2021; 24(4): 478-485
DOI: 10.17049/ataunihem.733924

RESEARCH/ARAŞTIRMA

THE EFFECT OF SIMULATION PRACTICES ON THE DEVELOPMENT OF NURSING STUDENTS' EMERGENCY CASE MANAGEMENT SKILLS[1]

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Alınış Tarihi/Received	Kabul Tarihi/Accepted	Yayın Tarihi/Published
28.05.2020	25.10.2021	15.12.2021

Bu makaleye atıfta bulunmak için/To cite this article:
Topbaş E, Terzi B, Görgen Ö, Bingöl G, Elçin M. The effect of simulation practices on the development of nursing students' emergency case management skills. Journal of Anatolia Nursing and Health Sciences, 2021; 24(4): 478-485. DOI: 10.17049/ataunihem.733924

ABSTRACT

Aim: *The objective of the study was to examine the effectiveness of simulation practices in improving the emergency case management skills of nursing students.*

Method: *The study was designed as quasi-experimental research and carried out with nursing students (n=42) in three phases. In the first phase, theoretical training on emergency situations was delivered. The students were involved in the emergency case scenarios interacting with high-fidelity simulators and standardized patients, and their performances were recorded in the second phase. In the third phase, debriefing sessions were conducted. Pre- and post-tests and written feedback forms were used to gather the data.*

Results: *The levels of knowledge (mean score of pre-test: 2.83; post-test: 5.95) were statistically significant (p<0.05). A positive change was revealed in the levels of self-confidence among the students after the training program.*

Conclusion: *It was concluded that simulation practices were effective in the improvement of students' self-confidence and knowledge in emergency case management.*

Keywords: *Clinical skills; emergency case management; nursing students; simulation; standardized patient.*

ÖZ

Simülasyon Uygulamalarının Hemşirelik Öğrencilerinin Acil Vaka Yönetim Becerilerinin Geliştirilmesine Etkisi

Amaç: *Bu çalışmanın amacı hemşirelik öğrencilerinin acil vaka yönetim becerilerinin geliştirilmesinde simülasyon uygulamasının etkisinin incelenmesidir.*

Yöntem: *Araştırma yarı deneysel nitelikte tasarlandı ve hemşirelik öğrencileri ile üç aşamada gerçekleştirildi (n=42). İlk aşamada, acil olgulara ilişkin teorik eğitim verildi. İkinci aşamada, yüksek gerçeklikli similatör ve standart hastaların kullanıldığı acil olgu senaryolarında öğrencilerin performansları kayıt altına alındı. Üçüncü aşamada ise çözümleme oturumları gerçekleştirildi. Verilerin toplanmasında ön ve son testler ile yazılı geri bildirim formları kullanıldı.*

Bulgular: *Bilgi düzeyi (ön testin ortalama puanı: 2.83; test sonrası: 5.95) istatistiksel olarak anlamlıydı (p <0.05). Eğitim programından sonra öğrencilerin öz yeterlilik düzeylerinde olumlu bir değişim ortaya çıktı.*

Sonuç: *Simülasyon uygulamalarının öğrencilerin acil vaka yönetimindeki öz yeterlilik düzeyleri ve bilgilerinin geliştirilmesinde etkili olduğu sonucuna varıldı.*

Anahtar Kelimeler: *Klinik beceriler; acil vaka yönetimi, hemşirelik öğrencileri; simülasyon; standart hastalar.*

[1] The results of this research were presented at the International Congress of Black Sea Nursing Education-ICOBNE 12-13 October 2017 Samsun, Türkiye

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INTRODUCTION

Emergency clinics are the medical units where patients with various health problems are diagnosed and treated. There may be some medical risks, and complicated situations for patients, caregivers, and healthcare professionals in emergency clinics. Exposing many patients with different diseases and risk levels and the possibility of misdiagnosis while running up may cause anxiety and fear among the health professionals (1). Hence, besides their knowledge, skills and ability to make critical decisions, nurses should be trained adequately to work within the teams and use therapeutic communication methods with the patients and their caregivers. Emergency nursing requires advanced knowledge and skills in this field, the quality of the care provided to the emergency patients is directly proportional to the knowledge and skills of the nurses (2). The responsibilities and duties of the emergency care nurses make them important members of the emergency team (3).

The challenges in current healthcare models increase the demand for more qualified healthcare professionals (4). Emergency care nursing is one of the areas of specialization at the graduate level. As the number of specialized nurses is inadequate for the entire country, it is important to emphasize certain fields like emergency patient care in the undergraduate nursing curriculum. Many newly graduated nurses are obliged to work in emergency clinics or intensive care units because of the lack of qualified staff in these areas.

Technological developments and changes in healthcare education provide new opportunities that may help to overcome some of the challenges in healthcare services. The nursing schools are struggling with the increasing number of nursing students, decreasing number of patients on the wards, not wanting student nurses of health institutions, and relative lack of teaching staff. It is challenging to organize and conduct clinical education, particularly in specific fields like emergency and intensive care units. With the development of simulation techniques and high-fidelity simulators, educators can create situations and environments mimicking the real facilities. Such simulated learning environments help students become more equipped for their clinical experience and feel more confident (5, 6). Studies in the literature show that simulation practices are effective in increasing students' knowledge level (7, 8, 9), retaining knowledge (7), improvement of clinical (8, 10) and psychomotor skills (11), and increasing leadership and self-confidence (7, 12). The aim of our study was to improve the nursing students' emergency case management skills using high-fidelity simulators and standardized patients.

METHODS

Design

The study was quasi-experimental research.

Participants

The population consisted of 50 final year nursing students studying at a university's Faculty of Health Sciences and were completed in the Internal Diseases Nursing, Surgical Diseases Nursing, and Intensive Care Nursing and Psychiatry Nursing courses. The sample consisted of 42 students (84% of the total) who voluntarily participated in the study and met the inclusion criteria.

Study setting

Faculty of Health Science's simulation laboratory consisted of two separate rooms; clinical and intensive care units. Both rooms were equipped with an oxygen and aspiration vacuum system, patient bed and electrocardiography (ECG) device and defibrillator. There was also a high-fidelity simulator (SUSIE S1001 human model) in the intensive care unit. There was a control room between two units for trainers. Emergency case scenarios were conducted in the intensive care unit of that laboratory. Standardized patients were involved in the scenarios. Standardized patients were trained on the scenarios before the practices. After the completion of performances on each scenario, a debriefing session was conducted.

Data collection tools

The pre-test and post-test forms and the feedback form were used for collecting data in the study. All forms prepared by the researchers. There were eight questions for knowledge and seven statements about their self-confidence levels in the pre-test and post-test forms. The knowledge level of the participants in the pre-test and post-test was calculated based on their correct answers to the first eight questions. An additional group of four questions about participants' experiences on emergency case management and simulation practices were included in the pre-test forms. The feedback form included three titles for the participants' thoughts about: "positive aspects of the education," "aspects of education which

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DOI: 10.17049/ataunihem.733924

need improvement," and "dissemination of simulation practices in the curriculum."

Educational topics and scenarios

We identified six topics to be included in such a program: management of intoxication cases, cardiac problems (myocardial infarction), metabolic problems (hypoglycemia), multiple traumas, neurological problems (stroke) and psychiatric cases (depression and schizophrenia). We also decided to discuss the fundamental issues at each case, including emergency units and their operational processes, emergency calls and information systems, patient admission in emergency units, triage system, and transfer processes.

Brief presentations for each topic were prepared, and the content experts and simulation educators developed intermediate difficulty scenarios. Scenarios were created using Hacettepe University Medical Faculty Medical Education and Informatics Department Patient History Development Form for each topic. Necessary data to program the simulator were identified. A high-fidelity simulator was used for cardiac and metabolic cases; standardized patients were used for intoxication, neurological and psychiatric cases; hybrid simulation was used for the trauma case.

The Research Preparation, Application Phase

This 3-day study included theoretical training sessions, simulation practices and debriefing sessions (Figure 1).

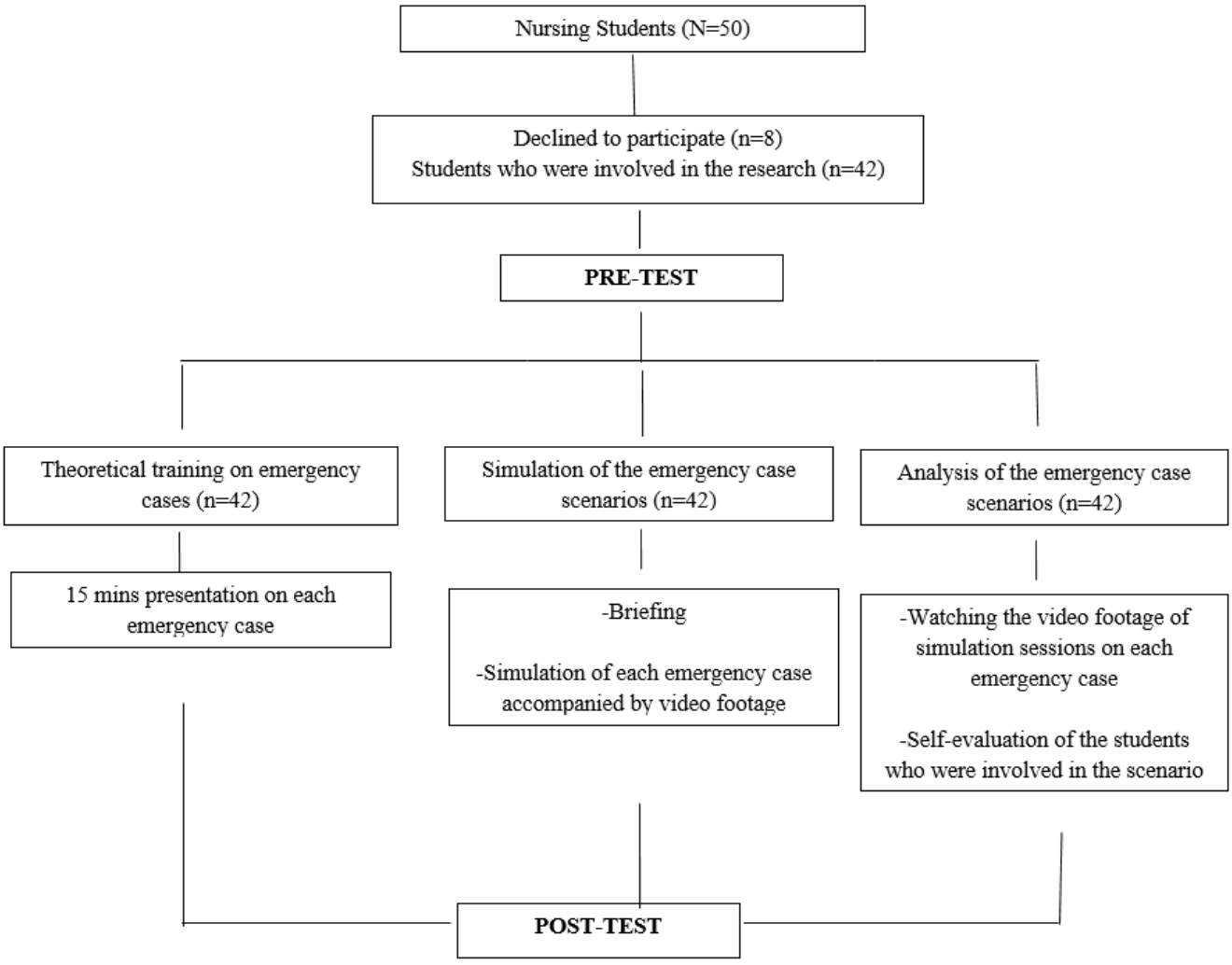

Figure 1. Research Pattern

At the beginning of the study, we asked the students to determine their expectations about the session and fill the pre-test forms.

Then, the students were randomly (simple random sampling) divided into six groups according to the topics of the educational content. Fifteen minutes of theoretical training for each topic was delivered to all groups. After the theoretical training, the students were informed about the simulation practice and the environment. The students participated in the scenarios and tried to manage the emergency case as a team with two or three members. The students only performed individually in the psychiatric case. The scenarios lasted 8-10 minutes, and each scenario was performed three times by different students, with the participation of 2 or 3 students each time. Every performance was recorded.

After the simulation practices were completed, debriefing sessions were conducted with the participation of the entire group. Debriefing sessions lasted approximately 60 minutes. In the debriefing sessions, each group was asked to reflect on their performances with the help of guiding questions like "How did you feel yourself during this case?", "What do you think you did well?" and "What can you do better if you participate in a similar case again?" After the participating group completed the reflection process, the students who watched the performance were asked to provide feedback to their peers with the help of guiding questions like "What do you think the group did best?", "Is there anything that can be improved?" and "What could you do better?" The students watched the scenarios they did not participate in, attended debriefing sessions, and evaluated the performances during debriefing, allowing them to enhance their learning on different scenarios. Finally, the tutor provided feedback to the groups and summarized the session. The students were asked to complete the post-test and feedback form on the last session of the program.

Data analysis

We used IBM SPSS Statistics version 20.0 (IBM Co., Armonk, NY, USA) software program and analyzed the data using the number, percentage distribution, and Independent T- Test. Statistical significance was set at the level of $p<0.05$.

Ethical considerations

Ethical approval for this study was received from Amasya University Scientific Ethics Committee (09/05/2017-E.10946). Additionally, oral consent was also obtained from the students prior to the study.

Limitations of research

Limitations of our study were that students could not participate in each scenario, there was not a measurement phase to evaluate the performances, and the evaluations were only based on the reflections and feedback from the participants.

RESULTS AND DISCUSSION

The experiences of students on emergency case management and simulation

Thirty-nine of the students (92.9%) had never intervened in an emergency case, and 26 of them (61.9%) never intervened in an emergency case as a team member/observer. Twenty-one of the participants (50.0%) had already experienced training activities, including simulation practices (Table 1).

Table 1. Characteristics of Student's Emergency Case Experiences (N=42)

Variable	Yes	No
	n (%)	n (%)
Being employed as a nurse	4 (9.5)	38 (90.5)
Having intervened in an emergency case	3 (7.1)	39 (92.9)
Having intervened in an emergency case as a team member	16 (38.1)	26 (61.9)
Having experienced training with simulation practices	21 (50.0)	21 (50.0)

Clinical nurses play an active role in critical cases in hospitals, and they are supposed to be well educated in essential decision-making skills, especially for emergency cases. Unfortunately, they cannot have the chance to attain sufficient experiences for this because of several reasons. In our study, most of the students (92.9%) had never intervened in an emergency case. It is crucial for educators to provide their students with opportunities to develop skills and attitudes besides knowledge and get experienced and ready for special situations. Many nursing schools are investing in simulation centers for that reason (5, 11). Our faculty is small but has initiated a successful attempt to creating an educational environment that will prepare our graduates for real life.

Students' pre-test and post-test scores

The average overall scores of the students from the post-test were statistically higher than

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the pre-test ($p<0.05$) (Table 2). There was a positive change in the self-confidence levels through the pre-test and post-test results (Table 3).

Table 2. Students' Knowledge Levels Pre-test and Post-test Results (N=42)

	N	Mean	t	p
Pre-test	42	2.93±1.37	15.11	0.000*
Post-test	42	5.95±1.29		

*Paired Samples t-Test

Students' opinion about the program

Students mostly expressed positive opinions about the program. They stated in the feedback forms that the training was beneficial for many reasons like completing the theoretical training, revealing students' deficiencies, facing the stress factor that may be met in a natural working environment, feeling involved in a real case, working as a team and communicating with patients and their relatives.

The students mentioned that the training would be improved when the time period was longer, when the students could participate in more cases, and when they participated in the cases after getting more familiar with the environment and the camera. The students also suggested that having more simulation practices in the curriculum could provide more effective learning and more realistic experiences.

Table 3. Students' Self-Confidence According to Pre-test and Post-test Results (N=42)

Statement	Before			After		
	Yes	No	Maybe	Yes	No	Maybe
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Competency in intervention to general emergency situations	2(4.8)	32(76.2)	8(19.0)	19(45.2)	6(14.3)	17(40.5)
Competency in intervention to emergency intoxication situations	1(2.4)	37(88.1)	4(9.5)	27(64.3)	6(14.3)	9(21.4)
Competency in intervention to patient with emergency cardiac problems	4(9.5)	30(71.4)	8(19.1)	24(57.1)	8(19.1)	10(23.8)
Competency in intervention to patient with emergency metabolic problems	4(9.5)	32(76.2)	6(14.3)	32 (76.2)	3(7.1)	7(16.7)
Competency in intervention to general body trauma cases	10(23.8)	26(61.9)	6(14.3)	25(59.5)	9(21.4)	8(19.1)
Competency in intervention to patient with emergency neurological problems	2(4.7)	33(78.6)	7(16.7)	18(42.8)	7(16.7)	17(40.5)
Competency in intervention to patient with psychiatric problems	13(31.0)	15(35.7)	14(33.3)	20(47.6)	5(11.9)	17(40.5)

In the field of health sciences education, students are raised as an individual at school. They are educated in their own learning environment. But in the work environment, they are expected to work as members of clinical teams (13). The adaptability and competence of the team during a crisis is an essential component of the team consciousness. Team support is important to decrease personal mistakes. When nurses with clinical experiences participate in training programs, including emergency scenarios, it contributes to improving non-technical skills like team interaction and responsibility-sharing (14). In our study, the students came across various health professionals like emergency medical technicians, emergency doctors, emergency security guards, and laboratory technicians to improve team awareness.

Their thoughts about that awareness are; "*It helped us to learn about real life problems and team work."; "I learned that I should be in communication with other health professionals*

and patient relatives."; "When I watched the video, I understood that team members are affected by each other's behavior and skills." Our program was incredibly beneficial for the students to achieve non-technical skills like teamwork and team awareness.

At the beginning of the study, 61.9% of the students mentioned that they had never intervened in emergency case as a part of an emergency care. They had no idea about the clinical environment and emergencies. They were inexperienced in clinical behavior, and all those situations negatively impacted their critical decision-making skills. Their average of overall scores from the post-test was statistically higher, and a positive change in their self-confidence through the pre-test and post-test results was analyzed: That indicated that using simulation-based training for the emergency case processes was effective. In a study conducted by Kim et al., the knowledge and skills of the nurses who had simulation-based training on pediatric emergency were higher than the control group (15). Bogossian et al. emphasized that nursing students' skills remain inadequate to recognize and manage patients with general condition disorder. For this reason students should be prepared for these situations by including uncommon clinical cases in the curriculum encouraging teamwork (16). Dane et al., indicated that nurses who received advanced life support training had the ability to make early diagnoses and intervene immediately, and this had a vital effect on patient survival (17). Another study emphasized that improving both technical and non-technical skills were equally important for the management of clinical emergencies (14).

The students also emphasized the importance and impact of the program on their knowledge, skills, and behaviors: "*This program requires us to manage time and stress.", "I learned how to overcome my excitement.," "The patient and the clinic were in our responsibility that has never happened before; it made us feel more serious and responsible", "We realized our lack of knowledge and practice," "I learned what I might face during an emergency situation";" I learned how to evaluate the patient properly.", "We couldn't manage to perform many routines that we normally could do easily, and it indicated the stress factor during work*.", *"Having practices right after theoretical training was useful to reinforce what we learned.", "Learning by practice was more permanent than theoretical training.", "I felt like we were in a real case.",* "*Experiencing this training, especially when we were still at the school, was very beneficial for us.", "I learned how important it was to get a proper medical history."*

Using simulation techniques in training programs had a positive impact in creating a positive educational climate. The literature also revealed that simulation-based training had a significant effect on both students' (18, 19, 20) and nurses' (21) satisfaction with educational methodology. Furthermore, it was mentioned that simulated learning methodologies provide an experimental and fluent activity (22).

The students in our study also mentioned the effects of simulation on their learning:

"Everything was systematic and well-designed.", "We felt like nurses on duty; it was very beneficial.", "It was not boring and overwhelming. It was an entertaining and instructive program.", "In the debriefing session, we were asked what we did well, not what we couldn't do. This was really nice.", "*I would like to have such activities in our curriculum because using the knowledge we gained from the theoretical training on realistic patients made us understand our mistakes.", "I believe that standardized patients should be used more often in our education.", "I believe that it was useful for us to reinforce the information we learned."*

Similarly, in Sarmasoglu's study, it was revealed that standardized patient methodology attracted students' interest and helped students to develop self-confidence (11). In another study where psychiatric patient interviews were conducted, it was mentioned that it helped nursing students to gain self-confidence (22). In another study on hypoglycemic patients, it was concluded that educational programs, including simulation, increased nursing students' confidence in their performance; allowed students to actively participate in patient care; decreased students' psychological stress by providing a safe environment; and allowed students to apply their theoretical knowledge on simulated clinical situations (6).

CONCLUSION

In conclusion, simulation-based training program aiming to improve nursing students' emergency case management skills could be an effective alternative to complement the existing inadequate clinical practice. Our study showed that simulation-based activities were effective in improving both self-confidence and knowledge for emergency case management. As an initial step, elective courses including various

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DOI: 10.17049/ataunihem.733924

simulation modalities like high fidelity simulators, standardized patients, or hybrid simulation can be implemented into the curriculum.

Acknowledgment: The study was supported by the Research Fund of Amasya University Scientific Research Projects Unit (Project No. FMB-BAP 16-0211).

Conflicts of Interest: None declared.
Author Contribution: Concept- ET, BT, ÖG, GB; Design- ET, BT, ÖG, GB, ME; Supervision- ET; Materials- ET, BT, ÖG, GB, ME; Data collection &/or processing- ET, BT, ÖG, GB, ME; Analysis and/or interpretation- ME; Literature search- ET, BT; Writing- ET, BT; Critical review- ET, BT, ME.

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