

# An Examination of the Effect Two Different Evaluation Methods Used in CPR Training Have on the Learning Process

Fatma Demir Korkmaz<sup>1</sup>, Esmâ Ozsaker<sup>1</sup>, Nurten Tasdemir<sup>2</sup> and Kevser Karacabay<sup>3</sup>

<sup>1</sup>Nursing Faculty, Ege University

<sup>2</sup>Zonguldak Health School, Bülent Ecevit University

<sup>3</sup>Kütahya School of Health, Dumlupınar University

## Abstract

*The aim was to analyze the effects of two different assessment methods on the learning process in CPR training. This quasi-experimental study design included two groups consisting of 152 third-year students. Group I students evaluated themselves by watching the videotapes and performing the CPR practice once again, while Group II students were evaluated by their trainers and asked to perform this skill again after receiving feedback. It was found that there was no significant difference between the self-assessment method and the feedback provided by their trainers ( $F=1.8362$ ,  $p=.245$ ,  $p>0.05$ ). It was determined that with the videotapes used by Group I students, insufficient/incorrect practices were easier to spot during the self-assessment process.*

**Key words:** CPR; nurse; process assessment; student; video recordings.

## Introduction

The aim of all medical interventions is the preservation of human life, and therefore resuscitation to save the life of someone who has stopped breathing is of great importance. In such a situation, it is of the utmost importance to intervene in the shortest possible time, in the correct sequence and in the right way, using scientifically-based methods (Abella, Alvarado, Myklebust, Edelson, Barry, O'Hearn, Vanden Hoek, & Becker, 2005).

The incidence of cardiac arrest in hospitals is between 0.1% and 0.5% (Bullock, 2000). A short time between cardiac arrest and cardiopulmonary resuscitation (CPR)

increases the chances of survival (Bullock, 2000; European Resuscitation Council Guidelines for Resuscitation, 2005). Studies have shown that doctors and nurses who have received training in CPR during their professional training perform CPR better (Bullock, 2000; Kardong-Edgren & Adamson, 2009; Kardong-Edgren, Oermann, Odom-Maryon, & Ha, 2010). Abella et al. (2005) have reported that the application of CPR in hospitals is inconsistent, and does not conform to the guidelines (European Resuscitation Council Guidelines for Resuscitation, 2005).

Nurses are those who intervene first when cardiac arrest is detected in a hospital (Bullock, 2000; Kardong-Edgren & Adamson, 2009; Madden, 2005). Nurses' CPR skills are important for the survival of patients in situations of cardiac arrest (Madden, 2005; Mutchner, 2007), and for this reason there is a need for nurses to be trained in effective CPR (Kardong-Edgren & Adamson, 2009; Nishiyama, Iwami, Kawamura, Ando, Kajino, Yonemoto, Fukuda, Yuasa, Yokoyama, & Nonogi, 2009). Nursing students must complete this training successfully before embarking on clinical practice (Bullock, 2000; Kardong-Edgren & Adamson, 2009).

Historically, traditional lecture has been one of the most commonly used teaching strategies (Mennenga, 2013). The development of motor skills and the ability to perform procedures in the clinical setting are critical outcomes of nursing education programs. Learning a motor skill is a permanent change in students' capability to perform the skill (Oermann, 2011). There is no time in a nursing program for instruction of skills that students will rarely use or have limited opportunities to practice (Oermann, 2011). Many studies have recently been carried out to evaluate the effectiveness of various training methods to develop psychomotor skills in the application of first aid (Ömeroğlu, Balkanay, Göksedef, & İpek, 2012; Perkins, Hulme, & Bion, 2002). One of the suggested methods is the use of video in CPR training. This is an important method for developing students' skills and self-confidence (Nishiyama et al., 2009; Sarac & Ok, 2010). At the same time, Kardong-Edgren and Adamson (2009) reported that more research was needed to determine the best method for nurses to acquire CPR skills (Kardong-Edgren & Adamson, 2009).

Examination of research into the development of CPR skills revealed numerous studies on the effectiveness of training methods such as the use of video or simulations (Bullock, 2000; Kardong-Edgren & Adamson, 2009; Ömeroğlu et al., 2012; Perkins et al., 2002; Şener & Yaylacı, 2010). However, no studies have been found on the effects which the methods involving giving feedback to students during the course of training have on learning.

## **Methods**

### ***Aim***

This study was conducted to investigate the effect of two different evaluation methods used in CPR training on the learning process.

## **Problems**

The research problems are:

- a) to examine the differences between two different (instructor-based and video recording method) evaluation methods and their effect on the development of CPR skills,
- b) to examine the effect of video recording method on the development of CPR skills,
- c) to compare the effect of the instructor-based method and video recording method on the development of CPR skills.

## **Hypothesis**

Hypothesis  $H_1$  = There is a statistically significant difference in the effect of two different evaluation methods used in CPR training on the learning process.

## **Sample**

The sample in this semi-experimental study consisted of 152 students studying at Ege University Nursing Faculty and taking the course in first aid. No sampling method was used in the study and the sample consisted of 152 students who agreed to participate in the research (participation rate 100%).

## **Data Collection Instruments**

A sociodemographic form, video recordings and the CPR Skills Evaluation Form were used in the collection of data.

**Sociodemographic Form:** This form consisted of a total of ten questions: four open-ended and six multiple choice questions.

**Video Recordings:** Video recordings were used for self-assessment only in Group I, each student was recorded with a video camera while performing CPR, after permission had been obtained from the students. Later, the students were asked to assess their own performances while watching the video recordings.

**CPR Skill Evaluation Form:** This form was created by the researchers and was based on European Resuscitation Council (ERC) Guidelines (Turkish Cardiology Association, 2011), and consisted of 21 items (Table 4). This form was used in both groups in order to evaluate the performance of CPR. Correctly performed steps were given a score of 1, steps which needed further development scored 0, and then the total score was calculated.

## **Data Collection Method**

In the study, the students were given four hours of theoretical CPR lessons, after which the CPR technique was demonstrated. One day after the theoretical CPR lessons, students were taken into the skills laboratory to complete their CPR psychomotor skills. They were grouped according to the class list. Those whose numbers on the list

were even (76 students) formed Group I, while those with odd numbers (76 students) formed Group II. In order to prevent interaction between students, they were taken into the skills laboratory one by one. Each student performed the CPR technique within the period of 20 to 25 minutes.

### **Group I – Practical CPR Performance**

Group 1 students were asked to perform their first CPR, of which a video recording was made at this stage. Later, a CPR skills evaluation form was handed out and students were asked to assess their own performance by watching their video recording. They were asked to place a (+) on the evaluation form next to the correctly performed technique, and a (-) next to the steps which needed further development. Students scored 1 for a correctly performed technique and 0 for a step which needed further development, and when the scores were added the total score for their first performance of CPR technique was obtained. In the next stage the students were asked to perform CPR again. The same form was used, but this time the assessment was carried out by the educators, who gave the score for the second CPR performance.

### **Group II – Practical CPR Performance**

Group II students were asked to perform CPR. At this stage, the students' performance was evaluated by the researchers using the CPR skills evaluation form. Correctly performed steps were given a score of 1 and steps which needed further development scored 0. Students were given feedback on which stages they had performed correctly and which needed further development. Later, students were asked to perform the CPR technique again. This second CPR performance was evaluated by the researchers, and the second performance score was given.

In each group, the process was repeated until the students performed the incorrect or inadequate skills correctly. At the end of the CPR course, all students attained a sufficient skill level. All CPR techniques were performed on Resusci Anne™ mannequins (Laerdal Medical, Stavanger, Norway).

Evaluation of research data was performed by Ege University Medical Faculty Department of Biostatistics and Informatics. The statistics program SPSS-11.0 was used for numerical, percentage, repeated measures ANOVA and chi-square analyses.

### ***Ethical Consideration***

Before initiating the research, a written permission was obtained from Ege University Nursing Faculty Scientific Ethics Committee, and oral permission was obtained from the students.

## **Results**

It was established that 99.0% of the students were female, 87.5% were graduates of regular high schools, 91.4% were not employed, 14.5% had had pervious training in

CPR, and 25.7% had a driving licence. The students' ages varied from 19 to 27 years (mean  $21.63 \pm 1.25$ ). Statistical evaluation showed that for gender ( $p = 0.316$ ,  $X^2 = 0.541$ ,  $p > 0.05$ ), high school of graduation ( $p = 0.462$ ,  $X^2 = 0.541$ ,  $p > 0.05$ ), employment status ( $p = 0.147$ ,  $X^2 = 2.103$ ,  $p > 0.05$ ), CPR training status ( $p = 0.645$ ,  $X^2 = 0.213$ ,  $p > 0.05$ ) and driving licence possession ( $p = 0.194$ ,  $X^2 = 1.690$ ,  $p > 0.05$ ), there was no statistically significant difference between the groups ( $p > 0.05$ ) (Table 1).

Table 1  
*Distribution of Students' Sociodemographic Characteristics*

Demographic Characteristic	Group I		Group II		Total		p	X <sup>2</sup>
	n	%	n	%				
Gender								
Female	76	100	75	98.7	151	99.3	0.316	1.007
Male	-	-	1	1.3	1.3	0.7		
Graduated from								
Health Vocational School	8	10.5	11	14.5	19	12.5	0.462	0.541
High School	68	89.5	65	85.5	133	87.5		
Employment status								
Employed as a nurse	4	5.3	9	11.8	13	8.6	0.147	2.103
Not employed	72	94.7	67	88.2	139	91.4		
Status of Having Received CPR Training								
Yes	10	13.2	12	15.8	22	14.5	0.645	0.213
No	66	86.8	64	84.2	130	85.5		
Driver's License								
Yes	23	30.3	16	21.1	39	25.7	0.194	1.690
No	53	69.7	60	78.9	113	74.3		

The comparison of the first and second CPR performance scores of the students in the group in which self-assessment was carried out using video recordings shows that the students' mean score for the first CPR performance was 17.17, and 20.00 for the second performance. The comparison of the scores in the first and second performance of the students in the group where feedback was given by the teaching staff showed a mean score of 17.47 in the first performance and a mean score of 20.36 in the second performance. The difference between the scores in the first performance and the second performance was found to be statistically significant ( $F = 241.280$ ,  $p = .000^*$ ,  $p < 0.05$ ). The students' scores in the second performance were found to be significantly higher than those in the first performance.

In the first performance, the mean score of students in Group I was 17.17, and that of students in Group II was 17.47. In the second performance, the mean score of students in Group I was 20.00, and that of students in Group II was 20.36. It was established therefore that the difference between CPR performance of the two groups was not statistically significant ( $F = 1.8362$ ,  $P = .245$ ,  $p > 0.05$ ) (Table 2).

Table 2

*Distribution of Groups' Mean CPR Scores*

	Group I X± SD	Group II X± SD	F	p
First Performance	17.17±2.65	17.47±2.88	241.280	.000 *
Second Performance	20.00±1.13	20.36±1.04		
Applications x Groups F=1.8362 p=.245 p>0.05				

Data are shown as mean ±SD

\*ANOVA for repeated measurements, p&lt;0.05

No statistically significant difference was found between the students' sociodemographic characteristics and their scores in the first and second performance, except for employment status as nurse (p>0.05) (Table 3).

Table 3

*Comparison of the First Practice Scores and Second Practice Scores of the Students According to Their Demographic Characteristics*

Demographic Characteristics	First Application Scores X± SD	Second Application Scores X± SD	F	p
Graduated from Health Vocational School	17.78±2.89	20.21±0.22	.178	.673
High School	17.25±2.75	21.40±13.98		
Employment status			8.944	.003*
Employed as a nurse	16.07±4.38	19.84±1.14		
Not employed	17.43±2.55	21.38±13.67		
Previous CPR education			1.867	.174
Yes	18.22±2.54	20.31±0.89		
No	17.16±2.78	21.41±14.14		
Driver's License			.689	.408
Yes	17.48±2.80	20.33±0.86		
No	17.26±2.76	21.57±15.17		

Data are shown as mean ±SD

\*ANOVA for repeated measurements, p&lt;0.05

For all students participating in the study, the steps on the CPR Skills Evaluation Form which were forgotten or wrongly performed during the first performance were, in order of frequency: laying the patient on a hard surface (52.6%); loosening the tie, belt and collar of the patient (40.8%); holding the fingers without making contact with the rib cage and without bending the wrists above the breastbone perpendicular to the body (34.9%); in the absence of breathing, giving two rescue breaths, each given over one second so that the patient's chest rises, and checking whether the patient breathes out (32.9%); applying pressure to the breastbone so that it is lowered by 4-5 cm (one third of the height of the chest as seen from the side) and performing this operation at a rate of 100 times per minute (29.6%); and calling for medical help (calling 112) (29.6%) (Table 4).

Table 4

*Distribution of Students by Steps on the CPR Skills Evaluation Form during the First Application*

Steps on the CPR Skills Evaluation Form	Correct		Incorrect	
	n	%	n	%
<b>1</b> Be certain of your own safety and safety of the victim.	144	94.7	8	5.3
<b>2</b> Check consciousness by lightly touching shoulders of the victim and asking: "Are you all right?"	135	88.8	171	1.2
<b>3</b> Request medical aid (call 112 in Turkey)	107	70.4	<b>45</b>	<b>29.6</b>
<b>4</b> If necessary, move the victim to a safe place on a hard surface.	72	47.4	<b>80</b>	<b>52.6</b>
<b>5</b> Kneel next to the victim.	139	91.4	13	8.6
<b>6</b> Loosen the tie, belt and collar of the victim.	90	59.2	<b>62</b>	<b>40.8</b>
<b>7</b> Check the inside of the victim's mouth for any objects blocking the airway; if there are any, remove them.	131	86.2	21	13.8
<b>8</b> In order to open the airway perform head-tilt and chin-lift: place one hand on the forehead of the victim.	134	88.2	18	11.8
<b>9</b> Tilt his/her head back to lift the chin with fingertips under the point of the victim's chin.	121	79.6	31	20.4
<b>10</b> Check for 5 seconds whether or not the victim is breathing using the 'look, listen and feel method'.	130	85.5	22	14.5
<b>11</b> If the victim is not breathing, use the thumb and index finger of the hand placed on his/her forehead to close the nose of the victim.	124	81.6	28	18.4
<b>12</b> Place your mouth in a manner that covers the mouth of the victim when the head is tilted backwards.	136	89.5	16	10.5
<b>13</b> If there is no breathing, give 2 life-saving breaths each lasting one second that will raise the chest of the victim and check whether or not the air is being inhaled and exhaled.	102	67.1	<b>50</b>	<b>32.9</b>
<b>14</b> Determine the centre of the chest according to the position of the sternum (the centre of the upper and lower end of the sternum) for implementing chest compressions.	142	93.4	10	6.6
<b>15</b> Place the bottom of one hand at the centre of the chest.	146	96.1	6	3.9
<b>16</b> Place the other hand on top of this hand.	146	96.1	6	3.9
<b>17</b> Lace the fingers of both hands together.	144	94.7	8	5.3
<b>18</b> Hold the fingers perpendicular to the body above the sternum without touching the rib cage and without bending the elbows.	99	65.1	<b>53</b>	<b>34.9</b>
<b>19</b> Apply pressure in such a manner that the sternum descends 4-5 cm (1/3 of the chest height when looked at from the side) and perform this procedure 100 times per minute.	107	70.4	<b>45</b>	<b>29.6</b>
<b>20</b> After giving the victim 30 heart massages, give 2 breaths for respiration.	149	98.0	3	2.0
<b>21</b> Continue without interrupting the basic life support of the victim until vital reflexes resume or medical aid arrives.	133	87.5	19	12.5

When students were asked about their views on the evaluation methods, responses from Group I students such as: “I could see better the mistakes or omissions in the procedure which I thought I had done correctly”; “it was a different performance of CPR”; “it was nice to see myself, and I was aware of my mistakes when I was performing the second CPR application” and “oral feedback gets forgotten” showed that the use of video was effective.

## **Discussion**

All of the students participating in the study were young ( $21.63 \pm 1.25$ , min. 19, max. 27 years). The majority were females (99.3%) and graduates of regular high schools (87.5%). Only a minority (14.5%) had had previous training in CPR, while a quarter of students (25.7%) had a driving licence (Table 1). It was established that there was no statistically significant difference between the sociodemographic characteristics of the students in the two groups ( $p > 0.05$ ).

Very few (14.5%) of the nursing degree students in this study had had previous training in CPR. In contrast to this, in a study carried out by Kardong-Edgren et al. (2010) it was reported that almost all nurses (91.9%) had received training in CPR. In the literature it is stated that nursing students must successfully pass a class in CPR before joining a nursing education program or beginning clinical experience (Bullock, 2000). It was seen in the present study that only students who were working as nurses had had CPR training in their high schools or in the organisations where they were currently working. Students working as nurses were graduates of medical vocational high schools and had received CPR training during their high school education, so that the mean scores of students working as nurses at the time of the study were expected to be higher. However, no statistically significant difference was found between being a health vocational school graduate and working as a nurse, and the mean CPR skill score ( $p = 0.462$ ,  $X^2 = 0.541$ ;  $p = 0.147$ ,  $X^2 = 2.103$ ). This is in accordance with the literature. It is stated in the literature that nurses' CPR skills are insufficient (Bullock, 2000; European Resuscitation Council Guidelines for Resuscitation, 2005; Kardong-Edgren & Adamson, 2009; Kardong-Edgren et al., 2010; Madden, 2005). However, when it is considered that nurses' CPR skills are an important factor affecting the outcome of cardiac arrest (Madden, 2005), it is a matter of concern that the scores of those of our students who were practicing the nursing profession were so low.

It was established that over a quarter of students in this study had driving licences. However, no statistically significant relationship was found between possession of a driving licence and the mean CPR skills points. In Turkey, obtaining a driving licence requires 12 hours of first aid lessons and a minimum age of 18. As the average age of the students participating in the study was  $21.63 \pm 1.25$ , students with driving licences must have recently taken a course in first aid and thus their mean scores in CPR skills should have been higher. This can be explained by CPR skills being very quickly forgotten.



In both Group I and Group II, a statistically significant difference was found between the mean scores in the first and second performance of CPR ( $F=241.280$ ,  $p=.000^*$ ,  $p<0.05$ ). It was also seen that the mean scores of neither group were very low in the first CPR performance. It is thought that this may be related to the fact that the students performed their first CPR after taking a theoretical and practical course in first aid.

It was established in this study that there was no difference in the acquisition of CPR skills between the method of self-evaluation using the video and the method of feedback given by teaching staff. There are studies described in the literature examining the effects which the use of video in teaching CPR has on the learning process, and these support the use of video in CPR training. However, our findings could not be compared with those of other studies as no studies were found which examine the effect that video recording of students performing CPR in the training process has on the correction of missing or wrong steps. There are no other studies in which students watched the videos of themselves performing CPR, either. Nevertheless, many of the students in Group I reported that they had been affected by their self-evaluation while watching the video recording. These students stated that they were surprised when they watched the video recording because they saw that some steps of CPR which they were virtually certain that they had carried out correctly were in fact wrong or incomplete. It might not have been so convincing if the students had been told by another person that these steps were wrong or incomplete.

## **Conclusions**

The results of the study show that even though no difference was found from the aspect of acquiring CPR skills between the self-evaluation using the video method and the method of feedback given by the teaching staff, it was reported by the students that the self-evaluation method using the video was more beneficial.

In line with the results obtained in the study, and taking into consideration the fact that students reported that they could more easily see their omissions or errors with the self-evaluation method using the video, it may be suggested that different evaluation methods, such as video recording, should be used in the development of skills training to evaluate first aid application, and similar studies should be carried out on larger sample using other evaluation methods.

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**Fatma Demir Korkmaz**

Surgical Nursing Department  
Nursing Faculty, Ege University  
35100, Bornova, Izmir Turkey  
fatma.demir@ege.edu.tr

**Esmâ Ozsaker**

Surgical Nursing Department  
Nursing Faculty, Ege University  
35100, Bornova, Izmir Turkey  
esmaozseker@yahoo.com

**Nurten Tasdemir**

Nursing Department  
Zonguldak School of Health , Bülent Ecevit University  
Esenköy, Kozlu, 67600, Zonguldak Turkey  
ntasdemir@gmail.com

**Kevser Karacabay**

Nursing Department  
Kütahya School of Health, Dumlupınar University  
Evliya Celebi Yerleskesi Tavşanlı Yolu 10.km, Kutahya, Turkey  
kevseryeter@gmail.com

# Analiza utjecaja dviju različitih metoda koje se koriste za procjenjivanje usvojenosti tehnike kardiopulmonalne reanimacije na proces učenja

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## Sažetak

*Cilj rada bio je analizirati utjecaj koji dvije različite metode ocjenjivanja usvojenosti tehnike kardiopulmonalne reanimacije (KPR) imaju na proces učenja. Kvazieksperimentalno istraživanje obuhvatilo je dvije skupine od ukupno 152 studenta treće godine. Studenti u Skupini 1 sami su sebe ocjenjivali tako što su gledali video snimke samih sebe dok su izvodili tehniku kardiopulmonalne reanimacije, a nakon toga su ponovno primijenili KPR tehniku. Studente u Skupini 2 ocjenjivali su njihovi nastavnici, a nakon što su dobili povratnu informaciju o tome kako su izveli tehniku kardiopulmonalne reanimacije, studenti su je ponovili. Pokazalo se da ne postoji značajna razlika između metode samoocjenjivanja i povratne informacije koju daju nastavnici ( $F=1,8362$ ,  $p=,245$ ,  $p>0,05$ ). Utvrđeno je da se u procesu samoocjenjivanja s pomoću video snimaka koje su gledali studenti u Skupini 1 može lakše uočiti nepotpuna/netočna usvojenost tehnike KPR-a.*

**Ključne riječi:** KPR; medicinska sestra; proces ocjenjivanja; student; videosnimke.

## Uvod

Cilj svih medicinskih intervencija jest spasiti ljudski život, pa je stoga reanimacija kojom se spašava život osobe koja je prestala disati od iznimne važnosti. U takvoj situaciji presudno je intervenirati u najkraćem mogućem vremenu, točnim redoslijedom radnji i na pravi način, koristeći se metodama koje se temelje na znanstvenim spoznajama (Abella, Alvarado, Myklebust, Edelson, Barry, O'Hearn, Vanden Hoek i Becker, 2005).

Postotak učestalosti srčanog zastoja u bolnicama je između 0,1% i 0,5% (Bullock, 2000). Kratko vrijeme između srčanog zastoja i kardiopulmonalne reanimacije (KPR) povećava izgleda za preživljavanje (Bullock, 2000; Smjernice za reanimaciju Europskog vijeća za reanimatologiju, 2005). Istraživanja su pokazala da liječnici i medicinske

sestre koji su završili obuku iz područja kardiopulmonalne reanimacije tijekom svojeg stručnog obrazovanja bolje primjenjuju tehniku KPR-a (Bullock, 2000; Kardong-Edgren i Adamson, 2009; Kardong-Edgren, Oermann, Odom-Maryon i Ha, 2010). Abella i sur. navode da je primjena tehnike KPR-a u bolnicama neusklađena i da nije u skladu s preporukama (Smjernice za reanimaciju Europskog vijeća za reanimatologiju, 2005).

Medicinske sestre su te koje prve interveniraju kada dođe do srčanog zastoja pacijenta u bolnici (Bullock, 2000; Kardong-Edgren i Adamson, 2009; Madden, 2005). Njihove vještine izvođenja kardiopulmonalne reanimacije bitne su za preživljavanje pacijenata u slučaju srčanog zastoja (Madden, 2005; Mutchner, 2007), pa stoga postoji potreba za stručnim osposobljavanjem medicinskih sestara za učinkovito izvođenje tehnike KPR-a (Kardong-Edgren i Adamson, 2009; Nishiyama, Iwami, Kawamura, Ando, Kajino, Yonemoto, Fukuda, Yuasa, Yokoyama i Nonogi, 2009). Studenti sestrištva trebali bi uspješno završiti takvu obuku prije nego počnu raditi u bolnicama (Bullock, 2000; Kardong-Edgren i Adamson, 2009).

Tijekom povijesti tradicionalna predavanja bila nastavna metoda koja se najčešće koristila (Mennenga, 2013). Razvoj motoričkih vještina i sposobnost primjena odgovarajućih tehnika u bolničkom okruženju ključni su ishodi obrazovnih programa u sestrištvu. Ovladavanje motoričkim vještinama predstavlja trajnu promjenu u sposobnosti studenata da izvedu određenu tehniku (Oermann, 2011). U studiju sestrištva nema vremena za poučavanje vještina kojima će se studenti rijetko koristiti ili ih neće imati prilike uvježbavati (Oermann, 2011). U posljednje vrijeme provedena su mnoga istraživanja koja se bave učinkovitošću različitih nastavnih metoda kojima se razvijaju psihomotoričke vještine za pružanje prve pomoći (Ömeroğlu, Balkanay, Göksedef i İpek, 2012; Perkins, Hulme i Bion, 2002). Jedna od predloženih metoda jest korištenje videosnimaka prilikom obuke u području kardiopulmonalne reanimacije. To je važna metoda za razvoj vještina kod studenata, kao i za njihovo samopouzdanje (Nishiyama i sur., 2009; Sarac i Ok, 2010). Istodobno su Kardong-Edgren i Adamson (2009) naveli da je potrebno provesti više istraživanja da bi se odredila najbolja metoda koja bi medicinskim sestrama pomogla u ovladanju tehnikama izvođenja kardiopulmonalne reanimacije (Kardong-Edgren i Adamson, 2009).

Analiza istraživanja provedenih u području unapređenja vještina KPR-a pokazala je brojne studije o učinkovitosti pojedinih nastavnih metoda, kao što su upotreba videosnimaka ili simulacije (Bullock, 2000; Kardong-Edgren i Adamson, 2009; Ömeroğlu i sur., 2012; Perkins i sur., 2002; Şener i Yaylacı, 2010). Međutim, nisu pronađene nikakve studije o utjecaju koji metode koje uključuju davanje povratne informacije studentima tijekom obuke imaju na proces učenja.

## **Metode**

### **Cilj**

Ovo istraživanje provedeno je s ciljem određivanja utjecaja koji dvije različite metode ocjenjivanja tehnike kardiopulmonalne reanimacije imaju na proces učenja.

## **Problemi**

Problemi kojima se ovo istraživanje bavi su:

- a) Ispitati razlike između dviju različitih metoda ocjenjivanja (povratna informacija od nastavnika i metoda videosnimanja) i njihov utjecaj na razvoj vještina izvođenja kardiopulmonalne reanimacije
- b) Ispitati utjecaj metode video snimanja na razvoj vještina izvođenja kardiopulmonalne reanimacije
- c) Usporediti utjecaj davanja povratne informacije od nastavnika i metode videosnimanja na razvoj vještina izvođenja kardiopulmonalne reanimacije.

## **Hipoteza**

Hipoteza  $H_1$  = Postoji statistički značajna razlika u utjecaju koji dvije različite metode ocjenjivanja koje su se koristile u obuci studenata za izvođenje kardiopulmonalne reanimacije imaju na proces učenja.

## **Uzorak**

Uzorak u ovom polueksperimentalnom istraživanju činila su 152 studenta na studiju sestristva Sveučilišta u Egeu koji su pohađali tečaj prve pomoći. U istraživanju se nije koristila nijedna metoda uzorkovanja, a uzorak se sastojao od 152 studenta koji su pristali na sudjelovanje u istraživanju (stopa sudjelovanja od 100 %).

## **Instrumenti prikupljanja podataka**

Za prikupljanje podataka koristili su se sociodemografski upitnik, videosnimke i upitnik za procjenu vještine izvođenja kardiopulmonalne reanimacije.

**Sociodemografski upitnik:** ovaj upitnik sastojao se od ukupno deset pitanja: četiri su bila otvorenog tipa, a preostalih šest pitanja bilo je u obliku pitanja višestrukog izbora.

**Videosnimke:** samo u Skupini 1, u kojoj su se za samoocjenjivanje koristile videosnimke, svaki student sniman je videokamerom za vrijeme izvođenja tehnike kardiopulmonalne reanimacije, nakon što je prethodno to dopustio. Poslije su studenti zamoljeni da ocijene svoju tehniku izvođenja KPR-a dok gledaju videosnimke.

**Upitnik za procjenu vještine izvođenja kardiopulmonalne reanimacije:** ovaj upitnik sastavili su istraživači u skladu sa Smjernicama za reanimaciju Europskog vijeća za reanimatologiju (Tursko udruženje kardiologa, 2011), a sastojao se od 21 tvrdnje (Tablica 4). Taj upitnik koristio se u obje skupine da bi se ocijenilo izvođenje tehnike KPR-a. Točno odrađeni koraci ocijenjeni su jednim bodom, a koraci koje je potrebno doraditi ocijenjeni su s nula bodova. Nakon toga je izračunat ukupan rezultat.

## **Metoda prikupljanja podataka**

Tijekom istraživanja studenti su odslušali četiri sata teorijske nastave o kardiopulmonalnoj reanimaciji, a nakon toga im je tehnika kardiopulmonalne reanimacije demonstrirana. Dan nakon što je teorijska nastava završila, studenti su

otišli u praktikum da bi isprobali svoje psihomotoričke vještine prilikom izvođenja KPR-a. Studenti su podijeljeni u skupine prema popisu imena. Oni čija su se imena nalazila pokraj parnog rednog broja (76 studenata) stavljeni su u Skupinu 1, a oni čija su se imena nalazila pokraj neparnog rednog broja (76 studenata), činili su Skupinu 2. Da bi se spriječila interakcija među studentima, studenti su ulazili u praktikum jedan po jedan. Svaki student je praktično primijenio kardiopulmonalnu reanimaciju, što je za svakoga od njih trajalo od 20 do 25 minuta.

### **Praktična primjena kardiopulmonalne reanimacije u Skupini 1**

Studenti iz Skupine 1 morali su izvesti svoju prvu kardiopulmonalnu reanimaciju, što je u ovoj fazi snimljeno videokamerom. Poslije je studentima podijeljen Upitnik za procjenu vještine izvođenja kardiopulmonalne reanimacije te su sami morali ocijeniti svoju uspješnost u izvođenju tehnike KPR-a dok su gledali svoje snimke. Ako su točno izveli tehniku KPR-a, trebali su u upitniku napisati znak (+), a ako smatraju da još trebaju doraditi određene korake u tehnici KPR-a, trebali su u upitniku pokraj tih koraka napisati znak (-). Studenti su dobili 1 bod ako su točno izveli tehniku KPR-a, a 0 nula bodova za korake koje još moraju usavršiti. Tako je izračunat ukupan rezultat za njihovu prvu primjenu tehnike KPR-a. U sljedećoj fazi studenti su ponovno morali primijeniti tehniku kardiopulmonalne reanimacije. Koristio se isti upitnik, no ovaj put studente su procjenjivali nastavnici koji su im davali bodove za drugu primjenu tehnike KPR-a.

### **Praktična primjena kardiopulmonalne reanimacije u Skupini 2**

Studenti iz Skupine 2 morali su izvesti svoju prvu kardiopulmonalnu reanimaciju. U ovoj fazi njihovu tehniku ocjenjivali su istraživači služeći se Upitnikom za procjenu vještine izvođenja kardiopulmonalne reanimacije. Za točno izvedene korake u KPR tehnici dobili su 1 bod, a za korake koje je trebalo popraviti dobili su 0 bodova. Studenti su dobili povratnu informaciju o tome koje su faze tehnike kardiopulmonalne reanimacije izveli dobro, no i o onima koje još trebaju doraditi. Poslije su studenti morali ponovno primijeniti tehniku KPR-a. Taj drugi postupak ponovno su ocjenjivali istraživači, a zatim je dobiven rezultat druge primjene tehnike KPR-a.

U svakoj skupini proces se ponavljao sve dok studenti nisu potpuno točno izveli one korake koje su prethodno izveli netočno ili one koje su morali popraviti. Na kraju obuke iz kardiopulmonalne reanimacije svi studenti su dostigli odgovarajući stupanj vještina. Svaka primjena tehnike kardiopulmonalne reanimacije izvodila se na lutkama Resusci Anne™ (tvrtke Laerdal Medical, Stavanger, Norveška).

Evaluaciju podataka prikupljenih u istraživanju proveo je Odsjek za biostatistiku i informatiku Medicinskog fakulteta Sveučilišta u Egeu. Za numeričku analizu, postotak, ANOVA analizu ponovljenih mjerenja i za analizu hi-kvadrata koristio se SPSS-11.0 statistički softverski paket.

### ***Etička razmatranja***

Prije provođenja istraživanja dobivena je pismena suglasnost Odbora za etiku Fakulteta sestrinstva Sveučilišta u Egeu. Od studenata je dobivena usmena suglasnost.

## Rezultati

Analizom je utvrđeno da je 99 % studenata bilo ženskog spola, 87,5 % ih je završilo redovitu srednju školu, 91,4 % studenata bilo je nezaposleno, 14,5 % ih je već imalo obuku iz KPR-a, a 25,7 % ih je posjedovalo vozačku dozvolu. Dob studenata kretala se od 19 do 27 godina (srednja vrijednost  $21,63 \pm 1,25$ ). Statistička evaluacija pokazala je da između skupina nije postojala statistički značajna razlika ( $p > 0,05$ ) (Tablica 1) kada se radilo o spolu ( $p = 0,316$ ,  $X^2 = 0,541$   $p > 0,05$ ), završenoj srednjoj školi ( $p = 0,462$ ,  $X^2 = 0,541$   $p > 0,05$ ), zaposlenju ( $p = 0,147$ ,  $X^2 = 2,103$   $p > 0,05$ ), prethodnoj obuci iz kardiopulmonalne reanimacije ( $p = 0,645$ ,  $X^2 = 0,213$   $p > 0,05$ ) i posjedovanju vozačke dozvole ( $p = 0,194$ ,  $X^2 = 1,690$   $p > 0,05$ ).

### Tablica 1

Usporedba rezultata koje su studenti ostvarili nakon prve i druge primjene tehnike KPR-a u skupini u kojoj se samoocjenjivanje izvodilo s pomoću gledanja videosnimaka pokazuje da je srednji rezultat koji su studenti ostvarili nakon prve primjene bio 17,17, a 20,00 nakon druge primjene. Usporedba rezultata koje su studenti ostvarili nakon prve i nakon druge primjene tehnike KPR-a u skupini gdje su povratnu informaciju studentima dali nastavnici pokazala je nakon prve primjene tehnike da je srednji rezultat bio 17,47, a nakon druge primjene 20,36. Razlika u rezultatu nakon prve primjene tehnike KPR-a i nakon druge primjene bila je statistički značajna ( $F = 241,280$ ,  $p = ,000^*$ ,  $p < 0,05$ ). Rezultati koje su studenti ostvarili nakon druge primjene tehnike KPR-a bili su značajno bolji od onih ostvarenih nakon prve primjene.

Nakon prve primjene tehnike KPR-a srednji rezultat studenata iz Skupine 1 bio je 17,17, a rezultat studenata iz Skupine 2 bio je 17,47. Nakon druge primjene srednji rezultat studenata iz Skupine 1 bio je 20,00, a srednji je rezultat studenata iz Skupine 2 bio 20,36. Tako je utvrđeno da razlika u primjeni tehnike KPR-a između tih dviju skupina nije bila statistički značajna ( $F = 1,8362$ ,  $P = ,245$ ,  $p > 0,05$ ) (Tablica 2).

### Tablica 2

Nije utvrđena statistički značajna razlika između sociodemografskih obilježja studenata i njihovih rezultata nakon prve i druge primjene KPR-a, osim kod statusa zaposlenja kod onih studentica koje su radile kao medicinske sestre ( $p > 0,05$ ) (Tablica 3).

### Tablica 3

Kod svih studenata koji su sudjelovali u istraživanju koraci u Upitniku za procjenu vještine izvođenja kardiopulmonalne reanimacije koje su studenti najčešće zaboravili ili koje su netočno izveli tijekom prve primjene tehnike KPR-a bili su: položiti pacijenta na tvrdu podlogu (52,6%); otpustiti kravatu, ovratnik i remen pacijenta (40,8%); držati prste tako da ne dodiruju prsni koš i ne stavljati zapešće u položaj okomito na prsnu kost (34,9%); u slučaju da pacijent ne diše, dati dva kratka upuha, svaki u trajanju dužem od jedne sekunde, dok se prsni koš pacijenta ne počne dizati te provjeriti



izdiše li pacijent (32,9%); pritiskati prsnu kost tako da se ona spusti za 4-5 cm (za jednu trećinu visine prsnog koša gledano sa strane) i to brzinom od 100 puta u minuti (29,6%); zvat i hitnu pomoć (nazvati 112) (29,6%) (Tablica 4).

Tablica 4

*Distribucija studenata prema koracima u Upitniku za procjenu vještine izvođenja kardiopulmonalne reanimacije tijekom prve primjene tehnike*

Koraci u Upitniku za procjenu vještine izvođenja KPR-a	Točno		Netočno	
	n	%	n	%
<b>1</b> Vodite računa o vlastitoj sigurnosti i sigurnosti žrtve.	144	94,7	8	5,3
<b>2</b> Provjerite je li žrtva pri svijesti tako što ćete joj lagano dotaknuti ramena i pitati je: „Jeste li dobro?“	135	88,8	171	1,2
<b>3</b> Zovite hitnu pomoć (nazovite 112 u Turskoj).	107	70,4	45	29,6
<b>4</b> Ako je potrebno, pomaknite žrtvu na sigurno, na tvrdu podlogu.	72	47,4	80	52,6
<b>5</b> Kleknite pokraj žrtve.	139	91,4	13	8,6
<b>6</b> Otpustite kravatu, ovratnik i remen žrtve.	90	59,2	62	40,8
<b>7</b> Provjerite ima li u ustima žrtve bilo kakvih predmeta koji bi blokirali protok zraka; ako ih ima, uklonite ih.	131	86,2	21	13,8
<b>8</b> Da biste oslobodili dišni put, zabacite glavu i podignite bradu žrtve: stavite jednu ruku na čelo žrtve.	134	88,2	18	11,8
<b>9</b> Zabacite žrtvinu glavu da biste joj prstima podigli bradu ispod vrha brade.	121	79,6	31	20,4
<b>10</b> Provjeravajte tijekom 5 sekundi diše li žrtva ili ne, koristeći se metodom „gledaj, slušaj i osjećaj“.	130	85,5	22	14,5
<b>11</b> Ako žrtva ne diše, palcem i kažiprstom ruke koja je na čelu žrtve zatvorite joj nos.	124	81,6	28	18,4
<b>12</b> Svojim ustima prekrijte usta žrtve dok joj je glava zabačena unatrag.	136	89,5	16	10,5
<b>13</b> Ako žrtva ne diše, dajte joj dva upuha, svaki u trajanju od jedne sekunde, što će podići prsni koš žrtve, a zatim provjerite da li žrtva udiše i izdiše zrak.	102	67,1	50	32,9
<b>14</b> Odredite sredinu prsnog koša prema položaju prsne kosti (sredina između gornjeg i donjeg dijela prsne kosti) da biste izveli kompresije.	142	93,4	10	6,6
<b>15</b> Stavite dlan jedne ruke na sredinu prsnog koša.	146	96,1	6	3,9
<b>16</b> Stavite drugu ruku preko prve ruke.	146	96,1	6	3,9
<b>17</b> Isprepletite prste obje ruke.	144	94,7	8	5,3
<b>18</b> Držite prste okomito na tijelo iznad prsne kosti bez dodirivanja prsnog koša i bez savijanja laktova.	99	65,1	53	34,9
<b>19</b> Počnite pritiskati tako da se prsna kost spusti 4-5 cm (za jednu trećinu prsnog koša gledajući sa strane) i ponovite taj postupak 100 puta u minuti.	107	70,4	45	29,6
<b>20</b> Nakon što izvedete 30 kompresija, dajte dva upuha za disanje.	149	98,0	3	2,0
<b>21</b> Nastavite bez prekida održavati žrtvu na životu dok se vitalne funkcije ponovno ne pojave ili dok ne stigne hitna pomoć.	133	87,5	19	12,5

Kada se od studenata tražilo njihovo mišljenje o metodama ocjenjivanja njihove primjene, odgovori studenata iz Skupine 1 kao što su: „mogao sam bolje uočiti pogreške ili propuste u proceduri za koje sam mislio da sam ispravno izveo“; „to je bila sasvim drugačija primjena KPR tehnike“; „bilo je lijepo vidjeti samoga sebe, a bio sam svjestan svojih pogrešaka kada sam po drugi puta izvodio KPR“; „usmena povratna informacija se zaboravlja“ pokazali su da je upotreba videosnimaka bila učinkovita.

## Rasprava

Svi studenti koji s sudjelovali u istraživanju bili su mladi ( $21,63 \pm 1,25$ , minimalno 19, maksimalno 27 godina). Većina ih je bila ženskog spola (99,3 %) i završila je redovitu srednju školu (87,5 %). Samo je manji dio njih (14,5 %) imao prethodnu obuku iz izvođenja tehnike KPR-a, a četvrtina studenata (25,7%) imala je vozačku dozvolu (Tablica 1). Utvrđeno je da nije bilo statistički značajne razlike u sociodemografskim karakteristikama studenata iz dviju skupina ( $p > 0,05$ ).

Jako malo (14,5%) studenata sestrinstva koji su sudjelovali u ovom istraživanju imalo je prethodnu obuku iz KPR-a. Za razliku od toga, u istraživanju koje su proveli Kardong-Edgren i sur. (2010) navedeno je da su gotovo sve medicinske sestre (91,9%) imale obuku iz izvođenja kardiopulmonalne reanimacije. U literaturi se navodi da studenti sestrinstva moraju uspješno položiti gradivo iz KPR-a prije nego što se upišu na studij sestrinstva ili započnu svoj rad u bolnici (Bullock, 2000). U ovom istraživanju utvrđeno je da su samo oni studenti koji su već radili kao medicinske sestre imali nastavu iz KPR-a u srednjoj školi koju su pohađali ili u organizaciji u kojoj su trenutno radili. Studenti koji su radili kao medicinske sestre završili su srednje strukovne medicinske škole i imali su nastavu iz KPR-a tijekom svojeg srednjoškolskog obrazovanja, tako da se očekivalo da će srednji rezultat studenata koji su u vrijeme istraživanja već radili kao medicinske sestre biti bolji. Međutim, nije pronađena statistički značajna razlika između studenata koji su završili srednju medicinsku školu i radili kao medicinske sestre i njihova rezultata na ispitivanju vještine pružanja KPR-a ( $p = 0,462$ ,  $X^2 = 0,541$ ;  $p = 0,147$ ,  $X^2 = 2,103$ ), što je u skladu s literaturom. U literaturi se navodi da su vještine medicinskih sestara u izvođenju KPR-a nezadovoljavajuće (Bullock, 2000; Smjernice za reanimaciju Europskog vijeća za reanimatologiju, 2005; Kardong-Edgren i Adamson, 2009; Kardong-Edgren i sur., 2010; Madden, 2005). Međutim, kada se uzme u obzir činjenica da su vještine medicinskih sestara u izvođenju kardiopulmonalne reanimacije važan čimbenik koji utječe na ishod srčanog zastoja (Madden, 2005), zabrinjava činjenica da su rezultati onih studenata koji već rade kao medicinske sestre u bolnicama bili tako niski.

Također se pokazalo da je više od četvrtine studenata koji su sudjelovali u navedenom istraživanju imalo vozačku dozvolu. Međutim, nije pronađena statistički značajna veza između posjedovanja vozačke dozvole i rezultata ostvarenog na ocjenjivanju vještine izvođenja KPR-a. U Turskoj dobivanje vozačke dozvole podrazumijeva da kandidat mora odslušati 12 sati nastave iz prve pomoći i imati najmanje 18 godina. Kako je prosječna dob studenata koji su sudjelovali u istraživanju bila  $21,63 \pm 1,25$ , studenti koji su već imali vozačku dozvolu morali su nedugo prije toga završiti tečaj iz prve

pomoći, pa su samim time njihovi rezultati u izvođenju tehnike KPR-a morali biti puno bolji. To se može objasniti činjenicom da se vještina izvođenja KPR-a vrlo brzo zaboravlja.

I u Skupini 1 i u Skupini 2 uočena je statistički značajna razlika između rezultata ostvarenih na prvom i na drugom izvođenju tehnike KPR-a ( $F=241,280$ ,  $p=.000^*$ ,  $p<0,05$ ). Također je uočeno da rezultati nijedne skupine nisu bili jako loši prilikom prvog izvođenja tehnike KPR-a. Smatra se da je ta činjenica možda povezana s činjenicom da su studenti prvi put izveli tehniku KPR-a nakon što su završili teorijsku i praktičnu nastavu iz prve pomoći.

Također je u ovom istraživanju utvrđeno da ne postoji razlika u usvajanju vještina izvođenja KPR-a primjenom metode samoocjenjivanja korištenjem videosnimaka i metode povratne informacije koju pružaju nastavnici. Postoje istraživanja opisana u literaturi koja se bave utjecajem kojega upotreba video snimaka u nastavi KPR-a ima na proces učenja, a takva istraživanja idu u prilog upotrebi video snimaka u nastavi KPR-a. Međutim, naši rezultati ne mogu se usporediti s rezultatima drugih istraživanja jer ne postoje istraživanja koja se bave utjecajem koji videosnimke studenata dok izvode KPR tijekom obuke imaju na ispravljanje pogrešnih ili propuštenih koraka u izvođenju KPR-a. Također ne postoje istraživanja u kojima su studenti gledali videosnimke samih sebe dok izvode kardiopulmonalnu reanimaciju. Ipak, mnogi studenti iz Skupine 1 naveli su da je na njih utjecalo samoocjenjivanje dok su gledali videosnimke. Ti studenti naveli su da su bili iznenađeni kada su gledali snimke jer su uočili da su neki koraci KPR-a za koje su bili sigurni da su ih izveli ispravno zapravo bili neispravni ili nepotpuni. Možda na njih ne bi toliko utjecalo to da im je neka druga osoba rekla da su ti koraci bili neispravni ili nepotpuni.

## Zaključci

Rezultati ovog istraživanja pokazuju da su, iako nije pronađena razlika u uspješnosti usvajanja vještina izvođenja KPR-a primjenom samoocjenjivanja putem metode videosnimaka i metode povratne informacije od nastavnika, studenti naveli da je metoda samoocjenjivanja prilikom koje se koriste videosnimke bila učinkovitija.

U skladu s rezultatima dobivenima u ovom istraživanju te uzimajući u obzir činjenicu da su studenti naveli da su lakše mogli uočiti svoje propuste ili pogreške primjenom metode videosnimaka, može se dati preporuka za upotrebu različitih metoda ocjenjivanja, poput videosnimaka, u praktičnoj nastavi, da bi se ocijenilo pružanje prve pomoći. Također bi se trebala provesti slična istraživanja na većem uzorku i primjenom drugačijih metoda ocjenjivanja.

## Zahvale

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