

# Effects of educational programs with simulation for life-saving nurses

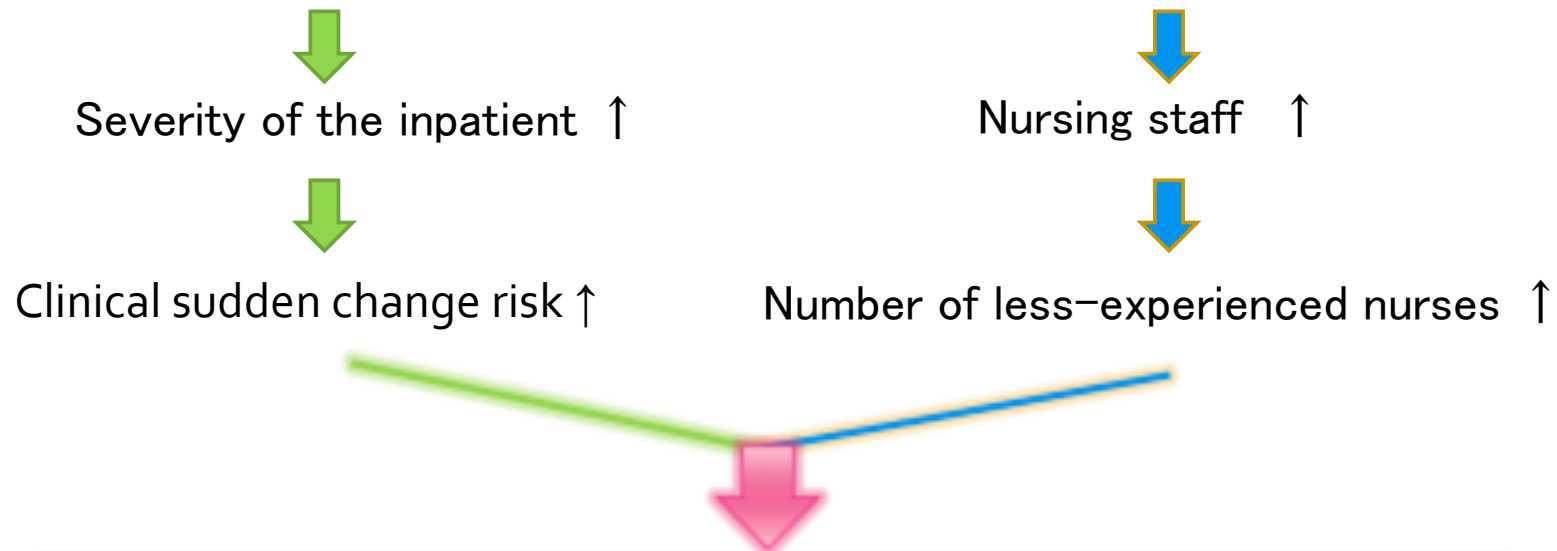
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# Background

## Change in environment that surrounds medical treatment in Japan

- Number of surgical operations ↓
- Hospitalization days ↓
- Introduction of a 7:1 patient-to-nurse staffing ratio



The sudden change cannot be noticed.  
It is not possible to connect to the rapid response even if it notices.

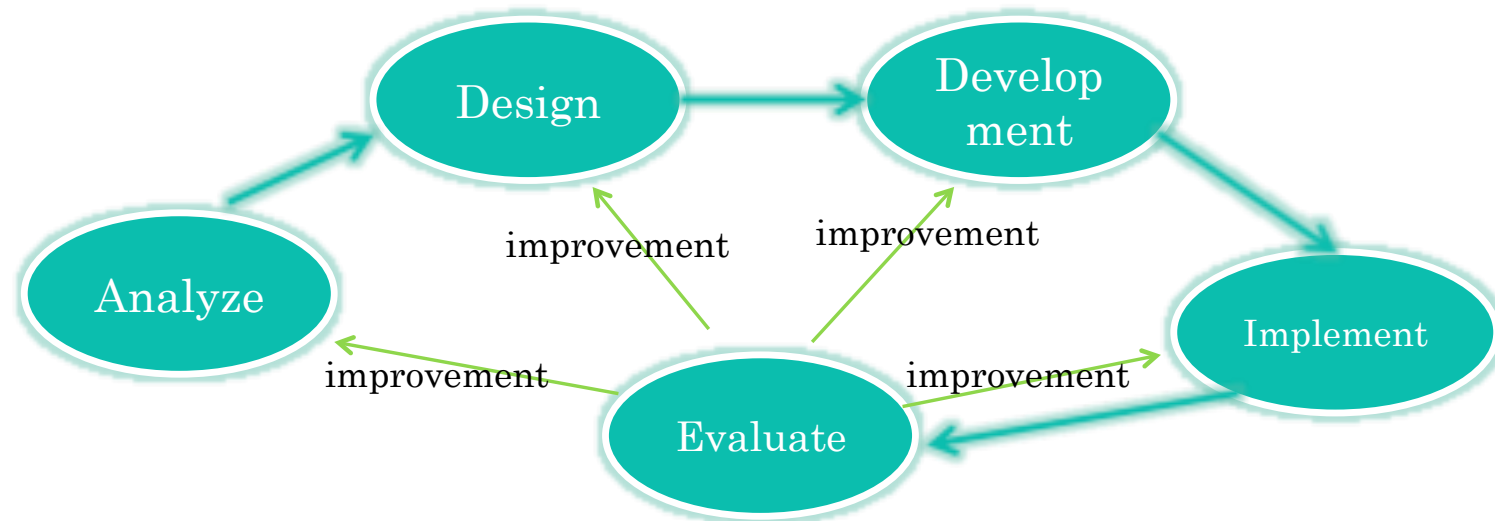
# Purpose

- Five programs have been developed with the aim of educating nurses in the first three years of their career, nurturing professionals who are able to predict sudden changes in patient's condition, who can deal with these sudden changes appropriately, and who can play roles as both a leader and a team member in response to such situations.
- To verify the efficacy of the five educational programs that have been developed.

# Educational program development (1)

## Method

- Instructional design
  - Methodology to design and execute education effectively, efficiently, and attractively
  - ADDIE model



# Educational program development (2)

## Elements of ability necessary for life-saving nurses

1. **Physical assessment abilities to notice sudden changes prior to, and not to make them serious**

60-70% of sudden cardiopulmonary arrest cases were not anticipated even though changes of certain symptoms in 6-8 hours prior to the accidents.

2. Abilities in critical scenes that can correspond adequately

⇒ Established educational programs (BLA-ACLS) were utilized.

# Educational program development (3)

## mission 1

To acquire physical assessment abilities to notice sudden changes prior to, and not to make them serious

Educational program	participants	goals
I	First year after graduation	To acquire basic knowledge and skills necessary for physical assessment of the respiratory system, circulatory system, the abdomen
II	Educational program I completion	To acquire an effective observation method through clinical cases
III	Educational program II completion	To acquire knowledge and skill necessary for clinical judgment and reporting of patients sudden changes

# Educational program development (3)

## mission 2

To acquire abilities in critical scenes that can correspond adequately utilizing established educational programs

Educational program	participants	goals
BLS	First year after graduation	To acquire skills necessary to save lives of patients with cardiac or respiratory arrest or near-arrest
ACLS①	BLS completion	To acquire knowledge and skills necessary to correspond sudden condition changes in patients
ACLS②	ACLS① completion	To acquire advanced lifesaving skills to save lives of patients with cardiac or respiratory arrest or near-arrest

# Educational program development (3) mission 3

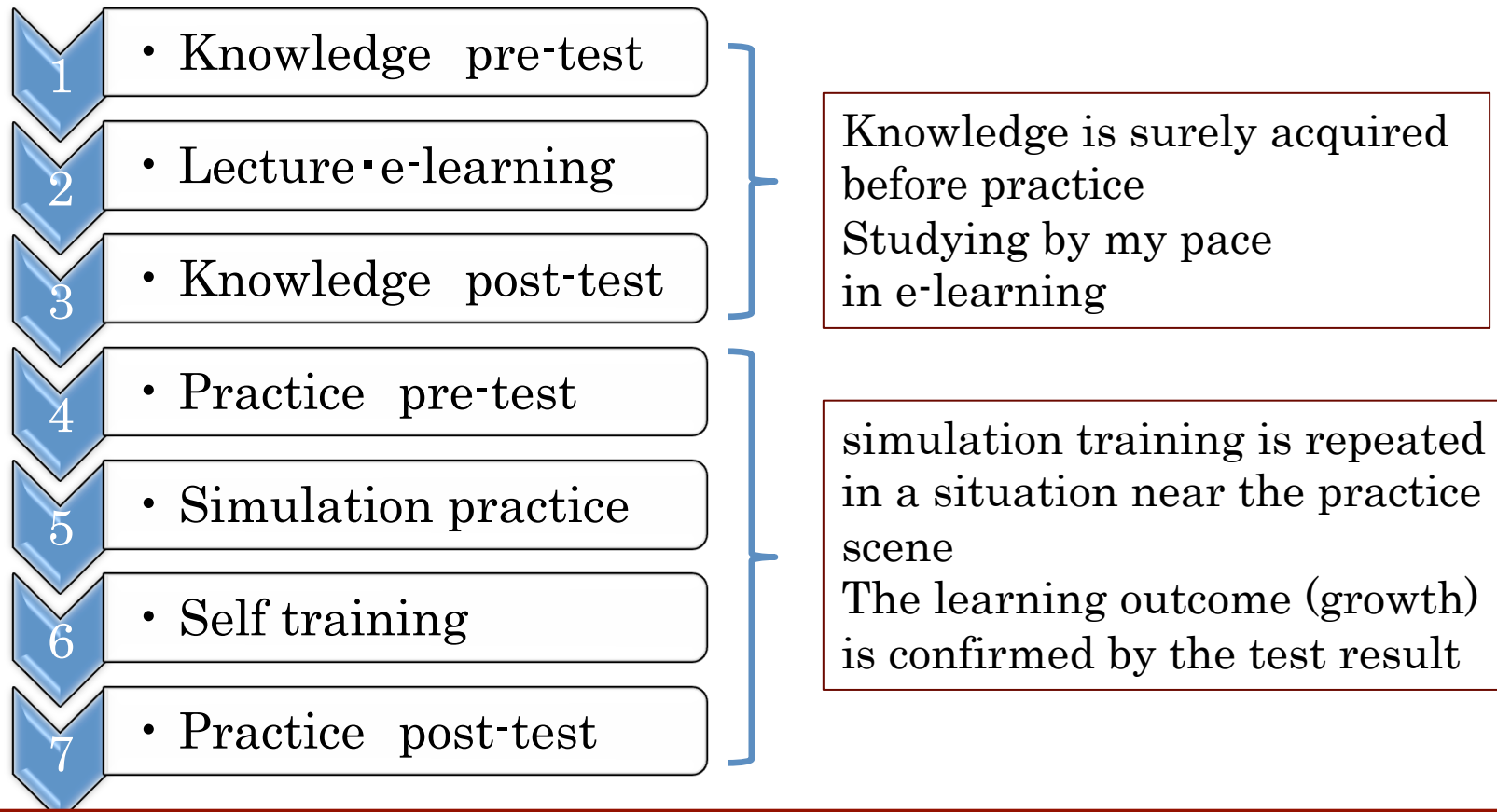
To integrate the abilities acquired by mission 1 and mission 2

Educational program	participants	goals
IV	Educational program III completion	To acquire knowledge and skills to clarify changes of certain symptoms effectively and to manage conditions in prior to sudden cardiopulmonary arrest
V	Educational program IV completion	To utilize leadership-membership theory (including non technical skills) and to develop team performance in case of sudden changes



# Educational program development (4)

## How to progress each educational program



Nurses only who had passed the knowledge test and the skill test (with full marks) could advance to the next educational program.

## Educational program development (5)

### Instructor for educational programs

- Certified Nurse of Critical Care Nursing
- Certified Nurse Specialist of Critical Care Nursing

# Educational program development (6)

## life –saving nurses certification examination

	Knowledge test	Performance test
Candidates requirement	Educational program <b>IV</b> completion	Pass the test of the knowledge of the qualifying examination.
Content	Contents of five educational programs	Three case scenarios; chest pain, dyspnea, headache
Method	Online examination and reviewing outcomes of previous five educational programs	Examination will be executed by using the case scenarios in six minutes.

## Educational program development (7) Simulator used for performance test

- **SimMan 3G**
- **ALS Advanced**
- **SimMan**

# Educational program development (8)

## Methods of performance test

- **Evaluators**

Three evaluators were assigned in each simulator

1. Operating simulator with showing data
2. Evaluating leadership by checklists
3. Evaluating membership by checklists

- **Participants**

Performance tests conducted in groups of three participants

# Educational program development (9)

## evaluate of performance test

Items	Lower order items
1. The examinee observes patient's state variation by using own senses.	10 items
2. The examinee notices patient's abnormality and request assistance.	3 items
3. The examinee takes patients' vital signs.	6 items
4. The examinee prepare oxygen, monitors, and blood routes, when patients had sudden changes.	3 items
5. The examinee reports on patients' sudden changes by using SBAR for physicians.	4 items
6. The examinee communicates to leaders and members when the patient's conditions are changed suddenly.	5 items
7. The examinee support the patient's being alive status (preparation of intubation, preparation of DC and CPR).	3 items

# Methods

- Intervention group (trained group)
  - Nurses, who attended all five developed educational programs and passed all knowledge tests and performance tests.
- Control group (non-trained group)
  - Nurses, who have almost the same clinical experience years as of the intervention group, but were not attend all five developed educational programs.

# Data analysis

- Performance test score
  - Mann-Whitney U test
- Is there any difference among the two groups (trained and non-trained) ?
  - chi-square test



# Ethical consideration

- A request letter for collaboration to this research and a consent form were sent in prior to start this project.
- Explained in a document and oral.
- Consent to research collaboration was got before the project start.

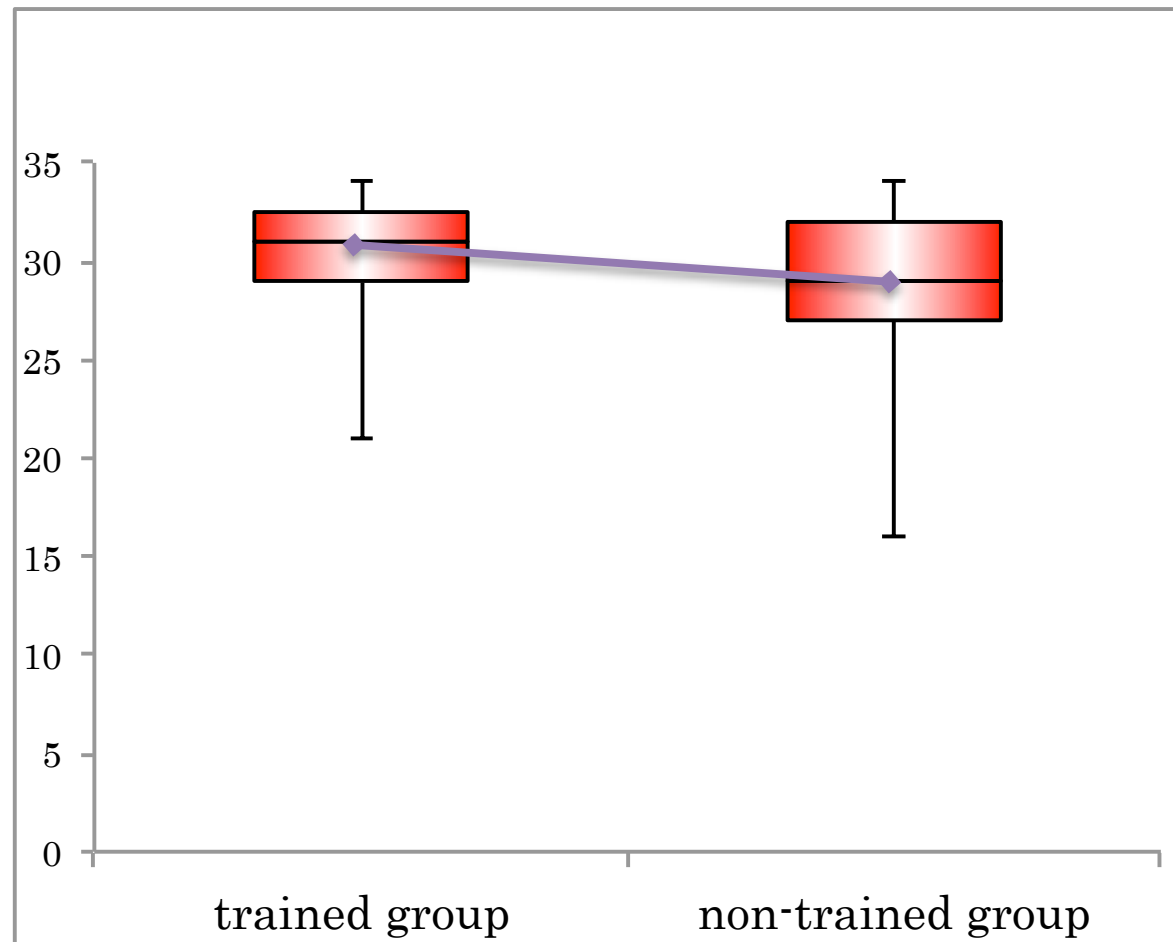
# Results

- In the score of the skill test, a significant difference between the two groups ( $p < 0.05$ ) was observed. Median value of 31.0 for the trained group, comparing the median value of 29.0 for the non-trained group.

## Comparison of the median in Trained group and Non-trained group

	Trained group	Non-trained group	P-Value
maximum	34.0	34.0	
third quartile	32.5	32.0	
median	31.0	29.0	0.03
first quartile	29.0	27.0	
minimum	21.0	16.0	

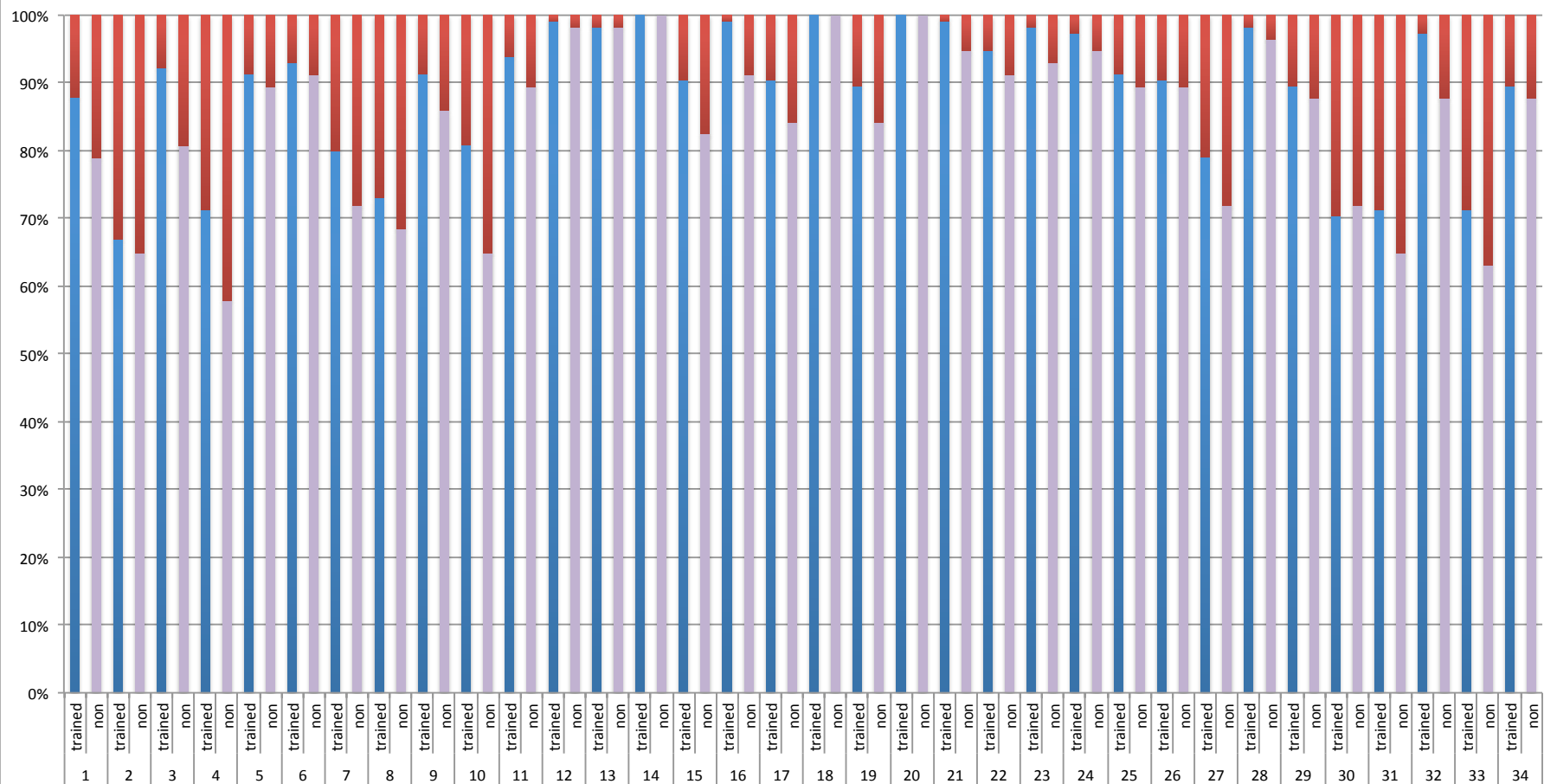
# Comparison of the median in trained group - non-trained group



# Trained group and Non-trained group

## Comparison of the percentage of done and non-done in each item

Trained group : done ■ non-done ■  
 Non-trained group : done ■ non-done ■



## Four items of the checklist observed a significant relationship ( $p < 0.05$ )

1. #3 “observation of the movement of the thorax”
2. #10 “confirmation of the presence or absence of fever”
3. #16 “auscultation of breath sounds”
4. #32 “preparation for intubation”

# Conclusion

- The five programs that have been developed can be considered effective in the professional education of nurses who are able to predict sudden changes in the patient's condition, who can deal appropriately with these sudden changes, and who can play the role of both a leader and a team member in response to such situations.