Effectiveness of Scenario-based Education on the Performance of the Nurses in the Critical Cardiac Care Unit for Patients with Acute Coronary Syndrome

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ABSTRACT

One of the key issues among those suffering from acute coronary syndrome is the treatment and caring of them. The present research seeks to study the effectiveness of scenario-based education on the performance of the nurses in caring for the patients with acute coronary syndrome in the critical cardiac care unit. A semi-empirical research using pre-test and post-test with the control group was conducted on some 80 nurses of the critical cardiac care unit of Urmia's therapeutic-educational centers. First, Seyed Al-Shohada and Ayat Allah Taleghani hospitals were first divided into the control and intervention centers. 40 nurses from Seyed Al-Shohada hospital and 40 from Ayat Allah Taleghani hospital were randomly placed in the intervention and control group respectively. During the research, 6 subjects were removed from the study and we had finally 38 people in the intervention group and 36 in the control group. The tools used for data analysis were divided into two parts: first, the demographic features, and secondly, the author-made checklist composed of 38 statements in caring for the patients with acute coronary syndrome. In the first step, the performance of all the participants in the three working shifts in the morning, afternoon and night was studied and their average performance scores were calculated in three shifts. In the intervention phase, the researcher delivered three two-hour speeches for the control group and eight two-hour scenario-based speeches in the intervention group on the cares and nursing performances for the patients suffering from acute coronary syndrome. One month after the intervention, the performance of the participating nurses in three different working shifts was measured and the average score of their performance was calculated for three shifts. The data was analyzed by SPSS v.15, chi-square, independent T, and paired test. As the results indicated, the average score of the nurses before the scenario-based training for the intervention and control group was 20.63 ± 2.13 and 21.44 ± 2.48 respectively (p = 0.150). After scenario-based training, the average performance score of the nurses for the intervention and control group was 24.32 ± 3.78 and 20.38 ± 3.32 respectively (p = 0.0001). Utilizing modern educational methods such as scenario-based learning can have a significant influence on enhancing the knowledge and performance of the nurses about their treatment with patients suffering from acute coronary syndrome.

Keywords: Acute Coronary Syndrome, Scenario-based Education, Nurses' Education.

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INTRODUCTION

A significant number of the patients hospitalized in the hospitals of the ministry of health care, treatment and medical education are those suffering from cardiac diseases, especially acute coronary syndrome [1]. Acute

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coronary syndrome is one of the most important challenges to health in the eastern and western societies [2]. It is predicted that within the period of 1990 to 2020, such diseases will increase as much as 120% among women and 137% among men in developing countries [2,3]. The cardiac diseases, especially acute coronary syndrome, are among the most common causes of death. Nearly 46% of the death toll is caused by such diseases [4].

The full clinical spectrum of the coronary arteries includes causeless Ischemia, chronic stable angina, unstable angina, acute myocardial infarction, ischemic cardiomyopathy and the sudden death of heart and the constitute the most common reason for the patients' hospitalization [5, 6]. The most valuable goal for treating and managing patients suffering from acute coronary syndrome is to restore the coronary blood flow as quickly as possible [7]. One of the key issues about those suffering from acute coronary syndrome is nursing and caring for them. Considering the sensitivity and importance of the issue, looking after the patients suffering from acute coronary syndrome during the various phases of the disease is composed of the following phases: 1) commencement of the problem in the chest area, 2) when the final diagnosis is available, 3) while the patient is being discharged from the hospital, 4) during recovery, 5) and after recovery with the goal of preventing angina or infraction [8]. Thus, the patients, especially those in the critical cardiac care unit, play a major role in facilitating and evaluating the patients prone to myocardial infarction [9].

Researches have proven the educational method of the nurses working in the critical cardiac care unit not very effective in terms of enhancing their knowledge and performance. Considering the extra-ordinary sensitivity in the critical cardiac care unit, educating the nurses of this unit with the appropriate method is essential [10]. Thus, it is necessary to utilize educational methods to develop the critical thinking skills of the nurses and enhance their clinical capabilities to respond to the demands of the patients and all those in the need of the healthcare system services [11].

One of the educational systems whose philosophy is based upon the learner's learning is the scenario-based learning. Scenario-based learning which is based upon the learning principles of the situational theory and education of adults is a structured approach which reflects the method of conducting a job in a real situation like a mirror [12]. The educational contents are designed based upon the real scenarios in which the learners are obliged to simultaneously use various skills. This educational method puts the learner in such a situation that he may test his hypotheses through research, study and collection of the evidences and arrive at a conclusion. This method results in the achievement and fulfillment of the goals. Furthermore, the learners will become aware of the methods of gaining knowledge and collection of information [13-15].

Some universities have created opportunities to develop clinical nursing so that they may run scenario-based learning programs. This program enables the learners to adjust their time and resources, apply their knowledge in looking after the patients, identify the new learning demands and move towards independence and self-guidance. This educational method also has a positive influence on the mentality and clinical performance of the nurses [16]. Considering the great importance of the nurses' caring behaviors in the critical care unit and keeping in mind the fact that the nurses in this unit face critical conditions, complicated situations and sensitive patients whose life is in danger, enhancement of the performance and mastering the knowledge of caring is a necessity for all of them. The present research was conducted to study the influence of scenario-based learning on the performance of the nurses in caring for the patients suffering from acute coronary syndrome in the critical cardiac care unit of Urmia's educational-therapeutic centers in 2015 and 2016.

MATERIALS AND METHODS

This is a semi-empirical research utilizing the pretest and post-test with the control group. Considering the information in the study conducted by Majdi Nasef et al [17] with a certainty of 95% ($\alpha = 0.05$) and a power of at least 85% and the average influence coefficient, the population was set to 74 people and later increased to 80 considering the possibility of the sample's shrinkage. The 2 hospitals of Seyed Al-Shohada and Ayat Allah Taleghani were first divided into the intervention and control groups. 40 nurses from Seyed Al-Shohada Hospital and 40 from Ayat Allah Taleghani were randomly placed in the intervention and control group respectively. During the research, 6 subjects were excluded leaving us with 38 people in the intervention group and 36 in the control group. The following inclusion criteria were observed: having a degree of B.S. or higher, at least one year of experience in the critical cardiac care unit, circulating work shifts, and filling the form of consent for participation in

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the study. As for the exclusion criteria, previous familiarity with the scenario-based education and no consent with participation in the research were causes of exclusion.

Having gained the necessary permits from the ethics committee of university, the researcher returned to the research environment and attended the critical cardiac care unit after making the necessary arrangements with management of Seyed Al-Shohada and Ayat Allah Taleghani therapeutic-educational centers and their nursing offices. Having explained the title and the goal of this research project, the willful consent forms were distributed among the participants.

The data collection tools included the author-made checklist composed of 2 parts: the first part included 7 statements about the demographic characters of the nurses and the second part dealt with the 5 main fields of nurses' performance in caring about the patients suffering from acute coronary syndrome including: the timely diagnosis of cardiac changes and homodynamic responses (8 statements), discomfort relief, upper chest pain (9 statements), sufficient blood supply to the tissues (7 statements), removing the respiratory distress (9 statements), and anxiety reduction (5 statements). There was a yes/no answering system for each statement. A score of 1 would be given If the performance was observed, while absence of that performance resulted in zero. The total score of the checklist ranged from 0 to 38.

To determine the validity of data collection checklist, the content validity through the quantitative method was utilized. Determination of content validity was based upon the judgment of the professionals. 7 experts in the field of nursing and 3 cardiologists made judgments and content validity ratio (CVR) and content validity index were examined. The initial checklist with 47 statements to determine content validity ratio was delivered to 10 experts and scholars. They were asked to evaluate each statement based on the three-part spectrum: 1- it is necessary; 2- it is useful, but not necessary; 3- it is not necessary. Those statements whose content validity ratio was more than 0.62 were considered to be significant ($P < 0.05$). Having studied the content validity ratio, 8 statements were removed from the primary checklist. To study CVI, content validity index of Waltz and Bausell was utilized (18). In content validity index, proportion, clarity, ambiguity, and the correlation of the items with the goal of the research as viewed by the researchers was deemed important [19]. 10 scholars (different from the previous scholars) studied the three criteria of simplicity, correlation, and clarity separately in a Likret spectrum consisting of four parts for each item. The content validity index score for each statement was calculated by dividing the number of the agreeing scholars with ranks of 3 and 4 to the total number of the experts. Huirkas et al (2003) had recommended a score of 0.79 or more for the acceptance of the items based upon the CVI score. If the items gained a score of 0.7 to 0.79, a review would be required [20]. In this study, the content validity index was calculated for all the initial 39 statements. Two statements were reviewed and one was discarded and the final checklist with 38 statements was utilized to determine the validity.

To determine the validity of the tools, the "correlation between the observers" method was utilized. To study the tools stability, goal-based sampling was conducted. In tools stability analysis, some 15 to 20 samples were recommended [19, 21]. The research sample in determining the stability consisted of 20 nursing experts and two observers holding a bachelor degree in nursing. Two observers completed the list for 20 nursing experts working in the critical cardiac care unit. The agreement between the observers was calculated using intraclass correlation coefficient (ICC). A correlation coefficient of 0.8 or higher represented the acceptable level of stability [21]. The intraclass correlation coefficient in this research was 0.86.

Before running the scenario-based learning program, the performance of the nurses in looking after those suffering from acute coronary syndrome in both the intervention and control group was measured using the observatory checklist three times in the morning, afternoon and evening. The average performance score of each of those participating in all three shifts was measured.

The introductory educational program was about nursing cares and performance for timely diagnosis of the cardiac changes and the hemodynamic responses, discomfort and chest pain relief, appropriate blood supply to the tissue, respiratory distress removal, and stress reduction of those suffering from acute coronary syndrome through one scenario for each field. Based on the current resources and nursing instructions, the researcher began developing and preparing scientific scenarios for each one of the five fields of nursing performances in treating acute coronary syndrome. The scenarios were then submitted to 5 scholars expert in the field of looking after cardiac patients and

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two cardiology department members of the medical college. After receiving the comments, the final scenarios were utilized in the final intervention.

Before beginning the intervention and starting the classes, two subjects were excluded as they were reluctant to take part in the classes. The researcher first started with the control group with 3 two-hour courses delivered through lectures and he provided and solved the scenarios developed during the debates.

Those in the intervention group were introduced to the principles of scenario-based learning and its phases in a two-hour session and one of the five prepared scenarios was given to each group and a duty was assigned to them. It was the duty of the team leader to manage the time, to gather information and present them to the instructor. Each group was given one week to review the content of the scenario, name the nursing cares for the patients and collect the data to describe the nursing functions. In the beginning of the following session, the suggestions were put forward by each group and the researcher would evaluate the suggestions and to come up with a correct conclusion. The next scenario was proposed by the end of the session and the above-said steps were taken again for each one of the scenarios. While running scenario-based trainings, two of the participants in the intervention group also left the research.

After the end of scenario-based training program and one month later, the performance of the nurses in looking after those patients suffering from acute coronary syndrome in both groups was measured and observed by the author using an observatory checklist three times during morning, afternoon and evening. The average performance score of each participants during all three shifts was calculated. It is necessary to point to the fact that the performance of 2 of the participants in the intervention group was not observed (it was excluded) as they were on maternity leave. The data was analyzed using SPSS v.15, chi-square, independent T and paired tests.

RESULTS

Nearly 74 nurses from the critical cardiac care unit participated in the research in both the intervention (n=38) and control (n=36) groups. The average age of the participants in the intervention and control group was 36.39 ± 4.83 and 34.63 ± 4.14 years old respectively. As for gender distribution in both groups, 92.1% of the participants in the intervention group and all of them in the control group were female. The results of chi-square statistical test indicated no significant difference between variables of age, marital status, education, and employment status in both groups ($P > 0.05$). No statistically significant difference was observed between the length of the background in the clinical works and previous clinical works in the critical cares unit based on independent T statistical test. No such difference was also observed in terms of age base on Mann-Whitney test either ($P > 0.05$).

According to table 1, the average performance score of the nurses in the morning, afternoon and evening before scenario-based training program in the intervention and control group was 20.63 ± 2.13 and 21.44 ± 2.48 respectively. Based on independent T statistical test, this difference was not significant ($P = 0.150$). However, these averages after the training course for the intervention and control group were 24.32 ± 3.78 and 20.38 ± 3.32 respectively. Based on independent T statistical test, this difference was significant ($P = 0.0001$).

Table 1. The general comparison between the nurses' performance score in their three shifts in the morning, afternoon and evening before and after intervention in both groups

	intervention	control	independent T test
	mean and SD	mean and SD	
before intervention	20.63 ± 2.13	21.44 ± 2.48	t = -1.457 df = 70 P = 0.150
after intervention	24.32 ± 3.78	20.38 ± 3.32	t = 4.801 df = 72 P = 0.0001

According to table 2, the average performance score of the patients in the three shifts of morning, afternoon and evening in the intervention group at the beginning of the research was 20.63 ± 2.13, while this value at the end of the research had increased to 24.32 ± 3.78. This difference was statistically significant ($P = 0.0001$). The average performance score of the nurses in the control group at the beginning of the research was 21.44 ± 2.48 at the

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beginning of the research. This value decreased to 20.38 ± 3.32 at the end of the research. This difference was not statistically significant (P = 0.147).

Table 2. The comparison between the general nurses' performance score average in their three shifts in the morning, afternoon and evening before and after intervention in both groups

	before intervention	after intervention	paired T test
	mean and SD	mean and SD	
intervention	20.63 ± 2.13	24.32 ± 3.78	t = -5.710 df = 35 P = 0.0001
control	21.44 ± 2.48	20.38 ± 3.32	t = 1.484 df = 35 P = 0.147

DISCUSSION

The results indicated no significant difference between the intervention and control groups in terms of the qualitative and quantitative demographic variables which were capable of affecting the results of this research. In other words, they were homogenous in terms of these variables. As the results indicate, the nurses in both groups used to deliver equal levels of care to those suffering from acute coronary syndrome before the scenario-based trainings. In other words, no significant difference was observed between the average scores of performance. After training the intervention group through scenario-based method and educating the control group through delivering speeches, a significant difference was observed between the performance score of the nurses in both groups. The average performance score of the nurses in the intervention group was significantly higher than what was recorded before the intervention. These results were in line with those of Doulin et al [13]. According to the results achieved in their research, scenario-based learning resulted in the better performance of the nurses in the intervention group and helped them have correct diagnosis and assess the Delirium in the hospitalized in the critical care unit. In another research conducted by Majdi Nasef, utilizing scenario-based training resulted in information enhancement and better performance of the nurses while encountering their occupational challenges in Al-Ahrar hospital of Egypt. Based on these resuls, Majdi Nasef et al emphasized the great need of the therapeutic-educational centers to change the strategies of in-service training of the nurses and utilize modern and creative training methods such as scenario-based learning [17]. In another study conducted by Dehkordi et al, using problem-centered methods resulted in improved view and performance of nursing students in internal surgery courses [22]. The results of this research are in line with those of Staun et al. and Heso et al [14, 23]. According to these studies, utilizing problem-centered and scenario-based educational methods had resulted in the better performance of those participating in the intervention group.

As the results indicate, the average performance score of those in the control group after the intervention program has not increased; instead we witness a sharp decrease. In the control group, training was mostly conducted through delivering lectures and the scenarios developed by the researcher and used passively in the discussions. In an attempt to justify the whole thing, we can say that 80% of the material delivered through speech is forgotten within 8 weeks. It is also recommended to use training through speech to deliver the information, not to apply them [24].

Various researches have studied the efficiency of curriculum-based learning in various groups [15, 25, 26]. This method has recently been considered as a learning stimulus with real patients and utilized in the clinical fields [27]. The results of the study conducted by Michelson showed that utilizing this educational method in infection control unit increases the awareness of the students and facilitates understanding complicated issues [28]. Nestel et al also believe that scenario-based education along with utilizing simulation technique can enhance the nursing techniques and methods, especially the communicative techniques [29]. This educational method is based upon the principles of adults' learning and situational learning theory and provides us with an learner-based opportunity for the complicated issues.

CONCLUSION

Scenario-based learning helps the nurses working in the critical cardiac care unit gain experience, develop their skills and gain the necessary skills without having any fear or anxiety of causing harm to the patient. Thus, utilizing

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this method results in safe care and favorable results for those suffering from acute coronary syndrome hospitalized in the critical coronary care unit.

REFERENCES

[1] Biranvand M, Kolahi A, Ghafelehbashi H. Characteristics and final diagnosis of patients with primary acute coronary syndrome. Persian Journal of Babol University of Medical Sciences. 2008;10(3):76-82.

[2] Ahmadi A, Sajjadi H, Etemad K, Khaledifar A, Mobasherii M. Epidemiological characteristics and determinants of mortality in acute coronary syndrome in Iran. J Mazandaran Univ Med Sci. 2015;24:1-9.

[3] Panahi M, Yavari P, Khalili D, Mehrabi Y, Hadaegh F, Azizi F. The Risk of Chronic Kidney Disease and Metabolic Syndrome in the Incidence of Coronary Heart Disease: Tehran Lipid and Glucose Study. Iranian Journal of Epidemiology. 2014;9(4):10-20.

[4] WHO Media Centre. The top ten causes of death. Updated october 2008 (310). Available from:http://www.who.int/mediacentre/factsheets/fs310/en/ind ex.html. Accessed October 15, 2010.

[5] Keaton A, Pierce L. Adherence to cardiac therapy for men with coronary artery diseas. rehabil nurs. 2007;26(6):23-5.

[6] Harrison T. Principles of internal medicine 1. 7th, editor .New York: Mc Graw Hill; 2009.

[7] Han J, Lindsell C, Hornung R. The elder patient with spected acute coronary syndromes in the emergency department. Acad Emery Med. 2007;14(8):732-9.

[8] Linda S, Paula D. Understanding Medical Surgical nursing. Edition. T ,editor. Philadelphia.: Davids Company.; 2007.

[9] Phipps. Medical surgical nursing. edition. t, editor: mosby co.; 2003. 657-71. p.

[10] Mohammadi G, Mahmoudi H. Evaluating the knowledge of intensive care unit nursing staff. Iranian Journal of critical care nursing(IJCCN). 2009;2(1):41-6.

[11] Profeto J, Grath M. Critical Thinking and Evidence - Based Practice. Journal of Professional Nursing. 2005;21(6):34-7.

[12] Errington EP. Developing scenario-based learning: Practical insights for tertiary educators: Dunmore Press; 2003.

[13] Devlin JW, Marquis F, Riker RR, Robbins T, Garpestad E, Fong JJ, et al. Combined didactic and scenario-based education improves the ability of intensive care unit staff to recognize delirium at the bedside. Critical Care. 2008;12:(1)R19.

[14] Hsu L-L, Huang Y-H, Hsieh S-I. The effects of scenario-based communication training on nurses' communication competence and self-efficacy and myocardial infarction knowledge. Patient education and counseling. 2014;95(3):356-64.

[15] Nagle BM, McHale JM, Alexander GA, French BM. Incorporating scenario-based simulation into a hospital nursing education program. The Journal of Continuing Education in Nursing. 2009;40(1):18-25.

[16] Hasankhani H, Heidarzadeh H, A. D, Fathi Azar E, Moghadasian S. Simulation utilization in nursing education. Intarnational Reearch Journal of Applied and Basic Sciences. 2013;7(9):554-7.

[17] Nasef MM, El-Tayeb IM, Mawgoud RA, Hammam DAE-S. Active learning versus lecture-based approaches in occupational training programs of intensive care nursing staff at Al-Ahrar Hospital, Zagazig City, Egypt. Gaziantep Medical Journal. 2014;20(2):147-59.

[18] Heravi-Karimooi M, Rejeh N, Foroughan M, Ebadi A. Designing and determining psychometric properties of the Elder Neglect Checklist .Iranian Journal of Ageing. 2013;8(3):25-34.

[19] Mohammadbeigi A, Mohammadsalehi N, Aligol M. Validity and Reliability of the Instruments and Types of MeasurmentS in Health Applied Researches. Journal of Rafsanjan University of Medical Sciences. 2015;13(12)

[20] Hyrkäs K, Appelqvist-Schmidlechner K, Oksa L. Validating an instrument for clinical supervision using an expert panel. International Journal of nursing studies. 2003;40(6):619-25.

[21] Mohtashami J, Salsali M, Pazargadi M, Manoochehri H, Alavi Majd H. Developing and Psychometric Properties Check List of Clinical Competency in Mental Health Nursing Students. Journal of Nursing Education. 2014;2(3):46-57.

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[22] Dehkordi AH, Heydarnejad MS. The impact of problem-based learning and lecturing on the behavior and attitudes of Iranian nursing students. Dan Med Bull. 2008;55(4):224-6.

[23] Staun M, Bergström B, Wadensten B. Evaluation of a PBL strategy in clinical supervision of nursing students: Patient-centred training in student-dedicated treatment rooms. Nurse Education Today. 2010;30(7):631-7.

[24] Habibzadeh H, Moradi Y, Rasoli D, Sheikhi N. The effect of concept mapping teaching method on the learning of health assessment lesson on nursing students of Urmia nursing and midwifery faculty 2013. Journal of Nursing and Midwifery Urmia University of Medical Sciences. 2013; 11(8).

[25] Lynch MD. Developing a scenario-based training program: Giving officers a tactical advantage. FBI law enforcement bulletin. 2005;74(10):1-8.

[26] Zaghari tafreshi M, Rasouli M, Sajadi M. Simulation in nursing education: A review article. Iranian Journal of Medical Education. 2013;12(11):888-94.

[27] Jones M, Johnston D. Is the introduction of a student-centred, problem- based curriculum associated with improvements in student nurse well-being and performance? An observational study of effect. Int J Nurs Stud. 2006;43(8):941-52.

[28] Mikkelsen J, Reime MH, Harris AK. Nursing students' learning of managing cross-infections–Scenario-based simulation training versus study groups. Nurse Education Today. 2008;28(6):664-71.

[29] Nestel D, Kneebone R, Kidd J. Teaching and learning about skills in minor surgery. Journal of Clinical Nursing. 2003;12(2):291-6.