

The Effect of Applying Basic CPR Training by 2010 HA Guideline to Nursing Students

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Abstract

The purpose of the study is to assess the effect of basic CPR training by 2010 AHA guideline in nursing students in order to provide nursing students with the basic data on CPR training. The study features a pre-experiment that uses a before-after design in a single group. The study selected 102 nursing students who participated in training programs conducted in the CPR Center of the C University located in G City from Jan. - Sept. 2013. The study used a knowledge measurement tool that was modified by the researcher based on the 2010 AHA guideline and Park Jeong-mi's tool (2006), and the tools of Kang Kyung-hui (2004) and Park So-hyun (2002) were modified by the researcher and used for attitude measurement. For self-efficacy measurement, the study used a tool modified by Park Jeong-mi (2006), which modified the tools of Kang Kyung-hui (2004) and Schlesse, et al., (1995). The study used the SPSS WIN 19.0 program for data analysis to calculate technical statistics for general characteristics, CPR knowledge, attitude, and self-efficacy of participants, and conducted a paired t-test to verify differences in general characteristics, CPR knowledge, attitude, and self-efficacy, and a paired t-test to verify differences in CPR knowledge, attitude, and self-efficacy before and after training. For correlation analysis between CPR knowledge, attitude, and self-efficacy of study participants, the study used Pearson's correlation coefficients. The study showed that the basic CPR training for nursing students significantly improved knowledge, attitude, and self-efficacy in relation to CPR, and the correlation between the variable results suggests a net significant correlation between CPR attitude and self-efficacy only.

Keywords: *Cardiopulmonary resuscitation training, nursing student*

1. Introduction

For a recent decade in Korea, the number of death for heart disease has revealed an increasing trend, the death toll was 35.3 people per 100,000 population as of 2003 to 50.1 people in 2013[1]. The proper treatment of cardiac arrest and early CPR implementation can increase the survival rate of those suffering cardiac arrest by two to three [2]. CPR performance by nurses is extremely important because 49.6% of the first CPR performers in the event of an emergency within a hospital are nurses [3] However, 55.4% of new nurses have low CPR performance capabilities [4]

Approximately 98.9% of nursing students work in clinical areas after graduation [5] and thus it is highly likely that they may be the first responder in the event of an emergency. Before graduation, therefore, CPR training is necessary for students in order that they acquire the capabilities to respond rapidly and accurately [6].

According to previous research findings, factors that inhibit CPR performance include lack of knowledge and self-confidence and while there are reports [7] and [8] that it would be difficult to provide appropriate treatment in the event of cardiac arrest, there is

a close relation between self-efficacy and attitude when performing CPR with self-efficacy having the biggest influence on attitude formation that helps in the ability to perform CPR [9-11]. Hence, it is necessary to check the effect of CPR training on knowledge, attitude, and self-efficacy that are reported to be factors inhibiting the performance of CPR.

There have been many studies concerning the effect of CPR training on knowledge, attitude, and performance confidence [12], performance capability [13], knowledge and skills [14], knowledge, self-efficacy, and performance capability [15], knowledge, attitude, and self-efficacy [7] for nursing students; however, It is confirmed that there are differences in study results on the report of deterrent factors to implement CPR depending on researchers, such as lack of knowledge and self-confidence [7,8], attitude, and self-efficacy [9-11].

The purpose of the study is to verify changes and relationship in knowledge, attitude, and self-efficacy regarding the effect of CPR training for nursing students to provide a basic data to build skill-oriented CPR training programs for nursing students who will be the first witness to perform CPR in the clinical field.

1.1 Purposes

The purpose of the study is to assess changes in knowledge, attitude, and self-efficacy in relation to CPR training targeting nursing students and the relationship among these items in order to provide the basic data for the provision of technology-oriented CPR training programs for nursing students who will be the first responders and performers of CPR in the clinical field.

2. Method

The study is a pre-experiment that uses a before-after design in a single group to examine the effect of basic CPR training on knowledge, attitude, self-efficacy related to the basic CPR training of nursing students. The study selected 102 nursing students, through nine sessions by using convenient sampling, who participated in training programs conducted in the CPR Center of the C University located in G City from Jan. - Sept. 2013. The study used a tool modified by the researcher based on the 2010 AHA guideline and Park Jeong-mi's [12] tool to measure knowledge about CPR. The researcher modified the tools of Kang Kyung-hui [13] and Park So-hyun[14] and used them to measure attitude for CPR. To measure self-efficacy, the study used a specific self-efficacy tool among self-efficacy tools modified by Park Jeong-mi [12] based on the tools of Schlessel, *et al.*, [15] and Kang Kyung-hui [13]. The study used the SPSS WIN 19.0 program for data analysis to calculate technical statistics for general characteristics, CPR knowledge, attitude, and self-efficacy of participants, and conducted a t-test to verify differences in general characteristics, CPR knowledge, attitude, and self-efficacy, and a paired t-test to verify differences in CPR knowledge, attitude, and self-efficacy before and after training. For correlation analysis between CPR knowledge, attitude, and self-efficacy of study participants, the study used Pearson's correlation coefficients.

2.1 Research Process

The experimental treatment of the study has been drafted on Power Point based on the 2010 AHA (American Heart Association) guideline and provided training 30 minutes ahead of practical training, and was configured into two-hour theoretical and four-hour practical training in each session. Three or less students are allocated to one mannequin to watch and follow (Practice While Watch) videos produced by AHA and provided additional explanation and support when necessary. Two research assistant BLS providers

provided assistance during training and performed a post-survey using the same tool after CPR training

3. Result

The results of this study are as follows:

1. Prior knowledge of CPR training among participants showed a significant difference according to training experience ($t=2.131, p=.035$), while there was a significant difference in attitude according to grades ($t=-2.051, p=.045$), genders ($t=2.381, p=.019$), and training experience ($t=4.803, p<.000$), and a significant difference was revealed in terms of self-efficacy according to grades ($t=-2.781, p=.007$) and training experience ($t=3.461, p<.001$). That is, a group with training experience had greater knowledge related to CPR, while students in their fourth year had a higher score for attitude than second-year students, males students had a higher score for attitude than female students, and the group with training experience had a higher score for attitude than that of the no-training experience group; fourth-year students had a higher score for self-efficacy than second-year students and the group with training experience had a higher score for self-efficacy than that of the no-training experience group [Table 1].

2. The knowledge score of participants after CPR training was 14.66 points, significantly higher than the pre-training score of 9.01 points ($t=-23.324, p<.001$); the score for attitude was 25.75 points, which is significantly higher than the 19.21 point score before CPR training ($t=-20.371, p<.001$), and self-efficacy showed a significant increase from 63.73 to 95.01 before and after CPR training ($t=-14.943, p<.001$) [Table 2].

3. The CPR-related attitude and self-efficacy ($r=.263, p=.008$) of participants prior to CPR training revealed a weak correlation, and after training there was a moderate correlation in CPR-related attitude and self-efficacy ($r=.572, p<.001$) only [Table 3].

Table 1. Knowledge, Attitude and Self-efficacy by General Characteristics

Variables	Division	Knowledge		Attitude		Self-efficacy				
		M±SD	t	p	M±SD	t	p			
Grade	Sophomore	9.41±2.67	-0.342	.733	18.71±2.44	-2.051	.045	64.61±18.29	-2.781	.007
	Senior	9.73±2.43			20.54±4.70			76.94±15.22		
Gender	Male	8.92±3.86	-0.041	.967	20.93±3.24	2.381	.019	68.62±24.33	0.944	.349
	Female	9.01±2.26			18.92±3.11			62.93±21.30		
Religion	Yes	8.83±2.74	-0.733	.465	19.21±2.34	0.242	.813	66.80±20.70	1.832	.071
	No	9.21±2.23			19.01±4.22			58.81±22.81		
Cardiac disease	Yes	7.62±1.60	-1.582	.118	19.32±4.06	0.094	.932	49.42±34.09	-1.972	.051
	No	9.12±2.57			19.24±3.15			65.01±20.16		
Witness of fallen patient	Yes	8.73±2.94	-0.493	.628	20.23±2.93	1.412	.162	69.82±19.69	1.213	.229
	No	9.01±2.46			19.01±3.23			62.63±22.02		
Experience of CPR education	Yes	9.62±2.53	2.131	.035	20.92±3.97	4.803	<.001	72.51±19.78	3.461	<.001
	No	8.64±2.46			18.13±1.94			58.12±21.18		

Table 2. Comparison of Knowledge, Attitude and Self-efficacy between Pretest and Posttest (N=102)

Variables	Pre-test	Post-test	t	p
	M±SD	M±SD		
Knowledge	9.01±2.53	14.66±1.98	-23.324	<.001
Attitude	19.21±3.21	25.75±2.00	-20.371	<.001
Self-efficacy	63.73±21.73	95.01±14.07	-14.943	<.001

Table 3. Correlations among Knowledge, Attitude and Self-efficacy at Pretest and Posttest (N=102)

Variables	Pre				Post			
	Attitude		Self-efficacy		Attitude		Self-efficacy	
	r	p	r	p	r	p	r	p
Knowledge	.134	.181	.152	.127	-.090	.370	-.155	.121
Attitude			.263	.008			.572	<.001

4. Discussion

The study aims to confirm the effect of basic CPR training on knowledge, attitude, and self-efficacy targeting nursing students.

The average knowledge point of the target prior to the training was 9.01 points, which is 45.05 points when converted it into 100 points; while using a different tool, the points of the target showed a slightly higher points than that of students of the health department at 41.00 points [16], nursing students at 43.50 points [7] when converted the points into 100 points, there were a significant difference when compared with female nursing students at 72.35 points[17], nursing students at 64.50 points [18], 63.00 points [19], 43.50 points [20], students of early childhood education at 69.26 points [21], and nurses at 66.30 points [22]. When compared with students of early childhood education at 69.26 points, the target grouped showed significantly lower points, suggesting the urgent need of CPR training for nursing students.

The attitude point of the target group prior to training was 19.21 points, which is 68.61 points when converted it into 100 points. However, since there is no study that measured points using the same tool making it difficult to conduct a direct point comparison. While the target group showed higher points than that of students of early childhood education at 63.00 points [21] when converted the points into 100 points although used a different tool, there was a significant difference with female nursing students at 74.80 points [17] and nursing students at 75.81 points [7], but lower points than that of elementary and middle school teachers [10] at 75.71 points. This is due to higher positive attitude points for CPR because there are more health teachers (52%) in the teacher group. The target group's lower attitude points than that of students of health department at 71.98 points [16] including students of dental hygiene, although similar to nursing students at 69.62 points [20] suggests the more need of training to foster positive attitudes for CPR of nursing students.

The self-efficacy points of the target group prior to training were 63.73 points, which is 53.11 points when converted it into 100 points; the point is lower than that of the elementary and middle school students at 67.5 points (56.25 points when converted into 100

points) [10] conducted by Choi using the same tool, nursing students at 67.73 points (56.44 points when converted into 100 points) [7] by Oh, the nursing students at 65.80 points (54.83 points when converted into 100 points) [18] by Lee. Although used a different tool, the target group's point was lower than students of early childhood education at 66.85 points [21] when converted it into 100 points. While a precise comparison is not feasible due to different measuring tools, the study confirmed the necessity of the training for nursing students, rather than students of early childhood education, to improve their self-efficacy.

The CPR-related knowledge of the study has a significant difference only in CPR training experience ($t=2.131, p=.035$). Therefore, a group with training experience showed higher basic CPR-related knowledge than that of a group without such an experience, showing consistency with the study result [10] of a significant difference depending on training experience. Whereas, there was a difference in the result [23] which was not significant in training experience. The result may be due to the difference in study targets where 85.3% of the target group of the study was female, 72.6% of the target of Moon and Park were male and 82% of them had no training experience.

The study showed a significant difference in attitude at grade level ($t=-2.051, p=.045$), gender ($t=2.381, p=.019$), and training experience ($t=4.803, p<.001$). Senior students had higher attitude points than that of sophomores and in terms of gender, men had higher attitude points than women and groups with training experience than a group without experience. The result of the significantly higher attitude points of male students than that of female students was consistent to the result [23] of the significantly higher attitude points of male students in different gender targeting high school students and college soccer players of a study conducted by Moon and Park. The study result that showed a significantly higher attitude points among one with training experience than one without was consistent with the results of Moon and Park, Chun, Park and Park, and Choi [10, 23, 24]. While Choi's study result showed no [10] significant difference in terms of gender, a slightly higher average points of women was because women accounted for 86.7% of the gender ratio of the teacher group. While the ratio of male students were 14.7% [20] smaller than that of female students in the study, it shows a difference in that it demonstrates a significantly higher points in the positive attitude.

In the study, self-efficacy showed a significant difference in grades ($t=-2.781, p=.007$) and training experience ($t=-3.461, p=.001$), where senior students and a group with training experience showed a significantly higher self-efficacy than that of sophomore students and a group without training experience. The result is believed to be due to improved self-efficacy for CPR implementation as a group with training experience and senior students had accumulated major knowledge and education experience. The study result is consistent with the results of Chun, Park and Park, and Choi [10, 24] which demonstrated higher self-efficacy among students with CPR training experience than that of one without.

Knowledge points for the basic CPR training improved significantly from 9.01 points prior to training to 14.66 points after training out of perfect 20 points. Although a different tool was used, the finding is consistent with the study results of nursing students [7, 17-20], students [21], students of health department [16], nurse [22], the general public [25] that showed improvement in knowledge after CPR training compared with one before, suggesting that the basic CPR training is effective for knowledge improvement.

Attitude points for the basic CPR had a significant improvement from 19.21 before training to 25.75 after training. While a measuring tool was a slightly different, the study result was consistent with other research findings demonstrating improved attitude points, such as nursing students [7,17,20], students [21], students of health department [16], the general public [25], and elementary and middle school teachers [10], where it was confirmed that the CPR training forms positive attitude.

The self-efficacy points for the basic CPR showed a significant different from 63.73 points before training to 95.01 points after training. Therefore, the study result is consistent with the research result [10] targeting elementary and middle school teachers by Choi and Oh's report [7] targeting nursing students whose self-efficacy points have improved after training. The increase of self-efficacy of the study's target was lower than the study result of Choi and it is believed that this is due to higher self-efficacy of elementary and middle school teachers, which includes health teachers, as they have more training opportunities. Although a different tool is used, there was a significant difference before/after training in the result of nursing students [19], students [21], and teachers [26], other studies with improved self-efficacy points, suggesting the effectiveness of the basic CPR training on self-efficacy improvement.

CPR-related attitude and self-efficacy before CPR training were shown as a positive correlation ($r=.263$ $p=.008$). In Choi's study, knowledge and attitude ($r=.54$ $p<.001$), knowledge and self-efficacy ($r=.38$ $p=.001$) was a moderate correlation, while attitude and self-efficacy were a high positive correlation, suggesting a closer correlation [10] of self-efficacy with attitude than that of knowledge that enables CPR implementation. To foster high confidence for nursing students in CPR implementation, it is confirmed that more expansion of practical CPR training is required. Also, the study showed a moderate positive correlation ($r=.572$ $p<.001$) in attitude and self-efficacy after the basic CPR training, which is consistent with the result [10] that shows a high positive correlation ($r=.63$ $p<.001$) of attitude and self-efficacy after CPR training in Choi's study, suggesting the higher the self-efficacy about CPR, the higher formation of a positive attitude for CPR.

The study has confirmed the effect of the basic CPR training on CPR-related knowledge, attitude, and self-efficacy targeting nursing students. As a result, it is confirmed that CPR training improves nursing students' self-efficacy for knowledge, attitude, and implementation for CPR. CPR-related attitude showed a positive correlation with self-efficacy than that of knowledge, suggesting the need of training programs in order to foster a positive attitude through self-efficacy improvement during CPR training.

5. Conclusions

According to the results, the basic CPR-related knowledge ($t=2.131$, $p=.035$), attitude ($t=4.803$, $p<.001$), and self-efficacy ($t=3.461$, $p<.001$) of the study participant group with training experience was significantly higher compared to the group without training. After the basic CPR training is provided, the participants showed a significant improvement in CPR-related knowledge ($t=-23.324$, $p<.001$), attitude ($t=-20.371$, $p<.001$), and self-efficacy ($t=-14.943$, $p<.001$) than before training; therefore, the study confirmed the effectiveness of the basic CPR training. The correlation between variables showed a positive correlation ($r=.572$, $p<.001$) in CPR-related attitude and self-efficacy. Since the basic CPR training for nursing students is effective in improving CPR knowledge, attitude, and self-efficacy and there is a significant net relation between self-efficacy and attitude, appropriate education programs should be developed for the formation of a positive attitude by enhancing self-efficacy.

The limitation of the study is the generalization of the study result because the study is designed as one group pre-post test targeting nursing students. The study confirmed that in order to enhance implementation capability of the basic CPR training, CPR-related attitude, rather than CPR-related knowledge, has a closer relation with self-efficacy. Therefore, to form attitude that can implement CPR, training programs for improving self-efficacy should be developed and that the study's confirmation of the need of such application will be beneficial basic data in planning training courses targeting nursing students.

The following is proposed based on the study result:

First, repeated measurement is necessary for efficacy of basic CPR training programs based on the expansion of study targets

Second, repeated research is necessary for effective program development and program efficiency for improving CPR implementation capabilities.

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