



The Effect of Development and Implementation of Cardiac Arrest Response Protocol Outside the Ward: The Quality Improvement Initiative



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Introduction

Cardiac arrests can occur anywhere in the hospital building. Situations such as cardiac arrest outside the ward are less equipped with emergency medications and supplies than in the ward, and there is a shortage of CPR personnel. Therefore, it is essential to quickly move to a place where proper management can be performed along with training for appropriate first response. This study aimed to evaluate the effect of implementing cardiac arrest response protocol and mock code simulation on transfer time to the appropriate place and self-efficacy and satisfaction with mock code simulation.

Methods

A quality improvement project was performed at a 1,385-bed university hospital from February 2021 to October 2022.

Phase 1 (February 2021 – October 2021)

We identified the status of in-hospital cardiac arrests in unconventional locations such as outpatient clinics, a lobby, or a hallway. We analyzed problems of the current response to the cardiac arrest situation. Then we developed appropriate cardiac arrest response protocols.

Phase 2 (August 2021 – October 2021)

In-situ mock code simulation and debriefing were performed in four locations according to the protocols.

Phase 3 (April 2022 – January 2023)

Some protocol revisions and several additional protocols were produced. And additional mock code simulation and debriefing were performed.

Outcomes (before: Feb. 2019 – Jan. 2021 vs. after: Feb. 2021 – Jan. 2023)

- Primary outcome* : transfer time from cardiopulmonary resuscitation (CPR) call to the emergency room (ER) or intensive care unit (ICU)s
- Secondary outcomes* : self-efficacy for CPR performance before and after the simulation and satisfaction with the mock code simulation.

Results

Table 1. Patient characteristics for cardiac arrest calls before and after protocol implementation

Variables	Pre-implementation (n = 60)	Post-implementation (n = 41)	P value
Age (years)	61.6 ± 15.9	61.0 ± 18.2	0.861
Sex (F)	27 (45.0)	18 (43.9)	1.000
Body mass index (kg/m ²)	23.2 ± 4.0	22.2 ± 4.8	0.260
Charlson comorbidity index score	1.1 ± 0.9	1.0 ± 0.7	0.413
Solitary tumor with metastasis	9 (15.0)	16 (39.0)	0.009
Inpatients	9 (15.0)	4 (9.8)	0.552
Location of cardiac arrest call			0.014
Main building	30 (50.0)	9 (22.0)	
Cancer center building	15 (25.0)	20 (48.8)	
Outpatient clinic building	11 (18.3)	11 (26.8)	
Annex building	4 (6.7)	1 (2.4)	
Time of cardiac arrest call			0.072
Morning (06:00 - 11:59)	19 (31.7)	20 (48.8)	
Afternoon (12:00 - 17:59)	33 (55.0)	20 (48.8)	
Evening (18:00 - 23:59)	8 (13.3)	1 (11.1)	
Transfer location			0.269
Emergency room	49 (73.3)	37 (90.2)	
Intensive care units	11 (18.3)	4 (26.7)	
Discharge from emergency room	23 (38.3)	16 (39.0)	1.000
Cardiopulmonary resuscitation			0.398
Onsite	19 (31.7)	17 (41.5)	
Transfer location	18 (94.7)	11 (64.7)	0.037
CPR duration (min)	10.5 ± 7.8	13.8 ± 9.6	0.267
Return of spontaneous circulation	18 (89.5)	16 (94.1)	1.000
In-hospital mortality	14 (23.3)	13 (31.7)	0.369

Values are presented as number (%) or mean ± SD.

Table 2. Characteristics of mock code simulation participants

Variables	Nurse	M.D.	Paramedic	Total	P value
	44 (60.3)	11 (15.1)	18 (24.7)	73	N/A
Years of service	18.0 ± 7.9	2.9 ± 1.2	11.6 ± 6.5	14.3 ± 8.9	< 0.01

Values are presented as number (%) or mean ± SD.

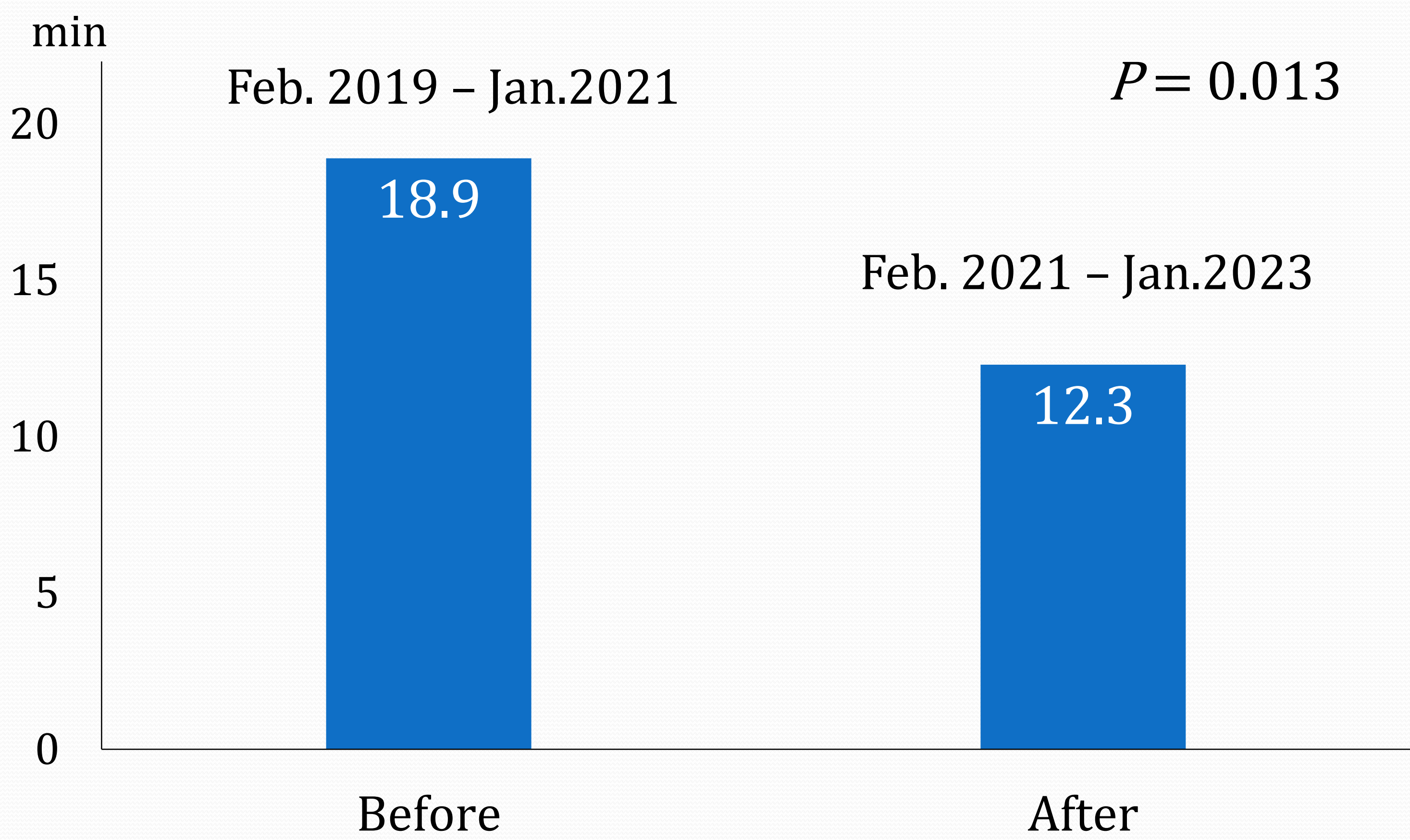


Figure 1 Transfer time from CPR call to ER or ICU

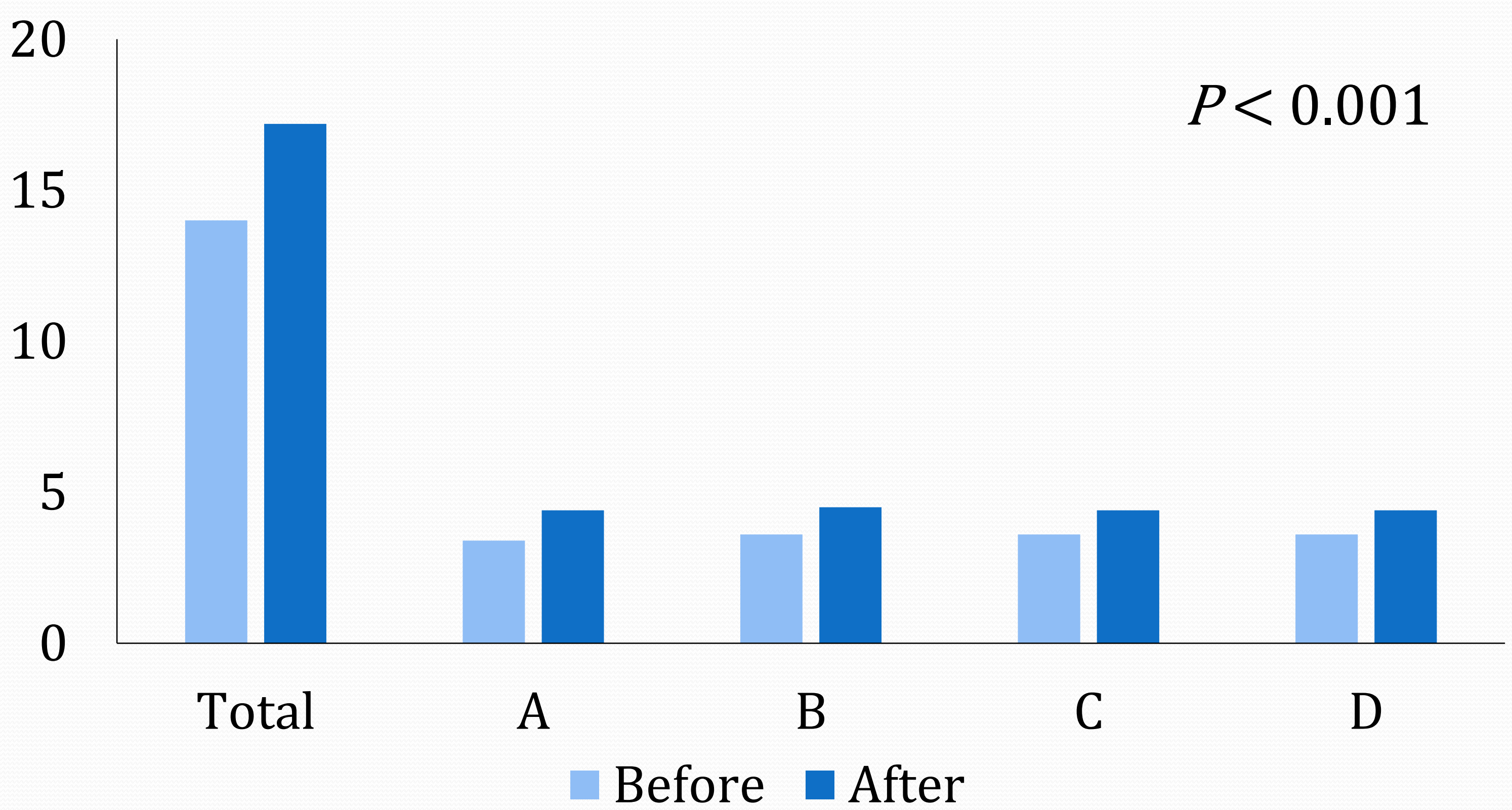


Figure 2 Self-efficacy before and after the mock simulation

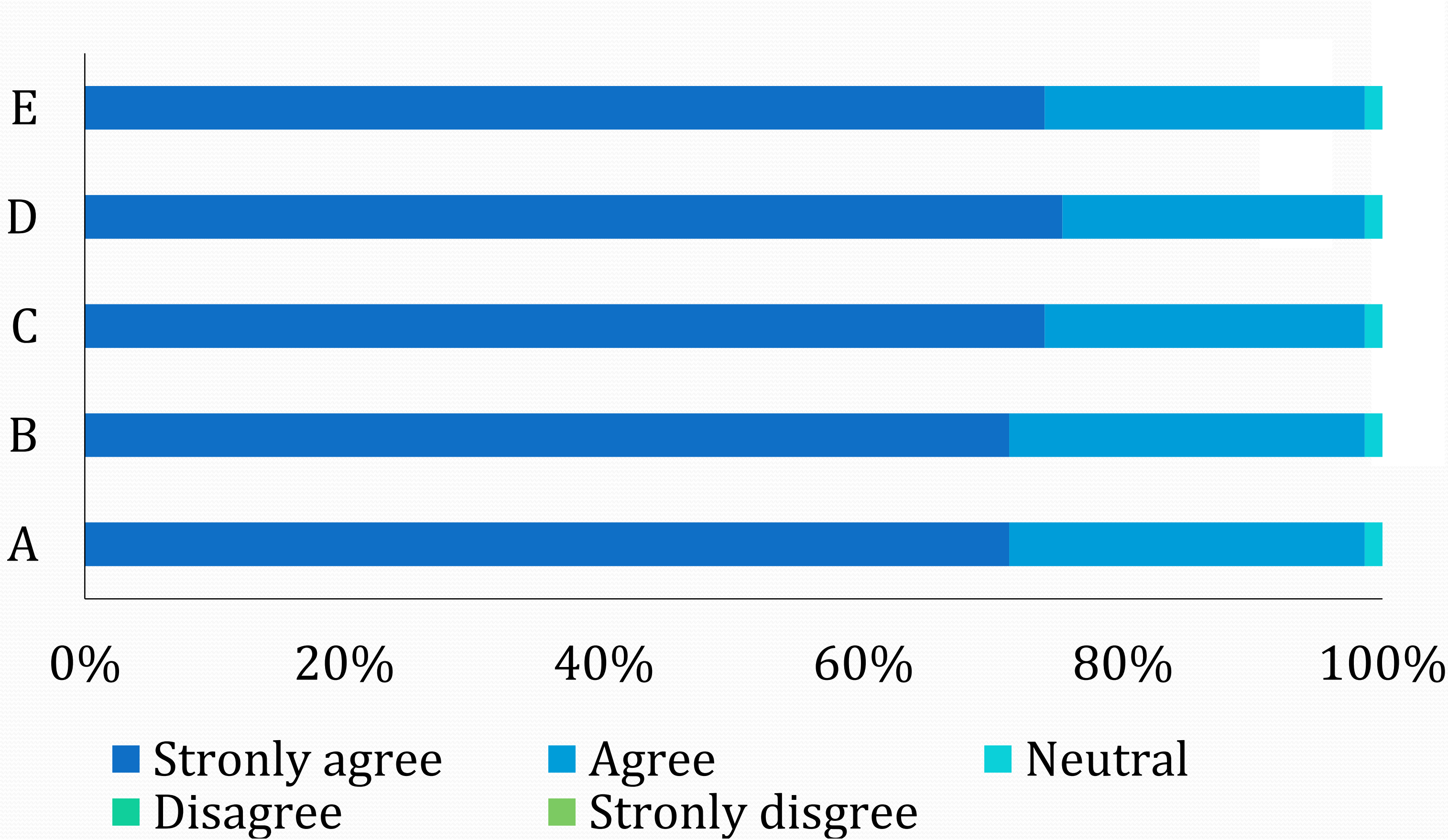


Figure 3 Participant satisfaction with the mock- simulation

Conclusion

Implementing cardiac arrest response protocol and mock code simulation led to a measured improvement in transfer time to ER or ICUs. Furthermore, in-situ mock code simulation improved participants' perceived self-efficacy in CPR performance.