curricular internship, which was named Groups 1 (students enrolled in the seventh semester and without previous experience of immunization in the field of practice of the curricular matrix) and 2 (students enrolled internship and with previous experience in immunization). The control variables were sex, age, completion of the technical nursing course and student satisfaction and self-confidence (obtained from SSSLS).

Data were analyzed using the Statistical Package for the Social Sciences Program, version 22. Results were presented using absolute and relative frequency (qualitative variables) and mean and standard deviation or median and interquartile range (quantitative variables), depend on the assumption of normality, verified by the Kolmogorov-Smirnov test (KS). In the comparison between the groups, the Chi-square, Likelihood Ratio (RV) and Fisher's exact (categorical variables) and T or Mann-Whitney tests (continuous variables) were applied. In the tests, a significance level of 95% (p <0.05) was adopted.

The study was approved by the Research Ethics Committee of the Federal University of Ceará, with opinion No. 2,251,160/2017, in compliance with Resolution 466/2012 of the National Health Council.

Results

In the studied sample, there was a predominance of female students (40; 85.1%), with no difference between groups (RV: 0.003; p=0.954). The median age was 23 years, ranging from 21 to 40 years. The groups did not differ as to the previous accomplishment of Technical Nursing Course (RV: 0.174; p=0.677). During the execution of the immunization procedure, there were no significant differences between the groups, as shown in Table 1.

Table 1 – Comparison of students' correct answers when performing the procedure, according to groups of students in the simulation (n=72). Fortaleza, CE, Brazil, 2018

Variables	Group 1	Group 2	p
	n (%)	n (%)	
Conference of room inputs	8 (61.5)	22 (64.7)	0.840*
Check box temperature	5 (38.5)	20 (58.8)	0.211†
Presentation with the companion	4 (30.8)	17 (50.0)	0.236†
Checking the vaccination card	12 (92.3)	34 (100.0)	0.277†
Correct scheduling of vaccines	2 (15.4)	6 (17.6)	0.852*
Accompanying information about vaccines to be administered	8 (61.5)	26 (76.5)	0.315*
Guidance on the correct position for oral vaccine administration	11 (84.6)	31 (91.2)	0.527*
Guidance on the correct position for administration of the intramuscular vaccine	11 (84.6)	29 (85.3)	0.954*
Guidance on side effects	10 (76.9)	30 (88.2)	0.413*
Hand hygiene before the procedure	4 (30.8)	18 (52.9)	0.173‡
Correct separation of materials	8 (61.5)	16 (47.1)	0.374‡
Correct vaccine aspiration technique	11 (84.6)	30 (88.2)	0.743*
Correct dose of aspirated vaccine	11 (84.6)	32 (94.1)	0.321*
Correct positioning - oral vaccine	11 (84.6)	32 (94.1)	0.321*
Correct positioning - intramuscular vaccine	10 (76.9)	27 (79.4)	0.098†
Correct technique - oral vaccine	11 (84.6)	33 (97.1)	0.181†
Technique - intramuscular vaccines	3 (30.8)	20 (61.8)	0.025*
Disposal in corresponding trash	3 (23.1)	16 (47.1)	0.134†
Hand hygiene after the procedure	2 (15.4)	9 (26.5)	0.408*
Answered mother's questions	11 (84.6)	33 (97.1)	0.181†
Performance evaluation			
Satisfactory	2 (15.4)	12 (35.3)	0.164*
Unsatisfactory	11 (84.6)	22 (64.7)	-

*Likelihood; †Chi-square test; ‡Fisher's exact test

When comparing the number of items performed by students in both groups, in the light of the checklist, it was observed that students in Group 1 performed an average of 12.0 (± 3.0) items, while students in Group 2 performed an average of 13.9 (± 3.5) items (t-test: 1.701; p=0.096). In this sense, there was no statistically significant difference between the groups.

Table 2 describes the students' evaluation of the simulation using the items related to the subscale of satisfaction with current learning, extracted from SSSLs.

In the subscale of satisfaction with current learning, an average of 4.08 (\pm 1.18) was obtained in Group 1 and 4.79 (\pm 1.49) in Group 2 (t test: 1.531; $p=0.133$). Table 3 shows the students' evaluation of the simulation, using the items related to the

subscale of self-confidence in learning, extracted from SSSLs.

In the subscale of self-confidence in learning, an average of 6.15 (\pm 1.57) was reached in Group 1 and 7.52 (\pm 1.64) in Group 2 (t test: 12.561; $p=0.014$). When comparing the total number of positive responses, from the SSSLs, an average of 10.23 (\pm 2.31) was obtained in Group 1 and 12.29 (\pm 2.82) in Group 2 (t test: 2,346; $p=0.023$).

Table 2 – Distribution of positive responses marked in the subscale of satisfaction with current learning, extracted from the Scale of Student Satisfaction and Self-confidence in Learning (n=72). Fortaleza, CE, Brazil, 2018

Variables	Group 1	Group 2	p
	n (%)	n (%)	
The teaching methods used in this simulation were useful and effective	13 (100.0)	32 (94.1)	1.000*
The simulation provided me with a variety of teaching materials and activities to promote my learning	8 (61.5)	31 (91.2)	0.022 [†]
I liked the way my teacher taught through simulation.	10 (76.9)	32 (94.1)	0.107 [†]
The teaching materials used in this simulation were motivating and helped me to learn	9 (69.2)	29 (85.3)	0.226 [†]
The way my teacher taught, through simulation, was suitable for the way I learn	8 (61.5)	20 (58.8)	0.865 [†]

*Fisher's exact test; [†]Likelihood

Table 3 – Distribution of positive responses marked in the subscale of self-confidence in learning, extracted from the Student Satisfaction and Self-confidence in Learning Scale (n=72). Fortaleza, CE, Brazil, 2018

Variables	Group 1	Group 2	p
	n (%)	n (%)	
I am confident that I have mastered the content of the simulation activity that my teacher introduced me	8 (61.5)	17 (50.0)	0.478*
I am confident that this simulation included the content needed to master the immunization curriculum	11 (84.6)	30 (88.2)	0.743 [†]
I am confident that I am developing skills and obtaining the necessary knowledge, from this simulation, to perform the necessary immunization procedures	12 (92.3)	29 (85.3)	0.500 [†]
My teacher used useful resources to teach simulation	9 (69.2)	33 (97.1)	0.009 [†]
It is my responsibility as the student to learn what I need to know, through the simulation activity	3 (23.1)	14 (41.2)	0.237 [†]
I know how to get help when I don't understand the concepts covered in the simulation	11 (84.6)	32 (94.1)	0.321 [†]
I know how to use simulation activities to learn skills	11 (84.6)	31 (93.9)	0.335 [†]
It is the teacher's responsibility to tell me what I need to learn on the theme developed in the simulation during the class	12 (92.3)	34 (100.0)	0.277 [‡]

*Chi-square test; [†]Likelihood; [‡]Fisher's exact test

Discussion

This study had as limitations the number of students and the local scope, contextualizing a specific group; however it contributes to the pedagogical practices active in nursing education, in a creative way and with low financial resources. Although the physical and human structure of public universities is in fact a challenge for conducting simulations of greater fidelity, it is important to emphasize that immunization is not just about the correct technique for vaccination, but a detailed work process.

According to the data presented, it is observed that the groups were comparable to each other, as there was no statistical difference in the profile presented. The results showed that the study corroborates data from the socioeconomic questionnaire of the National Student Performance Exam of 2004 and 2010, referring to those entering and graduating from the Nursing Course, as they also presented a percentage of women in the course, around 85.0%, and a higher proportion of students who worked while studying⁽¹¹⁾.

The general performance of the practice of immunization in realistic simulation did not differ between groups. However, the technique of applying intramuscular vaccines was better performed by students in Group 2, corroborating the idea that the improvement of knowledge, through innovative educational actions, that motivate reflection on their own responsibilities, during the care process, is necessary, looking for ways that encourage them to learn and establish safe procedures⁽¹²⁾. It is clear that the realistic simulation can allow the student to identify the stressors present at that moment, as well as develop critical reflection on learning⁽¹³⁾.

In continuity, students in Group 2 had an even better assessment of satisfaction and self-confidence in learning. Simulation has the potential to promote student learning and self-confidence, thus being an important tool for clinical education. By experiencing different realities, in a controlled and protected environment, the student becomes more proactive and attributes greater meaning to what was experienced⁽¹⁴⁾,

evidenced by the greater self-confidence in Group 2.

The variety of didactic materials and activities to promote learning and the usefulness of the resources available in the simulation were items with the best evaluation in Group 2. For the simulation environment to cause the sensation of immersion in the participants, it is important to use resources that favor and facilitate performance and learning. In this way, the following factors stand out: low cost, easy to maintain and with indication for the development of skills of students in training⁽¹⁵⁾.

It is also emphasized that the simulation, by allowing to rehearse a practice in a more real way, allows to identify errors, so that they are minimized in the field of practice and there is reflection about them⁽¹³⁾, which was diagnosed through feedback, in which students demonstrated that simulation integrated theory and practice, reviewed theoretical and practical content, exercised nursing planning and management and self-reflection about the difficulties faced by the procedure, either due to lack of skills or the need for further study on immunization.

The importance of realistic simulation was perceived for the development of student skills, interfering, above all, in the student's self-confidence for management and assistance activities in the vaccine room. In research carried out on the occurrence of an adverse event after vaccination, due to error, it was observed that most events were caused by inadequate nursing practice, in the immunization process, and that they were preventable⁽¹⁶⁾.

It should be noted that training and realistic simulation motivate academics to awaken and modify recurrent behaviors that can harm their health status or trigger adverse events in the vaccination room. Patient safety in the vaccination room is also related to possible adverse events, as well as vaccine preparation and application techniques, if performed improperly.

It should be noted that realistic simulation should not replace traditional practice. The two must be used mutually in the training of nurses⁽¹⁴⁾.

Conclusion

The previous practice of immunization in the field of practice did not influence the performance of nursing students during the realistic simulation, but it did interfere with satisfaction and self-confidence in learning.

Students with experience in the field of practice showed greater mastery of the technique of intramuscular vaccination and considered the variety of didactic materials, activities to promote learning and the resources available in the evaluated simulation to be sufficient.

Collaborations

Beserra EP, Camelo LBM, Teles LMR, Barbosa JEC, Cavalcante VMV, Gubert FA and Martins MC contributed to the conception and design, analysis and interpretation of data, writing of the article, relevant critical review of the intellectual content and final approval of the version to be published.

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