ISSN (Print) : 0974-6846
Indian Journal of Science and Technology, *Vol 9(41), DOI: 10.17485/ijst/2016/v9i41/103853, November 2016* ISSN (Online) : 0974-5645

Knowledge of Infant Cardiopulmonary Resuscitation of Pediatric Ward Nurses

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Abstract

Objectives: This study was attempted to provide the basic data of the effective Cardio-Pulmonary Resuscitation (CPR) education by identifying the level of knowledge of infant CPR of pediatric ward nurses. This study is a descriptive survey conducted to grasp the knowledge of infant CPR for pediatric ward nurses. **Methods/Statistical Analysis:** This study was implemented for 132 nurses who worked at the pediatric ward of 3 university hospitals and general hospitals of over 300 sickbeds located in Gyeonggi-do Province. The collected data was processed using 'SPSS' program. The general characteristics of the subjects were analyzed with real number and percentage, the knowledge level of infant CPR of nurses was done with average and standard deviation, and the difference in the knowledge of infant CPR according to the general characteristics was done with T-test. **Findings:** There was a statistically significant difference in age (p=.004), position (p=.002), service period (p=.008), education experience (p=.50), and a certificate (p=.001). **Improvements/Applications:** As a result, to maintain the wellbeing of the subjects by enhancing the performance ability of infant CPR, the periodic education which can enhance the knowledge of infant CPR of pediatric ward nurses is necessary.

Keywords: Cardiopulmonary Resuscitation, Infant, Knowledge, Nurse, Pediatric Ward

1. Introduction

Cardio-Pulmonary Resuscitation (CPR) is a series of process which helps circulate blood artificially, delay the damage of the brain by helping breathing, and make the heart recover from paralysis state[1]. The principle of CPR is to provide oxygen by helping breathing and metabolism with artificial respiration and to help blood circulation by giving pressure to a ventricle with chest compression. The purpose of CPR is to minimize the damage of tissue and maximize its function by providing oxygen and blood to essential organs such as brain, heart, etc during cardiopulmonary arrest[2]. A nurse at a hospital has a duty to do emergency treatment by starting CPR and make advanced cardiac life support done as soon as he or she discovers the cardiac arrest patient[3]. 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[4] and the study of[5] indicated that the implementation rate of CPR 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. However, according to[6] when cardiac arrest occurs in U.S.A., a nurse conducts CPR to a patient and if necessary, performs defibrillation and even medication treatment initially according to the prescription. Also, In[7] 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 until now, a nurse should perceive cardiac arrest or emergency during CPR, activate CPR team, and implement CPR recently, and that if necessary, a nurse 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

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in the position of taking care of the patient nearby, they are more likely to be the first people who discover the situation of cardiac arrest[8,9]. The nurses, who are the first witnesses to the cardiac arrest patients, must implement CPR to them 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[10]. One of the important points in child care is that a nursing care must be provided considering the individuality according to the each stage of development as well as the disease of children from newborns to adolescence and that the subjects have situational characteristics including their family as well as children. Also, pediatric ward nurses must have the knowledge of infant CPR like the followings: Infant cardiac arrest in a pediatric ward happens more frequently by respiratory arrest, not by the heart. For infants, CPR must not be conducted the same as for adults, 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 sterna area, and press it 30times strongly and fast with a speed of over 100times a minute and to a depth of about 4cm (1/2~1/3 of the diameter of the front and the rear of chest[1]. However, in most of medical institutions, only the basic CPR is taught while educating CPR, and there is no education of CPR for pediatric ward nurses. Examining the studies conducted on the nurses in relation to CPR, they are as follows: the study of[11] which identified the knowledge of CPR and performance ability of nurses, that[12] which analyzed the attitude of basic CPR of hospital nurses and influence factors, that of[5], which investigated the knowledge of CPR, attitude and education experience of some general ward nurses, that of[13] which examined the knowledge of CPR, performance ability and actual level of performance of nursing officers, and as foreign studies, there are the study of[14] which estimated the knowledge of basic CPR of only hospital nurses, and that of[15] which analyzed the effect of the continuous education of basic CPR and advanced cardiac life support on the knowledge of professional nurses. However, in fact, there are no previous studies which have examined the knowledge of infant CPR for pediatric ward nurses. Therefore, this study was attempted to provide the basic data of the effective CPR education by identifying the level of knowledge of infant CPR of pediatric ward nurses.

2. Methods

2.1 Study Subjects and Data Collection Methods

This study was implemented for 132 nurses who worked at the pediatric ward of 3 university hospitals and general hospitals of over 300 sickbeds located in Gyeonggi-do Province. When effect size was 0.12, significance level was 0.05, and power of test (1-β) was 0.90 using G*Power 3.1 program, the number of the subjects was 108 nurses. Based on it, given drop-out rate, 152 copies of questionnaires were distributed and collected on the spot. Except for insincere 29 copies, a total of 129 copies were used for analysis in the end, and the collection rate was 80.9%. These subjects of this study were the nurses who had worked at the pediatric ward over 3 months. The reason that working career at a pediatric ward was limited to over 3months was that it was considered that the course of preceptor-precept education of new nurses takes from 1month minimum to 3 months maximum after they enter the hospital. As for data collection methods, the study purpose was explained to head of the nursing first, and received permission. And then, after requesting the cooperation to the head nurse of the relevant pediatric ward, the questionnaires were distributed to the subjects of the study and the study purpose was explained to them by the researcher herself. It was explained through an explanatory note that only those who agreed the survey might participate in it voluntarily, and could withdraw from the participation at any time, and even when they withdraw from it, there would be no harm and disadvantage to them. After getting the signs for agreement only from those who voluntarily agreed the survey, cautions and how to respond were explained, and then the survey was implemented. It took about 20~30 minutes to fill out the questionnaires, and after they were filled out, the researcher collected them at once. The data was collected from Nov 1, 2015 to Nov 30, 2015.

2.2 Study Tools

In this study, measurement tools of Infant CPR knowledge was developed by this researcher based on the revised items of "2011 Korea Cardiopulmonary Resuscitation Guideline". As for the process of tool development,

first, 18 items where a researcher asks the contents, principle and implementation method of infant CPR were developed. With the developed tool, the validity of professionals was surveyed by 4 professors of department of emergency medical service and that of nursing who majored in pediatric nursing, and given the exactness of the meaning, the items were revised. Second, reliability verification was obtained from 2 emergency physicians and 2 pediatricians who worked at a university hospital in D city. During reliability verification, the items which didn't correspond to the answer of the 4 professionals were revised and complemented in vocabulary and terms. With the written tool, a preliminary study was conducted for 10 pediatric ward nurses who worked at the general hospital in C city from May 15, to May 20.In the part of the preliminary study, though there were no items themselves which couldn't be understood, given the process of CPR, arranging the sequence of questions orderly, the final tool was completed. Given the cases that answers are given en bloc, the rate between the items of correct answers and those of no correct answers was 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.

2.3 Data Analysis Methods

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

3. Study Results

3.1 The General Characteristics of the Subjects

As for the general characteristics of the subjects, there were 42 people under 24 years old (32.6%) and 42 people of 25~ 29years old (32.6%) by age, and there were 123 females (95.3%) by sex, who made up the majority of the subjects. In the question of position, there were 105 staff nurses (79.5), and there were 84 nurses (65.1%) who answered 1~ 5 years for the question of career (year), which was highest. In the question of CPR experience, there were 123 nurses (93.2%) who said 'none', in the question of CPR education experience, there were 69 nurses (52.3%) who said 'yes' and 60 nurses (47.7%) who said 'no'. In the question of whether they had a certificate in relation to CPR, there were 60 nurses(47.7%) who said 'yes' and 69 nurses (52.3%) who said 'no' (Table 1).

Table 1. General Characteristics of the Subjects

		Frequency	Percept
Age(yr)	≤24	42	32.6
	25-29	42	32.6
	30-39	39	30.2
	≥40	6	4.7
Sex	Male	6	4.7
	Female	123	95.3
Religion	Yes	63	48.9
	No	66	51.1
Position	Staff Nurse	105	79.5
	Charge Nurse	15	11.4
	Head Nurse or Chief Nurse	9	9.1
Career (year)	<1	3	2.3
	1-5	84	65.1
	6-10	24	18.6
	≥11	18	14.0
CPR Experience	Yes	6	4.8
	No	123	95.2
Education Experience	Yes	69	52.3
	No	60	47.7
Certificate	Yes	60	47.7
	No	69	52.3

3.2 Knowledge of Infant CPR of Pediatric Ward Nurses

The knowledge level of infant CPR of pediatric ward nurses is like Table 2. The knowledge level was GPA 0.71 ± 0.40 out of a perfect score (1 point). Examined by items, they are as follows: 'if spinal injuries are doubted and when a patient is placed in a spine position, head fixation is important and the patient is placed in an exact, neutral position-spine position (0.98 ± 0.15). 'The pulse is checked within 5 ~ 10sec from the brachial artery (0.89 ± 0.32), which was high. 'Unless breath and pulse

Table 2. Knowledge of Infant CPR of Pediatric Ward Nurses

Items		GPA ± Standard Deviation
1.	Infant cardiac arrest happens more frequently by respiratory arrest, not by the heart.	0.33 ?0.47
2.	The reason that respiratory arrest leads to cardiac arrest is that due to respiratory arrest, the oxygen is not provided to the heart muscle sufficiently.	0.80 ?0.40
3.	When cardiac arrest patient infant is discovered, ask other medical teams for the help first and identify whether he or she is conscious or not.	0.55 ?0.50
4.	The method of identifying consciousness is to identify consciousness and breathing, tapping the sole of the infant after putting the baby down on his or her back.	0.92 ?0.28
5.	Check the pulse from brachial(body of hummers)artery within 5sec ~ 10sec.	0.89 ?0.32
6.	The position to press is the area immediately below the center, a line which connects the part of both nipples.	0.53 ?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.	0.88 ?0.32
8.	The fingers of an operator must be vertical to the part which the breast bone (sternum) of a patient meets.	0.70 ?0.46
9.	Press 30 times 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).	0.71 ?0.46
10.	When spinal injuries are doubted and a patient is placed in a spine position, head fixation is important and a patient is placed in an exact, neutral position-spine position (0.98 ?0.15).	0.98 ?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.	0.83 ?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.	0.65 ?0.48
13.	Conduct artificial respiration twice after identifying whether the pulse of a patient is touched or not.	0.83 ?0.38
14.	Block the mouth and nose of the infant at once, and conduct artificial respiration twice.	0.74 ?0.44
15.	Observe whether the breast of the infant rises or not, and moves or not when conducting artificial breathing.	0.69 ?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)	0.82 ?0.38
17.	Unless breath and pulse don't return after they are reassessed, CPR of 4 cycles is conducted repeatedly across 1 min.	0.27 ?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.	0.74 0.44

Table 3. Differences in knowledge according to general characteristics

Variables	Knowledge		
	M	(SD)	F(P)
Age (yr)			
≤24	0.64	(0.12)	4.603(.004)**
25-29	0.64	(0.15)	
30-39	0.70	(0.16)	
≥40	0.72	(0.52)	
Sex			
Male	0.67	(0.15)	1.779(.241)
Female	0.69	(0.14)	
Religion			
Yes	0.67	(0.14)	0.607(.545)
No	0.68	(0.15)	
Position			
Staff nurse	0.66	(0.15)	4.270(.002)**
Charge nurse	0.71	(0.15)	
Head nurse or chief nurse	0.75	(0.14)	
Career(year)			
<1	0.61	(0.12)	4.041(.008)**
1-5	0.65	(0.14)	
6-10	0.67	(0.15)	
≥11	0.72	(0.43)	
CPR experience			
No	0.69	(0.15)	0.706(.418)
Yes	0.67	(0.15)	
Education experience			
Yes	0.68	(0.42)	0.674(0.50)*
No	0.67	(0.23)	
Certificate			
Yes	0.68	(0.15)	4.350(.001)***
No	0.65	(0.14)	

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

don't return after they are reassessed, CPR of 4 cycles is conducted repeatedly across 1 min (0.27 ± 0.44).' Infant cardiac arrest happens more frequently by respiratory arrest, not by the heart.' (0.33 ± 0.47), which was low.

3.3 The General Characteristics of Pediatric Ward Nurses and Difference in the Knowledge of Infant CPR of Them

The results of analyzing the difference in the knowledge of infant CPR according to the general characteristics of the subjects are like Table 3. There was a statistically significant difference in age (p=.004), position (p=.002), service period (p=.008), education experience (p=.50), and a certificate (p=.001).

4. Discussion

In this study, the level between the knowledge, attitude and performance ability on the infant CPR of Pediatric Ward Nurses and their relationship were grasped, the effect of the knowledge and attitude on the infant CPR of pediatric ward nurses on the performance ability was identified, and the main results were discussed as follows. First, the knowledge of infant CPR of pediatric ward nurses was 0.71 points in average out of a perfect score (1 point). As there were no previous studies which measured the knowledge of infant CPR for pediatric ward nurses, it is difficult to compare with them directly, however, it is similar to the study result that the score of the knowledge of the subjects is about the level of medium in the study of [15] which measured the knowledge of CPR for the nurses of small and medium hospitals. It may be considered that the reason that the knowledge level of infant CPR of pediatric ward nurses was the level of medium is that CPR education for hospital employees and medical centers is mostly conducted for the adults through the program of a hospital itself and instructors, however, the education on infant CPR is not provided on the whole. Second, in this study, knowledge showed a statistically significant difference in age, position, service period, education experience, and a certificate, however, it didn't show one in gender, religion and CPR experience. These results were different from those of the studies of [11], and [13]that there was difference in the knowledge level according to CPR experience, however, it was similar to that of [12]that there was no connection between a direct CPR experience and knowledge. It is considered that the reason that knowledge showed statistically significant results according to age, position, service period, education experience, and a certificate is that the working experience and the experience of the actual performance are more important due to the characteristics of the pediatric ward.In[16] said that the group which has a lot of experience on CPR can boost the confidence, and[12]said that when the certificate in relation to CPR is possessed, the performance ability on CPR is enhanced. Thus, in order to improve the performance ability of nurses on infant CPR, it is considered that organizing the proper group of new nurses and experienced nurses when organizing a working group for the emergency which can happen at any time is important, pediatric ward nurses must be encouraged to possess the certificate on the infant CPR, both lecture and practice education on the clinical site must be combined, and the education must be provided periodically and repeatedly, not once.

Also, nurses must take the responsibility of providing basic CPR for the proper perfusion and circulation of organs which are necessary to maintain life during cardiac arrest, perform the advanced cardiac life support to treat or convert the cause of cardiac arrest early by participating in CPR, and make preparations for performing the effective CPR[17]. However, as nurses lack in the knowledge of CPR, it is reported that there is variety in its level[18]. Also Broomfield[19] said that the nurses should possess the exact knowledge through the education on the changed contents of the revised guideline and through the periodic reeducation on the new guideline, and to improve the insufficient knowledge, the education must be provided to them often. Considering the study results of[13] that the higher knowledge is, the higher performance ability is, and that[20] that the higher knowledge is, the higher performance ability gets, knowledge education for enhancing the performance ability of CPR is very important, too. As a result, to maintain the wellbeing of the subjects by enhancing the performance ability of infant CPR, the periodic education which can enhance the knowledge of infant CPR of pediatric ward nurses is necessary, and further, it is considered that encouraging the certificate acquisition of infant CPR and managing the certificate through the regular reeducation are the plans which can enhance the performance ability of infant CPR of pediatric ward nurses.

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