

# Comparison of the Effects of Standardized Patient-based Simulation Education and Clinical Practice Education for Preoperative Nursing Care for High-risk Pregnant Women

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## Abstract

**Background/Objectives:** This study aimed to compare the effects of conventional clinical practice education and standardized patient-based simulation education on preoperative nursing care for high-risk pregnant women scheduled for a cesarean section, and, ultimately, to identify effective education method for nursing students.

**Method/Statistical Analysis:** This study used a non-equivalent control group, non-synchronized post-test design. The experimental group (34 subjects) received standardized patient-based simulation education, whereas the comparison group (32 subjects) participated in traditional clinical practice education. Descriptive statistics and ANCOVA was done to find the differences in the effects of the intervention between the two groups.

**Findings:** The results showed that clinical judgment ( $F = 33.63, p < .001$ ), nursing performance competency ( $F = 46.78, p < .001$ ), communication ability ( $F = 13.90, p < .001$ ), and learning satisfaction ( $F = 31.83, p < .001$ ), except for problem-solving ability, were significantly higher in the experimental group.

**Improvements/Applications:** Standardized patient-based simulation education can be effectively replaced with conventional clinical practice education when educating nursing students about preoperative nursing care for high-risk pregnant women.

**Keywords:** *Standardized patient program, Clinical practicum, Simulation education, Nursing students, Preoperative nursing care*

## Introduction

As the primary goal of nursing education is to train, through theoretical and practical education, professional nurses who can provide qualitative nursing<sup>[1]</sup>. However, with the recently increasing awareness of human rights among patients, there is a growing tendency for patients

to express that they do not want to be attended to by inexperienced and unskilled student nurses. Therefore, the conventional clinical practice education that provides nursing students with opportunities to perform direct nursing care in clinical settings is being reduced<sup>[2]</sup>. In other words, there are limitations for nursing students to have sufficient nursing competence through clinical practice education, and it is thus necessary to seek alternatives to effective practice education for nursing students.

Recently, simulation education using standardized patients (SPs) has emerged as an effective practice education method. SPs are individuals trained to imitate realistic patients with respect to health condition,

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personality, and emotional reactions<sup>[3]</sup>. Using scenarios that mimic clinical settings, SP-based simulation education aims to ensure that learning takes place in the process of allowing students to solve problems in situations similar to real-world situations<sup>[4]</sup>. Therefore, SP-based simulation education has the advantage of allowing students to learn more realistic and empirical knowledge compared with other education method<sup>[5]</sup>.

In South Korea, there is growing awareness of the rights to privacy protection, especially among pregnant women who experience childbirth. In addition, owing to an extremely low birth rate, nursing students are having fewer learning opportunities to perform directly nursing care for pregnant women<sup>[6]</sup>. Therefore, it is necessary to seek alternatives to practice education for nursing care for pregnant women.

No previous study has investigated the effects of SP-based education on preoperative nursing care for high-

risk pregnant women. In addition, studies comparing the effects of conventional clinical practice and SP-based education, even for other subjects of education, are scarce<sup>[7]</sup>. Thus, the present study aimed to compare between the effects of SP-based simulation education and conventional clinical practice education, and to investigate whether clinical practice education can be replaced by SP-based simulation education.

### Method

This was a study using a non-equivalent control group, non-synchronized post-test design [Figure 1]. The individuals of the study were the third-year students at a nursing college in C City, South Korea. The selection criteria were as follows: a) students who had already taken a women’s nursing theory course, and b) those who understood the purpose of this study and consented to join in this study.

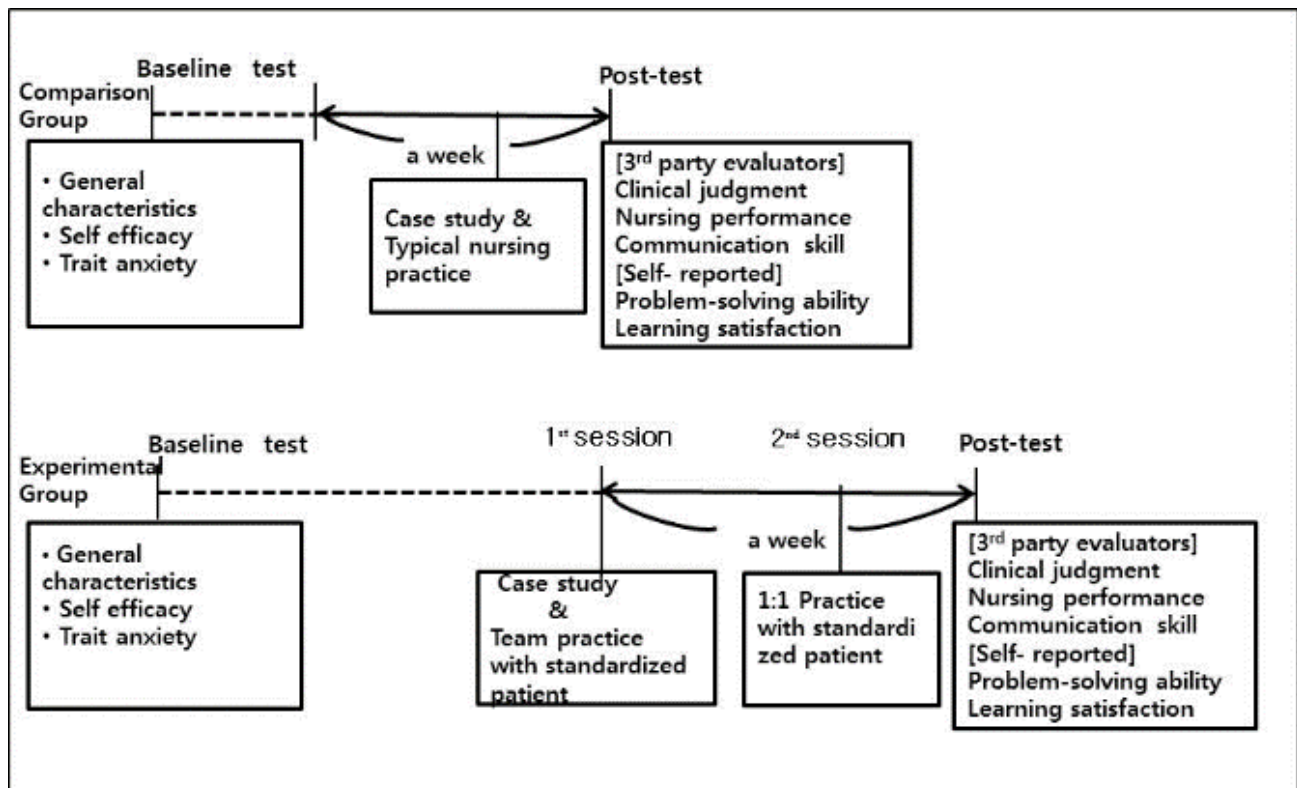


Figure 1. Research Design

The number of sample was computed using G\*Power (3.1.9.2). The number of sample required 30 individuals in each group with effect size of .65<sup>[8]</sup>,  $\alpha$  of .05, and a power of .80. This study recruited 35 participants for

each group; 1 in the experimental group and 3 in the comparison group dropped out. Accordingly, a total of 66 individuals were used in the analysis. Approval from the IRB at K University was obtained.

Study procedure was as follows. Prior to the intervention, the SPs were trained and scenarios were developed. The SPs were trained to portray patients for six hours. The scenarios to be used for the intervention were reconstructed based on two medical records by the chief nurse at the ob-gyn ward and the researchers: one educational scenario for the intervention and one for evaluation. The scenarios were constructed of a topic related to preoperative nursing for high-risk pregnant women who were scheduled for a cesarean section owing to preterm premature rupture of membranes.

Subsequently, the baseline test was conducted to verify the homogeneity between the two groups [Figure 1]. Then, the comparison group received the intervention first. The comparison group was divided into five teams. On the first day, they received case study education about nursing care for pregnant women who were scheduled for a cesarean section, followed by conventional clinical practice for one week, through which the participants were allowed to experience preoperative nursing care for high-risk pregnant women who will undergo a caesarean section.

After a post-test was conducted with the comparison group, the experimental group received the intervention. They received two training sessions for one week. At the first session, the group was divided into six teams to receive the same case study education as done for the comparison group. Then, several students in each team practiced team nursing for one SP using an educational scenario. After completing the team-level practice, debriefing was carried out to analyze the nursing care performed by the students themselves. At the second education session, each student directly performed face-to-face nursing care for the SP for 10 minutes, and then debriefing was followed.

After completing the intervention, the post-test was conducted in both groups. During the post-test, the effects of the intervention were measured in the two groups using a scenario on preoperative nursing care for high-risk pregnant women, and SPs. The scenario used here was different from the one used for the students during the intervention.

In the post-test, clinical judgment and nursing performance competency were assessed by a third party who did not join in the education of students during the intervention to ensure that each student could not be identified as from either study group. Communication

ability was also assessed by SPs who did not participate during the intervention. These steps were intended to increase the validity of the measurement. Problem solving ability and learning satisfaction were self-evaluated by the students.

In the baseline test, general characteristics, trait anxiety, and self-efficacy were investigated. The general characteristics of the participants included gender, age, experience of simulation education, and academic grade. Trait anxiety was measured using a tool developed by Spielberger<sup>[9]</sup>. The tool consists of 20 items rated on a 4-point Likert scale. A higher score means higher trait anxiety. Cronbach's  $\alpha$  was .87 in this study. Self-efficacy was measured using a tool that was modified for the self-efficacy in preoperative nursing care for high-risk pregnant women from the Neuroscience Nursing Self-efficacy scale<sup>[10]</sup>. This tool consists of 14 items rated on a 5-point Likert scale. A higher score means higher self-efficacy in preoperative nursing care for high-risk pregnant women. Cronbach's  $\alpha$  was .87 in this study.

A post-test was conducted to compare the effects of the intervention in the experimental and comparison groups. The post-test measures included clinical judgment, nursing performance competency, communication ability, learning satisfaction and problem solving ability. Clinical judgment was investigated using the Lasater Clinical Judgment Rubric<sup>[11]</sup>, which consists of 11 items rated on a 4-point Likert scale. A higher score means higher clinical judgment. Cronbach's  $\alpha$  was .88 in this study.

Nursing performance competency was measured using a tool that was modified by the researchers based on a checklist for evaluating preoperative patient nursing care presented by the Korean Accreditation Board of Nursing Education. This tool consists of 29 items rated on a 3-point Likert scale. A higher score means higher nursing competence. This tool was verified for content validity by two nursing professors, a chief delivery room nurse, and an ob-gyn physician. Cronbach's  $\alpha$  was .87 in this study. Communication skills were measured with an instrument developed by Yoo<sup>[12]</sup>. This tool consists of five items rated on a 5-point Likert scale. A higher score means higher communication competency. Cronbach's  $\alpha$  was .85 in this study. Problem-solving ability was investigated with an instrument developed by Woo<sup>[13]</sup> that consists of 25 items rated on a 5-point Likert scale. A higher score means higher problem-solving ability. Cronbach's  $\alpha$  was .93 in this study. Learning satisfaction

was measured using a tool developed by Seong<sup>[14]</sup>. This tool consisted of 20 items rated on a 5-point Likert scale. A higher score means higher learning satisfaction. Cronbach’s  $\alpha$  was .94 in this study. Data analysis was done using SPSS (21.0). The homogeneity between the groups was examined using t-test and X<sup>2</sup>-test. As the results of the homogeneity test for the general characteristics of the two groups revealed that self-efficacy was not homogeneous, analysis of covariance (ANCOVA) was done to find a difference between the groups.

## Result and Discussion

- 1. Demographic Characteristics:** The characteristics of the individuals are presented in [Table 1]. The gender, age, experience of simulation education, academic grade, and trait anxiety were not significantly different between the groups. However, self-efficacy in preoperative nursing care for high-risk pregnant women was significantly higher in the comparison group ( $p = .001$ ).

**Table 1. General Characteristics of Individuals**

Characteristics	Experimental (n = 34)	Comparison (n = 32)	$\chi^2$ or t	p
	M(SD) or n(%)	M(SD) or n(%)		
<b>Gender</b>				
Female	33(97.1)	28(87.5)	2.15	.142
Male	1(2.9)	4(12.5)		
Age□	21.15(0.65)	21.94(2.12)	0.39	.068
<b>Experience of simulation education</b>				
Yes	7(20.6)	5(15.6)	0.52	.608
No	27(79.4)	27(84.4)		
<b>GPA</b>				
<3.0	3 (8.8)	1(3.1)	0.38	.709
≥3.0, < 3.5	9 (26.1)	10(31.3)		
≥3.5, < 4.0	14 (41.2)	13(40.6)		
≥ 4.0	8 (23.5)	8(25.0)		
Trait anxiety□	2.26 (0.31)	2.27 (0.27)	0.16	.894
Self-efficacy□	2.51 (0.46)	2.92 (0.47)	3.53	.001

□: mean (standard deviation)

- 2. Comparison of post-test data between the two groups:** The scores for the effects of intervention in each group are shown in [Table 2]. Clinical judgment, nursing performance competency, community ability, and learning satisfaction were significantly higher in the experimental group than the comparison group ( $p$  for all <.001). However, problem solving ability was not significantly different between the groups ( $p = .057$ ).

**Table 2. Comparison of Post-Data between the Groups When Adjusted for Self-Efficacy**

Variables	Group	M(SD)	F	p
Clinical judgment	EG	3.01(0.47)	33.63	<.001
	CG	2.21(0.47)		
Nursing performance	EG	2.47(0.20)	46.78	<.001
	CG	1.95(0.33)		
Communication skill	EG	3.90(0.85)	13.90	<.001
	CG	2.93(0.94)		
Problem-solving ability	EG	2.82(0.70)	3.79	.057
	CG	2.64(0.53)		
Learning satisfaction	EG	3.90(0.57)	31.83	<.001
	CG	3.17(0.54)		

EG: Experimental group, CG: Comparison group

## Discussion

The results showed that SP-based simulation education was more effective for training clinical judgment, nursing performance competency, and communication ability, and learning satisfaction compared with conventional clinical practice, except for problem-solving ability. A comparison of these results and the results of previous studies is as follows. First, owing to the scarcity of previous studies comparing the effects of SP-based simulation education and conventional practice education on clinical judgment, it is difficult to compare results directly. The results of a study of Chinese nursing students comparing the effects of conventional education (demonstrated by instructors) and SP-based simulation education showed that clinical judgment was significantly higher in students who received SP-based education<sup>[15]</sup>, which is similar to the results of our study. In addition, although self-efficacy of preoperative nursing care for high-risk pregnant women was found to be lower in the experimental group at baseline, clinical judgment was found to be improved more in the experimental group after the SP-based education, which implies that the effects of SP-based simulation education were greater.

Second, nursing performance competency, communication ability, and learning satisfaction were found to be significantly higher in the experimental group. This result is consistent with those of studies revealing that SP-based simulation education improved nursing students' nursing performance competency in ob-gyn pelvic examination education<sup>[16]</sup>, and end-of-life care education<sup>[17]</sup>, and of another study indicating that communication ability significantly improved after SP-based education on the topic of interactions with patients with depression<sup>[18]</sup>. In addition, results of the present study are also consistent with those of a previous study indicating that learning satisfaction with SP-based simulation education on the topic of mental health was significantly higher<sup>[19]</sup>. However, these previous studies were conducted without a control group, or were comparisons with a control group receiving no intervention. Therefore, as the present study compared between the effects of conventional clinical practice education and SP-based simulation education, our study is different from previous ones.

Third, no significant difference was seen in the problem-solving ability between the experimental and comparison groups. This result does not necessarily

mean that SP-based simulation education was not effective in increasing problem-solving ability but that both SP-based education and conventional clinical practice likely contributed similarly to problem solving ability. In addition, as self-efficacy was higher in the comparison group, the possibility that students with high self-confidence reported having high-problem solving ability could not be ruled out as well.

The limitations of the study are as follows. First, as the participants of this study were selected from a single nursing college, it is difficult to generalize the results of this study to other samples. Second, it was difficult to identify how much the students in the comparison group experienced in nursing care for high-risk pregnant women during their conventional clinical practice. Third, this study used a quasi-experimental design in which the individuals were not randomly assigned.

Nevertheless, the results of this study are significant as follows. First, although most previous studies used no control group, or used a control group without intervention, this study compared the effects of SP-based simulation education and conventional clinical practice using a comparison group receiving conventional clinical practice education. Second, previous studies often assessed the effects of education based on self-report measures. In the present study, clinical judgment, nursing performance competency, and communication ability were objectively assessed by third parties who were not aware of the participants' grouping. As such, this study has a high validity.

## Conclusion

This study aimed to compare the effects of SP-based simulation education and conventional clinical practice education for nursing students on preoperative nursing care for high-risk pregnant women, and to seek effective practice education method for preoperative nursing care for high-risk pregnant women. The results showed that SP-based simulation education had higher effects on clinical judgment, nursing performance competency, communication ability, and learning satisfaction compared with the conventional clinical practice education. In addition, both education method showed similar effects on problem-solving ability. Therefore, conventional practice education can be effectively replaced by SP-based simulation education for preoperative nursing care in high-risk pregnant women.

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**Conflict of Interest:** Nil

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