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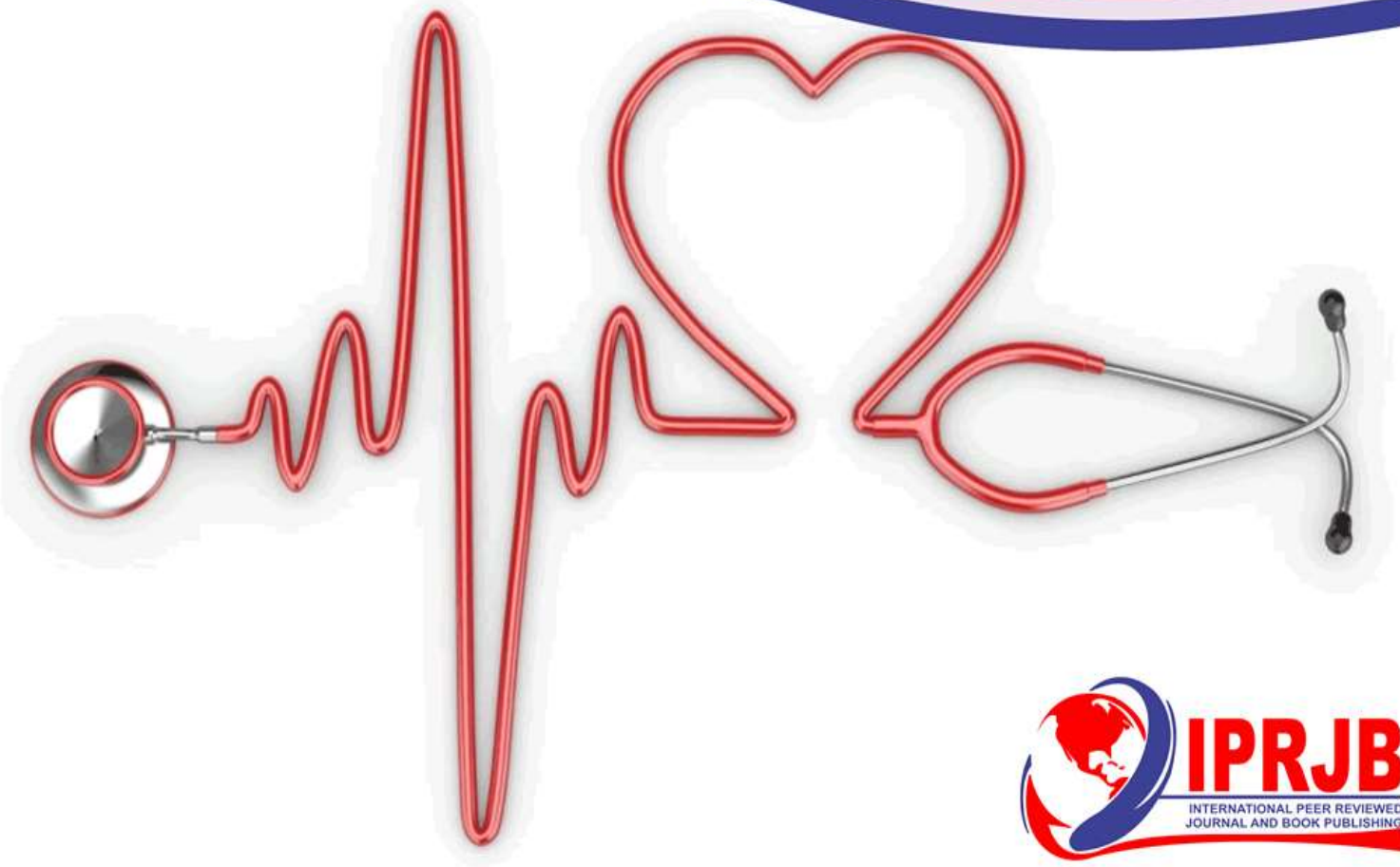

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Cardiopulmonary Resuscitation Training and Its Impact on Health Care Students' Knowledge and Anxiety Levels

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Abstract

Purpose: This study examines the impact of cardiopulmonary resuscitation (CPR) training on the knowledge and anxiety levels of healthcare students in the Home Patient Care Program. Cardiac arrest, a life-threatening condition requiring immediate intervention, underscores the critical importance of proper CPR application.

Methodology: The research utilized an experimental design with pre-test and post-test evaluations, involving 77 first-year students from Kastamonu University's Tosya Vocational School of Health Services. Participants were divided into experimental (n=34) and control (n=43) groups. The experimental group received five weeks of CPR and stress-anxiety management training based on the European Resuscitation Council's 2015 guidelines. Data were collected using a CPR knowledge questionnaire and the State-Trait Anxiety Inventory (STAI).

Findings: Results revealed significant improvements in the CPR knowledge scores of the experimental group, increasing from 3.47 (±1.73) to 10.09 (±1.68) ($p < 0.001$). Concurrently, their state anxiety levels decreased from 45.09 (±10.54) to 38.50 (±9.08) ($p < 0.001$), and trait anxiety scores showed a moderate reduction. No significant changes were observed in the control group.

Unique Contribution to Theory, Practice and Policy: The findings highlight the necessity of integrating CPR training with stress and anxiety management programs in healthcare education. Such training enhances students' ability to perform CPR effectively and reduces psychological barriers, ultimately improving patient outcomes. Further research with broader samples is recommended to validate these results.

Keywords: *Cardiopulmonary Resuscitation (CPR), Healthcare Education, Anxiety Management, Resuscitation Training, Student Performance*

JEL Codes: *I10, I12, I20, I21, I26, C93*

INTRODUCTION

Every year, millions of people around the world face life-threatening cardiac arrest situations that can result in death (Uslu and Demir Korkmaz, 2015). Cardiac arrest is characterized by the sudden loss of consciousness and mechanical cessation of the heart due to insufficient cerebral blood flow, and it requires immediate and urgent intervention (Kazak and Ökten, 2007). Cardiac arrest is more common in individuals between the ages of 45 and 75 (Uslu and Demir Korkmaz, 2015). Cardiopulmonary resuscitation (CPR) is one of the first aid practices that significantly impacts the survival rate in the face of this life-threatening emergency (Au et al, 2019). Therefore, it is crucial that CPR is applied at the right place, at the right time, and with the right method to be effective.

The effectiveness and outcome of CPR are directly proportional to the level of the practitioner's training and the stress they experience. CPR is a practice that creates significant physiological and psychological effects on the practitioners, as the survival of patients is closely related to the timely and correct actions of the practitioner. Therefore, practitioners may experience high levels of acute stress when facing a cardiac arrest situation that requires CPR (Vincent et al,2020). Stress can affect attention, increase distraction, and thus negatively impact the quality and performance of resuscitation (Vincent et al, 2020; Skosnik et al, 2000; Braunstein-Bercıvitz et al, Hunziker et al, 2001; Vincent et al,2020). Another variable affecting the quality of CPR is the practitioner's knowledge and level of CPR training (Vincent et al,2020). Literature indicates that successful resuscitation directly affects patient outcomes and survival rates. For this reason, there is an emphasis on optimizing and improving resuscitation training, especially for healthcare workers (Au et al, 2019).

Considering that most cardiac arrests occur at home, it becomes evident that home healthcare technicians who care for patients with heart disease should be trained in CPR. In order for students to respond correctly and effectively to critical cases such as cardiopulmonary arrest, they must be trained in university education to recognize such cases and apply the necessary interventions quickly and efficiently. In cardiopulmonary arrest cases, it is essential to apply CPR correctly, in the right order, completely, and at the right time. Since CPR significantly affects pre-hospital survival rates, students who are potential home care providers need to be able to perform CPR without stress and with confidence (Au et al, 2019; Vincent et al,2020).

For this reason, this study was conducted to examine the effects of cardiopulmonary resuscitation training, based on the practices of the European Resuscitation Council (ERC, 2015), on the knowledge and anxiety levels of students in the home care services department.

Since most cardiac arrests occur at home, it is vital to train home health care technician students in CPR to ensure effective intervention in such cases. University education should equip students with the necessary skills to identify and address cardiac arrest cases effectively. For successful outcomes, CPR must be performed promptly, accurately, and completely.

It has been observed that home care students often experience anxiety during CPR when they start working after graduation. Additionally, since they frequently encounter CPR situations, a review of the literature reveals that there are no studies addressing this issue specifically in the

context of home care students.

Given the significant impact of CPR on pre-hospital survival, students must be comfortable and stress-free during its application. This study, grounded in the 2015 guidelines of the European Resuscitation Council (ERC), investigates the effects of CPR training on home care services students' knowledge and anxiety levels.

Method Study Design

This study employed an experimental pre-test and post-test design with control groups.

Study Setting and Participants

The research was conducted in the Home Patient Care Program laboratory of Kastamonu University's Tosya Vocational School of Health Services. The laboratory simulated a hospital emergency room equipped with all necessary materials for CPR training.

Participants of the Study

The population of this study consists of 110 first-year students from Kastamonu University, Tosya Vocational School of Health Services, studying "Home Patient Care". In the formation of the experimental and control groups, first (daytime education) and second (evening education) shift students were randomly assigned to the groups, with first-shift students assigned to the experimental group and second-shift students to the control group. A total of 77 students who volunteered to participate in the study were included in the scope of the research. The experimental group consisted of 34 participants, while the control group had 43, selected randomly.

After completing the study, a power analysis (post hoc) was conducted to confirm the adequacy of the sample size. The observed 1-β and effect size were calculated using the G-power program. According to this result, the sample size of 77 participants was confirmed to be sufficient. Data are presented as mean ± S.D. Effect size (ES) was calculated to assess the clinical power of the result. ES was defined according to Cohen as small (=0.2), medium (=0.5), and large (=0.8) (Cohen).

Data Collection

The data for the study were collected in two stages during the fall semester of the 2019-2020 academic year. In the first stage, the experimental and control groups were determined, and a 12-item knowledge form developed by the researchers, along with the State and Trait Anxiety Inventory, were administered. Students' CPR knowledge and anxiety levels were assessed using SPSS 22. Based on the evaluation, it was found that the data obtained from the scales were similar in both the experimental and control groups. Then, for 5 weeks, the experimental group received CPR training from an Expert Emergency Nurse and stress and anxiety management training from an Expert Psychiatric Nurse and a Social Work Specialist. In the second stage, during the final week of the 5-week intervention, the same measurement tools were re-administered to both the experimental and control groups by an instructor, who was known to the students but not involved in the study, for data collection safety reasons.

Data Collection Tools

The data collection form consists of three sections. The first section includes a questionnaire

containing the participants' socio-demographic information and data related to CPR. The second section contains a questionnaire developed by the researchers to determine the students' level of CPR knowledge. The third section uses the State (Transient) – Trait Anxiety Inventory.

CPR Knowledge Level Items

A 10-item questionnaire was developed by the researchers to assess the CPR knowledge level. The items include questions on CPR techniques such as chest compression/ventilation methods, the use of an AED, ensuring airway patency, and pulse checking. Each correct answer given by the students to the questions was scored as 1 point.

State (Transient) – Trait Anxiety Inventory

The State (Transient) – Trait Anxiety Inventory was developed by Spielberger and colleagues in 1970, and its Turkish adaptation was made by Öner and Le Compte in 1985. The scale has two subdimensions. In the State Anxiety Scale, the items numbered 1 to 20 are scored as follows: (1) Not at all, (2) A little, (3) Quite a bit, and (4) Very much; while in the Trait Anxiety Scale, the items numbered 21 to 40 are scored as: (1) Almost never, (2) Sometimes, (3) Most of the time, and (4) Almost always.

There are two types of expressions in the scale: (1) direct (or straightforward) and (2) reversed expressions. Direct expressions reflect negative emotions, while reversed expressions reflect positive emotions. In the State Anxiety Scale, there are 10 reversed expressions, which are items 1, 2, 5, 8, 10, 11, 15, 16, 19, and 20. In the Trait Anxiety Scale, there are 7 reversed expressions, which are items 21, 26, 27, 30, 33, 36, and 39.

The scores obtained from both scales range from 20 to 80. An increase in the score indicates a higher level of anxiety, while a decrease in the score indicates a lower level of anxiety.

Implementation of the Study

The implementation of this study was carried out in 5 stages: planning, implementation-control, prevention, and evaluation.

In the planning stage: Before the CPR, Stress, and Anxiety Management Training Program, consultations were held with experts in measurement and evaluation as well as with the program planning specialist. Based on the experts' recommendations, the measurement tools to be used were determined. Following this, the students were randomly assigned to the experimental and control groups. A pre-test was administered, including the CPR Knowledge Levels Form and the State (Transient) – Trait Anxiety Inventory. After the data were collected, an explanation about the research was provided, and students' questions regarding the study were answered through a question-and-answer method (Table 1).

In the implementation and control stage: A 2-week training program, prepared based on expert recommendations, was implemented. The main topics of the program, organized by week, are presented in the table (Table 1).

Table 1: Educational Intervention Program Flow

Session	Period	Process	Topics	Practitioner
1. Session	45 min	PLANNING	Application of pre-test measuring instruments	All Researchers
			Explaning the purpose and importance of the research	
			Giving feedback to students by question and answer method	
2. Session	45 min	APPLICATION AND CONTROL	Cpr definition	Specialist Emergency Nurse
			Cases in which Cpr is applied	
			Stress concept and management	Specialist Psychiatry Nurse Social Service Specialist
			Anxiety concept and management	
3. Session	180 min		Cpr application method	Specialist Emergency Nurse
			Automatic external defibrillator application method	
			Cpr training model application	
4. Session	45 min	TAKING PRECAUTIONS	Individualized stressband anxiety management counseling	
5. Session	90 min	ASSESSMENT	Evaluation of students' Cpr application	All Researchers
			Assesment of students' stress situations	
			Evaluation of students' anxiety status	
			Evaluation of sessions	
			Application of post-test measuring instruments	

Prevention Stage: During the application and control stages, instructors provided individualized stress and anxiety management counseling to students who were observed to be

stressed and anxious.

Evaluation Stage: In this stage, students were asked to evaluate the sessions, the instructors, and themselves. At the end of the session, the final test measurement tools were administered.

Ethical Aspect of the Study

In this study, great care was taken to adhere to universally accepted ethical principles. In order for the study to be conducted, written approval was first obtained from the ethics committee of Kastamonu University. Additionally, the necessary permissions were obtained from the university where the field study was conducted, and official correspondence was made with the school where the intervention would take place. Participation in the study was voluntary, and it was ensured that the individuals included in the study were willing to participate. Before the participant information form and scales were applied to those who agreed to take part in the study, explanations were provided regarding the purpose of the research, the implementation process, the content of the questionnaires and scales, the benefits to be gained from the study, and the time commitment for the interventions and training. During the pre-study briefing, informed consent forms were completed by the participants, ensuring their voluntary participation in the study.

RESULTS AND DISCUSSION

This study was conducted to determine the effect of CPR training on the CPR knowledge levels and state and trait anxiety levels of health care services students. For this purpose, before the CPR training, students were administered a questionnaire to assess their personal information and knowledge related to the subject, a questionnaire developed by the researchers to determine their CPR knowledge level, and the State-Trait Anxiety Inventory. After basic life support training, these scales were re-administered, and the differences between the pre-test and post-test scores were examined.

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Table 2: İnformation about the Participants

Demographic variables		Experiment		Control		Total	
		S	%	S	%	S	%
Gender	Woman	22	64,7	38	88,4	60	77,9
	Male	12	35,3	5	11,6	17	22,1
	Total	**34**	**100**	**43**	**100**	**77**	**100**
High School Graduation	Healt Vocational High School Basic or Anatolian High School	5	14,7	8	18,6	13	16,9
		29	85,3	35	81,4	64	83,1
	Total	**34**	**100**	**43**	**100**	**77**	**100**
Do you follow the current information about CPR?	Yes	5	14,7	22	51,2	27	35,1
	No	29	85,3	21	48,8	50	64,9
	Total	34	100	43	100	77	100
Where do you follow?	Television	1	25,0	1	4,4	2	7,4
	Internet	3	75,0	22	95,6	25	92,6
	Total	**4**	**100**	**23**	**100**	**27**	**100**

The average age of the participants was 20.21 ± 1.83 years. Table 2 presents the socio-demographic characteristics of the students who participated in the study and their knowledge related to the subject.

Table 3: Comparision of CPR Inf. STAI, SAI and TAI Scales according to Gender

Gender	CPR Inf	STAI	SAI	TAI
Female (n=60)	9,22±2,03	83,05±14,49	39,40±8,55	43,65±8,07
Male (n=17)	10,53±1,55	81,76±12,10	37,41±8,62	44,35±5,87
	p:,016*	p:,739	p:,401	p:,739

CPR Inf: Cardiopulmoner Resusitation Information Level, STAI: State-Trait Anxiety Inventory, SAI: State Anxiety Inventory, TAI: Trait Anxiety Inventory

* p<0,05

On the Table 3, no statistically significant differences were observed in STAI dimensions scores according to students' gender. On the other hand, Male students had higher CPR Inf. Scores than Female students.

Table 4: Correlation among Age, CPR Inf. SAI, TAI and STAI Scores

		n=77	1	2	3	4	5
1	Age	R	-				
		P					
2	CPR Inf.	R	-,033	-			
		P	0,777				
3	SAI	R	-,071	,099	-		
		P	0,540	0,392			
4	TAI	R	,095	**-,271***	**,483****	-	
		P	0,414	0,045	0,000		
5	STAI	R	,008	-,055	**,878****	**,843****	-
		P	0,944	0,636	0,000	0,000	

CPR Inf: Cardiopulmoner Resusitation Information Level, STAI: State-Trait Anxiety Inventory, SAI: State Anxiety Inventory, TAI: Trait Anxiety Inventory

* p<0,05 ** p<0,001

When the relationship between the participants' age, CPR knowledge levels, State-Trait Anxiety Inventory, and the subscales of this inventory (State Anxiety and Trait Anxiety) was examined, a weak but significant negative correlation was found between CPR knowledge levels and the total score of the Trait Anxiety subscale ($r = -0.271$; $p < 0.05$). These results indicate that an increase in students' CPR knowledge levels significantly reduced their trait anxiety levels. (Table 4).

Table 5: Analyses CPR Inf., SAI, TAI and STAI Scores of Experimental and Control Groups

Dependent Variables		Pre-Test			Post-Test			P	ES
		N	Mean	SD	N	Mean	SD		
CPR Inf.	Experimental	34	3,47	1,73	34	10,09	1,68	**,000****	**,48**
	Control	43	3,95	2,05	43	3,05	2,13	,085	
SAI	Experimental	34	45,09	10,54	34	38,50	9,08	**,000****	**5,67**
	Control	43	39,41	8,68	43	39,32	8,20	,953	
TAI	Experimental	34	44,91	7,24	34	41,91	7,99	**,010***	**,19**
	Control	43	46,27	9,21	43	45,30	7,04	,308	
STAI	Experimental	34	90,00	14,04	34	84,41	14,84	**,000****	**,31**
	Control	43	85,70	16,02	43	84,63	13,04	,611	

CPR Inf: Cardiopulmoner Resusitation Information Level, STAI: State-Trait Anxiety Inventory, SAI: State Anxiety Inventory, TAI: Trait Anxiety Inventory ES: Effect Size (Small=0.2, medium=0.5, large=0.8).

* p<0,01 ** p<0,001

Significant difference between pre-test and post-test scores of CPR Inf., SAI and STAI of experimental group was observed with $p<0.001$, was observed with $p<0.01$ for TAI. CPR Inf. mean before training was 3.47 (±1.73), immediately after training was 10.09 (±1.68) for

experimental group (ES=.48). STAI mean before training was 90.00 (±14.04), immediately after training was 84.41 (±14.84) for experimental group (ES=.31). SAI mean before training was 45.09 (±10.54), immediately after training was 38.50 (±9.08) for experimental group (ES=5.67). TAI mean before training was 44.91 (±7.24), immediately after training was 41.91 (±7.99) for experimental group (ES=.19). No statistically significant differences were observed between pre-test and post-test scores of CPR Inf., SAI, TAI and STAI scores for control group (Table 5).

Discussion

CPR training is one of the important trainings that should be given to all individuals who will work as healthcare personnel before graduation. Although some universities have implemented these initiatives, some universities still do not allocate sufficient time or attention to CPR training (Cartledge et al, 2019). In our study, it was found that after the CPR training, students' knowledge levels increased and their trait anxiety scores decreased. Similarly, in the study conducted by Demirkıran and colleagues with first-year students at Istanbul University Cerrahpaşa Medical Faculty, CPR training was successful. In the same study, it was found that male students had higher knowledge levels than female students (Demirkıran et al, 2003). Similarly, in our study, it was found that after the training, male students had higher CPR knowledge levels than female students. Additionally, looking at Akdeniz's (2013) study, no significant difference in knowledge levels based on gender was found after CPR training given to final-year medical students at Istanbul University Cerrahpaşa Medical Faculty. The same study also reported a decrease in students' trait anxiety scores after the training (Demirkıran et al, 2003). Similarly, in our study, a weak but significant negative correlation was found between CPR knowledge levels and the total score of the Trait Anxiety subscale ($r = -0.271$; $p < 0.05$). These results indicate that an increase in students' CPR knowledge levels significantly reduced their trait anxiety levels. A review of the literature reveals that there are no other studies specifically related to CPR training and anxiety levels. However, there are similar studies related to preoperative anxiety and information provision. In Akkaş's research, it was observed that the education given to patients in the preoperative period reduced their anxiety levels (Akkaş, 1996).

CONCLUSION AND RECOMMENDATIONS

It has been found that the stress and anxiety management training provided to students had a significant effect on their CPR performance. In this context, incorporating stress and anxiety management skills training alongside regularly updated theoretical and practical CPR training can help students perform CPR more effectively, leading to better survival rates with less harm. It is recommended that future studies include different sample groups and consider adding the factor of continuity in training.

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