

Evaluating the Effectiveness of the Training Program on the Shock for Nurses in the Intensive Care Unit

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Abstract

Aims: The aim of this study was to evaluate the effectiveness of a training program developed for shock for nurses in the intensive care unit (ICU).

Materials & Methods: The present study was performed on 200 nurses working in the ICUs of selected medical sciences hospitals in Mashhad (Imam Reza, Shariati, and Ghaem) in 2016, based on the Kern educational model. The instruments used in the study included a demographic information questionnaire, an observational checklist, and a researcher-made clinical reasoning skills questionnaire. In order to evaluate the training program developed after the pilot training, the results of clinical reasoning and shock management of participating nurses were reviewed. The difference between the mean scores of nurses was determined using the Wilcoxon test and t-test.

Findings: The results showed that the mean score of clinical reasoning for shock diagnosis skills in nurses in pre-test was equal to 1.591 ± 0.287 and in post-test was equal to 1.889 ± 0.136 . Also, the average control skills of nurses in the pre-test were 3.158 ± 0.752 and in the post-test was 4.151 ± 0.762 . In addition, the results of the Wilcoxon test and t-test showed that educational intervention had a positive and significant effect on both diagnosis and control scores of nurses ($P=0.001$).

Conclusion: The results of this study indicate the importance and positive effect of developing continuing education programs in the field of clinical reasoning skills (diagnosis and control) in order to monitor shock effectively.

Keywords

Shock [<https://www.ncbi.nlm.nih.gov/mesh/68012769>];
Nursing Education [<https://www.ncbi.nlm.nih.gov/mesh/68004506>];
Intensive Care [Note Found];
Shock Management [Note Found]

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Introduction

Shock is a life-threatening condition that results from a drop in arterial blood pressure and insufficient blood supply and results in hypoxia in body tissues [1, 2]. In addition to lowering blood pressure, lowering consciousness and increasing heart rate also occur during shock. Shock is the body's defense response to a reduction in blood flow, which may be due to impaired cardiac output, a sudden change in the diameter of blood vessels, and an insufficient volume of intravascular fluid [3, 4].

According to statistics, the annual prevalence of shock (regardless of the cause and origin of shock) is between 0.3 and 0.7 per thousand people [5]. Also, the mortality rate due to cardiogenic shocks after infarction is 80 to 90% [6] and in septic shock as the most common cause of distributive shock, between 52 to 71% in patients with severe sepsis [7]. Hypovolemic shocks have also been reported as the most common type of shock in children and in the intensive care unit (ICU) due to blood loss or extracellular fluid loss or traumatic injuries [8, 9]. Despite therapeutic advances, the incidence of shock in patients has not decreased significantly [6] and even now, a significant population is dying due to this condition. For example, Aponte et al. (2020) stated that despite advances over the past decade, the incidence of heart attack due to acute myocardial infarction has increased by almost 50% with unchanged mortality [10]. Rapid diagnosis and timely treatment of shock greatly reduce the resulting mortality [7]. Studies have shown that the mortality rate of patients with septic shock who are diagnosed and treated in less than 6 hours upon arrival at the emergency room is fewer than other patients with this disease are diagnosed and treated with a longer process [5, 11, 12]. This is also true in the treatment process and in reducing the mortality rate of other identified shocks. The key to treating patients with shock is rapid diagnosis and timely treatment [13]. Since nurses play a role in the first line of treatment of patients in medical centers and emergency medical centers [14] and on the other hand, accelerating the identification and timely treatment of patients with shock is of considerable importance [15], providing the necessary training and developing comprehensive training programs to increase the awareness and knowledge of nurses in the ICU and emergency department is of great importance [16].

Considering the importance of educational programs to improve nurses' awareness and also the lack of sufficient information of nurses about shock identification and management in emergency patients, in the present study, based on a conceptual model and according to the training program, after assessing the needs of the nurses, they were evaluated in two dimensions of shock diagnosis and control. Then, the educational goals were determined, the strategy, pattern, and teaching

method were determined, and also the method for evaluating the training of the diagnostic process and appropriate control, and the program was developed.

Materials and Methods

The present study was performed on 200 nurses working in the ICUs of selected medical hospitals in Mashhad (Imam Reza, Shariati, and Ghaem) in 2020. This quasi-experimental study was performed on one group and the performance of nurses before and after the training program was compared. The instruments used included a demographic information questionnaire, observational checklist, and researcher-made reasoning skills questionnaire (with validity and reliability confirmation).

The educational model used in this study was the Kern model, which consists of six stages. A complete explanation of the different stages of the Kern educational model is given in the Kern study [17] and its application in other studies has also been described [18-20]. In summary, the six steps of the Kern model are as follows: the first step is identifying and describing the problem, the second step is assessing the needs of target learners, the third step is determining ideals and goals, the fourth step is determining educational strategies, the fifth step is curriculum implementation, and the sixth step is evaluation and feedback.

At the end of the sixth stage, evaluation was performed with indicators related to clinical reasoning skills and ability to control the shock in nurses. To assess the clinical reasoning skills of shock nurses in the ICU, a questionnaire was used using the Key Feature Problem (KFP) or a key feature of a problem. This questionnaire was designed by the researcher. Accordingly, nurses are allowed to choose a limited number of options after reading the scenario (which was announced at the beginning of the question).

In terms of scoring, the answers were divided into two categories:

- Correct answers, which were the key features of the problem.

- Wrong answers: which should not have been chosen.

- 1) The observational checklist was developed according to the steps of the Kern model and a researcher-made questionnaire was used to assess the needs in developing a shock training program.

- 2) In the present study, because the permissible number of answers was announced to the nurse, a negative score was not given to the wrong choices.

In this study, to determine the validity of the tools, the method of determining the validity of content and face was used. The tools were provided to ten faculty members of the School of Nursing and Midwifery of Shahid Beheshti University of Medical Sciences, and after collecting their comments, the necessary corrections were made in the tools.

To determine the reliability of the questionnaire, it was given to 20 nurses working in the ICU, and the scores were compared twice and at two-week intervals. Then, the obtained data were calculated by the Spearman correlation coefficient. The result of retest reliability ($r = 0.812$) indicated the reliability of the questionnaire. The reliability of skill checklists was also evaluated by the coefficient of agreement of the evaluators and this agreement coefficient was obtained as 0.83, which because this value is more than 0.8, therefore, the reliability coefficient of checklists was also ideal and appropriate.

In this study, inclusion criteria were having at least six months of work experience in the ICU, and in contrast, exclusion criteria included the reluctance of nurses to continue the treatment and also their transfer from the ICU and absence or leave during the study period.

Descriptive and inferential statistics were used to analyze the data. Descriptive statistics were used to calculate central indicators, dispersion of quantitative scales, drawing graphs, and tables. In order to evaluate the questions, appropriate tests, such as Kolmogorov-Smirnov test and Friedman test were used by SPSS version 16.

Findings

In the present study, most of the participants were female nurses (58%) and most of them were married (71.5%). More than 85% of the nurses participating in the study had a Bachelor's degree and the rest had a Master's degree. A summary of the demographic information of the study participants can be seen in Table 1.

Table 1) Demographic information of the subjects

Variable		Number	Percent
Gender	Female	116	58
	Male	57	42
Marital status	Single	57	28.5
	Married	143	71.5
Education	Bachelor's degree	171	85.5
	Master's degree	29	14.5

Table 2 also summarizes the information about the nurses' work experience and their work experience in the ICU. As shown in Table 2, the average work experience of nurses in their profession was more than a year and their average work experience in the ICU is nearly 7 years.

Table 2) Description information regarding the work history of the subjects

Variable	Mean±SD	Max	Min
Nursing work experience	10.68±5.83	29	1
Work experience in the intensive care unit	6.80±4.81	22	1

The status of nurses' experience regarding passing intensive care and shock training is also reported in Table 3. Accordingly, more than half of the nurses studied had completed intensive nursing care courses. However, a significant number of them

(82%) had not completed the courses of shock control methods.

Table 3) Information about the training courses of the subjects

Variable	Status	Number	Percent
Nursing intensive care	Passed	110	55
	Not passed	90	45
Shock control methods	Not passed	36	18
	Passed	164	82

Figure 1 shows the effect of the intervention on nurses' scores on the diagnosis as well as the shock control. Nurses had significantly better scores on the control, both before and after exposure. However, both shock diagnosis and control scores increased in the studied nurses.

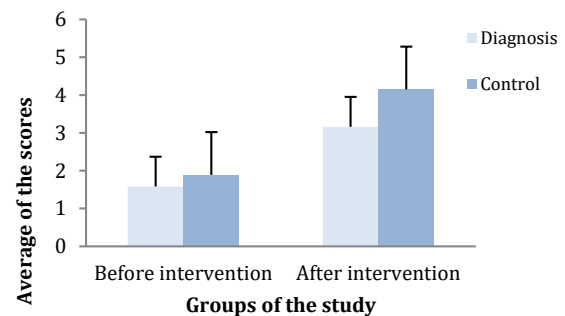


Figure 1) Comparison of the mean scores of the two groups in the shock diagnosis and control

Distribution of diagnosis and control data based on Kolmogorov-Smirnov test showed non-normality of both control and shock index (Table 4). As a result, non-parametric tests were used to evaluate the significant differences in pre-test and post-test.

Table 4) Kolmogorov-Smirnov test results on the normal distribution of data

Variables	Z	P-value	Result
Control	1.603	0.012	Non-normal
Diagnosis	1.173	0.0001	Non-normal

Regarding the effect of Kern training on the ability to diagnose and control shock by nurses, the nonparametric Wilcoxon test was used. The results of this test are shown in Table 5.

Table 5) The results of the Wilcoxon test on the control and diagnosis

Stage	Rank status	Number	Mean of the ranks	Sum of the ranks
Pre-test control index	Negative ranks	2	62.50	125.00
	Positive ranks	196	99.88	19576.00
Post-test control index	Relations hips	2	--	--
		10	34.35	343.35
Pre-test diagnosis index		173	95.33	16492.5
		17	-	-
Post-test diagnosis index				

As can be seen in Table 5, the score of shock control and diagnosis in nurses in the post-test increased significantly ($P < 0.05$) compared to the pre-test. In other words, the training of intensive care nurses significantly increased their score on shock control in patients admitted to ICUs.

Discussion

Today, nurses face complex health environments and require problem-solving and decision-making skills in complex cases, which require knowledge and awareness. Having the right information and awareness and knowledge leads to self-confidence, critical thinking, and job satisfaction. Critical thinking in nurses is used as a basis for clinical decision-making and evidence-based practice and requires the acceptance of acceptable standards in the performance of the individual's profession [21]. Instability in the condition of patients referring to the ICU occurs frequently and nurses as the most important members of the treatment team are constantly exposed to this condition of patients [22]. Therefore, the present study was conducted to evaluate the effectiveness of the Kern training program for intensive care nurses. Unfortunately, although nurses have encountered multiple patients over several years (the average work experience of nurses in the ICU was nearly seven years), they did not receive proper training in this regard and only 18% of the nurses had passed the training course related to shock monitoring and control.

The functional problem identified in this study was the lack of proper shock monitoring of patients by nurses in ICUs and they did not obtain an acceptable score before the intervention. Shock control of critically ill patients is a challenging and important issue that early detection can effectively reduce the associated mortality rate [23]. Due to the multifaceted situation and variable symptoms of patients in the face of shock, this issue complicates their care, which requires knowledge, recognition, and monitoring in therapeutic interventions for these patients [16]. Aponte *et al.* (2020) stated that, for example, the cardiogenic shock has different causes and these many causes make it very difficult to diagnose [10].

Numerous training programs have been conducted in different areas and different treatment centers to assess the status of nurses' awareness and also to train them about shock. In some of these studies, the results were consistent with the results of the present study and showed that the development and use of training tailored to the educational needs of nurses have a good effect on their knowledge in diagnosing or managing shock in ICUs or cardiac ICUs. For example, Liu *et al.* (2021) examined the clinical nursing program to effectively promote the implementation of sepsis package in septic shock. In their study, 226 patients with septic shock hospitalized from March 2017 to March 2020 were

divided into groups. After implementing the clinical nursing program and using the sepsis package for septic shock, the rate of achieving the goal with the 1-hour septic shock training package increased to 66.4 and the completion rate of the 3-hour sepsis training package increased to 81.4. Also, the completion rate of the 6-hour septic shock package increased from 77 to 89.4. In addition, the researchers stated that clinical planning is essential and can promote effective standardization of systematic management and treatment, improve coordination of medical staff, save time, and improve patient safety and satisfaction compared to physicians' clinical approach.

Harley *et al.* (2019), in a qualitative study, examined the knowledge and understanding of emergency nurses in the diagnosis and treatment of patients with sepsis. Fourteen emergency department nurses were evaluated by semi-structured interviews with the aim of assessing the extent of their experiences and their understanding of the diagnosis and treatment of patients with sepsis. Finally, the results showed that emergency nurses have errors and defects in the diagnosis and treatment of patients with sepsis and nurses need to acquire more knowledge and awareness in this field [16]. The results of the present study, in line with the results of previous studies, showed that the program used to train nurses was effective in improving both the diagnosis score and the control or management of the disease, and the diagnosis and control scores increased significantly ($P < 0.005$). In addition, factors, such as the diagnosis and control of shock effects in the golden hour of shock management and shock monitoring using biomarkers and non-invasive methods were also examined by other researchers. In these studies, the role of education in improving the performance of nurses was evident and led to improved clinical outcomes in treated patients [12, 25]. The present study also had some limitations, the most important of which was the COVID-19 pandemic, which led to some changes in educational strategies, such as providing virtual training. In contrast, this study was designed using a program that can be a model for other researchers as well as for clinical practitioners as part of continuing education. Researchers can monitor nurses' performance in future studies in addition to examining their awareness. In addition, future studies can be performed on the control of nurses' stress in the face of severe shock and other conditions.

Conclusion

In the present study, the importance of developed training programs to improve the performance of intensive care nurses to diagnose and control shock was identified. Nurses' level of awareness for managing referrals with shock diagnosis was not adequate, which increased to an acceptable level with a well-written training program. If the status of

information and knowledge of nurses regarding the diagnosis and control of hospitalized patients related to shock in other parts of the country is at the same level as the subjects in this study, the program used in this study can be used in other areas as well, as it significantly improved nurses' information. Also, in this study, the importance of continuing education programs in hospitals and training of nurses to improve their performance in clinical reasoning and patient management was clearly identified.

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