

Effect of simulation Techniques on Nurse Students' Knowledge and Satisfaction about Resuscitation Training

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Abstract: Nursing students must be educated with the most realistic technologies available to improve patients' safety. Nurses are frequently the first people to discover and respond to an in-patient respiratory or cardiac arrest. Thus, successful completion of a cardiopulmonary resuscitation (CPR) course is required by most clinical agencies prior to a nursing student's beginning clinical experiences.

Aim of the study: the aim of this study was evaluate the effect of simulation techniques on nurse students' knowledge and satisfaction about resuscitation training

Design: the design of this study was quasi-experimental with pre-test and post-test (study and control group).

Setting and Sample: The study starting from September 2015 to the September 2016 on 160 students (80 in study group and 80 in control group) at three level in the Nursing Faculty/ Suez Canal University in Ismailia city.

Tools of data collection: this study was used interviewing questionnaire checklist with theoretical and practical lessons.

Results: this study was found differences in the mean among the pre-test, post-test in the study group, the results show a highly statistical significant differences in the knowledge and satisfaction of students toward (CPR) in study group, and no statistical significant differences in the control group.

Conclusion: Students trained with simulation achieved higher scores in acquired and retained knowledge and satisfaction, indicating the value of simulation techniques in improving knowledge and satisfaction.

Recommendations: this study recommended that the nurses' school provide and use a high fidelity simulation in the students programs and training. A student is prepared to perform CPR skills adequately, if called on to do so.

Keyword: Simulation, Knowledge, Satisfaction Cardiopulmonary Resuscitation (CPR), Nursing Students, Training.

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I. Introduction

The education section is playing important role for developing the countries. So, it's should be focused on nursing student satisfaction during teaching program. Thus, the simulation leads to increasing student knowledge and satisfaction (Tawfik, 2018). All the educators define learning as the permanent behavioral change derived from experiences. Learning is occurs in a cycle which changes from concrete to abstract and from reflective observation (RO) to experience (Celik et al; 2017).

Simulation as a teaching and learning methodology is being embraced by nursing in academic and practice setting to provide innovation educational experiences to assess and develop clinical competency. This article provides an overview of historical basis for using simulation in education, simulation methodologies, and perceived advantages and disadvantages. It also provides a description of the integration of scenario-based programs using a full scale patient simulator into nursing education programming at a large academic medical center (Nagle et al; 2009). A simulation learning experience designed to teach nursing students about cardiac arrhythmias and nursing intervention for patients experiencing a cardiac dysfunction was developed and implemented. The key to stimulation was the use of the SimMan human patient simulator, a technologically advanced simulator that can be programmed to have realistic and individualized responses to health care scenarios (Çelik et al; 2017 & Guimond et al; 2011).

Cardiopulmonary resuscitation (CPR) is the way to do the work of the heart and lung when the person's heart and breathing have stopped. Students trained with stimulation showed improvements in their practice. This trained of the students allow them to be active learners rather than being passive learners and provides equality for all student's training. The main purpose is to restore partial flow of oxygenated blood to the brain and heart. The objective is to delay tissue death and to extend the brief window of opportunity for a

successful resuscitation without permanent brain damage(Akhu-Zaheya et al; 2013). CPR is a procedure performed in an emergency when the heart stops with the goal of prolonging circulatory and lung function. Although advances in emergency cardiac care continue to improve the chances of surviving cardiac arrest, cardiac arrest remains a leading cause of death in many parts of the world. Nursing students were taught basic CPR according to the guidelines by the American Heart Association (Abdulwahhab, 2017).

Almost, all nursing students are required to successfully complete a cardiopulmonary resuscitation course prior to starting their clinical experiences and practices. To complete successful course must be implies that students are ready to perform CPR effectively over a 2-year period. Videos were scored using a modified Public Access Defibrillation tool, based on CPR guidelines (National Athletic Trainers' Association, 2015). Nurses are often the first responders in clinical emergencies that require effective training to ensure high-quality resuscitation and patient safety. The aim of the study was to evaluate the efficacy of simulation-based resuscitation training by assessing two different training modalities (computer-based simulation versus mannequin-based simulation) with practicing nurses (Young Sook et al; 2011).

Nurses are frequently the first people to discover and respond to an in-patient respiratory or cardiac arrest. Thus, successful completion of (CPR) course is required by most clinical agencies prior to a nursing student's beginning clinical experiences. This training is most frequently completed just prior to entry into a program of nursing education (Humphreys, 2011). Nursing students, as part of the health care team, may be required to perform CPR at some point during their educational experience. Reports of nursing student use of CPR skills are rarely found in the literature (Brown, 2010).

Stimulation represents the state of the art in technology for educating students and health care providers at all levels and disciplines. Simulation is growing in popularity in nursing education, for learning, teaching patient safety, enhancing clinical practice, teaching resuscitation, and teaching clinical judgment skills(Wilkins, 2013). Stimulation becomes students' low-risk opportunities to practice rare and critical events in a controlled environment. Stimulation allows students to practice more than once, with or without errors (Fathi et al; 2014).

Simulation is a teaching method or technique that, once adopted, should be evaluated to determine its usefulness as a teaching method. Previous studies have reported positive effects of simulation on knowledge acquisition and/or skills training and on students' self-efficacy (Shinnick, 2015). Nursing students' knowledge and confidence in performing (CPR) is one of the major concerns of nursing educators. Students should have the knowledge and skills of basic life support (BLS) to practice as rapidly as possible in an emergency situation. Various teaching methods have been used to promote CPR competency. A method that has gained popularity among educators is simulation (Oermann et al; 2010).

The use of simulation in nursing education is a new culture in a developing country. Therefore, the integration of simulation into nursing education requires the creation of this culture by enhancing and strengthening the technical capabilities of all nurse educators and helping them implement these strategies safely. The purpose of this research study was to examine the effect of high fidelity basic life support (BLS) simulation on knowledge acquisition, knowledge retention, and self-efficacy of nursing students.

Aim of the Study:-

The aim of this study was evaluate the effect of simulation techniques on nurse students' knowledge and satisfaction about resuscitation training.

Research hypotheses:

- The nurse's students who will receive simulation techniques on CPR will have better knowledge and satisfaction in the post-test.
- Simulation-based significantly affect student' satisfaction.

Subject and Methods

Subject and Methods of this study were done under the four main designs as follows

- 1-Technical Design
- 2--Operational Design
- 3-Administrative Design
- 4-Statistical Design

Technical Design:

The technical design involves the research design, setting, sample size and tools of data collection.

Research Design:

This study was used quasi experimental design with pre-test and post-test in (the study and the control group).

Setting:

This study was carried out in Faculty of Nursing in Suez Canal University at Ismailia city in Pediatric Department.

Sample:

This study included 160 male and female students at 3 level year (80 in study group and 80 in control group) in pediatric nursing department training in 2015-2016 academic year. Convenience sampling randomly method was used.

Tools of data collection:

Data was collected through the use of the following tools:

Interviewing questionnaire checklist for all students in the pediatric lab. For the study group (80 students), 5-h theoretical and 8-h practical courses in total were carried out with 4 clinical instructors per week in 4 groups in separate sections. The practice steps were demonstrated by an instructor by doing with a group of 20 students each week after the theoretical lesson by means of utilizing simulation SimBaby in the CPR. For the control group does not use simulation SimBaby in the CPR and used the child model. After that, all the students were required to perform one-to-one procedure.

Operational design:

The design involves preparatory phase, pilot study, content validity, reliability and the procedure.

Preparatory Phase:-

The study tools were developed after extensive review of literature, different studies and theoretical knowledge of various aspects of the research topic using textbooks, articles, internet and periodicals. After that, for the application of the study, the permission was obtained from Faculty of Nursing in Suez Canal University.

Pilot study:-

A pilot study was carried out on 10% of the study sample to ascertain the clarity, applicability of the study tools, and to identify the obstacles and problems that may be encountered. Estimation of the time needed to fill in the questionnaire will be carried out.

Tools validity and reliability:-

Content validity (or logical validity) was performed to measure the extent to which the tools represent all facets of the social psychometrics construction. The method of measuring content validity was performed by gauging agreement among raters/judges regarding how essential of a particular item of the tools is. Each of the subject matter expert raters (SMEs) on the judging panel respond to the following question for each item: "Is the knowledge or practice measured by this item 'essential,' 'useful, but not essential,' or 'not necessary' to the performance of the construct?" If more than half the panelists indicate that an item is essential, that item has content validity. Greater levels of content validity exist as larger numbers of panelists agree that a particular item is essential.

Content reliability:-Coefficient of reliability was measured by Cronbach's α (alpha). Cronbach alphas were calculated for the overall tested items of the studied nurses including total knowledge. Furthermore, a reliability test was conducted on the domains of the knowledge.

Administrative Design:

An official permission was obtained using proper channels of communication. Official letters were sent to the dean of Faculty of Nursing, Suez Canal University, explaining the aim of the study and its expected outcome to take their permission to carry out the study.

Statistical Design:

The researcher used the appropriate statistical methods in the data analysis which included descriptive data analysis and inferential data analysis. The data obtained was analyzed by using SPSS 18.0 and used through descriptive statistics such as frequency, percentage, means, standard deviation, and through *t*-test.

II. Results

Table 1:-Students' knowledge about the CPR application among the study group in pre & post- test.

Items	Study(n=80)							
	Pre-test				Post-test			
	Yes		No		Yes		No	
	No	%	No	%	No	%	No	%
-The laboratory appropriate in general	55	68.75	25	31.25	74	92.5	6	7.5
-The duration of the application sufficient	44	55	36	45	64	80	16	20
-CPR application is sufficient and satisfy	63	78.75	17	21.25	75	93.75	5	6.25
-CPR application influence learning positively	59	73.75	21	26.25	77	96.25	3	3.75

Table (1) deals with the studygroup' knowledgeabout the CPR application. We noticed that 78.75% in the pre-test were satisfiedwhile 93.75% in the post-test having the same answer, and 73.75% in the pre-test having learning positively while 96.25% in the post-test were the same answer.This table shows that the majority percentage in the post-test than in the pre-test.

Table 2:-Students' knowledge about the CPR application among the control group in pre & post- test.

Items	Control(n=80)							
	Pre-test				Post-test			
	Yes		No		Yes		No	
	No	%	No	%	No	%	No	%
-The laboratory appropriate in general	44	55	36	45	53	66.25	27	33.27
-The duration of the application sufficient	58	72.5	22	27.5	60	75	20	25
-CPR application is sufficient and satisfy	50	62.5	30	37.5	55	68.75	25	31.25
-CPR application influence learning positively	40	50	40	50	52	65	28	15

Table (2) deals with the controlgroup' knowledgeabout the CPR application. We noticed that 62.5% in the pre-test were satisfiedwhile 68.75% having the same answer,and 50% in the pre-test having learning positively while 65% in the post-test were having learning positively. This table shows that no observe improvement in knowledge between the pre-test and the post-test.

Table 3:-Students' satisfaction about the SimBaby simulation among the study group in pre & post- test.

Items	Study(n=80)							
	Pre-test				Post-test			
	Yes		No		Yes		No	
	No	%	No	%	No	%	No	%
-The simulation model appropriate	62	77.5	18	22.5	76	95	4	5
-The simulation model sufficient	51	63.75	29	36.25	69	86.25	11	13.75
-The simulation model useful in the practice education	62	77.5	18	22.5	77	96.25	3	3.75
-The application influence learning positively	49	61.25	31	38.75	74	92.5	6	7.5

As regards the study group' satisfaction about SimBaby simulation, table (3) showed that, 77.5% of them in the pre-test were choosing the model appropriate and useful in the practice education. While, in the post-test the majority of them 95%, 96.25% were having the same answered. Finally, from this table were had clear improvement in students' knowledge and practices after SimBaby simulation.

Table 4:-Students' satisfaction about the SimBaby simulation among the control group in pre & post- test.

Items	Control(n=80)							
	Pre-test				Post-test			
	Yes		No		Yes		No	
	No	%	No	%	No	%	No	%
-The simulation model appropriate	51	63.75	29	36.25	59	73.75	21	26.25
-The simulation model sufficient	49	61.25	31	38.75	62	77.5	18	22.5
-The simulation model useful in the practice education	59	73.75	21	26.25	60	75	20	25
-The application influence learning positively	62	77.25	18	22.75	63	78.75	17	21.25

Table (4) demonstrate that 78.75% of the control group having satisfaction in influence learning positively. While, 21.25% did not having. In the same table, 75% of them satisfy about simulation model in the practice education and 25% did not satisfy. So, this table show no had improvement between the pre and post-test with using the SimBaby simulation.

Table 5:- Comparison between study and control group about the students'knowledge and satisfaction on the CPR application and SimBaby simulation.

Items	Study(n=80)			Control (n=80)		
	mean±SD	T. test	P. value	mean±SD	T. test	P. value
CPR application	2.53±0.48	86.87	0.014*	2.60±0.50	12.34	0.243
SimBaby simulation	2.55b±0.5	88.95	0.012*	2.72±0.57	54.87	0.751

* Statistically Significant

Concerning the comparison between the study and the control group related to CPR application and SimBaby simulation, the results in table (5) indicated that the study group had statistically significant difference after simulation. While, the control group had no statistically significant difference

Table 6:- Comparison between the study and control group about steps of CPR application.

Items	Study(n=80)		control(n=80)	
	T. test	P. value	T. test	P. value
-The purpose of CPR is to maintain sufficient circulation	6.87	0.005*	0.832	0.201
-Resuscitation start with Keeping the patient safe by looking in the hazard	5.98	0.009*	7.054	3.246
- Clear air way	2.511	0.014*	1.065	0.290
- Checked The carotid pulse	3.867	0.012*	1.245	1.023
- Assesse the breathing movement	0.145	0.001*	4.106	1.028
-Listening to breath sound and feel air	0.934	0.003*	2.111	0.402
Placed patient on theirback with firm surface-	1.258	0.009*	1.331	9.034
-The Depth of chest compression	6.870	0.005*	1.471	2.120
- Compression to ventilation is 15-2 for child	4.023	0.002*	0.182	0.714
-Chest compression- used the heel of hand with fingers placedparallel to the rib	1.340	0.011*	3.021	0.187
-Shoulder kept straight over the sternum	5.981	0.007*	0.298	4.023
-Chest compression for infant should use thumb above the xiphoid	1.888	0.034*	9.870	0.013*
-CPR should be continued until have normalbreathing return	3.144	0.004*	0.672	0.098*

* Statistically Significant

Table (6) shows that a highly statistical significant association was found among pretest and post-test in the study group than the control group about steps of CPR application.

Table 7:- Comparison between the nurses' knowledge and satisfaction among the study and control group.

Items		Study(n=80)			Control (n=80)		
		mean±SD	T. test	P. value	mean±SD	T. test	P. value
Nurses' knowledge	Pre-test	11.22±1.77	6.87	0.601	11.64±2.20	2.11	2.35
	Post-test	8.67±1.45	5.98	0.001*	12±1.92	1.74	0.14
Nurses' satisfaction	Pre-test	9.86±1.84	1.88	0.280	9.43±2.56	0.19	0.856
	Post-test	7.40±0.63	3.14	0.007*	9.71±2.58	1.33	0.204

* Statistically Significant

Table (7) attributed that the difference was a highly statistically significant immediate and after simulation training in the study group about their knowledge and satisfaction. In the other hand, the control group was clearly no statistically significant difference.

III. Discussion

It is very important for a student's nurse to use practices and abilities gained during education for personal satisfaction. This study results reveal that a highly statistical significant association were found among pre-test and post-test in the study group for student' knowledge about CPR application by using SimBaby simulation. This results consistent with (Celik et al,2017) who found that more than two-third of their nursing student participants stated that significant knowledge gains occurred in the study group after simulation. Also (Buali et al; 2013) agree with this point and said that most of the students were pleased with the practice education with simulation SimBaby and felt themselves more competent. And (Abdulwahhab, 2017) marked that the increase in the mean of students' knowledge suggest that the simulation techniques for undergraduate nursing education are the best to enhance teaching and learning quality by creating a collaborative community for knowledge.

The study results obtained showed that nursing student' training was effective in improving their knowledge and satisfaction on simulation CPR application. But it had no effect on theoretical only. In

total agreement with the present study results, (Bahmanzadeh, & Alizadeh, 2017) who found that the more than the two-third of participants stated that the laboratories were appropriate, more than half of the participants expressed that the application period was not enough for them. The reason for insufficiency is thought to be the fact that there were too many students and they did not have enough opportunity for application education.

This study found that there is that a highly statistical significant association was found among pretest and post- test in the study group than the control group about steps of CPR application. So this results were agreement with (Abdulwahhab, 2017). Who conducted that the marked increase in the mean of students' knowledge suggest that the Simulation techniques for undergraduate nursing education are the best to enhance teaching and learning quality by creating a collaborative community for knowledge. This results comes along with (National Athletic Trainers' Association, 2015). Which found that a significant difference in training student knowledge toward CPR.

In the study conducted it was revealed that the study group had statistically significant difference after simulation. While, the control group had no statistically significant difference in post-test than pre-test. This result concurs with Ali et al; (2016). Who found that the simulation training were important for high satisfaction of students. In addition to, it can increase a sense of control, self-efficacy, self-esteem, and social adaptation and support.

Moreover, in this study, the relationship between the nurses' knowledge and satisfaction among the study group were highly statistically significant. While, the relationship between the nurses' knowledge and satisfaction among the control group did not significant. This finding which shows parallelism with numerous studies (Çelik et al; 2017, Eker et al; 2014 & Şendir, 2013) who revealed the fact that nursing student training with SimBaby simulation in CPR application were help and satisfy the student for effective knowledge and practices.

IV. Conclusions

Generally, it can be concluded that the Simulation Techniques are a highly effective to increase the student' knowledge and satisfaction toward cardiopulmonary resuscitation.

V. Recommendation

According to the findings of the study this study recommend to prepare a special high-fidelity simulation center in the each nursing college. Therefore, it is recommended for planners of course specification education to use this training course to be able to reduce student' psychological problems, improve their quality of life and as a result, promote their happiness and quality of services. A further study could be done to evaluate the current model obtained in each of the training courses provided.

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