

## Araştırma makalesi

## Research article

# Effect of Two Different Simulation Modalities in Environmental Safety Teaching for Stroke Patients on Nursing Students' Stress, Self-Confidence and Satisfaction



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## ABSTRACT

**Aim:** This study was conducted to evaluate the effect of two different simulation modalities used in environmental safety teaching for stroke patients on self-confidence, satisfaction, knowledge scores and stress perception in nursing students.

**Material and Methods:** The study design was randomized controlled, pre-post-test, mixed-method design. Sixty-two students participated in the study. The students practicing with mannequin formed the control group and those practicing with the standardized patient formed the experimental group (mannequin group: n=31 and standardized patient group: n=31).

**Results:** Satisfaction and self-confidence scores of the students in standardized patient group were higher than the mannequin group and the difference was statistically significant (p=0.01; p=0.04). No significant difference was found between pre-test and post-test scores between the two groups in terms of knowledge levels (p>0.05). However, in-group comparison, there was a significant difference between the pre and post-test scores of the students in the mannequin group. Stress perceptions of the students were analyzed under two main themes: sources of stress and stress management.

**Conclusions:** Standardized patient simulation increases the satisfaction and self-confidence of the students. However, it was found that both simulation modalities did not make a difference in terms of students' knowledge level. It was determined that usage of simulation in environmental safety teaching for stroke patients was found to cause stress in students, but being well organized was effective in stress management.

**Keywords:** Education, environmental safety, nursing students, simulation

## ÖZ

### İnmeli Hastaya Yönelik Çevre Güvenliği Öğretiminde İki Farklı Simülasyon Uygulamasının Öğrenci Stres, Özgüven ve Memnuniyetine Etkisi

**Amaç:** Bu çalışma, inmeli hastaya yönelik çevre güvenliği öğretiminde kullanılan iki farklı simülasyon uygulamasının hemşirelik öğrencilerinin, özgüven, memnuniyet, bilgi düzeyi ve stres algısı üzerine etkisini değerlendirmek amacıyla yapılmıştır.

**Gereç ve Yöntem:** Araştırma, randomize kontrollü, ön test-son test, karma tasarım kullanılarak gerçekleştirilmiştir. Çalışmaya 62 öğrenci katılmıştır (kontrol grubu, n=31 ve deney grubu, n=31). Manken ile uygulama yapan öğrenciler çalışmanın kontrol, standart hasta ile uygulama yapanlar ise deney grubunu oluşturmuştur.

**Bulgular:** Standardize hasta grubundaki öğrencilerin sırasıyla memnuniyet ve özgüven puanları manken grubundaki öğrencilere göre daha yüksek ve aralarındaki farkın istatistiksel olarak anlamlı olduğu saptandı (p=0.01; p=0.04). Bilgi düzeyleri açısından her iki grup için pre-test ve post-test puanları açısından fark saptanmadı (p>0.05). Bununla birlikte grup içi karşılaştırmada, kontrol grubundaki öğrencilerin pre-test ve post-test puanları arasında anlamlı bir fark saptandı. Öğrencilerin stres algıları, stres kaynakları ve stres yönetimi olarak iki ana tema altında analiz edildi.

**Sonuç:** Standardize hasta ile uygulama yapmak öğrencilerin memnuniyet ve özgüvenlerini daha artırmaktadır. Bununla birlikte her iki simülasyon uygulamasının öğrencilerin bilgi düzeyleri açısından bir fark oluşturmadığı saptandı. Simülasyon uygulamasının öğrencilerde stres oluşturduğu ancak iyi organize olmanın stres yönetiminde etkili olduğu bulunmuştur.

**Anahtar kelimeler:** Çevre güvenliği, eğitim, hemşirelik öğrencileri, simülasyon

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## INTRODUCTION

Stroke has been the second most frequent cause of death in the world in the last twenty years<sup>1</sup>. Complications emerging after stroke are very common and generally neurological complications appear in the acute stage<sup>2</sup>. The frequency of epileptic or convulsive seizure seen after neurological complications varies from 2% to 67%<sup>3</sup>. Since seizure increase metabolic needs and can cause stroke-related brain damage, the conduction of emergency interventions and the provision of a safe environment supporting life are essential.

When a stroke patient has a seizure, nurses perform the first intervention. Therefore, it will be beneficial for nursing students to have experience in providing first intervention and providing a safe environment for their professional life. Students are offered simulation-based education directed towards the development of critical thinking, decision making and crisis management skills on similar cases very likely to be encountered.

In Turkey, simulation-based education has been used as an effective teaching method in nursing education since 2010<sup>4</sup>. Simulation practices can have low, medium and high fidelity. Following a high-fidelity simulation (HFS), skills, knowledge and satisfaction of students increase<sup>5,6</sup>. Learning about environment fidelity is improved by using mannequins or standardized patients (SPs) in simulation scenarios<sup>7</sup>. However, in a study by Hravnak, Beach ad Tuite, reduction of perceived reality due to skin and eyes of high-fidelity mannequins were found to be a barrier<sup>8</sup>. In several studies, SPs have been shown to enhance communication and fidelity<sup>9-11</sup>. While some studies have revealed that HFS improves clinical skills<sup>12</sup>, other studies have shown no difference in acquisition of knowledge, interpersonal skills, student satisfaction and self-efficacy between SPs and HFS groups<sup>13,14</sup>.

High-fidelity simulation is a beneficial technique in terms of acquiring knowledge and skills, support learning and enhance critical thinking. They help to gain care management skills in cases less frequently encountered in practice<sup>15</sup>. However, simulation-based education has been observed to cause stress in students. Determining which simulation-based practices lead to stress and factors causing stress is thought to contribute to learning. The results of the present study will provide guidance for educators in planning simulation-based education and making preparations for it. There have been many studies using high-fidelity mannequins<sup>16-18</sup>. However, there have been only a few studies examining the effects of two different high-fidelity simulations on students' satisfaction, knowledge and stress in particular. The aim of this study was to evaluate the effects of two different simulation modalities on self-confidence, satisfaction, knowledge scores and stress perception in nursing students.

### Research Hypotheses

**H<sub>1</sub>:** There is a difference in satisfaction and self-confidence scores between the students training with mannequins and SPs.

**H<sub>2</sub>:** There is a difference in pre-test and post-test knowledge scores for the provision of a safe environment between the students' training with mannequins and SPs.

### Research Questions

- What are the sources of stress perceived by students participating in the simulation application with mannequin and SPs?
- How do students deal with this stress?

## MATERIAL AND METHODS

### Study Design

The study design was randomized controlled, pre-post-test, mixed-method design (involving both quantitative and qualitative research methods). The students attending a mannequin formed the control group and those attending the standardized patient simulation formed the experimental group.

### Study Sampling

The study included sixty-two fourth-year students studying at a foundation university in the fall term of the 2017-2018 academic year and accepting to participate in the study. The students were assigned to the mannequin group (n=31) and the SPs group (n=31) by using a simple random numbers table. 9 male and 53 female students participated in the research (Figure 1).

### Steps Followed in the Research

#### 1. Preparation Stage

- A simulation design template was created by the researcher.
- A simulation scenario was written.
  - The purpose of the scenario was to provide a safe environment for a stroke patient having an epileptic seizure.
  - The objectives of the scenario:
    - \*Effective communication with stroke patients and their relatives
    - \*Ensuring the airway patency of the patient having a seizure
    - \*Providing a safe environment for a stroke patient having a seizure
- Expert opinion was obtained for the scenario.
- The University has a comprehensive simulation center. Permission was obtained from the simulation center and environment was prepared.
- Before the simulation application, standardized patient training was carried out regarding the standardized patients' roles, expectations from them and possible cases.
- A pilot study was conducted (4th-grade students who performed the pre-application was excluded from the research)
- The scenario was finalized with necessary corrections.

#### 2. Theoretical training

Theoretical subjects related to the nursing care of stroke patients were explained to students within the context of the curriculum (2 hours).

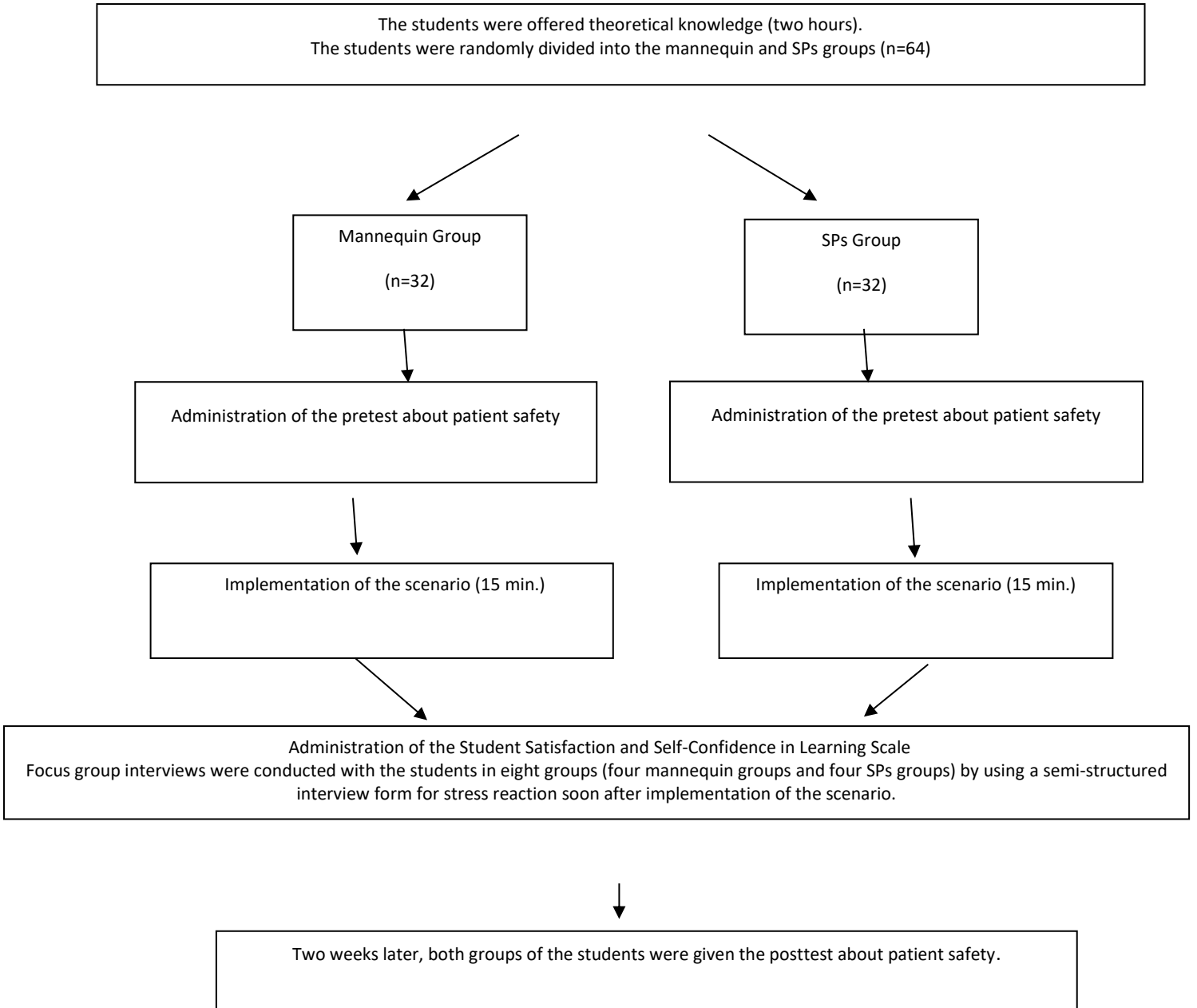


Figure 1. Flow Chart for the Study

3. After the theoretical training, the students were simply and randomly divided into experimental and control groups.

4. An information test was applied to all the students in the experimental and control groups for providing the environmental safety of a stroke patient having an epileptic seizure.

5. Before the application, plans, the literature to be read and videos to be watched were sent to the students via e-mail.

### 6. Application Stage

- Students in the experimental group participated in the simulation application with a standardized patient in groups, each consisting of 4 people (15 mins).

- Students in the control group participated in the simulation application with a mannequin in groups, each consisting of 4 people (15 mins).

- From the students in these groups with 4 people in each, two assumed the role of a nurse, one was the spouse of the patient and another one was the child of the patient. No team leaders were determined among the students who took the role of a nurse; they were requested to share the tasks. Assuming an active or passive role and effective process management were analyzed in the analysis session and focus group interviews. Students were given 10 minutes for this process after the briefing.

- In the scenario, students' learning was analyzed and equalized in terms of observation during the application stage and tasks and induced feelings of the roles during the analysis stage.

### 7. Evaluation

Following the simulation applications, "Student's Satisfaction and Self-Confidence in Learning Scale" was applied to the students in the experimental and control groups.

8. For the qualitative dimension of the study, the semi-structured interview form was applied and the focus group interview was held with students in the experimental and control groups in groups with 8 people in each regarding stress reaction.

9. Two weeks after the simulation application, "the Information Test for Providing the Environmental Safety of the Patient" was repeated on both control and experimental groups. During the application of the information tests, students were informed that they would not be evaluated with a score, and tests in exam formats were held under the observance of research academicians.

10. One of the researchers was also responsible for the theoretical course, and the other two were academicians working in co-departments (internal medicine and nursing and public health nursing). They were informed about the research. Academicians who were moderators (also researchers) were different in two scenario groups. However, students were evaluated at the standard level with the checklist created for evaluating the students' performance in the simulation application.

### Data Collection

Quantitative data were gathered with the Student Satisfaction and Self-Confidence in Learning Scale and Knowledge Quiz for Patient Safety. The qualitative data

were collected with a semi-structured interview form for stress reaction (Box-1).

**Knowledge Quiz for Patient Safety:** It is a knowledge test based on the goals of the scenarios, prepared by the researchers and given to the students exposed to simulations as a pre-test and a post-test. The information test consisted of 5 multiple-choice questions. It was prepared for the course in accordance with the learning objectives of the scenario by the academician/researcher who was responsible for the course. Expert opinions of other expert opinion academicians who participated in the study were obtained.

### The Student Satisfaction and Self-Confidence in Learning Scale:

The original scale was developed by Jeffries and Rizzolo (2006) and was composed of 13 items. It was adapted to Turkish by Unver et al.<sup>19</sup>. The Turkish version of the scale is composed of 12 items. It is a five-point Likert scale and involves the subscales Satisfaction with Current Learning and Self-Confidence in Learning. The former subscale is composed of five items and the latter is composed of seven items. Cronbach Alpha was .85 and .77 for Satisfaction with Current Learning and Self-Confidence in Learning respectively. Higher scores show higher satisfaction and self-confidence levels<sup>19</sup>. In the present study, Cronbach alpha coefficients were found to be .84 for Student Satisfaction and .89 for the Self-Confidence in Learning.

### Semi-Structured Interview Form for Stress Reaction:

It was developed by the researchers to reveal the stress status of the students after the simulations (Box-1). Qualitative data were collected by the researcher right after the analysis session of the simulation application. A focus group interview was held. Each session was participated by 8-10 students. The interviews took approximately 60 minutes.

#### Box-1. Questions of the Semi-Structured Interview

1. Did an atmosphere emerge during the simulation experience causing you to feel stressed? Could you explain it?
2. What were the circumstances that caused you to be stressed during the simulation experience?
3. Do you think that you can manage the stress you experienced during the simulation application?
4. If you had the chance of doing this simulation again, where would you feel more comfortable?
5. Is there anything else you would like to discuss?

### Data Analysis

Quantitative data were analyzed with SPSS 21.0 and Qualitative data were analyzed with Malterud's content analysis<sup>20</sup>. Student's t-test was used for the intergroup evaluation of the quantitative data and the Paired Sample t-test was used for the intragroup evaluation. The qualitative data obtained from the students through voice recordings were verbatim transcribed in a Word file. The transcriptions were coded by two researchers separately based on the aims of the study. The codes were categorized and themes and subthemes were determined. The data were interpreted and evaluated in accordance with these themes and subthemes.

### Limitations of the Study

The students were assigned to the groups through random sampling. Since the mannequin group had high scores for the post-test, the academic performance of these students was examined retrospectively and they were found to have high academic performance. The limitation of this study was that the classification of the students into the groups was not based on their academic performance. Thus, in future studies, it is suggested that students are included in the experimental and control groups according to their general academic grade point average.

### Ethical Considerations

Ethical approval was obtained from the ethical committee (decision number: 2017-16/20). Also, all the students were informed about the study and written informed consent was obtained from the students volunteering to participate in the study.

## RESULTS

There was a significant difference in the scores for student satisfaction and self-confidence between the mannequin and SPs groups. Both groups of the students got significantly high scores for satisfaction and self-confidence. The SPs group had significantly higher scores for satisfaction and self-confidence ( $4.40 \pm 0.48$ ;  $4.37 \pm 0.48$ ) than the mannequin group ( $4.03 \pm 0.61$ ;  $4.08 \pm 0.55$ ) ( $t=2.577$ ,  $p=0.01$ ;  $t=2.142$ ,  $p=0.04$ ). A comparison of the scores for satisfaction and self-confidence between the mannequin and SPs groups is presented in Table 1.

**Table 1. The Satisfaction and Self-Confidence in Learning Scores of the Mannequin Group and the SPs Group (n=64)**

	Satisfaction with Learning Scores M $\pm$ SD	Self-Confidence in Learning Scores M $\pm$ SD	t*	P
SPs Group	4.40 $\pm$ .48	4.37 $\pm$ .48	2.577	0.01
Mannequin Group	4.03 $\pm$ .61	4.08 $\pm$ .55	2.142	0.03

The pre-test and post-test results of the students related to patient safety are presented in Table 2. SPs group's pre-test score is  $58.70 \pm 21.86$  and the post-test score is  $67.09 \pm 19.69$ . Mannequin group's pre-test score is  $49.67 \pm 23.01$  and the post-test score is  $74.00 \pm 23.57$ . No significant difference was found between pre-test and post-test scores among the two groups in terms of knowledge levels. ( $p > 0.05$ ). However, during the intragroup comparison, a significant difference was detected between the pre-test and post-test scores of the students in the mannequin group ( $t = -4.539$ ;  $p = 0.001$ ).

**Table 2. The Scores for Knowledge Test for Patient Safety before and after Implementation of the Scenario (n=64)**

	Pretest M $\pm$ SD	Posttest M $\pm$ SD	t*	P
SPs group	58.70 $\pm$ 21.86	67.09 $\pm$ 19.69	-1.471	0.152
Mannequin group	50.00 $\pm$ 23.34	74.00 $\pm$ 23.57	-4.539	0.001

\*Paired Sample t Test

**Qualitative Data from Focus Group Interviews:** Focus group interviews were performed by one researcher with the students in eight groups after the simulation through a mannequin and SPs. A focus group interview was conducted with the whole sample (n: 62). The data obtained from the focus group interviews directed towards stress perceptions of the students were analyzed and the following themes emerged:

-Sources of stress

-Stress management

Sources of Stress

The sources of stress in the mannequin group were to reach learning goals, characteristics of the simulator, duration and to be observed. The sources of stress in the SPs group were playing the role of a nurse, standardized patient, the complexity of the task, being observed, differences in stress depending on the roles, insufficient experience and embedded participants.

### Stress Management

The stress management method utilized by the mannequin group was to get well-organized. The method utilized by the SPs group was to have a safe environment (Table 3).

## DISCUSSION

This study was carried out to evaluate the effect of two different simulation modalities on self-confidence, satisfaction, knowledge scores and stress perception in nursing students. The students in the SPs group had higher scores for self-confidence in and satisfaction with learning than those in the mannequin group. As a result, the first hypothesis of the study was accepted. It has also been reported in the literature that nursing students have increased self-confidence in knowledge, skills and communication and increased satisfaction with learning<sup>21-25</sup>. A study by Woodruff, O'neill and Walton-Moss also showed a significant relation between fidelity and self-confidence<sup>26</sup>. Congruent with the literature, the present study revealed that the simulation with SPs had considerably higher fidelity. Therefore, it was not surprising that the students in the SPs group had higher levels of self-confidence and satisfaction than the mannequin group. Although both the SPs group and the mannequin group had increased post-test scores for knowledge of patient safety, the post-test scores of the mannequin group were significantly higher. No significant difference was found between pre-test and post-test scores between the two groups in terms of knowledge levels. Although a medium-fidelity simulator was utilized in the mannequin group, a high-fidelity environment was created. In a meta-analysis, intergroup analyses did not show a significant difference between the high-fidelity simulation group (0.86) and the SPs group (0.86) in terms of effect size<sup>27</sup>.

Table 3. Themes and Subthemes

Themes	Subthemes	Mannequin Group	
Sources of Stress	<i>Stress due to reaching learning goals</i>	"The process involved many things ranging from taking history to performing physical examination. If we had been in hospital, the flow of the process would have been very different. I mean we were assigned some goals to achieve such as how to act in case a patient has an attack and offering information about medications or other things. We had to achieve all the goals in the scenario; however, in hospital, offering information can be postponed and it can be performed later on discharge. We had to do everything in the given time for the scenario."	
	<i>Characteristics of the Simulator</i>	"When I held its hands while checking its reflexes or performing its physical examination, I told it squeezed my hands, but actually it did not. I had to act as if the simulator was reacting to me, which didn't help me to learn much. Therefore, I don't like to study by using a simulator in general."	
	<i>Duration</i>	"I think we were given very little time."	
	<i>Being observed</i>	"I felt that I was being observed. Actually, I don't know whether it was possible without being observed. It was stressful. Thinking that I could make a mistake and what I would do first and next as my friend said were also a cause of stress."	
	<b>SPs Group</b>		
	<i>Playing the role of a nurse</i>	"I was playing the role of a nurse. I had to plan what I would do. At that moment, I got really confused with what I would do."	
	<i>Standardized patient</i>	"The environment was quite safe, but when the patient suddenly had a seizure, I felt as if I was in hospital. I thought he was really a patient. The patient was well adapted to his role. I felt as if I was in hospital and got panicked. His being a human made me panicked a lot."	
	<i>Complexity of the task</i>	"We were in a hurry, which wasn't due to the environment of the scenario. We couldn't adapt to the scenario. That's why we felt stressed out and confused. We attempted to do the task without planning what to do and without sharing duties. We were always thinking about our goals. We constantly asked ourselves whether we did this, whether we did that or whether we didn't do anything. We tried to do our duties in the scenario completely rather than playing the role of a nurse. Therefore, we were stressed and confused."	
	<i>Being observed</i>	"We know we were being observed. This created hastiness. We were afraid about whether we did something wrong. Also, I was playing the role of a family caregiver, but I was wearing my uniform. I shouldn't have worn it. We noticed it later. Actually, we couldn't distribute the roles properly."	
	<i>Differences in stress levels depending on roles</i>	"Since I played the role of the patient's relative, I felt less stressed. I didn't experience much stress. My friends were more stressed since they had to do many things, but I didn't experience stress about it." "As I told during implementation of the scenario, I felt safer while I was playing the role of a nurse. In fact, I better play the role of a nurse. When our professor asked us to change the roles, I played the role of a patient's relative. Actually, I'm a person without acting skills. I couldn't maintain the flow of the role and I failed. In fact, I was going to say the name of the drug the stroke patient was receiving. If had played the role of a nurse, I could have been better at it."	
	<i>Insufficient experience</i>	"We're fourth-year students, but we saw a stroke patient for the first time in the simulation. I hadn't seen such a patient before. I got confused with how I would perform the practice. That made me feel stressed."	
	<i>Embedded Participant</i>	"We studied what we would do beforehand, but since the other participant in the simulation was my friend, I felt anxious about whether my friend could answer my question. Since we felt worried about what responses we would get, we tried not to cause difficulty for our friends playing the role of a nurse. To tell you the truth, I tried to act like that sometimes. Sometimes I even exaggerated that behavior. That was the case."	
Stress Management	<b>Mannequin Group</b>		
	<i>Getting well-organized</i>	"We worked with a standardized patient in the simulation. When we face real patients, everything will be different in the future. Naturally, we will be responsible for everything. We will have to manage everything. The thing is that we will take care of a human. Therefore, it's impossible to laugh and to avoid responsibility. There were not such things even in the descriptions of the simulations. I think we could manage things as much as possible."	
	<b>SPs Group</b>		
<i>To have a safe environment</i>	"I didn't feel stressed out at all. The atmosphere was very comfortable. There were people I could trust. To be frank, I trusted my professors. Also, I saw what I could do in case of stroke on a standardized patient. It was very different for me. I knew that I was being observed. I was sure that my professors would intervene in case I needed."		

In a study by Ignacio et al. (2015), no significant difference was found in performance scores for management of worsening patient status between the high-fidelity simulator and SPs groups<sup>28</sup>. In addition, in a study by Gillett et al. using eight scenarios (2008), the students in both the simulators group and the SPs group were observed to achieve critical actions<sup>29</sup>. Although it is expected that students working with SPs get higher scores for the knowledge test, they can have the same performance as those using simulators. In the present study, when the mannequin group got a significantly higher score for the knowledge test about patient safety, their academic performance was retrospectively examined. The students with higher academic performance were found to be randomly assigned to this group. This might have caused a significant increase in their posttest scores.

Although simulation-based education enhances self-confidence in and satisfaction with learning, it affects students' perceived experiences of stress and encourages them to evaluate themselves and think critically<sup>30</sup>. In the current study, the themes emerging from the focus group interviews were sources of stress and stress management. Both the mannequin and SPs groups had a source of stress in common: i.e. being observed. The students were found to experience stress due to their educators and other learners observing them, which is compatible with the literature<sup>31</sup>. It may be that students knowing they are observed feel stressed since they are anxious about making mistakes and getting low scores. In addition, in the present study, the students in the mannequin group had stress due to their attempts to manage their time effectively. In several studies, nursing students attending simulation practices have been found to experience stress while they report their evaluations and observations about patients' status<sup>32</sup>. It can be suggested that educators' attitudes toward evaluation can create stress in students.

In the current study, the mannequin group reported that the nature of the simulator did not match their perception of reality while explaining sources of stress. In McIntosh et al.'s study (2018), most of the students reported that SPs provided more fidelity compared to mannequins and high-fidelity simulators<sup>33</sup>. SPs have been shown to be beneficial and have high-fidelity since they improve skills for performing interventions, communicating and taking history in emergency situations<sup>34</sup>. Although the perceived reality is of importance in simulation practices, it can cause stress in students. This can be due to lack of responses in mannequins and due to a possibility of giving harm in interventions using SPs, or SPs themselves.

In the current study, the SPs group reported that communicating with SPs, acting as a nurse and having insufficient experiences were the sources of stress. In Ignacio et al.'s study, interactions with the patient and fidelity caused stress<sup>28</sup>. In the present study, the students commented that interacting with SPs and body language, facial expressions, gestures and actions of SPs led to stress. Playing the role of a head nurse has been reported to increase self-efficacy scores<sup>35</sup>. Acting as a nurse assisting the head nurse does not improve self-efficacy scores as much as

expected. Students acting as a visitor can perform observations effectively, but they can have low self-efficacy<sup>35</sup>. It seems that acting as a nurse and not playing other roles in simulations can make greater contributions to learning. In a study performed by Lestander, Lehto and Engström to examine perceptions of learning after a high-fidelity simulation, the main themes were that acting as a nurse caused stress and the feeling of being inexperienced and that making a work plan and prioritizing things were important<sup>36</sup>. It can be suggested that the feeling of incompetence in intervening in a new case while acting as a nurse can create confusion with the role in the work plan or during the simulation.

In the current study, the SPs group reported that individuals playing the roles other than a nurse could create stress. Although they said acting as a nurse led to stress, they reported that they wanted to play the role of a nurse when they were given another chance and that the nursing role contributed to their learning more. Several studies have shown that acting as a nurse primarily responsible for patient care, as a nurse actively observing, recording and evaluating patient care and as a nurse assisting the others significantly increase scores for critical thinking and self-efficacy after simulations<sup>37,38</sup>. It is not surprising that roles in simulation scenarios influence learning and critical thinking and that stress levels can vary with roles.

In the current study, the SPs group reported to managing stress by creating a safe environment. The mannequin group commented that being well-organized was effective in stress management. Alconero-Camarero et al. (2018), using a simulation, their study found a relationship between students' satisfaction with learning and personal coping skills like problem-based solutions and solutions with emotional expressions. Emotional intelligence and coping skills are desirable qualities since they play a role in satisfaction with learning<sup>39</sup>.

#### **Students' opinions about their roles in the scenario**

The students said that they focused on only what they had to do while playing the roles other than a nurse and that these roles helped them to empathize. However, they did not want to play the roles except for a nurse and felt stressed while playing these roles. They also reported that their feeling of being observed and analysis sessions contributed to their learning. They admitted that such roles as a family caregiver and an assisting nurse decreased their perceptions of reality.

## **CONCLUSION**

While simulations increase self-confidence and satisfaction, they may lead to stress. The SPs group had significantly higher scores for self-confidence in and satisfaction with learning than the mannequin group. No significant difference was found between pre-test and post-test scores between the two groups in terms of knowledge levels. But both the mannequin and SPs groups got high scores for the pre-test and the post-test for the knowledge of patient safety, the scores of the former group were significantly higher.

The stress perceptions experienced by the students were categorized into two themes: i.e. sources of stress and management of stress. The students were found to experience different levels of stress depending on their roles. The perceived reality created by the mannequin and SPs and being observed were the other sources of stress. However, being well-organized was effective in stress management.

**Ethics Committee Approval:** Approval was obtained from related University Ethics Committee (Decision number: 2017-16/20).

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**Author contributions:**

Study design: EA, VÜ, BU

Data collection: EA, VÜ, BU

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**Katılımcı Onamı:** Öğrencilerden bilgilendirilmiş onam alınmıştır.

**Yazar katkıları:**

Araştırma dizaynı: EA, VÜ, BU

Veri toplama: EA, VÜ, BU

Makale yazımı: EA, VÜ, BU

**Teşekkür**

Çalışmaya katılan bütün öğrencilere teşekkür ederiz.

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