ORIGINAL ARTICLE

Targeted cardiopulmonary resuscitation training focused on the family members of high-risk patients at a regional medical center: A comparison between family members of high-risk and no-risk patients

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ABSTRACT

BACKGROUND: We developed a hospital-based cardiopulmonary resuscitation (CPR) training model focused on the target population (family members of patients with potential risks for cardiac arrest) and compared the outcome of CPR training between target and non-target populations for validity.

METHODS: Family members of patients in training were divided into three groups on the basis of patients' diseases, as follows: 1) the cardio-specific (CS) risk group, including family members of patients with cardiac disease at risk of cardiac arrest; 2) the cardiovascular (CV) risk group, including family members of patients with risk factors for cardiovascular disease; and 3) the no-risk group. Pre- and post-training surveys and skill tests as well as a post-training 3-month telephone survey were conducted. Educational outcomes were analyzed.

RESULTS: A total of 203 family members were enrolled into 21 CPR training classes. The CS group (n=88) included elderly persons and housewives with a lower level of education compared with the CV (n=79) and no-risk groups (n=36). The CS group was motivated by healthcare professionals and participated in the training course. The CS, CV, and no-risk groups showed improvements in knowledge, willingness to perform CPR, and skills. Despite the older age and lower level of education in the CS group, the effects of education were similar to those in the other groups. A high rate of response and secondary propagation of CPR training were observed in the CS group.

CONCLUSION: Family members of patients with heart disease could be an appropriate target population for CPR training, particularly in terms of recruitment and secondary propagation. Targeted intervention may be an effective training strategy to improve bystander CPR rates.

Keywords: Bystander; cardiopulmonary resuscitation; family; high risk; training.

INTRODUCTION

Bystander cardiopulmonary resuscitation (CPR) is a crucial factor contributing to the improvement of survival in individuals undergoing cardiac arrest.[1] Bystander CPR rates between 10% and 65% have been reported, with particularly low rates among rural, minority, and low-income communities. The percentage of ventricular fibrillation and survival to discharge rates in Asia were found to be lower than those in other countries.[2,3]

Public policies and resources have focused on increasing bystander CPR rates by implementing dispatcher-assisted CPR, publicizing compression-only CPR by layrescuers from 2011,

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and conducting mandatory CPR training in schools from 2013; however, the bystander CPR rate still remains low in Korea (Fig. 1).[4] The expansion of CPR training is a form of community intervention to raise bystander CPR rates, and it requires enormous expenses. However, there is no clear correlation between bystander CPR rates and efforts to implement CPR training. Community investment in providing bystander CPR training needs to be cost effective.[5] A system-wide CPR program was established in our region, Seongbuk, with a population of approximately 500,000 in Seoul, Korea. We have aimed at enhancing five major CPR deliveries including early emergency medical system (EMS) activation, bystander CPR provision, appropriate usage of automated external defibrillators (AEDs), high-quality advanced cardiac life support (ACLS) and standard post-cardiac arrest care for improving good outcomes in patients with out-of-hospital cardiac arrest (OHCA) in our region from 2011.[6] The bystander CPR and dispatcher-assisted CPR rates increased to approximately 50% in the patients with OHCA at Korea university medical center. However, only the bystander CPR rate was approximately 30% from 2011 to 2013, despite continuous community intervention, such as bystander CPR training and public AEDs provided by public healthcare centers and emergency medical services.[6]

Because most cardiac arrests occur in private residences, it is likely that family members will witness an arrest. However, most of the people undergoing CPR training are young and not family members, and in most cases, CPR training serves to fulfill a job requirement.[7]

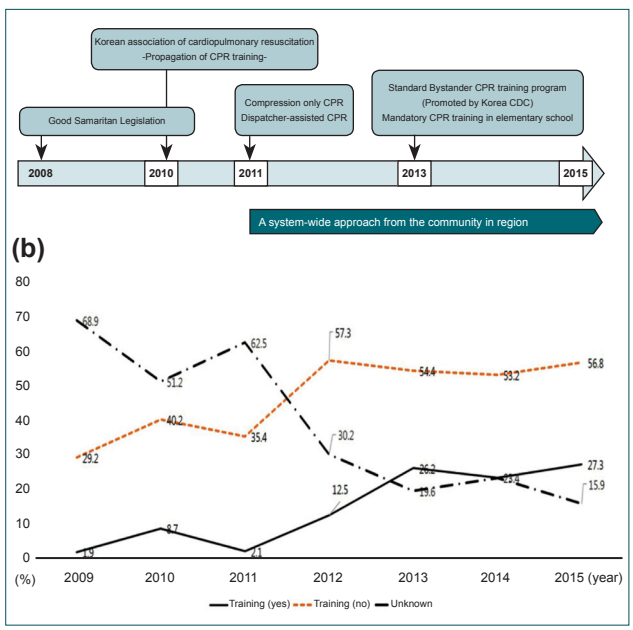

Figure 1. (a) Major changes of policy and protocol for increasing the bystander cardiopulmonary resuscitation rate. **(b)** Annual trends of the rate of previous training experience and the rate of no training experience among bystanders, who provided CPR in out-of-hospital cardiac arrests at a regional medical center. CPR: Cardiopulmonary resuscitation; CDC: Center for disease control and prevention.

Because 70%–80% of cardiac arrests occur at home and not in a public place,[8] the provision of CPR training courses to a target population of families of patients with heart disease or those with risk factors for cardiovascular disease may be an effective strategy.

The integral factors for a community-based CPR program are population, location, and barriers to participation in training, such as accessibility, cost, distance, and motivation.[9] Regional medical centers play a central role in caring for patients with heart disease and those with risk factors for cardiovascular disease. Family members of high-risk patients can be exposed to a Basic Life Support (BLS) training program, provided by regional medical centers during patient admission or outpatient clinic reviews. Family members may have a high motivation for CPR training and can be easily selected for hospital-based CPR training modules.

We hypothesized that improvements in CPR performance would be better among family members of high-risk patients and would include changes in attitude toward resuscitation. Family members were identified as the target population. We conducted CPR training for family members of high-risk patients after developing a hospital-based CPR training model at a regional medical center. We assessed educational outcomes, including skill, knowledge, and attitude, and compared the improvement in CPR performance between family members of high-risk and no-risk patients.

MATERIALS AND METHODS

Study Setting and Design

This was a prospective study conducted at a single tertiary medical center. The Institutional Review Board approved (IRB No.ED14301) the data collection and informed consent process for managing data on training outcomes, based on a survey and assessment.

The hospital-based CPR training model was structured as a regular open class for family members. No fees were charged. We developed a 1-h training program with assessment and evaluation tools, comprising a brief lecture about the importance of CPR, video-instructed compression practice with instructor support, and practice using an AED. The Resusci Anne manikin (Laerdal Medical, Stavanger, Norway) was used.

Content was based on a standardized program operating guidelines of BLS for lay rescuers from the Korea Centers for Disease Control and Prevention and focused on risk factors. Instructor qualifications were restricted to healthcare workers with an instructor certificate from the American Heart Association BLS. An instructor-training program for this session was developed, including a pre-class preparation checklist and a self-checklist of the program content. Instructors were taught for three sessions about delivering teaching and

assessments according to the instructor's manual. Instructors used instruction checklists for every class. Instructors participated in the CPR education program after successfully completing training.

The heart disease (coronary artery or valvular heart disease, arrhythmia, cardiomyopathy, heart failure, and a history of cardiac arrest), risk factors for cardiovascular disease (hypertension, diabetes, smoking, hyperlipidemia, and a family history of arrest), and chronic kidney disease by experts' opinions and literature review, are defined as the high risk disease of cardiac arrest.[10,11]

Participant Recruitment

We developed a data processing program to select patients with potential risk factors from the international classification of disease-10, on the basis of the computerized medical record. We disseminated information on the training program to the family members of at-risk patients through posters and pamphlets, direct recommendation from healthcare workers, and in-hospital and website-based announcements. Family members voluntarily applied for the program by contacting the training coordinator by telephone and e-mail. The coordinator reminded the course participants by text message and e-mail on three occasions before the class commenced.

The training class was conducted on a regular weekly basis at the same time and on the same weekday between November 2014 and July 2015. Volunteer participants completed a 1-h training session led by BLS instructors. A certificate of course completion was awarded to participants. Participants underwent surveys and assessment by BLS instructors before the hospital-based CPR training session. A telephone survey was conducted 3 months after the class, and no response was defined as a lack of response after the participant was called on three occasions at different times.

Participants were eligible for enrollment based on the following criteria: (1) age ≥18 years and (2) the family member felt fit and able to perform moderate physical activity.

Family members were divided into three groups for analysis, according to patient risk factors, as follows: 1) the cardio-specific (CS) risk group, including family members of patients with a diagnosis potentially related to underlying cardiac disease; 2) the cardiovascular (CV) risk group, including family members of patients with risk factors for cardiovascular disease; and 3) the no-risk group. Characteristics, basic knowledge, skill, and attitude for CPR were analyzed (Fig. 2).

Statistical Analysis

Participant demographics, characteristics, and outcomes were compared using Pearson's Chi-square test, Fisher's exact test, and ANOVA, where appropriate. The Generalized Estimating Equation method for repeat measure analysis was used. SAS version 9.4 (SAS Institute, Cary, NC, USA) was used for statistical analysis. A p-value <0.05 was considered statistically significant.

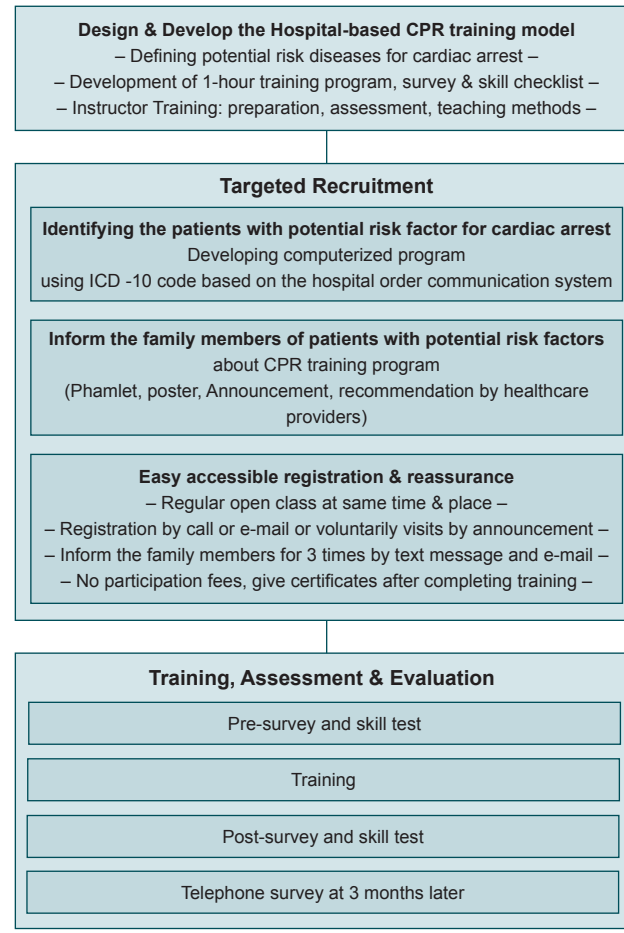

Figure 2. Flow chart of the regional medical center-based CPR training model focused on a target population, targeted location, targeted approach, and targeted time. CPR: Cardiopulmonary resuscitation; ICD: International classification of disease.

Ethics Statement

The study protocol was approved by the Institutional Review Board of Korea University Anam Hospital (IRB No.ED14301). Informed consent was confirmed by IRB.

RESULTS

A total of 203 family members were enrolled into 21 CPR training classes, and 14 instructors [median age = 42 (28–53) years] were recruited to conduct the classes. The instructor:trainee ratio was 1:3-4. One class had a ratio of approximately 2.12 instructors to 8.28 trainees. Total numbers of participants in the CS, CV, and no-risk groups were 88, 79, and 36, respectively.

Compared with the CV and no-risk groups, the CS group had higher rates of elderly and female participants and participants with a low level of education (< high school),

housewife occupation, or no occupation. Motivation for training in the CS group was more frequently triggered by a healthcare professional's recommendation than by other causes. Participants in the CS group perceived that their relative had a higher risk of cardiac arrest than that in the general population. Most participants did not have any exposure to CPR training over the preceding 2 years, and there were no differences in CPR training exposure between the three groups (Table 1).

Participants (40.9%, CS group; 41.8%, CV group; and 44.4%, no-risk group) stated that facing a cardiac arrest involving a family member, they would start chest compressions, despite not knowing how to perform CPR. However, when cardiac arrest occurred in an unknown person, 31.8% of participants in the CS group, 34.2% in the CV group, and 25.0% in the no-risk group stated that they would commence chest compressions. After training, most family members (95.5% in the CS group, 94.9% in the CV group, and 94.4% in the no-risk group) reported high willingness to start chest compressions with improved knowledge, regardless of whether the person with the cardiac arrest was a family member or an unknown person. There was no difference among the groups before and after training in willingness/unwillingness to perform cardiac compression or in the reason for willingness/unwillingness to perform cardiac compression (Table 2).

Table 1. Demographics and characteristics of family members according to group

	Cardio-specific group (n=88)	Cardio-vascular group (n=79)	No-risk group (n=36)	p
Age (years), Mean±SD	49.5±15.6	46.3±11.72	43.4±15.3	0.048
Sex, n (%)				0.041
Male	29 (33.0)	37 (46.8)	20 (55.6)	
Female	59 (67)	42 (53.2)	16 (44.4)	
Education level, n (%)				0.031
Middle school	11 (12.5)	5 (6.3)	1 (2.8)	
High school	37 (42.0)	24 (30.4)	12 (33.3)	
College	34 (38.6)	30 (38.0)	16 (44.4)	
Graduate school	6 (6.8)	18 (22.8)	6 (16.7)	
Other	0	2 (2.5)	1 (2.8)	
Occupation, n (%)				0.000
Housewife	37 (42.0)	21 (26.6)	6 (16.7)	
Professional	12 (13.6)	20 (25.3)	12 (33.3)	
White collar	9 (10.2)	13 (16.5)	5 (13.9)	
Blue collar	1 (1.1)	2 (2.5)	2 (5.6)	
Student	6 (6.8)	2 (2.5)	7 (19.4)	
Other	9 (10.2)	18 (22.8)	3 (8.3)	
None	14 (15.9)	2 (2.5)	2 (5.6)	
Exposure to CPR training over the past 2 years, n (%)				0.348
0	79 (89.9)	64 (81.0)	30 (83.3)	
1	4 (4.5)	12 (15.2)	3 (8.3)	
2	4 (4.5)	2 (2.5)	2 (5.6)	
3	1 (1.1)	1 (1.3)	1 (2.8)	
Concern about patient's risk of cardiac arrest, n (%)	69 (78.4)	36 (45.6)	9 (25.0)	0.000
Motivation for training, n (%)				
Recommendation by healthcare professional	28 (31.8)	10 (12.7)	4 (11.1)	0.003
Help a family member	44 (50.0)	32 (40.5)	11 (30.6)	0.120
Help a stranger	30 (34.1)	29 (36.7)	15 (41.7)	0.727
For my job/career	1 (1.1)	2 (2.5)	3 (8.3)	0.096
Other	2 (2.3)	13 (16.5)	5 (13.9)	0.006

SD: Standard deviation; CPR: Cardiopulmonary resuscitation.

Table 2. Attitude about cardiopulmonary resuscitation before and after training

		CS group (n=88)	CV group (n=79)	No-risk group (n=36)	p
Willing to perform CPR on family member					
No CPR, due to uncertainty of arrest	Pre	10 (11.4)	5 (6.3)	4 (11.8)	Pre 0.791
	Post	(–)	2 (2.5)	1 (2.8)	Post 0.471
No CPR, due to fear of doing harm	Pre	5 (5.7)	4 (5.1)	3 (8.3)	
	Post	(–)	(–)		
No CPR, due to fear of infection	Pre	2 (2.3)	(–)	1 (2.8)	
	Post	(–)	(–)		
No CPR, due to lack of knowledge	Pre	11 (5.4)	10 (12.7)	4 (11.1)	
	Post	(–)	(–)		
Start CPR, despite lack of knowledge on how to	Pre	36 (40.9)	33 (41.8)	16 (44.4)	
perform CPR	Post	3 (3.4)	2 (2.5)	1 (2.8)	
Start CPR, with knowledge on how to perform CPR	Pre	24 (27.3)	27 (34.2)	8 (22.2)	
	Post	85 (96.6)	75 (94.9)	34 (94.4)	
Willing to perform CPR on unknown person					
No CPR, due to uncertainty of arrest	Pre	9 (10.2)	5 (6.3)	7 (19.4)	Pre 0.451
	Post	(–)	1 (1.3)	(–)	
No CPR, due to fear of doing harm	Pre	6 (6.8)	6 (7.6)	6 (16.7)	
	Post	(–)	1 (1.3)	(–)	
No CPR, due to fear of infection	Pre	1 (1.1)	(–)	(–)	
	Post	1 (1.1)	(–)	(–)	Post 0.543
No CPR, due to lack of knowledge	Pre	16 (18.2)	17 (21.5)	5 (13.9)	
	Post	(–)	1 (1.3)	1 (2.8)	
Start CPR, despite lack of knowledge how to	Pre	28 (31.8)	27 (34.2)	9 (25.0)	
perform CPR	Post	3 (3.4)	1 (1.3)	1 (2.8)	
Start CPR, with knowledge on how to perform CPR	Pre	28 (31.8)	24 (30.4)	9 (25.0)	
	Post	84 (95.5)	75 (94.9)	34 (94.4)	
Confidence level for performing CPR	Pre	3.61±1.20	3.39±1.30	3.58±1.10	0.477
	Post	4.34±0.93	4.28±0.89	4.53±0.79	0.378
Willing to use AED after training	Post	85 (96.6)	78 (100)	36 (100)	0.344
Willing to disseminate information on CPR training	Post	4.62±0.91	4.52±0.90	4.67±0.63	0.300

CS: Cardio-specific; CV: Cardio-vascular; CPR: Cardiopulmonary resuscitation; AED: Automatic external defibrillator.

No differences in the rate of correct response for each step were observed among the groups. Following training, all groups achieved remarkable improvement in their knowledge of the BLS sequence and of each step of CPR skills as well as in the confidence level for performing CPR compared with pre-training levels (Appendix 1).

The knowledge level of the BLS sequence, confidence levels for performing CPR, and CPR skill performance in all groups increased after training (Appendix 2). There were no differences among the groups in differential improvement in knowledge, skills, and confidence after training, regardless of adjustments for age (Table 3).

Participant evaluation of the training class indicated that the class provided an easy learning opportunity, was helpful, and conveyed a clear message. Participants stated that they would highly recommend the course and reported that they were keen to participate in further training and were highly satisfied that the time allocated was adequate. There were no differences among the groups in the evaluation of the class.

Response rates to the telephone survey at 3 months were 53.4%, 55.1%, and 43.2% for the CS, CV, and no-risk groups, respectively. Participant knowledge level of the BLS sequence declined at 3 months across all groups (67.4%, CS group; 70.5%, CV group; and 78.6%, no-risk group). The propor-

Table 3. Comparison of the improvement differential between pre- and post-training levels of knowledge about CPR and CPR skills among participants by group

		CS group	CV group	No-risk group	[a]p	[b]p	[c]p
Knowledge							
Basic Life Support sequence	Pre	26 (29.5)	30 (38.0)	12 (33.3)	0.346	<0.0001	0.643
	Post	81 (92.0)	73 (92.4)	32 (88.9)			
Importance of CPR in survival	Pre	74 (84.1)	62 (78.5)	32 (88.9)	0.465	0.061	0.963
	Post	82 (93.2)	71 (89.9)	34 /94.4)			
Skill performance							
Check response and breathing	Pre	21 (24.4)	26 (41.9)	10 (38.5)	(–)	(–)	(–)
	Post	84 (97.7)	62 (100)	26 (100)			
Call 119	Pre	13 (15.1)	19 (30.6)	6 (23.10)	(–)	(–)	(–)
	Post	85 (98.8)	60 (96.8)	26 (100)			
Ask for AED	Pre	2 (2.5)	3 (5.4)	0 (0)	(–)	(–)	(–)
	Post	73 (92.4)	52 (92.9)	23 (100)			
Start chest compressions	Pre	78 (90.7)	53 (85.5)	22 (84.6)	(–)	(–)	(–)
	Post	86 (100)	62 (100)	26 (100)			
Correct hand position	Pre	28 (32.6)	28 (45.2)	8 (30.8)	0.442	<0.0001	0.568
	Post	84 (97.7)	60 (96.8)	24 (92.3)			
Compression rate (100–120/min)	Pre	17 (19.8)	18 (29.0)	5 (19.2)	0.684	<0.0001	0.580
	Post	83 (96.5)	59 (95.2)	24 (92.3)			
Compression depth (5–6 cm)	Pre	14 (16.3)	17 (27.4)	4 (15.4)	0.542	<0.0001	0.309
	Post	76 (88.4)	56 (90.3)	25 (96.2)			
Minimize handoff time	Pre	11 (12.8)	6 (9.7)	2 (7.7)	(–)	(–)	(–)
	Post	83 (96.5)	60 (96.8)	26 (100)			

CS: Cardio-specific; CV: Cardio-vascular; BLS: Basic Life Support; CPR: Cardiopulmonary resuscitation; AED: Automatic external defibrillator.
[a]p-value by generalized estimating equation (GEE) for group effect. [b]p-value by GEE for time effect. [c]p-value by GEE for group × time effect.

Table 4. Telephone survey results at 3 months after training

	Cardio-specific group	Cardio-vascular group	No-risk group	p
Response rate, n (%)	47 (53.4)	44 (55.1)	15(43.2)	0.441
Did you witness any arrest patient after training?	1	(-)	(-)	
Knowledge, n (%)				
Basic Life Support sequence	31 (67.4)	39 (70.5)	11 (78.6)	0.725
Step, n (%)				
Check response and breaths	39 (83.0)	35 (79.5)	12 (80.0)	0.909
Call 119 and AED	41 (87.2)	42 (95.5)	13 (86.7)	0.318
Starting chest compressions	46 (97.9)	42 (95.5)	14 (93.3)	0.682
Defibrillation	32 (68.1)	28 (63.6)	8 (53.3)	0.587
Identify the AED location closest to the house	31 (66.0)	28 (63.6)	10 (66.7)	0.964
Secondary propagation	31 (72.3)	22 (50.0)	7 (46.7)	0.050

AED: Automatic external defibrillator.

tion of participants who remembered the step of checking for patient response and spontaneous breathing was as follows: 83%, CS group; 79.5%, CV group; 80%, no-risk group. The proportion of participants who remembered to call 119 and to request for an AED was as follows: 89.3%, CS group; 95.5%, CV group; 86.7%, no-risk group. Only 68.1% of the

participants in the CS group, 63.6% of the participants in the CV group, and 53.3% of the participants in the no-risk group replied correctly to the step on defibrillation. Approximately 63.6%–66.7% of responders could identify the location of an AED near their house after training. The rate of conducting secondary propagation after 3 months was superior in the CS group (72.3%) (Table 4).

DISCUSSION

Bystander CPR may help to preserve heart and brain function and improve survival from OHCA.[1,12] While the rate of bystander CPR recently increased to 36.3% in the United States[13,14] and was reported as 44% in Denmark,[15] bystander CPR rates remain low, particularly in Asian countries.[3] Good Samaritan legislation, CPR training as a prerequisite of elementary school education, and dispatcher-assisted CPR programs are forms of community-based interventions.[5] The rate of survival to discharge and good neurologic outcome increased from 2011 by our system-wide approach from community to hospital for five delivery enhancements (early EMS activation, bystander CPR, usage of AED, high-quality ACLS and standard post-cardiac arrest care).[6] The bystander CPR rate and the rate of previous CPR training experience in bystanders at the scene also increased from 2011 (Fig. 1).[6] However, the bystander CPR rate and the rate of previous CPR training experience in bystanders shows no change, despite continuous community intervention, support by the state, and change in policy over several years.

Common barriers to performing CPR include emotional stress, lack of knowledge, low self-confidence in performing CPR correctly, fear of harming the patient, concerns about legal repercussions, infection transmission, and individual differences.[5,12,16] CPR training can increase layperson confidence and willingness to perform CPR, and training within 5 years may contribute to CPR performance in real situations.[16,17]

Sasson et al.[14] considered disparities in the provision of bystander CPR and survival, suggesting a paradigm to identify high-risk patients and barriers to learning, performing CPR, and implementing training programs focused on persons with high needs.

Reports indicate that 70%–84% of cardiac arrests occur in private residences, patients tend to be elderly, and bystander family members also tend to be elderly.[13,15,18] Potential trainees, such as family members, may not have convenient training opportunities. Most participants enrolling in CPR training are young with the purpose of fulfilling job requirements.[7] The discrepancy between low bystander CPR training and the high incidence of cardiac arrests highlights the importance of targeted education as a community-based intervention.[19]

The present study focused on the discrepancy between the limited opportunities for CPR training and the high likelihood of witnessing a cardiac arrest in a family comprising patients with heart disease or those with risk factors for cardiovascular disease. We divided recruited participants into CS, CV, and no-risk groups according to potential risk factors for cardiac arrest. The following are considered risk factors for sudden cardiac death: poor left ventricular function, malignant arrhythmia, electrolyte derangements, chronic renal disease, and diabetes.[10,11] Considering the degree of risk and the influencing impact of risk factors, family members in the present study were allocated to the CS group when the patient had known heart disease or the CV group when the patient had risk factors for cardiovascular disease.

Compared with the CV and no-risk groups, the CS group comprised older women and a greater proportion of housewives with a lower level of education. Compared with the no-risk group, the CV group comprised older women and a greater proportion of housewives. Papalexopoulou et al.[20] reported that old age and a low level of education are associated with low scores in practical and written tests. Low rates of CPR training in the United States were observed in black or Hispanic residents with a lower median household income and a higher median age, living in rural areas.[2] However, in the present study, the CS group, which included older participants, with a low level of education, revealed comparable results with other groups for willingness and confidence in performing CPR and in the assessment of the knowledge level and BLS skills. Several studies support our results and have demonstrated a high CPR training success among elderly subjects, despite relatively low interest in training.[21,22]

There was no difference among the three groups in the results of the assessments of attitude, knowledge, and skill performance. There was considerable improvement across all groups in the knowledge level and skill after training. There were no differences among the three groups in improvement differentials, defined as the increasing degree of knowledge and skills. Regardless of adjustments for age, the group with at-risk patients, particularly the CS group, reported an increased perception of the risk of cardiac arrest. We hypothesized that the CS group would be associated either with poor outcomes because of the high proportion of elderly persons with a low level of education or with a strong performance because of the prevalence of family members with increased perception of risk of arrest. However, old age and the level of education did not affect the outcome after this 1-h training class.

Although the CS group was concerned about the high risk of cardiac arrest in patients, recommendation by a healthcare professional to attend CPR training was an important contributing factor in prompting persons to participate in the program. These results support the reports that the interest in CPR of family members of patients with known heart disease is more likely to be influenced by physician recommendation.[23] Potential barriers to learning CPR include the lack of information on CPR classes, lack of intellectual and/or

physical capability to learn CPR, and concern about causing anxiety in the patient.[24] The reasons for the lack of targeted training for family members were the limitation of resources for CPR training, difficulty in identifying the target population with high-risk patients, failure to access family members of high-risk patients, and lack of attention to the target population by healthcare professionals.[8,23,24] The attention of healthcare professionals can be important for recruiting the target population that lacks opportunities and interest for CPR training.

The provision of CPR training for laypersons, as a community-based intervention for improving survival in OHCA, requires significant public resources. Targeted program interventions recruiting participants who are most likely to witness a cardiac arrest may be a cost-effective strategy to increase bystander CPR rates.[8] Moreover, CPR training alone may not be sufficient to increase bystander CPR rates, and intention-focused strategies may provide specific targets to strengthen the intention to perform CPR. To increase bystander CPR rates, specific interventions taking into consideration bystander characteristics are required, including the provision of different instruction material and the implementation of modules for specific target learners.[25] CPR training programs need to recognize individual differences and enhance motivational readiness and confidence.[23]

The present study found that although participants did not know how to perform CPR, there was a greater willingness across all groups to perform CPR on a family member than on an unknown person. Bystander CPR training focusing on performing CPR on a family member could increase the rate of performing CPR in private locations, where the incidence rate of cardiac arrests is high. It is also necessary to understand different bystander characteristics that affect belief and underlying reasons for learning CPR because ultimately these have a positive effect on performing CPR, particularly in the CS group. Identification of family members of high-risk patients; easy access to training; and participant characteristics, such as perception of the risk of cardiac arrest and a high willingness to perform CPR, can be positive influencing factors for successful learning and strengthening of the intention to perform CPR. Old age, low levels of education, limited interest in CPR training, and CPR training on the recommendation of healthcare professionals can be negative influencing factors. However, the potential bystander group achieved a similar successful learning outcome compared with the no-risk group.

The present study is a small-sized, single center study. The number of participants was not enough to generalize our results. Moreover, we should consider the cultural and regional differences while analyzing results. The risk factors for cardiac arrest were not clearly known. However, regional medical center-based bystander CPR training may be a model of targeted intervention, characterized by an adequate intention-focused, cost-effective training strategy. The training focused on a target population (family members of high-risk patients for cardiac arrest), targeted location (regional medical centers have a significant number of high-risk patients), targeted approach (patients were identified on admission to a ward or in the outpatient department upon recommendation by a healthcare professional), and targeted time (available waiting time for the test). The training can be offered as a part of cardiac rehabilitation programs for family members and high-risk patients.[26]

Conclusions

Family members of patients with risk factors for sudden cardiac arrest, particularly heart disease, tend to be elderly women with a low level of education. Nevertheless, improvement in the educational outcome in this category of respondents was comparable to that of other respondents. A total of 70% of respondents disseminated the contents of the course among their friends 3 months after training. The regional medical center-based CPR training model can be one of the targeted interventions as intention-focused, cost-effective training. By expanding this hospital-based CPR training program, community and medical facilities could contribute to the prevention and increased survival of patients with out-of-hospital cardiac arrests.

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Author Contribution

SJK and SWL conceived the study design and wrote the manuscript. KSH was responsible for target population training and helped conduct the trial and data collection. SJK, JSL, and SWL managed and analyzed the data, including quality control. All authors contributed substantially to the revision of the manuscript. KSH and SWL are co-first authors.

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ORİJİNAL ÇALIŞMA - *ÖZET*

Yerel bir tıp merkezinde risk düzeyi yüksek olan hastaların aile üyelerine yönelik kardiyopulmoner resüsitasyon (kalp masajı) eğitimi: Risk düzeyi yüksek hastalar ile risk taşımayan hastalarda aile üyelerinin karşılaştırılması

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AMAÇ: Hedef popülasyona (ani kalp durması yönünden potansiyel riskleri taşıyan hastaların aile üyeleri) yönelik hastane merkezli bir kardiyopulmoner resüsitasyon eğitim modeli geliştirilmiş olup, geçerli kılmak amacıyla hedef popülasyon ile hedef dışında kalan popülasyon arasında CPR eğitim sonuçlarını karşılaştırdık.

GEREÇ VE YÖNTEM: Hastaların eğitim sürecindeki aile üyeleri hastanın rahatsızlığına bağlı olarak üç gruba ayrılmıştır: 1) ani kalp durması riski taşıyan kalp hastalarının aile üyelerinin dahil edildiği kardiyak (CS) risk grubu; 2) kardiyovasküler hastalık yönünden risk faktörlerini taşıyan hastaların aile üyelerinin dahil edildiği kardiyovasküler (CV) risk grubu; ve 3) risk taşımayan grup. Eğitim öncesi ve eğitim sonrası anketler ve beceri testleri ile eğitim sonrasında 3 ay süreyle telefon üzerinden gerçekleştirilen bir anket uygulanmıştır. Eğitime ilişkin sonuçlar değerlendirilmiştir.

BULGULAR: Toplam 203 aile üyesinin, 21 ayrı CPR eğitim sınıfına kaydı gerçekleştirilmiştir. CV grubuyla (n=79) ve risk taşımayan grupla (n=36) kıyaslandığında CS grubunda (n=88) eğitim düzeyi daha düşük olan ev hanımları ve yaşlı bireyler yer almıştır. CS grubu, sağlık uzmanları tarafından motive edilerek eğitime katılmıştır. CS, CV ve risk taşımayan gruplarda bilgi, CPR gerçekleştirme konusundaki isteklilik ve beceriler yönünden ilerleme olduğu kaydedilmiştir. CS grubunda yaşlı bireylere ve eğitim düzeyinin düşük olmasına rağmen, eğitimin katkısı diğer gruplardaki kişilerle benzerlik göstermiştir. CS grubunda, CPR eğitiminin getirdiği ilave yararlar ve yüksek yanıt oranı gözlenmiştir.

TARTIŞMA: Kalp rahatsızlığı olan hastaların aile üyeleri, özellikle iyileşme ve ilave yararlar açısından CPR eğitimi için uygun bir hedef popülasyon teşkil edebilmektedir. Hedefe yönelik uygulamalar, CPR işlemini gerçekleştirecek olan üçüncü kişilerin sayısını artırmak amacıyla etkili bir eğitim stratejisi olabilmektedir.

Anahtar sözcükler: Aile; eğitim; kardiyopulmoner resüsitasyon; seyirci; yüksek risk.

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