ORIGINAL ARTICLE

Factors that influence nursing staff attitudes towards initiating CPR and in using an automatic external defibrillator when outside of a hospital

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ABSTRACT

Background: Ischemia is the leading cause of death worldwide and sudden cardiac arrest (SCA) caused by coronary heart disease is responsible for more than 60% of deaths. Cardiopulmonary resuscitation (CPR) increases the probability of survival of a person with cardiac arrest.

Aim: The aim of the present study was to investigate the factors which influence the attitudes of nursing staff towards initiating CPR and in using an automatic external defibrillator (AED) on an out of hospital victim of cardiac arrest.

Material and Methods: Between May and September of 2010, 310 nurses from both urban and rural Greek hospitals, were asked about their knowledge regarding CPR and the use of an AED and their willingness to perform CPR and to operate an AED in the out-of-hospital setting. Information was gathered through a questionnaire that was based on one of a previous study. Data collection lasted 5 months. Data analysis was performed with the statistical package SPSS ver. 17.

Results: The mean age of study participants was 35±7.85 years; 81% were female and 19% were male. Regarding the educational level of participants, 2.9% had completed secondary technological education, 23% had graduated from an additional 2- year program, 67.6% were graduates from Higher Technological Education Institute and 3.6% from University. Further, 2.6% held a master's degree and 0.3% a doctoral degree. 71.4% of the participants had a basic life support and AED training. Only 37.8% of the nurses reported that they would use the AED. The reasons for unwillingness to perform CPR were the lack of systematic training in the AED device and the lack of legal coverage of the state. There was a statistically significant positive correlation between the number of working years and the amount of CPR training (r = 0.139, p-value = 0.019).

Conclusions: The main factor that affects the attitude of nurses in initiating CPR is their lack of systematic training. In contrast, personal experience of nurses has a positive outcome since it reinforces their capability of initiating CPR. Further studies are needed to prove the effectiveness of CPR training on survival.

Keywords: Cardiopulmonary resuscitation, automatic external defibrillator, nurse attitudes, cardiac arrest.

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INTRODUCTION

Myocardial ischemia is the leading cause of death worldwide. Whereas sudden cardiac arrest (SCA), arising from coronary artery disease, is responsible for over 60 % of deaths. In Europe sudden cardiac arrest is the leading cause of death and is responsible for 700,000 casualties per annum. Early initiation of CPR drastically increases the probability of a victim's survival from a heart attack.[1]

The impact of sudden death in the world is extremely difficult to measure, and varies with the prevalence of coronary artery disease in different countries. It is particularly difficult to measure the death rate of sudden cardiac arrests worldwide. Although there are no combined figures in Greece, the incidence rate appears to be more than 6000 deaths annually.[2]

The most common sudden deaths that are caused by heart attacks occur outside of a hospital. Furthermore the survival rate in such cases is very low. It is estimated that only 1-5 % of these patients survive and are discharged from the hospital. The first person who promptly arrives to provide medical care after the heart attack has begun will encounter that the victim is experiencing ventricular fibrillation and ventricular tachycardia. These heart rhythms must be confronted quickly. In an effort to improve pre hospital care, the American Heart Association has promoted the "Chain of Survival" which is a sequence of four steps that should be taken in order to help a victim of cardiac arrest. If applied, this "Chain of Survival" improves a person's chances of continued existence. It has been proven that early defibrillation, which is one step in the chain of survival, is the only significant intervention used.[3]

The European Resuscitation Council (ERC) offers guidelines for providing CPR that are revised and published every five years. Traditionally cardiopulmonary resuscitation was only performed by a physician. With the creation of these guidelines and

instructions however, nursing staff has actively and directly become involved in the "chain of survival" in and out of the hospital. It has been scientifically proven that involving them in this process has decreased the delay in resuscitation.[4,5] Each member of the medical and paramedical community needs to know how to apply CPR and defibrillation not only in hospital but out of hospital as well.

The use of automated external defibrillators outside of the hospital can offer effective CPR for victims of cardiac arrest and this would save a significant amount of lives each year. Furthermore it would reduce the rate of severe disability caused by hypoxia of the brain for those who survive.[6,7]

Purpose

The purpose of this study was to explore the factors that influence the attitude of nursing staff in initiating CPR and in using the automated external defibrillator on victims of cardiac arrest out of the hospital.

Material and methods

The sample population of this study consisted of 310 nurses from various regions of Greece, from Athens and rural settings. A questionnaire based on a previous study was used.[8] It consisted of four parts. The first was concerned with the demographic characteristics of the respondents. The second consisted of questions inquiring about their educational experience as well as their practical experience in resuscitation. The third part explored the attitudes of the participants in the study towards initiating CPR in hypothetical situations. Lastly, the fourth part, explored the factors that influenced the attitudes towards initiating CPR.

The questionnaire was anonymous and purely voluntary. The respondents were given an explanation as to the goal of this study, that their involvement is purely voluntary, that their anonymity would be secured, that confidentiality would be maintained, and lastly that their information would not be used for other research or goals.

Statistical analysis

To find the correlation between the sample's level of education on resuscitation and their demographic characteristics, both the Pearson x^2 and the Spearman r were used. The statistical package SPSS ver.17 was used for the analysis of the results from this study. (SPSS Inc., 2003, Chicago, USA).

Results

Study population

The demographic characteristics of study population are reported in Table 1. The mean age of study participants was 35±7.85 (range 20-61) years; 81% were female and 19% were male. Regarding the educational level of participants, 2.9% had completed secondary technological education lyceum (TEL), 23% had graduated from an additional 2-year program, 67.6% were graduates from Higher Technological Education Institute (ATEI) and 3.6% from University (AEI). Further, 2.6% held a master's degree (Msc) and 0.3% a doctoral degree (PhD), (Table 1). 53.7% of the respondents worked in intensive care units, while 46.3% worked in hospital wards. In terms of location, 32.3% of the study subjects worked in rural areas and 67.7% worked in Athens (Table 1).

Questionnaires on CPR-AED training

CPR training data are listed in Table 2. 71.4% of the sample had attended a basic CPR-AED course; of this sample, 29.6% had attended the course once, 21.4% had attended twice and 29.3% had taken a refresher course in CPR more than 2 times (Table 2). The answers of the nursing staff regarding the factors that may influence its attitude in initiating CPR or on operating an AED are shown in Table 3. Of interest, it is neither the lack of confidence or training that affects their attitude in helping others. Study participants neither agree nor disagree with the statement that they may be negatively influenced by a fear that they may do more harm to a victim of cardiac arrest and "somewhat agree" that young victim, the lack of legal coverage from the state and the fear of contracting some illness may negatively influence their decision to begin CPR (Table 3).

There is a statistically significant correlation between the years of working experience and with the level of confidence (p=0.002), (Table 4). So is a statistically significant correlation between geographic work location and the willingness to use AED if it was available. (Table 5).

By implementing the control of 2 continuous variables using the Spearman r criterion, the following statistically significant correlations were discovered:

1) There was a statistically significant positive correlation between the age and the number of times that one has applied thoracic compressions or ventilations to a patient (r=0.146, p=0.013).

2) There was a statistically significant positive correlation between the

years of work experience and the number of times the person has been trained in CPR (r=0.139, p=0.019). Therefore as work experience increases it seems that they have also been trained more times in CPR.

3) There was a statistically significant positive correlation between the years of work and the number of times that one has implemented compressions or ventilations on a patient (r=0.189, p-value<0.001). Therefore as the work experience increases so does the number of times that they have applied CPR in the hospital, (Table 6).

Discussion

The results of this study showed that the sample population has not received enough satisfactory training, as they were not able to retain information relevant to applying CPR. This conclusion stems from the fact that a great percentage of the respondents did not answer correctly to the questions on the last guidelines of the European Resuscitation Council (ERC) that were relevant to the appropriate ratio of thoracic compressions to ventilations, as well as the defibrillator rhythms. In another similar study conducted by Govender et al.,[9] 20 professional health care workers had a decrease in their skills and their knowledge of CPR, even though they had been trained in CPR 3 months prior to the study.

Another similar study that was undertaken by a university clinical team in London showed that the retention of knowledge and skills during and after training in CPR is difficult and requires a more systematic training, as well as methods that will ensure better retention of skills and information.[10] In a study conducted by Soo-Il Oh et al.,[11] 47 professional nurses were tested on their skill of CPR 3 times at an interval of 4 months. From the results, it was confirmed that re-education clearly affects nurse's knowledge and skills by maintaining their knowledge and enhancing their skills. A good example of this is represented by the results of the study done by Preusch et al.,[12] which stressed the importance of training even experienced staff with the goal of adopting the guidelines for resuscitation and applying them properly in times where it becomes necessary. The factors that influence the attitudes of nursing staff in beginning CPR include the following: The fear of catching a contagious illness, and the number of times that they have been trained by

their employers thus increasing their confidence in applying CPR.

As far as the first factor is concerned, similar studies done by Giammaria et al.,[13] and Boucek et al.,[14] report the reluctance of professional health care workers in providing mouth to mouth without the appropriate means. Their reluctance is due to their anxiety over catching an illness from the victim.

As for the second factor, which is training, the respondents in this study have expressed their wish for training that is more systematic. Repeating training helps staff retain knowledge in CPR and in using the automatic external defibrillator. Anthonypillai[15], Berden et al.,[16] and Kuhnigk et al.,[17] have come to the same conclusion through their studies.

Through the comparative analysis done in this study we have come across some interesting conclusions about what factors influence nurse staff's knowledge in CPR and in using the automatic external defibrillators. Working experience is a significant factor which reinforce nurse attitude to initiate CPR and use the AED. Nurses feel more confident of their knowledge and skills. According to the results of the study the years of work experience are closely related to the number of times the person has been trained in CPR. Training

and availability of equipment help nurses use AED in resuscitation situations. There is often a gap between what is taught and what is practical in reality. Nurses need more encouragement and more information to reduce anxiety concerning defibrillation. Taniguchi et al.,[18] a study on 3328 individuals, amongst them were doctors, student doctors and teachers, suggests that a large proportion of the respondents would use the AED with great confidence regardless of the fact that they lack training and knowledge on this device.

Another study done by Makinen et al.,[19] that had a sample of 496 nurses, and lasted 4 years suggests that 27% of nurses are reluctant to use the AED in fear that they might cause trauma to the victim, and 64% would be reluctant out of anxiety of whether or not the machine would work. The above mentioned study concludes that there is a great need for intensive courses/training with the goal of boosting the confidence of nurses.

The results of our study also demonstrate that nurses who work in hospitals of Athens are more willing to use the AED. A possible explanation of this result is that nurses working in Athens have more opportunities of CPR training, a fact which encourage them to initiate CPR. Educational programmes

increase nurse's confidence in their own CPR-AED skills and create a positive atmosphere towards defibrillation.[20,21] Previous studies also, as mentioned above, have demonstrated that repeated educational programmes can improve skill retention and the likelihood of using an AED.[22,23]

Conclusions

The factor that shapes nurses' attitudes towards beginning CPR and in using the AED is mainly work experience. The more years of experience nurses have all the more willing they will be in applying CPR. The fear of transmitting an illness during resuscitation is also another important factor that influences nurse's attitudes.

Having systematic and recurring training in CPR is important. It is both the responsibility of health care organizations and of individual nurses to take the initiative in following such courses. Doing so will undoubtedly increase the staff's confidence in beginning CPR when it becomes vital in saving a life.

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ANNEX

Table 1. Demographic characteristics of the sample population

Gender	n (%)
Male	60 (19)
Female	250 (81)
Educational status	**n (%)**
TEL Graduates	9 (2.9)
Graduates/ 2 year program	71 (23)
ATEI Graduates	209 (67.6)
AEI Graduates	11 (3.6)
MSc	8 (2.6)
PhD	1 (0.3)
Working section	**n (%)**
Intensive care unit	160 (53.7)
Section	138 (46.3)
Geographic work location	**n (%)**
Province	100 (32.3)
Athens	210 (67.7)

Table 2. Educational status in relevance to cardiopulmonary resuscitation

	n	%
Have you ever followed a seminar of basic CPR[*] and use of AED[**]?		
a. Yes	220	71.4
b. No, never	79	25.6
c. I am not sure	9	2.9
How many times have you been trained in CPR?		
a. Never	58	19.7
b. Once	87	29.6
c. 2 times	63	21.4
d. > 2 times	86	29.3
Are you aware of the last guidelines of the European Resuscitation Council?		
a. Yes	131	42.8
b. No	117	38.2
c. I am not sure	58	19.0
Which is the right ratio of compressions to inflations?		
a. 5:2	32	10.8
b. 15:2	104	35.0
c. 30:2	155	52.2
d. 50:2	6	2.0
Do you know what an AED is?[**]		
a. Yes	216	70.6
b. No	55	18.0
c. I am not sure	35	11.4
In which arrhythmias AED[**] ministers defibrillation?		
a. Correct answer[****]	122	39.4
b. I don't know	188	60.6
Would you use AED[**] in a cardiac arrest victim out of hospital, if it was available?		
a. Yes	116	37.8
b. No	106	34.5
c. I am not sure	85	27.7

[*]*Cardiopulmonary Resuscitation*   [**]*Automated External Defibrillator*

[***]*PEA= Pulse less Electrical Activity*   [****]*Asystole & Ventricular Fibrillation*

Data are expressed in number, n (%)

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Table 3. Factors that influence sample's attitude in initiate cardiopulmonary resuscitation

The Factors that influence attitudes towards beginning CPR.	Mean± S.D.
I think that the fear of further harming a heart attack victim influences me greatly in initiating resuscitation.	3±1.4
I believe that my lack of self confidence influences me greatly in initiating resuscitation.	3±1.4
I believe that my lack of training influence me greatly in initiating resuscitation.	3±1.4
I believe that the young age of the victim positively affects my decision in initiating resuscitation.	4±1.3
I believe that the different gender or land of origin of the victim greatly influences my decision to begin resuscitation.	3±1.3
I believe that the lack of legal coverage of the state greatly influences my decision to begin resuscitation.	4±1.3
I believe that my fear of catching some disease greatly influences my decision to begin resuscitation.	4±1.2
I believe that if I know the victim (friend, or family etc.) this will positively affect my decision to begin resuscitation.	4±1.2
I believe that if the victim is of the same gender as me, this will positively influence my decision to begin resuscitation.	2±1.2
I believe that my training has to be repeated often, and it is the responsibility of my employer.	5±0.7
I believe that my training should be repeated often, and that it is my responsibility.	4±1.3

Scale: 1= completely disagree, 2= somewhat disagree, 3= I neither disagree nor agree 4= I somewhat agree 5= I completely agree.

Table 4. The correlation between the number of working years experienced and the lack of confidence in initiating resuscitation.

	My lack of confidence really influences my decision in starting resuscitation						
	I completely disagree	I somewhat disagree	I neither agree nor disagree	I somewhat agree	I completely agree	Total	**p-value**
Years of work experience							
< 10 years	36	41	38	29	21	165	
	21.8%	24.8%	23.0%	17.6%	12.7%	100.0%	0.002
≥ 10 years	49	14	29	36	14	142	
	34.5%	9.9%	20.4%	25.4%	9.9%	100.0%	
	85	55	67	65	35	307	
Total	27.7%	17.9%	21.8%	21.2%	11.4%	100.0%	

Table 5. The correlation between the geographic work location and the willingness to use an AED in an out of hospital cardiac arrest victim

	Would you use an AED in an out of hospital cardiac arrest victim if it was available?				
	No	I am not sure	Yes	Total	**p-value**
Geographic work location					
Province	49	21	29	99	
	49.5%	21.2%	29.3%	100.0%	0.002
Athens	57	64	87	208	
	27.4%	30.8%	41.8%	100.0%	
	106	85	116	307	
Total	34.5%	27.7%	37.8%	100.0%	

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Table 6. Results of correlations between demographic characteristics and education on resuscitation, as well as with experience

	1	2	3	4	5
1. age in years					
2. years of work experience					
3. How many times have you been trained in CPR?	0.089	0,139[*]			
	0.138	0.019			
4. How many times have you given compressions and inhalations or ambu ventilation) on an in - patient victim of cardiac arrest?	0,146[*]	0,189[**]	0,430[**]		
	0.013	0.001	<0.001		
5. How many times have you given compressions and inhalations on an out- patient victim of cardiac arrest?	-0.005	0.010	0,149[*]	0,284[**]	
	0.935	0.856	0.011	<0.001	