

Evaluation of the Effect of Problem-Solving Based Training on Decision Making and Creativity of Medical Emergency Students

Mohammad Reza Saeed, Neda Fayazi*, Homa Fayazi, Mahmoud Karimi, Azam Mohammadi

Received: 11 March 2018 / Received in revised form: 20 July 2018, Accepted: 25 July 2018, Published online: 05 September 2018
© Biochemical Technology Society 2014-2018
© Sevas Educational Society 2008

Abstract

Introduction: in one hand, given the importance of decision making and creativity in protecting and maintaining the life and safety of patients in health care system by medical emergency technicians, preventing the waste of time and providing the best care and outcome for patients, and as two factors of proper decision making and creativity are considered as the main professional competencies in the area of medical emergency, on the other hand, considering the useful and constructive effects and the importance of the role of the problem solving skills training in coping with stress and negative events, this study was conducted to evaluate the effect of problem solving based training on the decision making and creativity of the students of medical emergency department. **Method:** This research is a clinical trial, in which 50 medical emergency students were randomly assigned to control and intervention groups. At the beginning of the study, subjects of both groups completed the Scott and Bruce's Decision Making Questionnaire and 60-items Abedi's Creativity Questionnaire. After intervention (holding problem solving skills training workshop), which was performed for 8 weeks and once per week by, subjects of both group re-completed the questionnaires. Finally, two groups were compared. **Results:** The mean score of creativity before problem solving skill training in intervention and control groups was 54.88 and 54.64, respectively. After intervention, it was 160.56 and 66.48 in the intervention and control groups, respectively, which was statistically significant only in the intervention group (p-value <0.001) and the mean score of the decision-making in the intervention and control group was 44.14 and 39.20, respectively. After the intervention and at the end of the study, it was 104.12 and 58.00 in the intervention and control groups, respectively, which was statistically significant only in the intervention group (P-value <0.001). **Conclusion:** based on the results, problem solving methods training can increase the level of creativity and decision-making power of medical emergency department's students and can be used as one of the cost-effective methods for periodic training in medical emergency.

Keywords: Medical Emergency, Creativity, Decision Making, Problem-Solving Methods

Introduction

Nowadays, with the development of science and technology in every aspect, it is not possible to solve the upcoming problems merely by relying on your own information and knowledge. Thus, all human beings need to develop problem-solving, mental and physical skills, and creative thinking to adapt to the world of technology (Hamid et al., 2016). Problem-solving skill is a cognitive-behavioral process and a key for providing the best care (Baumberger-Henry, 2005); also, it is one of the main thinking skills used to cope with the problems and detect solutions for them (Zamani et al., 2017; Taghizadeh et al., 2015; Shamsikhani et al., 2014). In other words, this process is an active learning approach, which is more effective than traditional problem-solving methods (Masoomah et al., 2010). Based on the Heather and Peterson's theory, coping with problems and problem solving are two synonyms terms. In this process, new

Mohammad Reza Saeed

Bachelor of Anesthesia, Saveh University of Medical Sciences, Saveh, Iran.

Neda Fayazi*

Master of Nursing, Faculty of Nursing and Midwifery, Saveh University of Medical Sciences, Saveh, Iran.

Homa Fayazi

Master Student of Nursing, Faculty of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

Mahmoud Karimi

Ph.D. in Health, Faculty of Nursing and Midwifery, Saveh University of Medical Sciences, Saveh, Iran.

Azam Mohammadi

Master of Midwifery, Faculty of Nursing and Midwifery, Saveh University of Medical Sciences, Saveh, Iran.

problems can be solved based on previously learned principles. Hence, the learned cases not only are used in the problem-solving process but also new learning (Adavi et al., 2016; Huitt, 1992) happens which is used in a systematic way to cope critical and specific situations, including stressful situations and adverse events (Zamani et al., 2017; Beşer & Kissal, 2009; Burns et al., 2010). In this approach, we can have a diverse range of the best and most effective solutions to confront these situations (Shamsikhani et al., 2014).

The problem solving skill leads to improvement of social skills, rational growth in the form of correctly understanding the materials, comparing the point of views, understanding the link among the materials, induction and deduction, evaluating and judging, and finally, increasing the likelihood of effective coping with wide range of stressful situations (Hamid et al., 2016). The use of this approach is increasing day by day for its several distinct characteristics, including simple and understandable principles in accordance with the understanding of different audiences, the easy ability of its implementation, impressively cost-effective, structured nature of it, and its positive and valuable outcomes (Gavipankeh et al., 2014). Humans are continuously making simple and complex decisions during their everyday life. Nowadays, experts and planners believe that instead of transferring scientific facts and accumulating them in humans' mind, they must learn how to think, how to make decisions and judge different things, because the most important yet dangerous component of people's life, especially in health care area in which the medical emergency group is the most important and delicate, is making decisions. Hence, it is necessary to use decision making and useful strategies to provide the best efficiency in healthcare personnel in various clinical groups such as nursing, anesthesia, midwifery, and especially in the medical emergency department (Huitt, 1992; Heydari et al., 2013; Khodayarian et al., 2017).

In this profession, the task and responsibility of maintaining the life of patients is critical since it is associated with high workload, high stress, crowdedness in its environment, importance of seconds, and the unpredictability of situations. Thus, the personnel should learn skills, abilities and information to solve problems and make decisions in these specific and difficult situations (Heydari et al., 2013). In addition, considering the expansion of the world ahead, people need to develop creative minds and creativity; to this end, creativity is a word in which the mind directs its intelligent works and finally, brings innovative, new, valuable and diverse outcomes (13-15). Creativity is one of the key components of an organization's progress (Shahsavari et al., 2015; Sadeghi et al., 2015; Dehgani et al., 2015).

Nowadays, all organizations need new ideas for survival, and one of the basic skills in solving problems and challenges for all clinical professions, including medical emergency is creating new ideas (Taghizadeh et al., 2015; Bahador et al., 2016). Paying attention to creativity and its effect on self-efficacy of medical emergency students is one of the important factors in their success and the effectiveness of their care in clinical environments. Herbert Fox argues that creativity is in fact the process of solving problem in an innovative and useful way (Chan, 2013). Creativity is one of the most important accreditation criteria for hospitals. In addition, it is necessary and useful in interaction between the patient and the person providing the care, providing specific clinical care, solving problems and making the most critical decisions since innovation or creativity allows them to use their experiences and knowledge to achieve the best desired outcome (Xi et al., 2007). On one hand, Given the importance of decision making and creativity in maintaining and protecting the safety and life of patients in health care system by medical emergency technicians, importance of preventing the waste of time and providing the best care and outcome for patients, and as two factors of proper decision making and creativity are considered as the main professional competencies in the area of medical emergency, and on the other hand, considering the useful and constructive effects and the importance of problem solving skills training in coping with stress and negative events, this study was conducted to evaluate the effect of problem solving based training on the decision making and creativity of the medical students of the medical emergency department of Saveh Medical Sciences University.

Method

This study is a clinical trial conducted to evaluate the effect of problem solving based training on medical emergency students of Faculty of Medical Sciences of Saveh. In this study, 50 medical emergency students of Faculty of Medical Sciences of Saveh participated in the sampling. Students who met the inclusion criteria of study were entered into the study and randomly divided into two intervention and control groups using Convenience Sampling method. At the beginning, consent letter was taken from students participated in the study after providing comprehensive information on the research goals, the benefits, results and confidentiality of information and the way of doing the research. Demographic information and students' profile were recorded on special forms as basic information. At the beginning of the study, Scott and Bruce's decision making questionnaire and 60-item Abedi's creativity questionnaire were completed by both groups. Then, problem-solving skills training workshop for 8 sessions, 2 hours per session for 8 weeks (once a week) was held for intervention group. Finally, one week after the interventions (ninth week after the intervention), the Scott and Bruce's decision making questionnaire and 60-item Abedi's creativity questionnaire were re-completed by both groups. Without receiving any training in problem solving skills, the subjects of control group completed the questionnaires once at the time of the study and one week after the interventions. It should be noted that the intervention group were warned not to speak with control group on what they are learned in the problem solving skill sessions. The results were analyzed using descriptive tests (frequency, mean, and standard deviation) and inferential statistics (repeated variance analysis).

Results

As shown in Table 1, results showed that the mean age of medical emergency students was 22.64 years in the control group and 22.76 years in the intervention group. The control group students had mean weight of 61.64 kg and the intervention group students had mean weight of 61.52 kg. The mean GPA of students was 15.19 and 14.80 in the control and intervention groups, respectively. The two groups did not show a significant difference in the distribution of the above-mentioned variables, including age, weight and mean GPA.

According to the Table2, the mean score of creativity in the intervention group was 54.88 before the intervention and 160.56 after the intervention, which was statistically significant. In the control group, the mean score of creativity was 54.64 before intervention and 66.48 after intervention, which was not statistically significant.

The mean score of creativity between the two groups of control (54.64) and intervention (54.88) before the intervention was not statistically significant (p -value = 0.93), but after providing intervention at the end of the study, the mean score of creativity was 66.48 in control group and 160.56 in intervention group, which the difference was statistically significant (P -value <0.001).

The mean score of decision-making was not significantly different between control (39.20) and intervention (44.16) groups before intervention (p -value = 0.11), but after intervention, significant difference was found between control group (58.00) and the intervention group (104.12) (P -value<0.001). Using independent t-test showed no significant difference between the intervention and control groups in terms of mean of creativity and decision making before the intervention (P -value = 0.93) (p -value = 0.11), but after the intervention, there was a significant difference between the intervention and control groups in terms of mean of creativity and decision making (P -value <0.001) (p <0.001).

Table 1: Demographic characteristics of participants in both intervention and control groups

Characteristics	(n=25) Intervention group	Control group (n=25)
Age	22.76 (3.35)	22.64 (2.92)
Weight	61.52 (6.08)	61.64 (7.73)
Mean GPA	14.80 (1.52)	15.19 (1.95)

• Data represents the mean (standard deviation).

Table 2: Comparison of decision making and creativity of students in studied groups before and after intervention

groups	Creativity (n=25)		*P _{value}	Decision making (n=25)		*P _{value}
	Intervention	Control		Intervention	Control	
Before intervention	54.88 (8.34)	54.64 (11.09)	0.93	44.16 (9.54)	39.20 (11.97)	0.11
After intervention	160.56(11.46)	66.48 (15.04)	<0.001	104.12 (14.19)	58.00 (16.15)	<0.001

Data represents the mean (standard deviation).

*Results are reported based on independent T-test.

Discussion

Based on the results of the study, the level of creativity and decision making significantly increased in the intervention group, which may be due to the effect of problem solving skills training in this group. Based on literature reviews, no study has been conducted so far on the effects of problem-solving methods on two factors of creativity and decision making simultaneously on medical emergency students. One of the studies conducted about the effect of problem solving methods on the decision making of the medical emergency department's student is the one done by Shahbazi et al (2013) in which the effect of problem-solving methods in decision making in medical emergency medical students was evaluated. Results of this study revealed that problem-solving methods training leads to the improvement in decision-making skills of medical emergency students (Heydari et al., 2013).

Studies suggest that one of the most vital components of life in creating the best efficacy in healthcare staff, especially in the medical emergency department is to make the proper decision and developing creativity in order to direct the therapeutic interventions purposefully (Heydari et al., 2013; Khodayarian et al., 2017; Sadeghi et al., 2015). The direct relation between training the problem solving skills and improving the decision-making power has been reported in the study conducted by (Heydari et al., 2013). In addition, the direct association between problem solving skills training and improvement of creativity has been reported in the study conducted by (Hamid et al., 2016). Thus, given the benefits of problem-solving methods training, improvement in decision-making skills and creativity of the intervention group could be due to the learning of various problem-solving methods. In a study conducted by Shahbazi et al, it was

found that the use of problem solving skills can improve the decision-making power of individuals and increase the level of stress tolerance (Heydari & Shaykhi, 2011).

In another descriptive research carried out by Farhadi (2017) on nursing students of Islamic Azad University of Hamedan to evaluate the effects of problem solving methods on anxiety of nursing students, the results revealed that the anxiety level of nursing students gradually decreased after using problem solving techniques (Zamani et al., 2017). The anxiety level of the students was evaluated in the above-mentioned study while it was not evaluated in the current study and the level of creativity and decision-making power of students of medical emergency was evaluated. Also, in Farhadi's research, the nursing students were the samples, but in the current research the medical emergency students were targeted. All in all, these differences between two studies did not affect the results; hence, both studies indicated that problem solving skills lead to improvement in social and individual skills

In addition, the results of research carried out by Burns et al showed that the motivation of first-year nursing students gradually increases by learning problem-solving methods (Burns et al., 2010). The results of the mentioned study indicate the usefulness of problem-solving methods in increasing the motivation of students, while the level of creativity and decision-making power of the students were examined in the current study. However, it should be noted that in the Burns study, problem solving techniques were used in nursing students, but in the present study, these techniques were examined on the medical emergency students. Both studies showed the beneficial effects of problem-solving techniques.

Thus, it can be stated that improving the decision-making skills and creativity could be due to the training of new and varied methods of problem-solving techniques. In general, according to the results the decision making and creativity were increased in the end of the research. Given the aforementioned matters, it could be stated that the use of problem-solving techniques is effective in improving the decision-making power and creativity of the medical emergency students due to training and presenting various methods to cope with different problems and solving them. Although the number of studies conducted in this area is very limited, based on the results of the present study, it seems that the use of problem-solving techniques is effective in improving the decision making and creativity of medical emergency students. It is wished that this important group of medical staff will be improved to cope with the emergency situations by using these methods in future.

References

- Adavi A, Hamid N, Attari Y, Madmoli Y, Madmoli M. Study of the Effect of Problem-Solving Skills Training on Creativity and Assertiveness Among High School Students. *Iranian Journal of Nursing Research*. 2016;11(5):48-55. doi: 10.21859/ijnr-11058.
- Bahador RS, Soltani F, Madadzadeh F. The assessment of relationship between creativity and self-efficacy of clinical performance based on the nursing process in nursing students of Kerman. *Journal of Clinical Nursing and Midwifery*. 2016;5(3):12-22.
- Baumberger-Henry M. Cooperative learning and case study: does the combination improve students' perception of problem-solving and decision making skills? *Nurse Educ Today*. 2005;25(3):238-46. Epub 2005/03/30. doi: 10.1016/j.nedt.2005.01.010. PubMed PMID: 15795027.
- Beşer A, KISSAL A. Critical thinking dispositions and problem solving skills among nursing students. 2009.
- Burns HK, O'Donnell J, Artman J. High-fidelity simulation in teaching problem solving to 1st-year nursing students: a novel use of the nursing process. *Clinical Simulation in Nursing*. 2010;6(3):e87-e95.
- Chan ZC. A systematic review of creative thinking/creativity in nursing education. *Nurse Education Today*. 2013;33(11):1382-7.
- Chan ZC. A systematic review of critical thinking in nursing education. *Nurse Education Today*. 2013;33(3):236-40.
- Dehgani, Dehgani, Tehrani, M. the relationship of creativity with job satisfaction and mental health in nursing women. *Iranian Journal of Nursing*. 2015; 32-43.
- Duhamel KV. Bringing us back to our creative senses: Fostering creativity in graduate-level nursing education: A literary review. *Nurse education today*. 2016;45:51-4.
- Gavipankeh, E, Atri, B, Pakpour, V, Tarverdizadeh, et al. The effectiveness of problem solving skills training on depression of nursing and midwifery students. *Quarterly Journal of Hayat*. 2014; 20 (2): 38-46.
- Heydari M, Shaykhi R. The effect of problem solving course on student's stress intolerance. *Journal of Shahrekord University of Medical Sciences*. 2011;13(2):32-7.
- Heydari, Shabbazi, Deris. the effect of problem solving skills training on medical emergency students' decision making power. *Health promotion management*. 2013; 2 (2): 25-31.12
- Huitt W. Problem solving and decision making: Consideration of individual differences using the Myers-Briggs Type Indicator. *Journal of Psychological type*. 1992;24(1):33-44.
- Khodayarian M, Salimi T, Nasiriani K, Javadi S. A comparison of creativity in nursing undergraduate and graduate students of Shahid Sadoughi University of Medical Sciences in 2014. *The Journal of Medical Education and Development*. 2017;11(4):319-29.

-
- Masoomeh, M, Homeyrah, Kh, Shohreh, K, Farideh, B, Sarvar, P, Habib, A, The effect of problem solving based training on learning levels in nursing students.2010; 1-17.
- Sadeghi Gandomani H, Delaram M, Naseri-Ziba F, Naseri-Boroujeni N. Assessment the Creative Skills of Nursing Students and Nurses in the Intensive Care Units of Hospitals Covered by Tehran University of Medical Sciences. *Research in Medical Education*. 2015;7(3):11-20
- Shahsavari Is, Hosseini M, Fallahi Km, Peyrovi H, Khankeh H. Exploring Nurses'creativity Consequences In Clinical Settings: A Qualitative Study. 2015.
- Shamsikhani S, Farmahini Farahani M, Shamsikhani S, Sobhani M. Effectiveness of problem solving training on depression in nursing student. *Int J Palliat Nurs*. 2014;2(1):63-71.
- Taghizadeh Z, Purbakhtyar M, Daneshparvar H, Ghasemzadeh S, Mehran A. Comparison the Frequency of Domestic Violence and Problem-Solving Skill among Pregnant Women with and without Violence in Tehran. *IJFM*. 2015;21(2):91-8.
- Xi-Wen L, Chun-Ping N, Rui Y, Xiu-chuan L, Cheng C. Teaching Design of Cultivating Nursing Students' Creative Thinking. *Online Submission*. 2007;4(7):38-41.
- Zamani N, Barahmand A, Farhadii A. The Effects of Problem-Solving Training on Reducing Anxiety among Nursing Students. *Journal of Nursing Education*. 2017;6(3):56-61. doi: 10.21859/jne-06038.