RESEARCH

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Evaluation of nursing students about learning with clinical simulation

Avaliação dos estudantes de enfermagem sobre a aprendizagem com a simulação clínica

Evaluación de los estudiantes de enfermería sobre el aprendizaje con la simulación clínica

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ABSTRACT

Objective: to describe the contributions of clinical simulation for learning cognitive and procedural attributes through debriefing, from the perspective of nursing students. **Method:** descriptive exploratory study. Twenty nursing undergraduate students from a university in the interior of the state of São Paulo participated in this study. Data collection was performed at the debriefing stage. Student's perceptions about the simulation, positive aspects and what they could have done differently were registered. The students' statements were grouped according to the central themes and the framework of Bardin's content analysis (2011) and were analyzed using descriptive statistics. **Results:** enhancement of active, critical and reflective learning (47.5%) was identified due to the closeness to reality in nursing care (20.3%), manifestation of feelings experienced during the simulation (15.3%) and composition of the scenario (15.3%). **Conclusion:** the clinical simulation followed by debriefing promotes the understanding of the link between action and achievements in learning.
Key words: Nursing; Simulation; Learning; Educational Measurement; Educational Technology.

RESUMO

Objetivo: descrever as contribuições da simulação clínica para aprendizagem de atributos cognitivos e procedimentais, por meio do *debriefing*, na perspectiva dos estudantes de enfermagem. **Método:** estudo descritivo exploratório. Participaram 20 estudantes de Graduação em Enfermagem de uma universidade do interior paulista. Na coleta de dados, realizada na etapa do *debriefing*, foi registrada a percepção do aluno sobre a simulação, aspectos positivos e o que poderia ser feito de forma diferente. Os relatos foram agrupados em categorias temáticas centrais, segundo referencial de análise de conteúdo de Bardin (2011), analisadas por meio de estatística descritiva. **Resultados:** identificada valorização da aprendizagem ativa, crítica e reflexiva (47,5%) em decorrência da aproximação à realidade assistencial (20,3%), manifestação dos sentimentos vivenciados durante a simulação (16,9%) e composição do cenário (15,3%). **Conclusão:** a simulação clínica seguida do *debriefing* favorece a compreensão da relação entre ação e resultados alcançados na aprendizagem.
Descritores: Enfermagem; Simulação; Aprendizagem; Avaliação Educacional; Tecnologia Educacional

RESUMEN

Objetivo: describir las contribuciones de simulación clínica para aprender atributos cognitivos y de procedimiento, a través de *debriefing*, desde la perspectiva de los estudiantes de enfermería. **Método:** estudio exploratorio descriptivo. 20 estudiantes participaron en el Pregrado en Enfermería de una universidad de São Paulo. Durante la recolección de datos, que se aplicó

durante el *debriefing*, fue grabado en la percepción de los estudiantes de la simulación, los aspectos positivos y lo que podría hacerse de otra manera. Los informes de los estudiantes se agrupan de acuerdo a los temas centrales, según el referencial de análisis de contenido de Bardin (2011) y analizados mediante estadística descriptiva. **Resultados:** identificado la mejora de aprendizaje activo, crítico y reflexivo (47,5%) debido a la aproximación a la realidad en la atención de enfermería (20,3%), un resultado de la composición del escenario (16,9%), lo que favorece el desarrollo de sentimientos experimentados durante la simulación (15,3%). **Conclusión:** la simulación clínica seguida de *debriefing* favorece la comprensión de la relación entre la acción y los resultados obtenidos en el aprendizaje.
Palabras clave: Enfermería; Simulación; Aprendizaje; Evaluación de la Educación; Tecnología Educativa.

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INTRODUCTION

The fast advances in and democratization of knowledge through computer and information technologies have led to changes in the society and the labor world, which are reflected in nursing training. Professionals must be competent, i.e., capable of changing practices and bringing about new results compatible with the existing demand for critical thought, decision making and problem solving, so as to increase safety and quality in health care[1-2].

Nursing professional competences are developed based on opportunities that allow students to adopt reflective and critical attitudes towards their performance, and adopt new postures to enable reaching the intended learning objectives[2].

Reflection is a crucial aspect of learning. The concept of reflection bears specific meaning in the educational or professional light, as it stands for an intentional process of thinking intended to change behaviors based on fundamental principles or values, knowledge acquired and interpretation of situations experienced[3].

Developing critical thought in nursing is a long-standing suggestion and recommendation. Among the existing strategies one could mention: a) observation activities (where the capabilities of hearing, seeing and feeling are the most important ones); b) writing activities (journals, questionnaires, works of reaction, activities of research, analysis and summary); c) action activities (including simulations, games, problem situations, among others); d) mixed activities: critical incident (technique where a significant incident is evoked and, based on accurate instructions on what is to be achieved, concepts, opinions, observation skills, identification of attitudes and works can be worked on), among other possibilities[4].

Technological advances have made simulation in nursing training more accessible and popular, according to national and international surveys[5-7]. Laboratorial simulations provide opportunities of experimental learning where the objective is to match theory and practice[8-9].

Besides involving aspects inherent to knowledge, development of psychomotor skills and critical thought, students can experience emotional, spiritual and ethical components when providing care to patients and families, which could be applicable in the context of simulation in nursing and which are hardly practiced in other scenarios[10].

A recent study tried to verify the potential influences of both the presence of an evaluator in the scenario and shooting the scene in the absence of an evaluator on the level of anxiety and on the performance of students, in a simulated situation of clinical evaluation. These have not led to different degrees of anxiety among students[11].

The aim of this study was to approach a component part of this teaching-learning strategy - namely debriefing - between the aforementioned groups. The process allows the intentional reflection to maximize learning, which could enable behavioral changes, recognized to be the most important step after simulation[8-9,11-12].

Therefore, debriefing is considered to be a central axis for learning as a post-experience analytical process which evaluates the development and completeness of lessons learned in the scope of cognition and consciousness. The process provides opportunities to explore and make sense, discuss what went well and identify what could be done to change it, to make it differently or to improve it next time[13].

Moreover, the debriefing sessions enable the use of therapeutic communication skills, considering feelings and emotions as components of the learning-teaching process in simulation[8-9].

Thus, it is a process whereby professors and students reassess a simulation experience through thoughtful learning – considered to be the primary facilitator – and which aims at reinforcing behaviors and actions[12,14].

Few studies on the subject are found in the national literature[7] thus bringing about the need for identifying the contributions provided by debriefing as a strategy that enables significant learning based on the reflection about the experience of clinical simulation. Likewise, it is a moment to identify feelings, behaviors and cognition of students, which could be useful to verify the achievement of the proposed objectives and manage this teaching strategy for nursing students.

OBJECTIVE

The objective of this study was to describe the contributions provided by clinical simulation in learning cognitive and procedural attributes through debriefing from the perspective of nursing students.

METHOD

An exploratory and descriptive study, using a case study design, was carried out with nursing undergraduate students from a university in the interior of the Brazilian state of São Paulo.

A total of 73 students who met eligibility criteria were invited and, of those, 20 students expressed interest and participated in the study, being 19 women and 1 man, with a mean age of 23 years. Subjects were randomly divided into two groups. Group I performed clinical simulation with the presence of an observer in the scenario, while Group 2 performed clinical simulation in a room with a video camera, and with no observer. A simulator of average fidelity was used to make up the scenario.

The clinical situation elected to make up the study scenario was that of a patient with history of pain, and recommendation for using analgesics whenever necessary. The student was then expected to evaluate the pain characteristics. Based on this evaluation, the student should identify the need for administering medication, prepare it, administer it and, then, evaluate the results of the intervention[11].

When evaluating the intervention, the students' performance was analyzed based on a list of items that comprised the clinical evaluation performed, decision making on the intervention, preparation of medication and its administration. In this evaluation, the clinical performance of both groups was similar and considered to be satisfactory[11].

The simulation development was planned considering eleven dimensions of attributes[15], in a context of hospital setting to provide care to adult or aged patients, with contents of clinical evaluation of pain (data collection) and intervention of preparation and intravenous administration of medication (Chart 1). This option was selected due to the personal experience of the researchers on the theme.

The tool designed was validated regarding aspect and content (clarity and easy understanding, content scope and presentation of items) by three experts, professors who deliver classes related to clinical contents in nursing. A pre-test was performed with five students of the undergraduate nursing course to identify the best way of applying it and to promote the changes required. The tool comprises open questions that would allow for thinking over the experience of simulation through debriefing: 1) What did you think of the simulation performed? 2) Which aspects do you consider to be positive in the simulation you have just undergone? 3) What would you do differently?

Data were collected from February to August 2012, after authorization by the Research Ethics Committee, under Protocol no. 110503/2011.

It is worth highlighting that the invitation and research activities were under the responsibility of research assistants with no authority on the participants, and who were not teaching during the ongoing semester to ensure the possibility of exercising the free power of choice, and to prevent harming the volunteer nature of the students' decision or characterize conflict of interest, upon agreement and signing the Free and Informed Consent Form.

The approach to the students' statements comprised the phases of content analysis: pre-analysis, material exploration, processing of the results achieved and interpretation, which allow identifying the information relevant to the study[16].

The material obtained through guiding questions was fully transcribed, submitted to thematic analysis and grouped into four core categories according to their respective units of signification and context, focusing on sentences and/or paragraphs and analyzed through descriptive statistics tools.

Transcriptions were identified using codes representing the guiding question (1 - 3), followed by the numeric code assigned to the student (1 - 20) and to the group participating in the simulation with the presence of the observer (Group 1 = obs) or in a setting with video camera (Group 2 – film) to preserve the identity of the study participants. When results were presented the statements were grouped according to the order of the guiding question.

Chart 1 - Dimensions of the simulation and objectives established

Dimensions of the simulation	Objectives of the study
1 – Proposal / objectives of the simulation	Teaching concepts / technical skills and starting professional activity
2 – Participation unit	Individual
3 – Participants' level of experience	Undergraduate, taking the 7th and 8th semester of the course
4 – Context of care where simulation is applied	Hospital setting
5 – Discipline of the health field	Nursing
6 – Kind of knowledge, skills, attitudes and behaviors	Cognitive and procedural dimensions
7 – Age of patient in simulation	Adults
8 – Technology employed or required for simulation	Advanced Nursing Simulator – average fidelity
9 – Simulation site	Laboratory of Nursing Teaching and Communication
10 - Extent of participation in simulation	Low interactivity
11 – Method of feedback to students regarding the evaluation	Critical evaluation of the educator or self-evaluation of the shooting

Source: Prepared based on the Gaba (2004, p.127) recommendations[15]

RESULTS

Statements were grouped into four significant thematic categories: *active, critical and reflective learning; closeness to reality in nursing care; feelings experienced during simulation; and preparation of the scenario*.

The first thematic category, *active, critical and reflective learning*, with 28 (47.5%) testimonials, allowed us to identify that after the simulation activity the debriefing process was started; students considered the debriefing as an interesting opportunity that allowed the reflection about the results of their own actions and the recognition of the degree of anxiety, nervousness or attitudes that compromised performance during simulation. Moreover, they pointed out that participating in clinical simulation activities favors the development of skills, emotional control, autonomy, memorization and review of contents with reduced risk, as described in the students' statements in response to the first guiding question.

I found it interesting, it made us think and reflect about our actions regarding care to patient. (1.8 obs)

Interesting, for participant observation and reflection about their degree of anxiety. (1.15 film)

Great, as it made me control my anxiety before a situation of evaluation. (1.14 film)

Through this simulation I could think over the mistakes made during simulation. (1.10 obs)

Simulation shows us the possibility of paying attention to details that many times go unnoticed in the everyday of our professional lives like, for example, what the patient said about her level of pain. (1.13 obs)

I think simulation is a very interesting method of evaluation as, many times, the person may be nervous and end up making a mistake or forgetting some part of the procedure and that, at the time of simulation, s/he is not aware of it. (1.17 obs)

Very good as it prepares us to perform procedures / techniques in the presence of anyone, mainly during a job interview. (1.1 film)

Important to memorize the content and improve techniques. (1.19 obs)

Very important as due to the activity proposed the simulation method can bring about interesting results. (1.18 obs)

When asked about the positive aspects of clinical simulation through debriefing, students confirmed the value assigned to self-reflection in face of the learning opportunities experienced, as described below.

I could think over some mistakes made during simulation and that deserve further studies. (2.10 obs)

I could observe that I am more anxious than I believed I was. (2.15 film)

Perception of some things I should improve. Confirmation that I am doing it right. (2.17 obs)

It teaches us to control anxiety during a practical or public exam. (2.14 obs)

That I must review some basic concepts regarding medicine preparation. That it is also a way of evaluating ourselves. That I must learn to control my emotional state. (2.2 obs)

That many times we forget some important details and we must be attentive. I don't know if it is because it was a simulation, or if I had really forgotten it, but I didn't evaluate the venous access when I was evaluating the patient and, thus, I had to come back to the bed. (2.16 film)

Recall some experiences and the step-by-step of each procedure to be made; review conducts, reflection or postures. (2.19 obs)

In my view, a positive aspect was to recall and repeat techniques that I perform and will always perform. (2.7 film)

The freedom to perform the procedure with freedom to make mistakes and be evaluated. (2.3 obs)

It gives us the autonomy to do what we believe should be done, i.e., which care to deliver to a patient in a given moment. (2.1 film)

Regarding the guiding question on what could be done differently in the activity performed, students were able to make critical review of the learning experienced and point out further possibilities, as can be observed from the following statements.

I would be calmer, would ask the pain scale of 0 to 10, as I expressed how the patient's pain was but I did not effectively measure it. (3.15 film)

I would be calmer, would take more care about contaminating the peripheral venous access. (3.11 obs)

But I guess I would try to think better before starting the procedure to prevent mistakes. (3.2 obs)

I don't believe it would be possible to do anything differently, as it is not easy for me to control anxiety. If it were necessary, I would think deeper about the procedure to avoid forgetting any stage. (3.3 obs)

I guess I would demonstrate better each stage and would make the procedure in more slowly, verbalizing it better and explaining each stage. (3.8 obs)

Regarding my performance, I could have interacted more with the patient; I believe I was "embarrassed" and, thus, I should have made the step-by-step in a slower pace. (3.12 film)

Maybe I would prepare medication in a different way, as the process of dilution and preparation of medication is still hard for me. (3.13 obs)

I would analyze the case in a deeper way, with calmness to think first about what I would have to do. (3.14 film)

Interaction, in the sense of addressing what the patient wants to know; I would evaluate all the vital signs. (3.18 obs)

The students' testimonials about the second category, *closeness to reality in nursing care*, with 12 (20.3%) statements, showed the interest on and approval of the experience of clinical simulation. As students were taking the last year of the course, testimonials were compatible with prior experiences of internship programs and the professional work of nurses, in response to the first two guiding questions, as described below.

It is a very interesting activity where you can think of how things are in practice, and observe if that is really what happens. (1.4 obs)

I found it very interesting and compatible with the reality experienced during internship programs. (1.5 obs)

Interesting and close to reality, as it simulates comprehensive care to patients [...]. (1.6 obs)

I believe it really simulates reality. (1.2 obs)

A way of learning which is really close to practice. (1.9 obs)

Simulation handled with a general case, i.e., a case that we will always face in our professional lives […]. (1.10 obs)

Very good, it resembles reality [...]. (1.11 obs)

It is a situation we have already experienced in practice. (2.4 film)

[...] it was not different from our experience and learning in university. (2.5 obs)

Closeness to reality. (2.6 film)

Opportunity of facing a real situation, where you know you can't make any mistake. (2.9 obs)

Closeness to reality, ranging from the approach of the patient to the proper disposal of the material used. (2.11 obs)

As regards the third category, *feelings experienced during simulation*, reports on anxiety, nervousness and uncertainty prevailed, with manifestations of preference for shooting or an unknown observer as it is less stressful and favors the vigor intended in the experience-based learning process, with 10 (16.9%) statements in response to the first question, as described below.

It was very interesting, but I was quite nervous. (1.7 film)

Working with people we are not acquainted with makes us less stressed about the situation but, yet, generates high levels of anxiety. (1.2 obs)

And it seems to be less stressing when nobody is observing us. (1.4 film)

[...] but the presence of the evaluator made me nervous. (1.11 obs)

Being evaluated in practice either in the presence of a professor or through shooting generates anxiety and uncertainty. But shooting made a big difference if compared to practical evaluations I have undergone. It seems to "flow better". (1.12 film)

I thought it was interesting, as I believe in the future it could prevent students from feeling scared, if it is proved that the presence of an observer could harm the simulation. (1.3 obs)

Regarding the answer to the second question, students thought over clinical simulation and the use of shooting as potential means of evaluation in nursing courses, as can be observed from the statements below.

In this simulation we can feel the degree of anxiety increasing; however, it becomes a little easier if the evaluator is not there. (2.20 film)

And this simulation will contribute a lot to evaluate the students' degree of anxiety and, whenever required, to make changes on the means of evaluation. (2.12 film)

On the other hand, they could identify their difficulties regarding the process, as shown in the statements below.

I don't know. I am still a little nervous and can't think clearly. (3.2 obs)

And the tension of the moment makes me forget important aspects. (3.12 film)

In the last category, *preparation of the scenario*, there were nine (15.3%) citations. In response to the first question, students reported difficulty in using simulators, and the experience was considered to be similar to practical exams during the undergraduate course, as reported below.

I don't feel at ease working with dolls. Although there is someone there to answer me, I think it is weird and makes me lose focus. (1.16 film)

Very similar to practical exams. (1.20 film)

However, for the second question the realism of the simulator of average fidelity, compatibility with hospital setting and provision of previous information to students about organization and handling of resources involved in simulation were mentioned as essential.

The materials provided also matter as, the more realistic they are the better learning is. (2.1 film)

Setting, voice and doll favor simulation, making it look like reality […]. (2.5 obs)

The doll used in simulation is quite real! The laboratory setting is very close to our everyday in hospital internship. (2.12 film)

Laboratorial practice gets us closer to hospital setting or to any other field of work. (2.9 obs)

Patient reports pain, facilitating care, already having prescription and this is a situation I have experienced in practice. (2.4 film)

The video we watched first contributes a lot to improve our performance when delivering care or performing the activity proposed. (2.13 obs)

In response to the third question, it is worth mentioning the report on valuation of how the learning process is carried out, as described below.

In my view, simulation is being done very well, so, there is nothing I would change. (3.12 film)

It is worth mentioning that the thematic category *active, critical and reflective learning* prevailed in the answers for the three guiding questions regarding the debriefing stage, totaling 28 (47.5%) of the quotations, followed by *closeness to reality in nursing care* with 12 (20.3%), *feelings experienced during simulation* with 10 (16.9%) and *preparation of scenario* with 9 (15.3%) citations. However, these are interdependent and supplemental categories, as representations compatible with the richness, complexity and dynamism of the learning process in nursing.

DISCUSSION

In *active, critical and reflective learning* theoretical knowledge is used to explain and guide decisions, facilitating the representation and formulation of hypotheses for the solution of problems which, in turn, promotes confidence to the required interventions in the light of answering how a given conduct and action work[17-18]. Simulations have great potential to handle with problems related to the development of competence of professionals in charge of providing health care, in the sense of outperforming the process of passive reception focused on the transmission of contents[2,19].

The challenge posed for educators is to fill in the gap between the use of simulation in teaching laboratories and transferring knowledge to be applied in actual clinical practice. Although simulation should not replace direct clinical experience, it provides students with opportunities for experiential learning with specific adjustments for unique learning styles and needs[20].

In this light, reports about *closeness to reality in nursing care* confirm the results of simulation-based research where students consider this strategy as realistic, which makes them more confident and skilled in a given competence, thus reducing their fear of applying it directly to patients. Thus, it has been recognized as a facilitator of significant learning[9,21].

Students showed they understood given theoretical knowledge, but failed in showing the correspondent procedural and attitudinal knowledge which disclosed gaps in the integration of different types of knowledge. However, they recognized this aspect in the debriefing and were willing to fill in the gaps. In this light, a study carried out to compare nursing students' knowledge prior to and after the simulation strategy points out that theoretical knowledge and confidence in face of the clinical situation proposed have improved after simulation[18,22-23].

Shooting simulation contributes to improve the analysis of the learning experience. However, it was clear that videos should be used carefully. The use of simulation records makes discussion more effective and improve the engagement of students during the sessions of analysis and intentional reflection over the actions developed[20], in conformity with the perspective inherent to active, critical and reflective learning.

Therefore, simulation allows evaluating several capabilities and skills. Images recorded in the scenarios allow for analyzing the students' proficiency. The challenge here is to use simulation as an effective tool and to build strategies to evaluate practices pursuant to the best clinical and educational evidences in undergraduate nursing education[8-9,24-27].

Regarding *feelings experienced during simulation*, reports show the rise of stress and uneasiness to perform procedures in the presence of an observer during simulations. In relation to performance, students stated they seemed to be doing nothing, or it seemed they did not know what they were doing. These issues refer to the critical components that influence students' learning through participation in clinical simulations: due preparation, the behavior of teaching staff involved in simulation and the final debriefing on the experience[5,8-9].

Improving clinical thinking and technical skills to obtain data and make nursing interventions is a challenge for both undergraduate students and their educators; additionally, there is the difficulty in analyzing the acquisition of those skills. According to literature, learning clinical thinking is one of the experiences that causes more anxiety among clinical activities[18,24].

The focus on opportunity to develop competences not limited to finding errors and scoring, jointly with attitudes that are collaborative, facilitating and of confidence by the professors involved, contribute to reduce stress, and could help students

reformulate their inner premises and feelings, maximizing benefits during learning experience to reach better performance in the future[8-9,24,27].

The simulation experience is considered to be like a transition through a set of stages which starts with initial nervousness and anxiety and eventually progresses to the stage of becoming more confident and appraising the environment, where they can make mistakes without causing damages or being criticized. This was evidenced in the statements by the students in this study[20].

The *preparation of the scenario* was described as an opportunity of practicing skills in a safe, structured and supported setting. The more real the elements of the scenarios seem, the more they involve students, who, in turn, learn more with the experience[19-22,28]. However, the research points out difficulties and limitations inherent to the use of simulation in nursing training, notably in the approach of the social, emotional and affective context[2].

The due preparation was recognized as a critical component that influenced students' learning. The provision of the required resources and transfer of information to implement care interventions during simulation were crucial. Nursing training should provide conditions that lead students to match skills to solve complex professional situations, as required by the labor market today.

Moreover, the nursing professional training should consider different means of education and evaluation that could promote lower degree of stress and anxiety, as well as the identification of potential stressing sources in the teaching-learning process[21].

As expected, debriefing was a core component that influenced students' learning, and was considered to be an important strategy, notably when it is part of an experience of clinical simulation[8-9].

In this light, it is worth highlighting the contribution of simulation as a strategy for significant learning, which allows nursing students to analyze their attitudes, skills and clinical competences, mainly in debriefing.

FINAL CONSIDERATIONS

This study identified the contributions provided by debriefing after clinical simulation in nursing. It discloses reports of closeness to the reality of the profession, thus allowing the reflection about performance and feelings brought about in the activity simulated. It appraised the opportunity of analyzing mistakes that could be avoided in similar situations in the future, increasing patient safety.

However, the reports of uneasiness related to the exam of clinical skills, cognitive and procedural attributes could have influenced the students' willingness, which led to a short number of participants in the research. This aspect evidences the relevance of focusing on the development of skills from the adoption of postures that are collaborative, facilitating and of confidence during simulation and debriefing.

Finally, the results evidence the students' valuation of the opportunity provided by debriefing and one of the core elements in simulation, which contributes to achieve the process of active, critical and reflective learning resulting from the closeness to the nursing care reality, and favoring the manifestation of feelings experienced during simulation and understanding the link between action and achievements in learning.

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