

## Standardized Patient Simulation Usage in Nursing Education and Evaluation of Outcomes by Kirkpatrick Model

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### Abstract

**Objective:** The aim was to use the Kirkpatrick Model to evaluate the outcomes reported in studies conducted on the usage of standardized patient simulation in nursing education. In addition, the study sought to identify deficiencies in these study outcomes with the goal of improving the application of this approach in the field of nursing education.

**Design:** A systematic review of literature studies dealing with standardized patient simulation as applied in nursing education.

**Data sources:** In total, 23 relevant studies on patient simulation in nursing education in the literature published between 2012 and 2017 were included. The research process was carried out using the Cochrane Library, Medline Complete and Google Scholar databases,

**Review methods:** Two researchers evaluated the studies by applying various combinations of key words such as “standardized patient simulation”, “nursing education” and “standardized patient”. The outcomes reported in the studies were categorized according to the four levels of the Kirkpatrick Model.

**Results:** The studies focused mainly on first- and second-level outcomes, including assessing the level of satisfaction with the technique, the technique perception status and the knowledge and skill levels of students. This demonstrated that the focus had been more on short-term outcomes, and that outcomes expected to be acquired in the long run had not been evaluated.

**Conclusions:** Not enough is known about the effects of integrating simulation methods into nursing education and the research dealing with the subject is deficient. This study revealed the need to include and examine all dimensions of the expected outcomes, especially at the third and fourth levels. The present findings may serve as a strong basis for providing literature-based evidence in future studies.

**Keywords:** Nursing education; Simulation; Standardized patient; Program evaluation.

### Introduction

The nursing profession requires the acquisition of psychomotor skills and development in cognitive and affective domains as well as the integration of physical skills with theoretical knowledge [1-54]. In nursing education, it is important to use interactive methods that provide opportunities for students to actively participate in the learning process [7,22] in order to effectively develop proficiency in all three dimensions. In adult education, the most effective outcome involves an active role in the learning process. This learning style allows students to gain new experiences by applying their knowledge and skills [33]. Among these active learning approaches, simulation applications have gained momentum in recent years.

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Various studies [1,8,9,17] have pointed out that simulation applications can be used for developing psychomotor skills in students and that these applications can improve cognitive and affective skills such as critical thinking, problem solving and effective communication, while also reducing the anxiety experienced during clinical practice.

In order for effective results to be obtained from simulation applications, the concept of reality is of great importance. Reality refers to the degree to which the simulation experience reflects the real situation [19]. There are three realities involved in the field: the simulation tool used, the reality of the simulation environment, and the psychological reality. Environmental reality refers to materials and equipment used in the simulation application which are appropriate for and reflect a real-life situation, whereas psychological reality refers to realistic perception of the applications which encourages realistic feelings and beliefs to be revealed [11].

Students may find that the realities of these applications are limited; however, high-fidelity simulators can produce effective results in different areas [36]. In simulation applications, students cannot communicate effectively with a mannequin, which might cause them to perceive these applications as emotional “games” [12,14]. As a result, in order to enable more realistic communication, the need arises to increase the level of reality in all three dimensions of the simulation application. In this respect, the nursing students studied by Terzioğlu et al. [48] felt that they were inadequate in their skill applications when they entered the clinical arena and had problems with team members and patients. Moreover, they reported that the skill development applications used in their training were useful for them, but that they did not feel like real applications only because they got no reactions/responses from those applications [48].

### **Standardized patient simulation**

The concept of a “simulated or standardized patient” is defined as a healthy individual who has been carefully trained to reflect the symptoms and findings of a real patient and act accordingly in a consistent manner within a scenario designed for training, implementation or evaluation [3,27,34,38]. The first standardized patient was introduced by Howard Barrows in the 1960s [20]. Barrows noted that the standardized patient technique offers advantages such as providing flexibility and standards in education, providing the opportunity to become an educator guide, and allowing students to participate actively in their training [25].

Since the 1960s, standardized patients have been used in the teaching and evaluation of clinical assessment techniques for medical students [4,10]. Over time, standardized patient education programs began to be used in the training of clinicians [49] and in teaching culturally sensitive communication skills to students [2]. Today, in most educational institutions that play a role in the education of health professionals, the standardized patient is used in the training of students.

While in the past standardized patients were less frequently used in nursing education programs, they are

used more commonly today [32]. In the study by McIntosh et al. [29], nursing students pointed out that the standardized patient application was the best simulation practice they had experienced during their nursing education in terms of such skills as communication, critical thinking and evaluation strategies. It has also been stated that standardized patient laboratories are more effective in developing psychomotor skills than nursing skill laboratories [54]. Therefore, evaluating the results obtained from studies carried out on standardized patient simulation provided a great opportunity to examine the effect of the short- and long-term outcomes of the method.

### **Kirkpatrick model in the evaluation of educational approaches**

The Kirkpatrick Model, developed by Donald Kirkpatrick in 1954, provides a framework for categorizing the outcomes of educational approaches. In this model, the outcomes from an application technique are divided into four levels. The first level includes the outcomes regarding students' reactions to educational approaches and their satisfaction level, while the second level includes assessment of their performance and acquisition of knowledge carried out at the end of training. The outcomes for the first and second levels are for short-term changes. The third level consists of outcomes for the transfer of behavioral change to the actual clinical field brought about by the educational approach. At this level, a decision is made as to whether or not the students will transfer the behavioral change to the actual clinical field. Outcomes for the fourth level are the ones that are more desirable, but more difficult to assess, including changes in organizational outcomes [37,39]. The fourth level assesses whether the student has transferred the acquired knowledge and experience to the clinical setting and has improved the outcomes achieved in patient care [37,53].

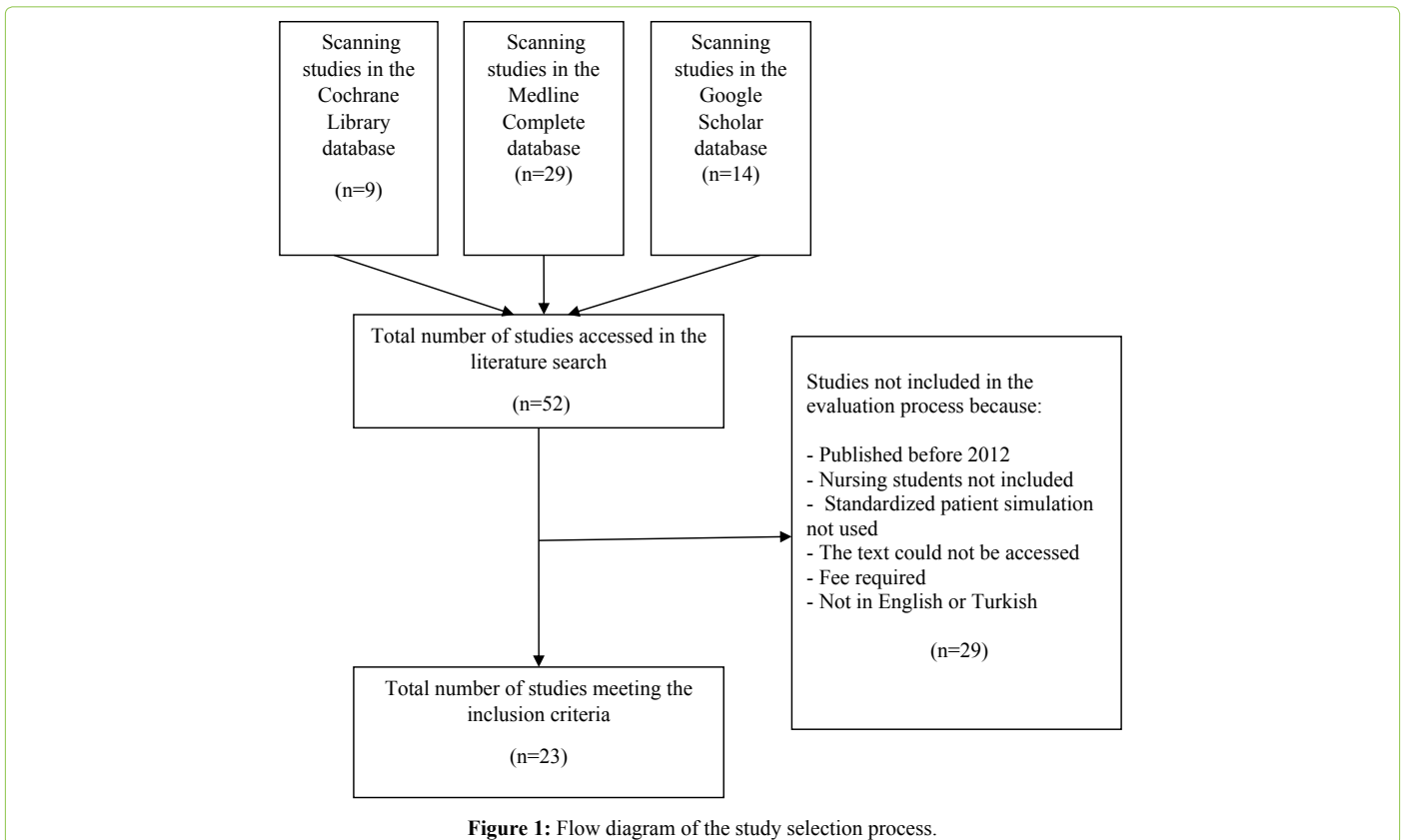
The National Organization of Nurse Practitioner Faculties (NONPF) published a report in 2010 on the use of simulation methods for individual patient care in the clinical training of nurses. This report pointed out that there was not enough scientific evidence in the clinic to compare the actual patient care with the knowledge, skills and attitudes of the students in terms of the outcomes of the simulation applications [31].

The application of the patient simulation approach in nursing education has been extensively studied. In order to examine the effectiveness of the simulation method, an analysis of the outcomes obtained from a number of these studies was conducted according to the Kirkpatrick Model. This provided the opportunity to identify the missing dimensions in the outcomes of the standardized patient simulation technique as used in nursing education.

### **Method**

#### **Purpose of the study**

The purpose of this study was to examine in terms of the Kirkpatrick Model the outcomes reported in literature studies of standardized patient simulation applications in nursing education. In addition, the study sought to identify the areas in which these study evaluations were inadequate with the goal of improving the use of this approach in the field of nursing education.



## Inclusion criteria

Relevant studies in the literature published between 2012 and 2017 were included in the study. All studies had to use standardized patient simulation as the simulation model and had to be conducted on nursing students. Moreover, the inclusion criteria required these literature studies to be available in full text without charge and to be written either in Turkish or in English. No design limitations were employed in the inclusion criteria in order that this study might serve as a basis for further studies.

## Research process

The research process was carried out using the Cochrane Library, Medline Complete and Google Scholar databases, with various combinations of key words such as “standardized patient simulation”, “nursing education” and “standardized patient”. The process of searching for studies in the literature was completed when the same studies began to appear again on the databases. In total, 23 studies meeting the inclusion criteria were evaluated by two researchers. The selection process for the studies is presented in figure 1.

## Results

When studies conducted on nursing students and standardized patient simulation techniques between 2012 and 2017 were examined, 23 studies meeting the inclusion criteria were included in this study. The study outcomes obtained using the standardized patient simulation method in nursing education were evaluated based on the Kirkpatrick Model and it was found that those studies concentrated on first-level and second-level outcomes, in particular, while they did not deal with the third- and fourth-level outcomes

in which nursing students transfer the knowledge that they have acquired via the simulation model to the clinical field. Those studies also did not deal with organizational outcomes to improve the quality of patient care or patient safety (Table 1).

Table 2 shows a detailed analysis of the studies carried out between 2012 and 2017 dealing with standardized patient simulation used in nursing education and includes the outcomes which were evaluated in terms of the Kirkpatrick Model. It can be seen that the studies dealing with standardized patient simulation focused mainly on assessing the level of satisfaction with the technique, technique perception status, and the knowledge and skill levels of the students, i.e., the first- and second-level outcomes according to the Kirkpatrick Model. This demonstrated that there was more emphasis on short-term outcomes, while those that were expected to be acquired in the long run were not evaluated.

## Discussion

This study revealed a heavy focus on the evaluation of short-term (first- and second-level) outcomes in the use of standardized patient simulation in nursing education. Moreover, it was determined that the long-term (third- and fourth-level) outcomes were not evaluated at all. These results are similar to the findings of Rutherford-Hemming et al. [40], who conducted studies on the simulation applications used in nursing education.

In this respect, the fact that there are sufficient levels of evidence-based data on the outcomes of simulation applications at all levels is an important argument for the more comprehensive use of simulation applications in

**Table 1:** Outcome levels in the studies based on the Kirkpatrick Model.

Studies	Kirkpatrick Model Assessment Levels			
	Level 1	Level 2	Level 3	Level 4
Bornais et al., 2012 [6]		*		
Luctkar-Flude et al., 2012 [28]	*	*		
Lin et al., 2013 [26]	*	*		
Sharpnack et al., 2013 [45]	*	*		
Bays et al., 2014 [5]		*		
Webster, 2014 [52]		*		
Fink et al., 2014 [13]	*	*		
Kameg et al., 2014 [21]	*	*		
McIntosh et al., 2015 [29]	*	*		
Kowitlawakul et al., 2015 [24]	*			
Ignacio et al., 2015 [18]	*	*		
Mert, 2015 [30]	*	*	*	
Slater et al., 2016 [46]	*			
Tuzer et al., 2016 [50]		*		
Defenbaugh and Chikotas, 2016 [10]		*		
Goh et al., 2016 [15]	*	*		
Terzioğlu et al., 2016 [48]	*	*	*	
Sarmasoğlu et al., 2016a [42]		*		
Sarmasoğlu et al., 2016b [43]	*			
Ham, 2016 [16]	*			
Ward, 2016 [51]	*	*		
Karadağ et al., 2016 [23]	*	*		
Sarıkoç et al., 2017 [41]	*	*		

**Table 2:** Analysis of studies on standardized patient simulation in nursing education (2012-2017).

Authors	Study design	Aim	Sample group	Application	Outcomes
Bornaris et al., 2012 [6]	Experimental design	To examine the efficacy of patients to standardize the development of health assessment skills	108 first-year nursing students	Standardized patient simulation application	-The experimental group yielded a higher score of health assessment skills (M=78.57 and 69.28, F=24.13, p<.001), However there was no significant difference between groups (p=.963).
Luctkar-Flude et al., 2012 [28]	Experimental design	To examine the effect of standardized patients and high-fidelity human patient simulators on satisfaction, personal-efficacy and performance levels within the health assessment course	44 undergraduate nursing students	Standardized patient simulation, high-fidelity human patient simulation, practice with community volunteers	-In the group working with high-fidelity human patient simulators, lower satisfaction level was measured compared to the other human patient groups; performance levels were found to be higher. -No significant difference was found between the groups in terms of personal effectiveness.
Lin et al., 2013 [26]	Randomized, controlled experimental design	To examine the effectiveness of standardized patient application using the standardized patient feedback and group discussion on the interpersonal communication skills and learning satisfaction	26 nursing students	Standardized patient application	-High level of satisfaction (94.44%) and increasing interpersonal communication skills (p<0.025) were measured in all students in the study and control groups. There was no significant difference between the groups.
Sharpnack et al., 2013 [45]	Randomized, controlled experimental design	To improve the leadership skills of students and to increase their competence in terms of quality and safety with the use of standardized patients	66 senior nursing students	Standardized patient simulation	-There was a statistically significant increase in leadership skills in the experimental group (t = 3.55, p <.01). -Students considered standard practice as an opportunity to implement leadership principles
Bays et al., 2014 [5]	Quantitative, single group, pre-test-post-test design	To examine the effect of simulated patient interviews on professional communication skills in critical illnesses	128 physicians, 17 intern nursing students	Simulated patient interview	-Participants' scores increased in 8 out of 11 coded behaviors (p <0.05). -The only factor that determined the development of the performance was participation in the practice (p <0.001).

Webster, 2014 [52]	Quasi-experimental, single group, pre-test-post-test design	To evaluate the efficacy of standardized patient application in the teaching of therapeutic communication skills in psychiatric nursing	89 senior nursing students taking psychiatry lesson	Standardized patient application	-A statistically significant difference was found in 12 out of 14 criteria showing an increase in the therapeutic communication skills ( $p < .05$ ). -Standardized patient practice is an effective method in the development of therapeutic communication skills.
Fink et al., 2014 [13]	Quantitative, quasi-experimental design	To evaluate the use of standardized patients in the standardized teaching of emotional care in end-of-life care	54 nursing students (experimental group = 30, control group = 24)	Standardized patient application	-The level of knowledge and competence of the study group was higher than the control group ( $t = 3.572, p = .001$ ). -It was found that the students' level of satisfaction was higher in the standardized patient application.
Kameg et al., 2014 [21]	Quantitative, quasi-experimental, pre-test-post-test design	To examine the effect of integration of standardized patients within the mental health field on the level of anxiety experienced by students	69 senior nursing students	Standardized patient application	There was a significant difference between the anxiety levels experienced before and after the simulation experience of the students ( $t = 2.07, p = .022$ ). -The perceptions of the students on the simulation experience were positive.
McIntosh et al., 2015 [29]	Qualitative design	To develop a realistic autism scenario for senior nursing students and to assess its impact	27 senior undergraduate nursing students	Standardized patient simulation	-Students stated that the simulation method was effective in learning communication, critical thinking, prioritization and evaluation strategies.
Kowitlawakul et al., 2015 [24]	Descriptive qualitative design	To explore master of nursing students' perceptions towards standardized patient simulation and to define the learning needs of students	7 master of nursing students	Standardized patient simulation	-Students noted that standardized patient simulation was useful and realistic in the development medical history taking, communication, and emergency management skills. -Students stated that standardized patients reflected the symptoms and signs in the scenario in a limited way.
Ignacio et al., 2015 [18]	Randomized, controlled, pre-test-post-test design	To compare the effect of patient and high-fidelity simulation on managing stress and improving performance in a clinical setting. To determine the opinions of the students about these simulation methods	57 nursing students	Standardized patient simulation, high-fidelity simulator application	-There was no significant difference between the two groups in terms of performance level ( $p = 0.744$ ) and stress management ( $p = 0.317$ ). -Standardized patient simulation in the clinical field was regarded as a valuable technique.
Mert, 2015 [30]	Randomized, controlled study	To evaluate the effectiveness of different simulation methods in the development of nursing students' knowledge and skills in the management of postpartum bleeding	84 third-year taking the Obstetrics and Gynecology Nursing course	Vocational skills laboratory, standardized patient laboratory and simulation laboratory applications	-The group that attended all standardized patient and simulation laboratory processes had the highest mean scores of cognitive ( $52.61 \pm 12.74$ ), psychomotor ( $83.53 \pm 7.40$ ) and communication skills ( $90.54 \pm 6.21$ ). As the group practiced the application more, psychomotor ( $F=18.733, p=0.001$ ) and communication skills ( $F=19.533, p=0.001$ ) developed. The control group was found to have the lowest mean scores of cognitive ( $16.96 \pm 12.46$ ), psychomotor ( $36.29 \pm 11.64$ ) and communication skills ( $65.00 \pm 12.08$ ). -It was determined that the anxiety levels did not increase in different skill development environments of the students ( $p > 0.05$ ).

Slater et al., 2016 [46]	Mixed design method	Comparison of the use of patients or peers to the standard in the conducting of face-to-face physical assessment skills	117 nursing students	Practice on standardized patient simulation and peers	-Using patient-to-patient simulation, the group indicated that critical thinking skills improved to a higher level and that there was less need for recalling ( $p < .05$ ). -They even considered the patient simulation as a more realistic standard.
Tuzer et al., 2016 [50]	Mixed design method	To assess the effect of patient-to-patient simulation and high-fidelity human patient simulation on thorax, lung, and cardiac examination skills. To reveal the opinions of the students on their learning experiences.	52 fourth-year nursing students	Standardized patient simulation, high-fidelity human patient simulation	-In terms of scores of knowledge, the group that dealt with standardized patients had higher mean scores ( $p=0.024$ ); however, there was no significant difference between the groups in terms of performance ( $p=0.374$ ). -The students indicated that the teaching environment and simulation techniques provided opportunities for learning.
Defenbaugh and Chikotas, 2016 [10]	Qualitative design	To examine the effect of applying the standardized patient simulation in nursing education	29 nursing students (20 practitioner nurses, 9 anesthetist nurse students)	Standardized patient simulation in inter-professional education	-Standardized patient simulation allowed students to apply communication skills in interprofessional training. -The study increased awareness of the communication skills between the patient and the nurse.
Goh et al., 2016 [15]	Single group, pre-test-post-test, quasi-experimental design	To reveal the learning experience on the use of standardized patients for mental state assessment skills and suicide risk assessment skills	Second-year undergraduate nursing students taking Mental Health Nursing course	Standardized patient simulation	-A statistically significant increase in the levels of satisfaction and personal competence of the students was revealed. -Standardized patient practice was considered as an effective tool for learning practical skills.
Terzioğlu et al., 2012 [48]	Prospective study design	To examine the psychomotor and communication skills of students in three different educational environments and their effects on anxiety and satisfaction levels	60 nursing students	Nursing skills laboratory, standardized patient, laboratory, clinical environment applications	-When the psychomotor skill levels of the groups were compared, the highest average was found in the clinical field (88.6), then in the standard patient (81.5) and lastly in the skills laboratory (73.1). Similarly, the highest average in communication skills ( $p < 0.05$ ) was found in the clinical field (79), in the standardized patient (71.6) and then in the skills lab (64.9). - Anxiety levels decreased gradually (skill laboratory: 33.0, standardized patient lab: 32.0, clinical area: 31.0). - It was determined that as the reality level of the educational environment increased, the level of satisfaction of the students also increased.
Sarmasoğlu et al., 2016a [42]	Quasi-experimental design	To determine the opinions of students on standard patient and model use in clinical skills training	87 first-year undergraduate nursing students	Standardized patient simulation, working on models	-It was found that the students working on standardized patients had more positive views of clinical skills training ( $p=0.009$ ), learning professional responsibilities ( $p=0.030$ ), and contribution to readiness for clinical training ( $p<0.001$ ) than those working on models.
Sarmasoğlu et al., 2016b [43]	Quasi-experimental design	To evaluate the effect of standardized patient use on the development of psychomotor skills in clinical skills training	87 nursing students (experimental group = 44, control group = 43)	Standardized patient simulation, working on models	-The blood pressure measurement performance of students working on standardized patients was significantly higher than the students who worked on models ( $p < 0.001$ ); but there was no significant difference between the groups in the ability to administer subcutaneous injection ( $p = 0.524$ ).

Ham, 2016 [16]	Quasi-experimental design	To examine students' opinions on the effects of standardized patient use in drug application simulation	90 nursing students	Practice on standardized patient simulation and mannequin	-Students working on standardized patients had more positive views of their experience. -It was stated that working with standardized patients gave them opportunity to practice prior to the actual clinical application and that this application should be permanent.
Ward, 2016 [51]	Mixed-method design	To determine the effect of the simulation application on the empathy levels of the students To identify students' empathy perceptions in future applications after simulation	146 senior nursing students	Standardized patient simulation	-There was no significant difference in empathy levels between the two groups. - After the simulation application, a statistically significant increase in the empathy levels of the students in the facilitated academic curriculum group was determined ( $p < .04$ ). -They described the use of simulation as 'beneficial' in terms of their practice of empathy.
Karadağ et al., 2016 [23]	Experimental design	To determine the effects of case study and simulated standardized patient use on students' patient care planning	70 second-year nursing students	Case study and simulated patient application	-A significant difference was found between the groups in terms of their contribution to learning method ( $p = .003$ ). -A significant difference was found in terms of diagnosis and nursing practice scores among the groups ( $p < .05$ ).
Sarıkoç et al., 2017 [41]	Pre-test, post-test, randomized, controlled quantitative design	To evaluate the effects of standardized patient use in psychiatry cases on students' motivation and learning perception	86 third-year nursing students	Standardized patient application	-When the post-test scores were compared between the groups after the application, the experimental group had higher scores in the four sub-dimensions and the total motivation scale than the control group ( $p < 0.05$ ). -In terms of perceived learning level, the experimental group had a higher average than the control group in terms of the psychomotor and affective area and there was a significant difference between the groups ( $p < 0.05$ ).

nursing education and for their accessibility in clinical applications, as stated in the report published by the National Organization of Nurse Practitioner Faculties [31]. However, nursing educators need to understand the outcomes of simulation applications and the factors contributing to these outcomes in the context of clinical practice as it is an increasingly expensive instructional strategy [47].

One of the most important reasons for using simulation methods in nursing education is to provide the opportunity to train competent and efficient nurses in terms of knowledge and skills [35]. Therefore, it is of great importance that simulation methods are used to assess long-term outcomes in order to ensure permanent behavioral changes in students and to increase the quality of nursing care [40]. However, findings of the present study showed that long-term outcomes in particular had not been evaluated. In this respect, Scholtz et al. [44] demonstrated the effects of using the simulation method in the changing of a central venous catheter dressing with fourth-year nurses. Effective outcomes have great potential in terms of providing strong evidence of the effects of simulation methods on patient care.

Standardized patient simulation requires a high level of effort in terms of labor, cost and time in the preparation,

implementation and evaluation processes [47]. Therefore, the assessment of long-term outcomes as well as short-term outcomes will contribute to scientific support for the efficiency of standardized patient use and will strengthen the awareness of the technique and its applications.

## Conclusion

There is evidence-based information that supports the use of standardized patient simulation in nursing education [26,42,43]. However, this study found that the outcomes expected from the simulation technique were not evaluated holistically, but rather were focused on certain areas. This illustrates the missing dimension in the evidence-based information supporting the view that simulation techniques facilitate effective learning and improve the quality of patient care in the long run. Therefore, there is a lack of knowledge on ways to integrate simulation methods into nursing education and insufficient support for them to replace a specific number of clinical practice hours [40]. From this point of view, the study revealed the need to include and examine all dimensions of the expected outcomes, especially at the third and fourth levels. The present findings may serve as a strong basis for providing literature-based evidence in future studies.

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