

# Effects of 119 Paramedics Wearing Personal Protective Equipment on Blood Pressure, Pulse, and Breathing

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## Abstract

This study analyzed the physical changes in 119 paramedics transporting equipment at the emergency site and performing post - cardiopulmonary resuscitation through experiments. First, the average heart rate increased by about 25 times comparing CPR was performed without physical load and with personal protective equipment after moving equipment. In the third quartile, it increased to about 27 times. Second, when CPR was performed without physical load, and CPR was performed after moving the equipment with personal protective equipment, both the body temperature was raised and the rising body temperature was measured within normal body temperature. Third, the change in respiration rate increased by 7 times on average comparing CPR was performed without physical load and CPR was performed after moving the equipment while wearing personal protective equipment. In the third quartile, it increased to about 11 times. Finally, the change in blood pressure increased by 26.6 mmHg on average comparing CPR was performed without physical load and with wearing personal protective equipment after moving the equipment, and increased by 31.2 mmHg on average in the third quartile.

**Keywords :** 119 paramedics, CPR, Personal protective clothing, Blood pressure, Pulse

1. 가 1 19  
1 27 2  
119 23 가  
[3],  
가 가 가 가  
(Personal Protective Equipment, PPE)  
(2017) 2015 119 가  
2,706 , 가  
29,078 .[1]  
2019 12 가  
19가 가  
LEVER D  
2020 3 11 [2] [4].

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14 19  
 14 , 37.5  
 ( , ) CPR  
 A  
 B  
 .[10]  
**3.**  
**3.1**  
 19 20%  
 119 20  
 SPSS18  
 one - way ANOVA  
 Paired t - test

<Table 2> Subject Characteristics (N=20)

Classification		Frequency	Percent (%)
Gender	Male	16	80.0
	Female	4	20.0
Age	Less than 30	5	25.0
	30~34	6	30.0
	35~39	4	20.0
	40~49	3	15.0
	over 50	2	10.0
Career	Less than 1 year	3	15.0
	1~5 years	6	30.0
	5~10 years	5	25.0
	10~20 years	4	20.0
	over 20 years	2	10.0
Licence type	nurse	5	25.0
	Paramedic	8	40.0
	EMT - basic	4	20.0
	Emergency medical responder	3	15.0
Class	Fire Fighter	4	20.0
	Senior Fire Fighter	9	45.0
	Fire sergeant	4	20.0
	Fire Lieutenant	3	15.0

$p < 0.05$   
 <Table 2>  
 16 4 30 (50%) 20  
 (25%) 40 (15%) 50 (10%) 1  
 5 (30%), 5 10 (25%), 10  
 20 (20%), 1 (15%), 20 (10%)  
 1 (40%), (25%), 2  
 (20%), (15%)  
 (45%), (20%), (20%), (15%)  
 1 5 30 1  
 가 . 2019  
 119  
 1

(LAVEL D) N95  
 , 가 ,  
 가 KF94  
 LEVEL D KIT  
 가  
 CU Defibrillator LiFEGAIN  
 CU - HD1  
 , 가  
 ( )  
 가

**3.2**

**3.2.1**

가  
 119 가  
 ( BRAUNR IRT6530)

20 , 55%

### 4.2

가  
 가 Laerdal Resusci Anne  
 Advanced SkillTrainer 가 가  
 IM - LAB HeartiSense Kit, APP  
 가  
 119 가

[Figure 1(a)]

[Figure 1(b)]

[Figure 1(c)]

### 3.2.2

2018 119 77%가  
 [11] (2016) 2  
 [12] 2 가  
 3

[Figure 1(d)]

(Level D) 1

2 3

2 가

(±15.81) , 109.80(±19.40)  
(Level D)

119 Defibrillator 25%  
 (CU LIFEGAIN CU - HD1 5KG)  
 10m 3 가  
 가

122.75

[Figure 2(a)]

2 145

### 4.3

#### 4.

#### 4.1

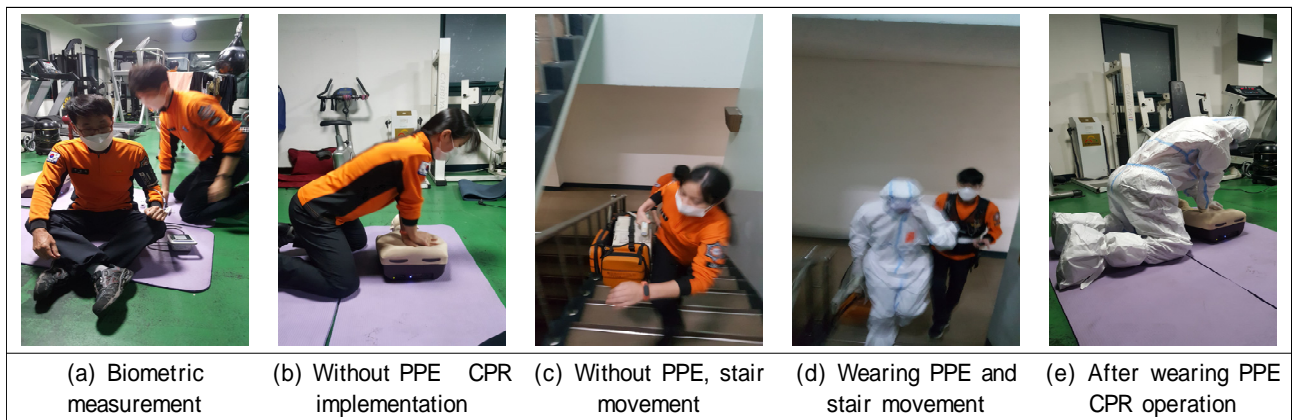
<Table 3>

36.82  
 (±0.34), 36.92 (±0.27), 36.86 (±0.41), 37.06  
 (±0.34) (Level D)

<Table 3>

75.10  
 (±8.70) , 85.20(±11.46) , 98.45  
 23 54%

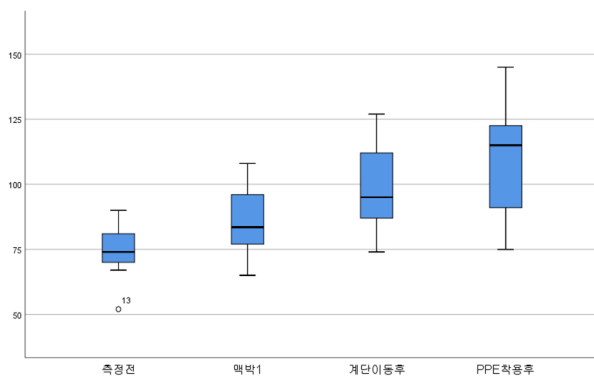
37.0 25% 37.3 3  
 37.5



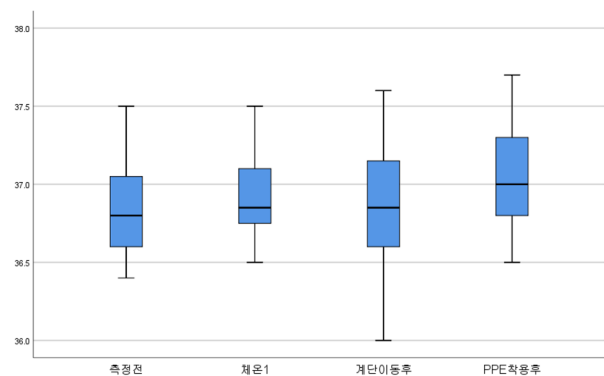
[Figure 1] Experimental Scene

<Table 3> Change in Vital Signs

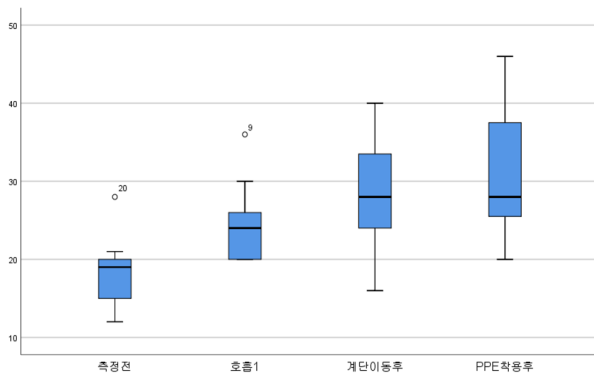
Classification	State	Mean	SD(±)	Min.	Max.	Percentile		
						25	50(Median)	75
Body temperature	Before CPR	36.815	.3392	36.4	37.5	36.600	36.800	37.075
	CPR without PPE	36.920	.2668	36.5	37.5	36.725	36.850	37.100
	CPR After stair movement	36.860	.4147	36.0	37.6	36.550	36.850	37.175
	CPR with PPE	37.055	.3364	36.5	37.7	36.800	37.000	37.300
Heart rate	Before CPR	75.10	8.699	52	90	70.00	74.00	82.50
	CPR without PPE	85.20	11.455	65	108	76.50	83.50	96.00
	CPR After stair movement	98.45	15.806	74	127	86.00	95.00	112.00
	CPR with PPE	109.80	19.395	75	145	90.50	115.00	122.75
Respiration	Before CPR	17.95	3.980	12	28	15.00	19.00	20.00
	CPR without PPE	24.20	4.384	20	36	20.00	24.00	27.00
	CPR After stair movement	28.65	6.659	16	40	24.00	28.00	33.75
	CPR with PPE	30.80	7.164	20	46	25.25	28.00	37.75
Blood pressure	Before CPR	134.30	14.819	115	169	122.25	130.00	146.50
	CPR without PPE	136.55	13.387	112	157	127.25	134.00	148.00
	CPR After stair movement	158.20	19.530	124	194	143.75	157.50	174.75
	CPR with PPE	163.10	19.652	132	202	143.25	164.00	179.25



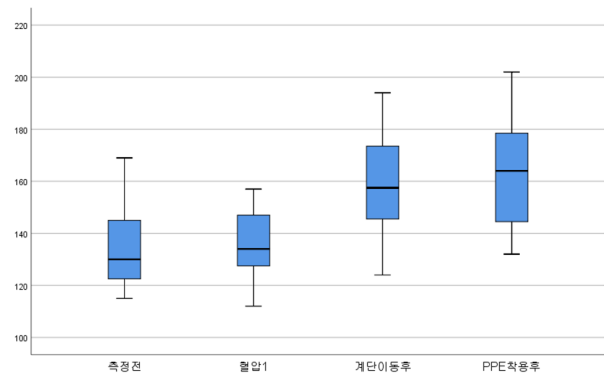
(a) Heart rate change



(b) Change in body temperature



(c) Respiratory change



(d) Blood pressure change

[Figure 2] Compare phased changes

4.4

가

.[13]

<Table 3> 17.95  
(±3.98) , 24.20(±4.38) , 28.65(±6.66) , 30.80  
(±7.16) (Lavel D)

5.2

28 25% 37.5

3

3 40

4.5

5.3

119

<Table 3> 134.30  
(±14.82)mmHg, 136.55(±13.39)mmHg, 158.20  
(±19.53)mmHg, 163.10 (±19.65)mmHg  
(Lavel D)

30

가

가

.[5]

25% 179.2mmHg

164mmHg

4

5.4

190mmHg

<Table 3>

[Figure 2(a)] 가 가

, [Figure 2(b)]

가

170mmHg

202mmHg

[Figure 2(c)]

119

[Figure 2(d)]

가

6.

5.

119

5.1

119

(1)

가 120  
, (2010)

85.2 109.8

가 3 96.0 122.75

가 가

가 145 가

(2)





∴  
∴  
, ,  
∴



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