Research Article

Utilizing Saudi Heart Association Basic Life Support Guidelines in Evaluating the Retention of Cardio Pulmonary Resuscitation Knowledge and Skills Among Nursing Students

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Abstract

Introduction: Cardiopulmonary Resuscitation (CPR) is the immediate response to a person who is suffering cardiopulmonary arrest and the survival rate will be depending on the competency and efficiency of the provider. Studies from different institutions revealed that after the initial CPR training, the CPR skills deteriorate its quality overtime most specially if not being in practice but the knowledge retained and even give higher score compared to the initial result. There is a need of continuous CPR training by utilizing high fidelity manikins to simulate real scenario in the clinical settings to enhance health care practitioner skills in performing CPR.

Objectives: This study evaluates the retention of (CPR) knowledge and skills among the nursing internship students utilizing the Saudi Heart Association (SHA)-BLS guidelines.

Methods: One group Posttest time-series design was adopted to investigate internship students' retention of knowledge and skills immediate after CPR training and 9 months post CPR training (internship period). Twenty-six (26) participants were given lecture and demonstration of CPR during the course. The first post test was conducted after 2 weeks of CPR training. The students were assessed for the knowledge and skills. The retest was conducted among the students 9 months after the CPR training during their internship period. The difference between the retention of knowledge and skills immediate and 9 months after the training were identified and computed by using statistics.

Results: The results of this study show that the knowledge and skills were deteriorated over time. The mean knowledge of the immediate pretest was 17.15 with SD of 2.5 and it was decreased to 13.23 SD - 4.25. Similar result in skills in performing CPR with a Mean score of 3.78 (SD- 0.18) for the first test and 2nd test shows the mean score of 2.82 (SD- 0.28). The efficiency of the chest compression skills were deteriorated over time more than other items in the checklist. Declining the quality of chest compressions would give a great effect to the quality of CPR, hence, could be a reason of poor survival rate of patient under emergency situation. The study also shows a significant association between the skills on CPR and participation in training programs during internship period (χ^2 - 3.869, p- 0. 0.0492). This only means that there is a need of constant and continuous programs such as seminar, workshop, group discussion, simulation regarding BLS courses to improve their CPR knowledge and skills. Positive correlation between the knowledge and skills of CPR in both tests were identified, immediate test after training (0.32) and re test during internship (0.16).

Conclusion: Nursing interns' knowledge and skills in CPR deteriorated over time. Participation in training session or any related activities in CPR has a positive significant effect in their knowledge and skills compared to those who did not have any training session. Therefore, this study strongly suggests that the necessity of periodical training courses to strengthen the competency of the nursing interns and effectively react to emergency situations. It is also recommended to utilize the high-fidelity manikin to mimic the real emergency scenario most specially in applying CPR. This will further enhance not only their knowledge and skills but also their confidence level in handling emergency scenarios.

Keywords: Retention of CPR Skills; Knowledge and Skills on CPR Overtime

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Introduction

Advanced cardiac life support (ACLS)

In-Hospital Cardiac Arrest (IHCA) and Out-of-Hospital Cardiac Arrest (OHCA) incidence this year 2016 in the United States of America are 209,000 and more than 350,000 respectively. The IHCA survival rate is 24.8% compared to OHCA 46.1% for adult patient [1]. In a study on the outcomes of patients admitted to the Intensive Care Unit following cardiac arrest at a tertiary hospital in Saudi Arabia where 7.7% (134/1749) overall survival rate to hospital discharge after underwent cardio pulmonary resuscitation [2]. Cardiopulmonary Resuscitation (CPR) is the immediate response to a person who is suffering cardiopulmonary arrest and the survival rate will be depending on the competency and efficiency of the provider.

In a study entitled Evaluation of Staff's retention of ACLS and BLS Skills showed poor retention in skills performance in advanced cardiac life support (ACLS) and basic life support (BLS) skills after 3 months and 12 months. The theoretical knowledge for both ACLS and BLS retained for the time period of the study [3].

A study conducted in Oregon Health and Science University (OHSU), Portland, OR, USA about retention of cardiopulmonary resuscitation skills in medical students utilizing a high-fidelity patient simulator showed decline in their performance in CPR rates and maneuvers. Some of medical students failed to do the process in a correct way base from the guidelines such as began CPR without first checking for a response, did not request a defibrillator, and an average of 35.9 (0.0, 100.7) seconds elapsed before CPR was initiated. This problem could be avoided by continuous utilization of simulation training into medical education thus could bridge the gap between theoretical knowledge and practice [4]. A related study conducted to determine the CPR knowledge and skill level of 83 third-year nursing students of the Department of Nursing in the Faculty of Health Sciences of Near East University in North Cyprus utilizing quasi- experimental design. The study revealed a deterioration of CPR skills in one month and six month after the training with a result of 18.4 out of 21, and 13.8 (p < 0.05) respectively. While the retention of CPR knowledge had a better result, 9.3 ± 2.9 out of 23 pre-test, increased to 17.0 ± 1.8 one month after the CPR lecture and decreased by two points back to 14.9 ± 3.8 after six months [5].

Based from the previous studies, after the initial CPR training, the CPR skills deteriorate its quality overtime most specially if not being practice [3-5] thus; there is a need of continuous CPR training by utilizing high fidelity manikins to simulate real scenario in the clinical settings [4]. High fidelity-simulated teaching helps the nursing interns to bridge the gap between theories and practice and to overcome the challenges of increasingly complex clinical practice settings. This is supported by a study in University of Western Australia to evaluate the medical intern students' acquisition and retention of resuscitation skills during and following a vertically integrated training program incorporating an Immediate Life Support course (ILS). It reinforces the CPR skills of the medical students until internship for a period of 6-9 months [6].

This study aims to evaluate the retention of CPR knowledge and skills among the nursing internship students utilizing the Saudi Heart Association (SHA)-BLS guidelines.

Statement of the problem

To examine and compare the retention of knowledge and skills of nursing internship students on cardiopulmonary resuscitation after 9 months of CPR training.

Objectives

- To identify the CPR knowledge, skills after training and 9 months post CPR training.
- To recognize the association between the knowledge, skills and the training exposure of CPR during internship.
- To find the correlation between the knowledge and skills of CPR at two stages.

Methods

One group Posttest time-series design was adopted to investigate student nurses' CPR knowledge and skills immediate after training and the internship period. CPR knowledge and skills of the participants were assessed immediately after the training and a retest was conducted after 9 months later to evaluate the retention of their CPR knowledge and skills. The students who were registered for the course of First and emergency considered for the study. The initial phase of study was started with recruitment of the study participants. The participants were explained with the purpose and confidentiality of the study. All the students were given lecture and demonstration of CPR during the course. The first post test was conducted after 2 weeks of training. The students were assessed

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for the knowledge and skills. The retest was conducted among the students during their internship period. Total of 26 students were retested for the knowledge and skills again after 9 months of gap. The difference between the after training test and re test after 9 months was computed by using the statistics. The retention level of knowledge and skills were identified.

Population/ Sampling

The respondents of the study were the final year male students who registered for the first aid emergency course. They were followed up for the re test during their internship program after 9 months of training. Total of 26 students were recruited randomly for the study.

Research instrument

The SHA CPR Performance Checklist was utilized to determine the skills of the students, consists of 10 items with a four-point scale rating with the Saudi heart association guidelines. The knowledge instrument will be composed of 20-item questions (Validated and pre tested) based on Saudi Heart Association guidelines to ascertain their knowledge about cardiopulmonary resuscitation.

Data gathering procedure

The research was approved by the research committee of the department. Official permission was obtained for the conduct of the study. The researchers included the final year male nursing students who are registered for the first aid and emergency course. The purpose of the study was explained to all the participants. Confidentiality was assured. Consent was taken. Knowledge and skills were assessed by the pretested questionnaire and checklist.

First phase

The students were given CPR training during the first aid and emergency course. After 2 weeks of gap knowledge and skills were assessed for the 1st post test by using and the questionnaire and check list. The students were given a scenario based assessment for performance of skills. The sessions were supervised by the same lecturers of the First Aid Emergency Nursing Clinical course, who are at the same time, certified providers of the Saudi Heart Association Basic Life Support.

Second phase

The second phase was started during their internship program. 2nd Posttest was conducted at the middle of the internship period (9 months gap from 1st post test). The students were re tested for their knowledge and skills of CPR. Formal permission was ob-

tained from the hospital for the data collection during the internship training during the hospital.

Results

Table 1 shows the significant difference between the knowledge scores immediate after training and internship period (after 9 months). Decreasing pattern of Mean scores was observed between the two stages. The mean score of knowledge was 17.15 (SD-2.5) obtained in the 1st post test immediately after training, and the Mean score was decreased to 13.23 (SD-4.25) in the 2nd re test after 9 months. These scores suggest that the knowledge score are not retained at the same level after 9 months. Significant difference between two stages on cardio pulmonary resuscitation was observed with $p < 0.001$. (t-8.011). Hence H01 is rejected.

Variables	Mean (SD)		Paired t Test Value
	After Training	Internship (After 9 months)	
	N=26	N=26	
Mean Knowledge scores	17.15	13.23	t= 8.0119
	SD-2.5	SD-4.25	p<0.001

Table 1 : Test after training and Internship period (after 9 months) scores: Cardiopulmonary resuscitation knowledge.

Table 2 shows the significant difference in cardio pulmonary resuscitation skills between the 1st test immediate after the training and the 2nd test after 9 month gap. The gap shows the decreasing skills in performing CPR. The 1st test shows the Mean score of 3.78 (SD - 0.18) for the 4points scale and 2nd test shows the mean score of 2.82 (SD - 0.28). The skills of chest compression and breathing are decreased more than other items on the check list. The efficiency of the Chest compression skills are deteriorating over time. The main observation was declining the quality of chest compressions. Hence H02 is rejected.

Variables	Mean (SD)		Paired t Test Value
	After Training	Internship (After 9 months)	
	N=26	N=26	
Mean Skills scores	3.78	2.82	T=19.04
	SD- 0.18	SD- 0.28	p<0.001

Table 2: Test after training and Internship period (after 9 months) scores: Cardiopulmonary resuscitation Skills.

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Participation/scores	Chi-square value χ^2
Knowledge and Training Exposure	- 7.583, df-1, p- 0.0059
Skills and Training Exposure	- 3.869 , df-1, p- 0. 0492

Table 3: Association between percentage score of students in knowledge & Skills of CPR and

Training exposure during internship.

The above table shows the significant association between the knowledge and participation in CPR information during the internship period. The students who attended some training like seminar, workshops, clinical teaching, bed side teaching and journals during internship training had higher level of knowledge scores than who did not. Among the students who participated the in training had scored higher than the students who did not attend to any kind of training on CPR. Among the 26 students, 13 students scored above 75% in the knowledge items. In that 10 students had some kind training on CPR during internship period.

In relation to skills, out of higher score achieved students majority of them had participated in the training programs related to CPR during their internship. There is a significant association between the skills on CPR and participation in training programs during internship period (χ^2 - 3.869, p- 0. 0492).

Table 4 shows the positive correlation between the knowledge and skills of CPR in both tests. However the correlation between the knowledge and skills were weaker in the immediate test after training (0.322) and re test during internship (0.162).

Variable	Correlation coefficient	P-Value*
Immediate test after training Knowledge – Skills	0.32	<0.01
Re test during internship Knowledge – Skills	0.16	<0.01

Table 4: Correlation between knowledge and skill scores on CPR. *Correlation significant at 0.01 level (2 tailed).

Figure 1 reports the specific information about the quality of chest compression rate and depth among the nursing students. The immediate posttest shows that all the students had achieved acceptable progress (62%) and competent (38%), the delayed posttest shows remarkable deterioration in CPR skills in chest compression and depth: Progress acceptable (46%), Need improvement (34.6%) and competent (19%).
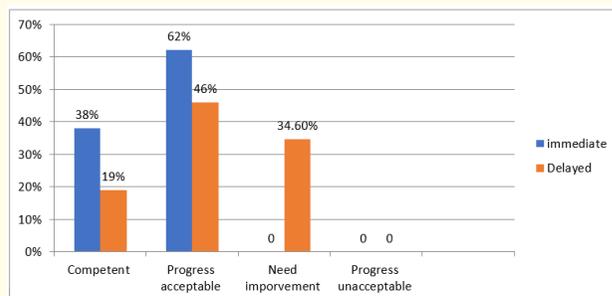

Figure 1: Percentage distribution of skills particularly Chest compression rate and depth.

Discussion

According to American heart association, 70 percent of out-of-hospital cardiac arrests happen in homes [7]. In that Only 46 percent of the people get immediate help before the arrival of the professional people. The retention of CPR knowledge and skills is a key factor in determining CPR competence. However, there are number of evidences to suggest that CPR knowledge and skills are poorly retained across populations [8,9]. The results of this study show that the knowledge and skills were deteriorated over time. The mean knowledge of the immediate pretest was 17.25 with SD of 2.5 and it was decreased to 13.23 SD - 4.25. Similarly the skills also decreased from test after training and retest during internship.

Similarly a study from Botswana also highlighted that the nurses' knowledge and skills improved after training of CPR, but deteriorated over the three months [10]. A study by Oermann., *et al*. 2011 also reports the significant deterioration in both CPR knowledge and psychomotor skills. This study also recommends frequent CPR training to improve CPR skill retention and performance to enhance CPR skills during in-hospital cardiac arrest [9]. Ackermann, A. (2007) studied the effectiveness of the Human Patient Simulation program in acquisition and retention of CPR skills. This study highlighted that the retention scores were higher in the experimental group [11]. Lorrel E Brown., *et al*. (2018) had identified the poor retention CPR skills among high school students. Much deteriora-

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tion observed among the high school students within 3 months [12].

This study also identified the influence of participation in training session on CPR knowledge and skills. Nurses knowledge and skills needs to be kept updated to improvement the survival rates during cardiac arrest events.

Recommendations

The researchers emphasized on the necessity of periodical training for the interns to continuously update them regarding CPR knowledge and skills. It is also recommended to utilize the high-fidelity manikin to mimic the real emergency scenario most specially in applying CPR. This will further enhance not only their knowledge and skills but also their confidence level in handling emergency scenarios. Similar study should be conducted in a bigger population to further validate the result of this study. This study also recommends for CPR training schedules for the interns, assessment of periodic training course schedules and collection of information regarding the nurses and students participatory role in the incidence of cardiac arrest in the clinical area.

Conclusion

Nursing interns' knowledge and skills in CPR deteriorated over time. Participation in training session or any related activities in CPR has a positive significant effect in their knowledge and skills compared to those who did not have any training session. Knowledge and skills regarding CPR had deteriorated overtime. Therefore, this study strongly suggests that the necessity of periodical training courses to strengthen the competency of the nursing interns and effectively react to emergency situations.

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