

Clinical simulation in cognitive performance, satisfaction and self-confidence in learning: a quasi-experimental study

Simulação clínica no desempenho cognitivo, satisfação e autoconfiança na aprendizagem: estudo quase-experimental
 Simulacro clínico en el rendimiento cognitivo, satisfacción y autoconfianza en el aprendizaje: estudio cuasi experimental

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Abstract

Objective: To analyze the cognitive knowledge, satisfaction and self-confidence of nursing students based on simulation use in teaching nursing consultation in community nursing vaccination.

Methods: An intervention and quantitative study comprised in two phases. A quasi-experimental design of a control group not equivalent to the pre- and post-test type was used. All ethical aspects have been respected. The final sample consisted of 94 Portuguese nursing students. They were allocated into two groups: control and experimental. The control group had access to a traditional skill class. The experimental group participated in a simulation session with two cases. In addition to the sociodemographic characterization, the students answered a pre- and post-test to measure cognitive performance. Moreover, satisfaction and self-confidence in learning scale was applied. A significance level of 5% was adopted.

Results: Of the 94 students, 95.7% were female, 91.5% were aged between 18 and 20 years, 98.9% were single and 94.7% were unemployed. From the clinical simulation, students learn more when compared to students who participated in the traditional strategy (p value = 0.000). Furthermore, clinical simulation promotes satisfaction among students.

Conclusion: Since it is a teaching and learning strategy that allows a better cognitive performance, and because it generates satisfaction among students, clinical simulation can be pointed out as a potential strategy for teaching in community nursing.

Universal Trial Number: U1111-1227-2241

Resumo

Objetivo: Analisar o conhecimento cognitivo, a satisfação e a autoconfiança de estudantes de enfermagem a partir do uso da simulação no ensino de consulta de enfermagem em vacinação no contexto da enfermagem comunitária.

Métodos: Estudo de intervenção, quantitativo, compreendido em duas fases. Foi utilizado o delineamento quase-experimental de grupo controle não equivalente do tipo pré-teste e pós-teste. Foram respeitados todos os aspectos éticos. A amostra final foi composta por 94 estudantes de enfermagem portuguesas. Os estudantes foram alocados em dois grupos: controle e experimental. O grupo controle teve acesso a uma aula de habilidade tradicional. O grupo experimental participou de uma sessão de simulação com dois casos. Além da caracterização sociodemográfica, os estudantes responderam a um pré-teste e pós-teste para aferir o desempenho cognitivo. Além disso, foi aplicada uma escala de satisfação e autoconfiança na aprendizagem. Adotou-se um nível de significância de 5%.

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Conflicts of interest: nothing to declare.

Resultados: Dos 94 estudantes, (95,7%) são do sexo feminino, com faixa etária entre 18 e 20 anos (91,5%), solteiros (98,9%), sem vínculo laboral (94,7%). A partir da simulação clínica os estudantes aprendem mais quando comparado aos estudantes que participaram da estratégia tradicional (p valor = 0,000). Além disso, a simulação clínica promove satisfação entre os estudantes.

Conclusão: Por ser uma estratégia de ensino e aprendizagem que permite um melhor desempenho cognitivo, por gerar satisfação nos estudantes, a simulação clínica pode ser apontada como uma estratégia potencial para o ensino em enfermagem comunitária.

Resumen

Objetivo: Analizar el conocimiento cognitivo, la satisfacción y la autoconfianza de estudiantes de enfermería a partir del uso de simulacro en la enseñanza de consulta de enfermería en vacunación, en el contexto de enfermería comunitaria.

Métodos: Estudio experimental, cuantitativo, realizado en dos fases. Se utilizó el diseño cuasi experimental de grupo de control no equivalente tipo pretest y postest. Se respetaron todos los aspectos éticos. La muestra final estuvo compuesta por 94 estudiantes de enfermería portugueses. Los estudiantes fueron separados en dos grupos: control y experimental. El grupo de control tuvo acceso a una clase de habilidad tradicional. El grupo experimental participó en una sesión de simulacro con dos casos. Además de la caracterización sociodemográfica, los estudiantes respondieron un pretest y postest para determinar el rendimiento cognitivo. También se aplicó una escala de satisfacción y autoconfianza en el aprendizaje. Se adoptó un nivel de significación de 5 %.

Resultados: De los 94 estudiantes, el 95,7 % era de sexo femenino, del grupo de edad entre 18 y 20 años (91,5 %), solteros (98,9 %), sin vínculo laboral (94,7 %). A partir del simulacro clínico, los estudiantes aprendieron más en comparación con los estudiantes que participaron de la estrategia tradicional (p valor = 0,000). Además, el simulacro clínico promueve la satisfacción de los estudiantes.

Conclusión: Por ser una estrategia de enseñanza y aprendizaje que permite un mejor rendimiento cognitivo, por generar satisfacción en los estudiantes, el simulacro clínico puede indicarse como una estrategia potencial para la enseñanza de enfermería comunitaria.

Introduction

Thinking about nursing teaching in the context of the current world of work implies reflecting on the investment in human structures and resources; diversification of teaching and learning strategies; minimization of errors in health and nursing; guarantee of patient safety; qualification of the workforce; respect and condition of individual and collective health; comprehensiveness and humanization of care, among other issues.⁽¹⁾

It is important to highlight that contact among students, professionals and patients/users should be mediated from knowledge, skills and abilities. This interaction should be guided by bioethical principles and human rights.⁽¹⁾ In this perspective, it is shared the thought that for professionals be more prepared in real practice, it is essential that they experience, during training, different moments that provide opportunities for the development of these skills.

Therefore, it is thought of teaching and learning strategies that are capable of improving student cognitive performance, encouraging them to be more self-confident and promoting satisfaction. Simulation contemplates these perspectives since it promotes significant learning and reproduces different realities in health.⁽²⁾

In nursing teaching, simulation is identified as a teaching strategy that uses technologies to

replicate settings that simulate practice, in a controlled and realistic environment, where students actively participate in the teaching and learning process with the purpose of practicing thoroughly, learning, reflecting and assessing products and processes.⁽³⁾ In simulation, the participating elements are the facilitator, the participants, the educational practices (clinical case and clinical simulation), the simulation design characteristics (focusing on problem solving), and the simulation result expectation (debriefing).⁽⁴⁾

In this study, the concept of cognitive knowledge used is part of Miller Pyramid's theoretical perspective. The "knows", the pyramid basis, refers to the assessment of how students integrate previous knowledge with the new information: knowledge. Knowledge, from a theoretical perspective, is of fundamental relevance so that students can reach other levels of the pyramid: the "knows how", the "shows how", and the "does".⁽⁵⁾

Satisfaction is understood as a feeling of pleasure given by the reach of what is expected.⁽⁶⁾ With regard to student satisfaction, it can be associated with greater involvement and motivation to learn. Besides that, it can be an indicator to assess the teaching strategies adopted during the training course of students, with the aim of improving the quality of education.⁽⁷⁾ The concept of self-confidence is related to demonstrating belief in the success of actions

in cognitive, psychomotor and attitudinal skills and abilities.^(4,7)

In Portugal, simulated practice is part of the curriculum of many nursing schools.⁽⁶⁾ However, in the reality studied, simulation use for the learning of some community nursing contents such as immunization, has still been little explored. Therefore, identifying students' efficacy, satisfaction and self-confidence from the use of this strategy becomes an important step towards broadening simulation use at the Nursing School of Coimbra (*Escola Superior de Enfermagem de Coimbra*, abbreviated ESEnfC). In this perspective, this study aimed to analyze the cognitive knowledge, satisfaction and self-confidence of nursing students based on simulation use in the teaching of nursing consultation in community nursing vaccination.

Methods

This is an intervention and quantitative study, comprised in two phases. A quasi-experimental design of a control group not equivalent to the pre- and post-test type was used.⁽⁸⁾

Since it is a research involving human beings, the study took into account the guarantee of ethical and legal principles that govern research in human beings in Portugal. It was submitted and approved along with the ESEnfC's Research Ethics Committee, under Opinion P454-09/2017 and Universal Trial Number TN U1111-1227-2241. The students were informed about the objectives, the possibility of abandonment at any time without adverse consequences, the confidential nature of the answers and the procedures that were adopted during data collection. They were also informed that this study had no influence on the final grades of the curricular unit.

The study was conducted at the ESEnfC, with 2nd year students of the Undergraduate Nursing Course in the Community and Family Nursing Curricular Unit, in the laboratory practice component. The initial sample of the non-probabilistic type for convenience was 120 students. It was offered curricular unit in four classes in the second half of 2018.

Students were allocated into two groups: Control Group (CG) and Experimental Group (EG). It is worth mentioning that allocation did not meet the criteria of merits of the respondents, and was due to the researcher's availability of time and the research work schedule.

We included undergraduate nursing students regularly enrolled in the Community and Family Nursing Curricular Unit who were present during the application of research instruments, interventions and who filled out the instruments of the study. Students who were not present in the class in which the data were collected were excluded, as well as those who partially responded to the study instruments. After applying the eligibility criteria, the final sample consisted of 94 students – as presented in the follow-up diagram (Figure 1).

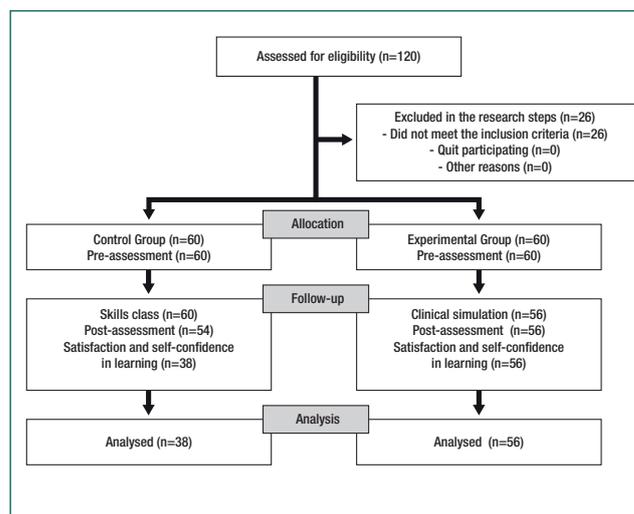


Figure 1. Follow-up diagram

The CG students completed the sociodemographic questionnaire, answered the cognitive performance test and had access to traditional teaching - a skill class related to immunization in the context of community nursing. In the end, they answered a performance test, and filled the Student Satisfaction and Self-Confidence in Learning scale.

The traditional class was performed from the theoretical exposure in power point and the resolution of clinical cases. In the skills training, the students trained vaccine administration techniques.

On the other hand, the EG students completed the sociodemographic questionnaire, answered

the cognitive performance test and participated in two simulation settings with debriefing referring to the nursing consultation in nursing vaccination. In the end, they answered again the cognitive performance test, and filled the Student Satisfaction and Self-Confidence in Learning scale.

The sociodemographic questionnaire had the following variables: age, sex, marital status, employment relationship and nursing preference area. Regarding the cognitive performance test, the questions presented, a total of five, including clinical cases with situations commonly found in nursing consultations in vaccination in different life cycles. They were multiple-choice questions of five items. It is noteworthy that the cognitive test was developed by researchers and had its content validated by professors of the curricular unit. All those involved were nurses, with PhD in nursing, and professional experience in clinical simulation. Therefore, the test was assessed by four professors. There was no disagreement regarding the content of the assessment questions. The overall test value was 10.0 points, of which 2.00 per question.

In the simulation session, Jeffries' conceptual model was followed.⁽⁴⁾ Two settings were constructed: one referring to an accidental domestic (adult) traumatic accident and a second related to a false contraindication in children. The settings were also constructed and validated by the same team involved in the construction of the cognitive performance test.

In the settings that were simulated, the standard patient tool was used. Standard patient are actors trained to act and reproduce user behavior in various situations and health care facilities.⁽⁹⁾ Two actors were previously trained in speech, reaction and body language.

Setting 1 had the following learning objectives: to experience crisis management situations to the client affected by a traumatic/accidental event in the Family Health Unit; and to propose the most appropriate propaedeutics of management to the client affected by traumatic/accidental event without proof of vaccination situation. In this setting, moulage was used to characterize the patient. An injury was reproduced that characterized an acci-

dent with scissors for the cutting of grapes. The total duration of the session was 45 minutes (15 for case performance and 30 for debriefing).

Setting 2 had the following learning objectives: to experience situations of management of situations of refusal in the administration of immunobiological agents in children in the Family Health Unit; to ascertain the vaccination status of the child; and to recognize and handle situations of refusal and to face false contraindications. At the time, a standard patient with a low-fidelity pediatric simulator and a real patient who played mother, previously trained for the setting, were used. The time allocated to conduct the session was also 45 minutes. The settings were conducted by the team of researchers – two nurses with professional experience in simulation, doctors in nursing – at the ESEnFC's Simulation Center.

The Student Satisfaction and Self-Confidence in Learning questionnaire was used to measure student satisfaction and their abilities to perform nursing interventions after experiments and conclusion of simulation (NLN, 2004). It is important to highlight that this questionnaire was developed by National League for Nursing, and should be used in high-fidelity simulations. In the study, we used the Portuguese version of the scale Student Satisfaction and Self-Confidence in Learning.⁽¹⁰⁾ Validation was performed with 103 nurses. In this process, internal consistency (Cronbach's alpha) presented values of 0.86 factor 1, with 06 items and 0.77 for factor 2 of 07 items.⁽¹⁰⁾

The instrument used has two subscales: satisfaction and self-confidence, total of 13 items. In the satisfaction subscale, there are 5 assessment items. On the self-confidence scale, eight items are included. Both are composed of a Likert scale of 5 items, namely: 1 = I strongly disagree with the statement, 2 = I disagree with the statement, 3 = undecided – I neither agree nor disagree with the statement, 4 = I agree with the statement, 5 = I strongly agree with the statement.

The data were analyzed using the SPSS (Statistical Package for Social Sciences), version 24. Descriptive statistics were used to characterize sociodemographic profile. In the cognitive perfor-

mance and satisfaction and self-confidence scores in learning analyses, the Mann-Whitney test was used for a significance level of 5%. Moreover, the Wilcoxon test was performed for intragroup analysis, and the same significance level was adopted.

Results

As for sociodemographic profile, it was found that of the 94 students, 95.7% were female, 91.5% were aged between 18 and 20 years, 98.9% were single and 94.7% were unemployed. Table 1 shows the characterization of those surveyed in the CG and EG.

Table 1. Distribution of frequencies and percentages of groups according to sociodemographic characteristics

Sociodemographic characteristics	Experimental Group (n=56)	Control Group (n=38)	Total (n=94)
	n(%)	n(%)	n(%)
Age group			
Between 18 and 20 years old	52(92.9)	34(89.4)	86(91.5)
Between 21 and 27 years old	3(5.4)	2(5.2)	5(5.3)
Between 28 and 36 years old	1(1.7)	2(5.2)	3(3.2)
Sex			
Male	1(1.8)	3(7.9)	4(4.3)
Female	55(98.2)	35 (92.1)	90(95.7)
Marital status			
Single	56(100.0)	37(97.4)	93(98.9)
Married	-(-)	1(2.6)	1(1.1)
Divorced	-(-)	-(-)	-(-)
Common-law marriage	-(-)	-(-)	-(-)
Employment			
Yes	5(8.9)	-(-)	5(5.3)
No	51(91.1)	38(100.0)	89 (94.7)

Regarding the respondents' cognitive performance, Table 2 presents the scores of the pre-assessment (before the intervention) and post-assessment (immediately after the intervention). As stated, the CG students presented higher mean and lower standard deviation (SD) in the pre-assessment. On the other hand, the EG students achieved a higher mean and lower SD in the post-assessment (p value = 0.000).

Table 2. (Pre- and post-) cognitive performance of students in the control and experimental group and statistical significance

	Control Group (n=56)		Experimental Group (n=38)		P value ^a
	Mean	SD	Mean	SD	
Pre-assessment	8.21	1.66	7.10	1.90	0.005
Post-assessment	7.84	1.70	9.50	0.87	0.000

^aMann-Whitney tests

In addition to intergroup comparison, the Wilcoxon test was performed for intragroup analysis. In this analysis, the EG also presented greater evolution between the pre- and post-assessments, obtaining statistical significance (p value = 0.000). On the other hand, the CG students were stagnant regarding the increase in cognitive performance scores (p value = 0.242). Table 3 shows the means, SD, and p value of the CG and EG regarding satisfaction and self-confidence in learning. With regard to internal reliability, the Cronbach's Alpha was 0.850, being 0.820 in the satisfaction subscale and 0.761 in the self-confidence subscale.

Discussion

In this research, the students who participated in the simulation session had better performances – in the post-test – in relation to the students who participated in the traditional strategy. Other studies are in line with the findings of this article.⁽¹¹⁻¹⁴⁾

Clinical simulation enhances the cognitive performance of nursing students. Moreover, studies point to simulation as a strategy that allows learning to be meaningful.⁽¹⁵⁾ For learning to be meaningful students need to realize the applicability of what they are studying.⁽¹⁶⁾

Student participation during debriefing enhances the lived experience and brings meaning to what was experienced.^(17,18) Furthermore, the study reflects on the action and improves learning for future situations.⁽¹⁹⁾

Since it enables structured clarifications and active student participation in the teaching and learning process, simulation - from debriefing - is presented as a strategy of greater impact for students when compared to more traditional strategies.⁽²⁰⁾

Regarding satisfaction with current learning and self-confidence in learning, it can be observed that, in both subscales, the students who participated in the EG presented higher means and lower SD. In the first subscale, there was statistical significance in the five variables that compose it.

A study of 199 undergraduate nursing students that examined the perception of their satisfaction

Table 3. Student Satisfaction and Self-Confidence in Learning, Portuguese version

Satisfação com a aprendizagem atual	Grupo Controle (n=56)		Grupo Experimental (n=38)		
	Média	DP	Média	DP	P-value
1. Os métodos de ensino utilizados nesta simulação foram úteis e eficazes.	4,28	0,51	4,80	0,40	0,000
2. A simulação forneceu-me uma variedade de materiais didáticos e atividades para promover a minha aprendizagem do currículo de tópicos de Atenção Primária (imunização de adultos).	4,00	0,69	4,41	0,80	0,003
3. Eu gostei do modo como o meu professor ensinou através da simulação.	4,55	0,55	4,82	0,43	0,006
4. Os materiais didáticos utilizados nesta simulação foram motivadores e ajudaram-me a aprender.	4,18	0,65	4,57	0,59	0,003
5. A forma como o meu professor ensinou através da simulação foi adequada para a forma como eu aprendo.	4,36	0,63	4,76	0,42	0,001
A autoconfiança na aprendizagem					
6. Estou confiante de que domino o conteúdo da atividade de simulação que o meu professor me apresentou.	3,50	0,76	3,51	0,66	0,620
7. Estou confiante que esta simulação incluiu o conteúdo necessário para o domínio do currículo de tópicos de Atenção Primária (imunização de adultos).	3,89	0,76	4,16	0,73	0,118
8. Estou confiante de que estou desenvolvendo habilidades e obtendo os conhecimentos necessários a partir desta simulação para executar os procedimentos necessários em um ambiente clínico.	4,13	0,62	4,23	0,60	0,386
9. O meu professor utilizou recursos úteis para ensinar a simulação.	4,44	0,55	4,66	0,51	0,051
10. É minha responsabilidade como aluno aprender o que eu preciso saber através da atividade de simulação.	4,42	0,59	4,60	0,49	0,146
11. Eu sei como obter ajuda quando eu não entender os conceitos abordados na simulação.	4,13	0,57	4,44	0,63	0,011
12. Eu sei como usar atividades de simulação para aprender habilidades.	3,86	0,62	4,12	0,66	0,062
13. É responsabilidade do professor dizer-me o que eu preciso aprender na temática desenvolvida na simulação durante a aula.	3,71	0,89	3,33	0,87	0,058

*Mann-Whitney tests

and self-confidence in simulation concluded that the respondents were satisfied with the experience and felt confident in their performance.⁽²¹⁾ Another study carried out in Saudi Arabia, with 117 nursing students, also showed that simulation as a strategy for clinical education promotes student satisfaction with learning and improves their self-confidence.⁽²²⁾

Regarding the self-confidence in learning subscale, the EG students also presented higher means and lower SD. However, there was only statistical significance of strong association in variable 11 (p value= 0.011).

Still in the self-confidence in learning subscale, the variable 13 that deals with the professor as a central figure in the teaching and learning process stands out. In the variable, the CG students presented a mean of 3.71, SD of 0.89. The EG students had lower values (mean of 3.33 and SD of 0.87).

The results of this study are also in line with other research regarding simulation as a strategy that generates satisfaction and self-confidence in learning.⁽²²⁻²⁴⁾ However, traditional teaching strategies can also generate these feelings.⁽¹¹⁾

In a Portuguese study, the students reported that the structured debriefing allowed to increase self-confidence, develop leadership skills, increase the potential for teamwork, develop the help relationship, promote self-awareness, identify difficulties in their actions, as well as improve the ability to manage emotions.⁽²⁰⁾

Motivated and satisfied students learn more and better. High scores of satisfaction with simulated practice can be a stimulus for nursing schools to invest in this strategy.⁽⁷⁾ Furthermore, identifying student satisfaction might serve as an assessment of their achievement of learning objectives and performance.^(2,25)

From this perspective, clinical simulation needs to be thought of within the nursing curriculum. Defining learning objectives seems to be the initial step towards thinking about the teaching and learning strategies that will be adopted during training. When one thinks of experiencing and or training more complex conducts, simulation gains prominence in relation to more traditional strategies since it allows an approximation with reality.⁽⁴⁾

In addition to the approximation with reality, studies show advantages of this strategy to the detriment of others in nursing education, namely: experiencing clinical situations regardless of chance; patient and student safety; prior use of technologies available in health equipment, among others.^(22,25) Investigations in clinical simulation has also contributed to the development of several specific and cross-sectional skills and competences.⁽²⁶⁾

Conclusion

The study showed that, from the experience in clinical simulation as a teaching and learning strategy for the teaching of nursing consultation in community nursing teaching vaccination, students learn more when compared to students who participated in the traditional strategy - skills class (p value = 0.000). Therefore, in the context studied, clinical simulation proved to be a more effective strategy in relation to the skills class. Moreover, clinical simulation is a strategy that promotes satisfaction among students. In the five items of the subscale of satisfaction with current learning, it was possible to identify statistical significance, which reinforces the potential character of simulation as a teaching and learning strategy. Regarding self-confidence in learning, the EG students also presented higher means and lower SD. As limitations, losses are pointed out - in a total of 26 students - due to the partial completion of any of the research instruments. In addition, the follow-up time was relatively short. Another limitation was the small number of studies comparing the more traditional strategies and simulation in the teaching of nursing consultation in community nursing vaccination. From this perspective, it was not possible to perform a deeper, comparative dialogue of the evidence extracted and other studies already completed. It is expected that the study will contribute to answer gaps in the literature regarding the efficacy of simulation, from the point of view of cognitive performance, in different contexts of nursing education. It is suggested to conduct new studies, experimental in nature and quasi-experiments, so that scientific evidence can be reinforced.

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Collaborations

Costa RRO, Medeiros SM, Coutinho VRR contributed to the design of the project, analysis and interpretation of the data, writing of the article, relevant critical review of the intellectual content and final approval of the version to be published. Veríssimo CME, Silva MANCGMM, and Lucena EES contributed to the analysis and interpretation of the 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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