Effect of Attitude Education to Perform Cardiopulmonary Resuscitation

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Abstract: The purpose of the study is to determine the education-related factors those influence the willingness to perform Cardiopulmonary Resuscitation (CPR). A total of 347 participants were divided into three groups; a 30 min lecture, 30 min of practice and a 30 min attitude education presentation; a 30 min lecture and 60 min of practice and the control group was provided with a 45 min lecture and 45 min of practice. A univariate analysis was conducted using a binominal logistic regression model to identify the educational factors that influenced the willingness to perform CPR. The participants in Experimental Group (EG) 1 showed increased willingness to perform CPR for non-family members (49.6 versus 85.7%, p<0.001). There were statistically significant differences between EG 1 and the Control Group (CG) (p<0.001) as well as between EG 1 and EG 2 (p<0.001) regarding knowledge of CPR between EG 1 and the CG (p<0.001) as well as between EG 2 and the CG (p<0.001) regarding CPR performance and between EG 1 and the CG (p<0.001) as well as between EG 1 and EG 2 (p<0.001) regarding the willingness to perform CPR. The willingness of EG 1 (Odds Ratio (OR): 5.622; p<0.002), EG 2 (OR: 2.801; p<0.001) and the CG (OR: 1.668; p = 0.027) to perform CPR after the completion of the course was a statistically significant predictor. Attitude education presentations during the course of CPR training may increase the willingness of participants to perform CPR.

Key words: Knowledge, performance, willingness, practice, attituade, lecture

INTRODUCTION

The factor that contributed to bystander CPR is Basic Life Support (BLS) training for laypersons (Cho *et al.*, 2010). The implementation rate of CPR by bystander is 8.2% and the time from the initial call to arrival of the Emergency Medical Technician (EMT) is 8 min in Korea (Uhm and Kim, 2014). The implementation rate was very low compared to a rate of 30% in other developed countries (Park *et al.*, 2017; Hung *et al.*, 2017).

Due to reasons such as panic, fear of injuring the victim, concern for performing CPR incorrectly, physical limitations, fear of legal liability, fear of infection and victim characteristics, only a portion of Out-of-Hospital Cardiac Arrest (OHCA) patients receive bystander CPR before the arrival of emergency medical services worldwide. Although, these factors are related to the willingness to perform CPR, many researchers have emphasized increased and repeated training for improving CPR knowledge and performance (Lu *et al.*, 2017; Langlais *et al.*, 2017; Taniguchi *et al.*, 2007). Some studies have suggested that, these barriers to CPR performance could be reduced or overcome with education and preparation during CPR training courses (Bray *et al.*, 2017; Lederman *et al.*, 2017; Son *et al.*, 2017) the

methodology of CPR training had a great impact on the attitude of the participant (Takamura *et al.*, 2017; Bhanji *et al.*, 2015). American Heart Association (AHA) guidelines have aimed to improve CPR performances on the basis of these studies but continue to present only educational content for CPR courses which emphasizes concepts such as simplification, consistency, objective-based content, hands on practice, contextual content, competency-based tests, practice to mastery and assessment (Andresen*et al.*, 2008).

Because attitude, rather than knowledge and performances, seems to be a more important factor for the initiation of CPR, the cultivation of a positive attitude needs to be strengthened during CPR training. In this study, we hypothesized that CPR attitude education for laypersons would positively affect the willingness of participants to perform CPR.

MATERIALS AND METHODS

Research design: A total of 347 participants who took CPR course from March-May 2015 at a university were divided into three groups. Experimental Group 1 (EG 1) consisted of 119 students received a 30 min CPR attitude education which included topics such as understanding

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brain death, effective chest compressions and physical confidence, occurrence of injuries in the victim, overcoming victim characteristics, Good Samaritan laws and decreasing the risk of infections; a 30 min adult CPR lecture and a 30 min adult CPR practice session. Experimental Group 2 (EG 2) consisted of 120 students received a 30 min adult CPR lecture and 60 min of adult CPR practice. The Control Group (CG) consisted of 108 students received a 45 min adult CPR lecture and 45 min of adult CPR practice. About 90 min was chosen as the duration of the training sessions because it has previously been demonstrated that a 2 h class is sufficient for participants to acquire basic life support skills including defibrillator training for laypersons (Del Pozo *et al.*, 2016).

Survey contents and administration: About 80 students were taught by one instructor in the lectures concerning adult CPR knowledge and attitudes and 40 students were taught by one instructor and two assistants in the practice session for adult CPR. A non-feedback mannequin (Actar 911 Squadron™; Vital Signs, New Jersey, USA) was assigned to every student and a real-time visual feedback mannequin (Resusci Anne SkillReporter™; Laerdal Medical, Stavanger, Norway) was assigned to every 20 students. In accordance with 2010 AHA guidelines for layperson CPR, this course included theoretical (cognitive education), practical (psycho-motor education) and willingness and barrier factors (attitude education).

Researchers explained the aim of this study to the students prior to each CPR course. For each course, researchers obtained an informed consent from each student and the names were deleted when the data were analyzed. Before the course, data on the general characteristics of the attendees were collected including experience in emergency situations such as any time spent in an ambulance in an emergency room and with emergency patients; previous CPR training; readiness to perform CPR and a self-rating score (Likert scale; 1, not at all; 2, not really; 3, undecided; 4, somewhat; 5, very much) of CPR knowledge, performance and willingness. After the course, data regarding the readiness to perform CPR and self-rating scores (Likert scale of 1-5) of CPR knowledge, performance and willingness was collected. The students who answered the questions both before and after the course via. a group interview were considered participants.

Data analysis: Continuous variables such as the year were compared using the mean and standard deviation. Categorical variables including gender, major and grade were expressed as percentages. To compare the proportion of students who exhibited readiness to perform CPR before and after the course in each group, a Wilcoxon signed rank test was applied. The percentages of students who exhibited readiness to perform CPR were compared using a Chi-square test. To ensure homogeneity among the three groups before the course and to determine the validity of the educational method used to facilitate CPR willingness after the course, the Likert scales used to assess CPR knowledge, performance and willingness were examined using one-way ANOVA. A univariate analysis was conducted using a binomial logistic regression model to identify predictors associated with readiness to perform CPR according to CPR knowledge, performance and willingness. Odds Ratios (ORs) and 95% Confidence Intervals (CIs) were calculated. The model calibration was evaluated by a Hosmer-Leme show goodness-of-fit test. A p<0.05 was considered a statistically significant difference. SPSS for Windows (v 19.0; IBM Inc., New York, USA) was used for the data analysis.

RESULTS AND DISCUSSION

Among the 347 participants who responded to our group interviews out of the 368 students who participated in 6 CPR courses at a University. About 47.6% had previous CPR training (mean, 1.5 years prior to the course) as seen in Table 1.

No significant difference was observed between the readiness to perform CPR for family members before and after the course (91.1% Versus 95.1%). The differences in gender, experience in emergency situations and experience in CPR training were not statistically significant between the group of individuals who showed readiness and the group of individuals who did not show readiness to perform CPR. The percentage of students who exhibited readiness to perform CPR in EG 1 after the course was significantly higher (85.7%) than that of EG2 (45.8%) and the CG (43.5%) as seen in Table 2.

Homogeneity among the three groups regarding CPR knowledge (p = 0.654) and performance (p = 0.183) and the willingness (p = 0.233) to perform CPR was statistically confirmed before the course, however, the differences among the 3 groups after the course were statistically significant with respect to CPR knowledge (p<0.000) and performance (p<0.000) and the willingness to perform CPR (p<0.000). In Scheffe test, statistically significant differences were observed between EG 1 and the CG (p<0.000) and as well as between EG 1 and EG 2 (p<0.000) regarding knowledge of CPR between EG 1 and the CG (p<0.000) as well as between EG 2 and the CG (p<0.000)

Table 1: General characteristics of the participants

Characteristics	Experimental Group 1		Experimental Group 2		Control group		Overall	
	N = 191	(%)	N = 120	(%)	N = 108	(%)	N = 347	(%)
Sex								
Female	104	(85.2)	87	(72.5)	82	(75.9)	273	(78.7)
Male	15	(14.8)	33	(27.5)	26	(24.1)	74	(21.3)
Age								
≤19	60	(50.5)	59	(49.1)	0	(0.0)	119	(34.3)
20-24	59	(49.5)	57	(47.4)	103	(95.4)	219	(63.1)
25+	0	(0.0)	4	(3.4)	5	(4.6)	9	(2.6)
Mean years (SD)	19.7(17.4)		20.3(2.23)		21.8(1.5)		20.6 (2.03)	
Previously trained in CPR								
Yes	55	(46.2)	50	(41.7)	60	(55.6)	165	(47.6)
No	64	(53.8)	70	(58.3)	48	(44.4)	182	(52.4)
Mean number of elapsed years (SD)	1.32(1.99)		1.16 (2.19)		1.90 (2.37)		1.5 (2.2)	

Experimental Group1 was provided with a 30 min lecture, 30 min of practice and a 30 min attitude education course. Experimental Group 2 was provided with a 30 min lecture and a 60 min practice session. The control group was provided with a 45 min lecture and a 45 min practice session; SD, Standard Deviation; CPR, Cardiopulmonary Resuscitation

Table 2: Participant's readiness to perform cardiopulmonary resuscitation for non-family members in relation to specific variables

Variable	Readiness to perform CPR			
	Yes (%)	No	χ^2	p-values
Sex				
Female	129(42.3)	144	3.470	0.062
Male	44(59.5)	30		
Experience in emergency situations				
Yes	63(63.6)	36	0.528	0.468
No	141(57.6)	104		
Previously trained in CPR				
Yes	96(59.2)	69	0.048	0.827
No	108 (59.3)	74		
Group				
Before the course				
Experimental Group 1	59(49.6)	60	0.639	0.727
Experimental Group 2	63(52.5)	57		
Control group	51(47.2)	57		
After the course				
Experimental Group 1	102(85.7)	17	54.318	0.000
Experimental Group 2	55(45.8)	65		
Control group	47(43.5)	61		

CPR; Cardiopulmonary Resuscitation

regarding CPR performance and between EG 1 and the CG (p<0.000) as well as between EG 1 and EG 2 (p<0.000) regarding the willingness to perform CPR as seen in Table 3.

The willingness of the CG (OR: 1.668; p = 0.027), EG 1 (OR: 5.622; p<0.002) and EG 2 (OR: 2.801; p<0.000) to perform CPR after the course was a statistically significant independent predictor of the readiness to perform CPR. However, the knowledge and performance of CPR were not statistically significant independent predictors of the readiness to perform CPR as seen in Table 4.

The results of this study show that, CPR attitude education has a positive effect on the knowledge and performance of CPR as well as the willingness to perform CPR for non-family members. The 60 min practice session also positively affected not only performance of CPR but also the knowledge and willingness to perform CPR, however, surprisingly, this practice session had a smaller influence than the attitude education presentation on the knowledge, performance and willingness to perform CPR. The lowest mean scores were exhibited by the training group provided with a 45 min lecture and a 45 min practice session. We strongly suggest that, CPR courses should be focused on attitude education. We found that the participants in the training group provided with 30 min of CPR attitude education, despite having the same amount of CPR time hours as the other groups, demonstrated an increased readiness to perform CPR on non-family members.

Because readiness to perform CPR for family members before and after the course was observed, these data could not be statistically analyzed. Korean society still exhibits a strong family bond compared to other countries (Hung et al., 2017; Lu et al., 2017; Takamura et al., 2017). Additionally, due to the wording of the question, "Do you have any readiness to perform CPR for family members?" the only possible answers were "yes" or "no". A limited amount of reliable data has been generated from other Korean studies regarding the readiness of participants to perform CPR. When Korean elementary school students were asked "Would you take the initiative to perform CPR?" their mean self-rating score was 4.30 on a Likert scale ranging from 1-5 (Choi et al., 2015). In contrast, in a comparison of the readiness and non-readiness to perform CPR for non-family members by gender, experience in emergency situations and experience in CPR training did not show statistically significant differences. We presume that the result seemed to be more strongly influenced by the indigenous family bond rather than the three educational variables. In terms of infectious diseases, the cumulative number of human immunodeficiency virus cases in Korea in 2013 was only 1.013; therefore, other

Table 3: Comparisons of self-assessed score means among the three cardiopulmonary resuscitation training groups

Domain	Groups	Before the course			After the course		
		Self-assessed score* Mean (SD)	F-values	p-values	Self-assessed score* Mean (SD)	F-values	p-values
Knowledge	Experimental Group 1	2.57(0.73)	0.425	0.654	3.97(0.72)	11.971	0.000
	Experimental Group 2	2.53(0.77)			3.60(0.76)		
	Control group	2.62(0.62)			3.55(0.59)		
Performance	Experimental Group 1	2.23(0.86)	1.706	0.183	3.83(0.76)	14.655	0.000
	Experimental Group 2	2.50(0.97)			3.73(0.84)		
	Control group	2.43(0.99)			3.29(0.79)		
Willingness	Experimental Group 1	3.01(1.07)	1.462	0.233	4.04(0.77)	38.197	0.000
	Experimental Group 2	3.18(1.02)			3.13(0.99)		
	Control group	3.23(0.90)			3.06(1.09)		

*By Likert scale 1, not at all; 2, not really; 3, undecided; 4, somewhat; 5, very much; SD; Standard Deviation

Table 4: Logistic regression of the readiness to perform cardiopulmonary resuscitation for non-family members predicted by domains

Groups	Domain	OR	95% CI	p-values
Experimental Group 1	Knowledge	1.751	0.577-5.314	0.323
	Performance	1.942	0.651-5.794	0.234
	Willingness	5.622	1.876-16.85	0.002
Experimental Group 2	Knowledge	0.721	0.408-1.273	0.260
	Performance	0.810	0.489-1.342	0.414
	Willingness	2.801	1.737-4.519	0.000
Control group	Knowledge	0.970	0.452-2.085	0.939
	Performance	1.694	0.877-3.273	0.117
	Willingness	1.668	1.060-2.625	0.027

Hosmer-Lemeshow goodness-of-fit test with p = 0.681; OR; Odds Ratio; CI; Confidence Interval

factors also influenced the results (Sullivan, 2015). The readiness of respondents who did or did not undergo CPR training demonstrated no difference (59.2% versus 59.3%). This result could be interpreted as meaning that both previous CPR training with no attitude education component and a longer CPR retention period (mean of 2.2 years elapsed) influenced those particular attitudes of the participants. This idea may be indirectly supported because some studies have shown deterioration of performances or knowledge after 1-6 months (Roppolo *et al.*, 2007; Spooner *et al.*, 2007).

The willingness to perform CPR in the three groups after the course was an independent predictor of the readiness to perform CPR and the OR of the group provided with a 30 min attitude education component was higher than those of the other 2 groups. This finding indicates that, the willingness to perform CPR could be related to the implementation of CPR and the willingness to perform CPR could be positively impacted by a relatively short attitude education component. Additionally, the OR of the willingness to perform CPR of the group provided with a 60 min CPR practice session was greater than that of the group provided with a 45 min CPR practice session, indicating that a longer CPR practice session influences the readiness to perform CPR. This result is consistent with the CPR practical testing results and the effect that repeated CPR training has on the willingness to perform CPR (Taniguchi *et al.*, 2007;

Lederman *et al.*, 2017). CPR attitude education was the most effective factor for improving the readiness to perform CPR in our study. However, CPR attitude education at the expense of CPR practice has rarely been applied to CPR training programs including in the CPR educational concepts of the AHA guidelines (Andresen *et al.*, 2008).

As our topic is not CPR performed in the past but the willingness to perform CPR based on a self-rating score, this study is constrained by the limitation that the data could be influenced by survey respondents. More valid measurements of the willingness to perform CPR should be developed for this type of study and sophisticated measurements could also be used to evaluate the effectiveness of CPR training.

CONCLUSION

A 30 min attitude education component including concepts such as understanding brain death, effective chest compressions and physical confidence, occurrence of injuries to the victim, overcoming of victim characteristics, Good Samaritan laws and the low risk of infections, increases the willingness to perform CPR for non-family members. Attitude education in CPR training should be formalized to increase the rate of CPR performance by laypersons.

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