

# A Study of the Knowledge Level of Infant CPR of Nursing Students

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## Abstract

**Objectives:** This study was attempted to improve the problems in proceeding with the class of infant CPR in the curriculum of nursing science and to provide the basic data of the effective CPR education by identifying the knowledge level of infant CPR of nursing students. **Methods/Statistical Analysis:** The subjects of this study were the students of department of nursing science of 3 universities located in cities of C and K. The data was collected from Sep 1, 2015 to Oct 30, 2015. The data collection method was a self-report questionnaire one. The general characteristics of the subjects were indicated with real number and percentage using SPSS/WIN 21 program for the collected data. The knowledge level of infant CPR of nursing students was analyzed with average and standard deviation, and the difference in the knowledge of infant CPR according to the general characteristics of nursing students was done with T-test. **Findings:** This study result, there was a statistically significant difference in education experience ( $p=.001$ ) and certificates ( $p=.001$ ). **Improvements/Applications:** It is considered that it must be performed through a more planned program in order to improve the attitude and performance ability of infant CPR of students. And it is necessary to introduce the repetitive and regular curriculum on the infant CPR to nursing students.

**Keywords:** Cardiopulmonary Resuscitation, Infant, Knowledge, Nursing Student

## 1. Introduction

If a nurse discovers a cardiac arrest patient at a hospital, he or she has a duty to do emergency treatment by starting CPR at once and make advanced cardiac life support done within a fast time<sup>1</sup>. In Korea, as the role of nurses for CPR is not clearly defined, there have been many cases where nurses can't make important treatment when they respond initially<sup>2</sup>, and it was insisted that the implementation rate of CPR by a nurse is low because of the recognition that treatment like direct chest compression and the use of a defibrillator must be conducted by a doctor and because of the lack of confidence of the nurses on CPR<sup>3</sup>. However, according to<sup>4</sup>, when a cardiac arrest occurs in U.S.A., a nurse conducts CPR to a patient and when necessary, performs defibrillation and even initial medication treatment according to the prescription. Also,<sup>5</sup> insisted that though the nursing practice has been limited to the measurement of vital signs of a patient and medication

while conducting a traditional CPR, a nurse should perceive a cardiac arrest or an emergency situation during CPR, activate CPR team, and implement CPR now, and that when necessary, he or she should implement defibrillation, participate in the decision making of a CPR team, and perform various roles such as intravenous route access for medication, blood collection, proper medication, and response to caretakers. As many nurses who work at a hospital are in the position of taking care of the patient nearby, they are more likely to be the first people who discover the situation of a cardiac arrest<sup>6,7</sup>. The nurses, the first witnesses, must implement CPR to cardiac arrest patients at once, and the immediate implementation of CPR by the first witness is very important in enhancing the survival rate by raising the circulation recovery rate<sup>8</sup>. One of the important points in child care is that a nursing care should be provided considering the individuality according to the each stage of development as well as the disease of children from newborns to adolescence and

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that the subjects have situational characteristics including their family as well as children. Also, an infant cardiac arrest happens more frequently by respiratory arrest, not by the heart and in the case of infant CPR, it requires a different method from adult CPR. Therefore, pediatric ward nurses who should take care of children must have the knowledge of infant CPR, such as in the case of chest compression, after gathering a thumb and a middle finger or a middle finger and a ring finger, place the part of the first joint on the sternal area of an infant, and press it 30 times strongly and fast with a speed of over 100 times a minute and to a depth of about 4 cm (1/2~1/3 of the diameter of the front and the rear of chest). However, in most of medical institutions, only as adult CPR education is being done and infant CPR education is done as an irregular and limited type of education only to the pediatric ward nurses, it is necessary to try to improve that. As the knowledge and technological performance ability of infant CPR acquired while in a university affects the confidence and attitude on emergency treatment of infants in the emergency situation as well as at a workplace after they become nurses after graduation<sup>3</sup>, it is necessary to prepare them from the curriculum so that they may cultivate education experience and a positive attitude of infant CPR. At present, there is no compulsory regulations for CPR education except for medical fields, and the education conducted in a curriculum of nursing science in the universities of Korea is being done among themselves, because there is no standard of education on the optimal class hours, term to be completed, and the effective teaching-learning method of theory and practice in the subjects of basic nursing science or adult nursing science. Therefore, this study was attempted to improve the problems in proceeding with the class of infant CPR in the curriculum of nursing science and to provide the basic data of the effective CPR education by identifying the knowledge level of infant CPR of nursing students.

## 2. Methods

### 2.1 Study Subjects and Data Collection Methods

After acquiring the approval from Institutional Review Board (IRB) of the research institute (PO1-201506-22-005), the purpose and methods of the study were explained to the study subjects and it was conducted with a written consent received. The subjects of this study were the

students of department of nursing science of 3 universities located in cities of C and K. The data was collected from Sep 1, 2015 to Oct 30, 2015. The data collection method was a self-report questionnaire one. The purpose and intent of the study were explained to the subjects and the agreement of participation was asked for. By distributing the questionnaires, the subjects were made to fulfill them. It took about 10 minutes for the survey. As for the calculation of the number of survey subjects, 138 people were calculated with effect size (0.12), significance level (0.05), and power of test (1- $\beta$ )(0.90) using G\*Power 3.1 program. In this study, expecting dropouts, a total of 160 copies of questionnaire were distributed and 154 copies of them were collected. Except for insincere 3 copies, a total of 151 copies (98.7%) were used for analysis.

### 2.2 Study Tools

In this study, the tool developed by<sup>9</sup> based on the revised items of "2011 Korea Cardiopulmonary Resuscitation Guideline" was used as measurement tool of knowledge of infant CPR. Given the cases that answers are given en bloc, the rate between the items of correct answers and those of no correct answers was made 14:4, and the tool was composed of a total of 18 items. As for tool measurement, 'right' was 1 point, and 'wrong' or 'don't know' was 0 point, and therefore it means that the higher the score is, the higher the knowledge is. The reliability of measurement tool of the knowledge of infant CPR was that Cronbach's  $\alpha = .85$  at the time of development of the tool and that it was Cronbach's  $\alpha = .83$  in this study.

### 2.3 Data Analysis Methods

The general characteristics of the subjects were indicated with real number and percentage using SPSS/WIN 21 program for the collected data. The knowledge level of infant CPR of nursing students was analyzed with average and standard deviation, and the difference in the knowledge of infant CPR according to the general characteristics of nursing students was done with T-test.

## 3. Study Results

### 3.1 The General Characteristics of the Subjects

As for the general characteristics of the subjects, most of them were 134 female nursing students (88.7%). In

religion, there were 45 Christians (29.8%) and 78 other religion believers (5.17%). In the experience of CPR education, the subjects who received it were 115 people (76.2%) and those who had a certificate related with CPR were 104 people (68.9%) (Table 1).

**Table 1.** General Characteristics of the Subjects

Variables	Characteristics	Frequency	Percent
Gender	Male	17	11.3
	Female	134	88.7
Religion	Christian	45	29.8
	Catholic	12	7.9
	Buddhism	16	10.6
	other	78	51.7
Education	Yes	115	76.2
Experience	No	36	23.8
Certificate	Yes	104	68.9
	No	47	31.1

### 3.2 Knowledge of Infant CPR of Nursing Students

The knowledge level of infant CPR of nursing students is like Table 2. It was GPA  $0.59 \pm 0.40$  out of a perfect score (1 point). Examined by items, they are as follows: 'Observe whether the breast of the infant rises or not, and moves or not when conducting artificial breathing ( $0.86 \pm 0.4$ )', 'CPR can be stopped when the infant breathes for himself or herself or his or her movement is obvious while CPR is continued ( $0.81 \pm 0.44$ )', which was high, 'Unless breath and pulse don't return after they are reassessed, CPR of 4 cycles is conducted repeatedly across 1 min ( $0.32 \pm 0.44$ )' and 'Conduct artificial respiration twice after identifying whether the pulse of a patient is touched or not' ( $0.32 \pm 0.38$ ), which was low.

### 3.3 General Characteristics of Nursing Students and Difference in Knowledge of infant CPR of Them

The results which analyzed the difference in the knowledge level of infant CPR according to the general characteristics of the subjects are like Table 3. There was a statistically significant difference in education experience ( $p=.001$ ) and certificates ( $p=.001$ ).

## 4. Discussion

This study was attempted to provide a basic data of effective and efficient education of infant CPR by analyzing the difference between the knowledge level of infant CPR and the general characteristics of nursing students. Although the fast performance of CPR is absolutely important, that of CPR by nurses whose accessibility to the patient is best is relatively rare. The percentage of the nurses who performed CPR in person was only 22.6% of the ones who discovered cardiac arrest patients. The reason is that there is recognition that CPR is the role of doctors (18.6%) and that there is insufficient legal protection when problems happen (14.8%)<sup>3</sup>. It is said that CPR is delayed for 2 ~ 3 minutes as the nurses wait for doctors, not performing it<sup>2</sup>. In addition, according to the study results which identified the meaning of CPR to nurses, with the embarrassment and nervousness as well as worthiness and greatness they feel after CPR, they feel the responsibility and heartache on the results and impediments after CPR. The meaning of these negative experiences can work as obstacles when nurses perform CPR in person at once. In this context, in the case of an infant cardiac arrest, these obstacles can work largely when nurses perform CPR. Furthermore, in the case of infants, as there is less frequency in the cardiac arrest of them than that of the adult patients, the nurses have fewer chances to encounter an infant cardiac arrest, so that embarrassment and tension, and the responsibility and heartache on the result of CPR may work more largely. Therefore, it is more necessary to have a program of repetitive, regular infant CPR education focusing on practice. Especially, when an infant cardiac arrest happens in the local community as well as in the clinic, if nurses and nursing students volunteer to perform infant CPR positively, the safety net of a community can be more strengthened. The reason is that there is more frequency of occurrence of patients with cardiac arrest in the local community than that of an infant cardiac arrest in the clinics, such as a hospital, etc. Recently, in Seoul city, visiting nurses service started from 950 daycare centers in 2012 and expanded to 2000 ones in 2015<sup>10</sup>. Therefore, the opportunities of providing the education of infant CPR to nursing teachers and school parents got increased and the accessibility to cardiac arrest infant patients is getting higher along with it. Therefore, Korea in a situation where it is much required to enhance

**Table 2.** Knowledge of Infant CPR of Nursing Students

Items	GPA ±Standard Deviation
1. An infant cardiac arrest happens more frequently by respiratory arrest, not by the heart.	0.59 ±0.47
2. The reason that a respiratory arrest leads to a cardiac arrest is that the oxygen is not provided to the heart muscle sufficiently due to respiratory arrest.	0.80±0.40
3. When cardiac arrest infant patients are discovered, ask other medical teams for the help first and identify whether they are conscious or not.	0.53 ±0.50
4. The method of identifying consciousness is to identify consciousness and breathing, tapping the sole of the infant after putting the infant down on his or her back.	0.70 ±0.28
5. Check the pulse from brachial (body of humerus) artery within 5sec ~ 10secs.	0.49 ±0.32
6. The position to press is the area immediately below the center, a line which connects the part of both nipples.	0.71 ±0.50
7. After gathering a thumb and a middle finger or a middle finger and a ring finger, place the part of the first joint on the sterna (sternum) area.	0.72 ±0.32
8. The fingers of an operator must be vertical to the part which the breast bone (sternum) of a patient meets.	0.76 ±0.46
9. Press 30times strongly and fast with a speed of over 100times a minute and to a depth of about 4cm depth (1/2 ~ 1/3 of the diameter of the front and the rear of chest).	0.61 ±0.46
10. When spinal injuries are doubted and the patient is placed in a spine position, head fixation is important and a patient is placed in an exact, neutral position-spine position.	0.69 ±0.15
11. Lift the chin with a hand to the extent that ears and floor are in parallel (Neutral Position), and tilt the head back with the other hand.	0.65 ±0.38
12. In the case of infants, as the airway may be blocked if the chin is lifted high, it must be lifted to the extent that ears and floor are in parallel each other.	0.53 ±0.48
13. Conduct artificial respiration twice after identifying whether the pulse of the patient is touched or not.	0.32 ±0.38
14. Block the mouth and nose of the infant at once, and conduct artificial respiration twice.	0.57 ±0.44
15. Observe whether the breast of the infant rises or not, and moves or not when conducting artificial breathing.	0.86 ±0.46
16. The rate of chest compression vs artificial breathing must be 30:2 when the rescuer is 1 person or 2 persons. (1 Cycle)	0.53 ±0.38
17. Unless breath and pulse don't return after they are reassessed, CPR of 4 cycles is conducted repeatedly across 1 min.	0.32 ±0.44
18. CPR can be stopped when the infant breathes for himself or herself or his or her movement is obvious while CPR is continued.	0.81 ±0.44

the performance ability of infant CPR by enhancing the knowledge of infant CPR of nurses and strengthening the positive attitude including the confidence of them. Therefore, it is necessary to enhance the knowledge of nursing students, the nurses of the future, and given that the attitude and reaction including the emotional aspects, it is more effective to foster the positive attitude on infant CPR from nursing students before becoming nurses. In this study, the knowledge score of infant CPR was  $0.59 \pm 0.40$  points. As there are no previous studies which measured infant CPR for nursing students, it is difficult to have a direct comparison with them, however, in a study

of Korea, it was reported that the knowledge score of CPR of nursing students was noticeably low, that is, 4.6 points (51 points out of a perfect score(100 points))<sup>11</sup>, which suggests that the study has even fewer items(9 items) than other studies. Also, as the different tools were used in the studies, there is a limit in a direct comparison. A nurse who must perform CPR at once when cardiac arrest infant patients are in emergency has a low knowledge score, where it can be inferred that the reason is there is a few opportunities to meet CPR infant patients, and CPR is performed immediately by doctors in the clinics. However, as the faster performance time of CPR is, the

more dramatically the recovery rate increases, and as the emergency situation may happen at any time, it is essential to have a regular repeated studying to complement that. In this study, the knowledge of infant CPR showed a statistically significant difference with education and a certificate. As there are no previous studies, it is difficult to make a direct comparison with them. However, considering the results in the studies of 12 that the higher the knowledge is, the higher the performance ability is, it can be known that knowledge education for enhancing the performance ability of CPR is very important, too. There is a significant difference in the knowledge of infant CPR along with whether a certificate is possessed or not. As the education of infant CPR which nursing students receive now is one-time or irregular one, it may help in acquiring short-term knowledge or in improving performance ability, however, it is considered that it must be performed through a more planned program in order to improve the attitude and performance ability of infant CPR of students.

**Table 3.** Differences in Knowledge according to General Characteristics

Variable	Characteristics	Knowledge	t / F
		M ?SD	
Gender	Male	10.88?5.57	3.018
	Female	11.33?0.07	(.004)
Religion	Christian	11.13?4.42	1.225
	Catholic	12.67?2.23	(.303)
	Buddhism	12.13?1.13	
	other	10.97?1.31	
Education experience	Yes	12.03?2.20	7.378
	No	8.86?4.45	(<.001)
Certification	Yes	12.30?2.24	7.941
	No	9.09?1.37	(<.001)

\*p<.05, \*\* p<.01

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