

The Development and Effects of a Simulation-based Practicum Education Program on Urinary Catheterization Care for Women

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Abstract

This research aimed to identify the developing of simulation-based practicum education program used urinary catheterization care for women can effect an knowledge, clinical competency and learning attitude after simulation based practicum program for nursing students. They were given with simulation-based practicum program comprising of pre-test and post-test in simulation room similar to clinical situation. The result of this study is that the nursing students significantly improved their clinical competency after they received the simulation-based urinary catheterization nursing program for women. The average clinical competency scores between pre-test and post-test statistically significantly increased($t=-2.593$, $p=.016$). Therefore, simulation based practicum program can be effective for clinical competency of nursing students in simulation room similar to clinical situation.

Keywords: Simulation, Education, Urinary, Catheterization, Women

1. Introduction

1.1. Necessity of Study

The fast development of recent medical technology and the improvement of quality of medical service are necessary. It is very important to have professional capacity of nurses which account for a lot of manpower in hospitals to provide those [1]. In addition, as the complexity of patients and their severity increase, nurses who have ability for professional knowledge and the development of technology are required [2].

Since new nurses have attended clinical practice given the first consideration for observations, which make differences between the knowledge and actual clinical nursing tasks, they feel difficulty in applying to the clinical nursing service [3][4]. Accordingly, hospitals prepare the nurses to conduct the duties necessary for clinical field through lecture-type orientation educations before they are assigned the clinical jobs [5]. The lectures, however, are effective in delivering knowledge, but have limits in improving actual nursing capability for nursing clinics where complicated and various problems occur [6]. Therefore, it is necessary to introduce a new education method that may convert the theoretical knowledge nurses obtained through the lectures into the practical knowledge necessary for the duties in nursing clinics.

The simulation-based education is a method in which nurses solve clinical problems by applying a patient scenario to HPS in a place like a clinic [7]. The simulation learning is an effective way for learners to obtain learning contents and critical thinking as well as increase the ability to conduct in a field without harming a patient in a safe environment

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[8]. Also, the simulation learning enables nurses to repeat the experiences and practices as much as they desire, which improves not only the nurses' confidence for the duties but also their competency [9]. Thus, the simulation-based education could improve the nursing job performance of new nurses by promoting the application of the knowledge learned in college to the actual clinical situation, and as a result, the nurses were able to provide patients with nursing of good quality [10].

Looking at the results of studies that applied the simulation-based training in nursing education, John et al. used a trained nursing model to provide nursing college students with a simulation training for nursing the elderly who had hip surgery and then have them watch the cases. The students in this study had increased critical thinking after the education [11].

In addition, the application of simulation in nursing education in Korea found that the integrated simulation lecture, simulation-based integrated practice program which applied adult, maternity, children's clinical cases and core nursing techniques, and simulation-based advanced cardiac life support training in experienced nurses for intensive care unit and emergency room were effective in knowledge and clinical job performance [12][13]. Also, a simulation-based education in nursing students was effective in knowledge, clinical performance and problem-solving process [14]. However, HPS has been introduced in nursing education in South Korea since 2000, but less studies prove the effect and their application objects are not diverse [15].

Therefore, this study is to develop simulation scenario based urinary catheterization practicum education program similar to clinical situation and to see the effect of the simulation scenario based urinary catheterization practicum nursing education program.

1.2. Purpose of Study

The purpose of this research is to identify whether to produce an effect on knowledge, clinical competency and learning attitude of nursing students or not after developing and practicing of simulation practicum program on urinary catheterization care for women after simulation practicum program in simulation room similar to clinical situation.

1.3. Hypothesis

1.3.1. Hypothesis 1

There will be higher degrees of post-test of knowledge treated with simulation based practicum education on urinary catheterization care for women than pre-test of knowledge.

1.3.2. Hypothesis 2

There will be higher degrees of post-test of clinical competency treated with simulation based practicum education on urinary catheterization care for women than pre-test of practical ability.

1.3.3. Hypothesis 3

There will be higher degrees of post-test of learning attitude treated with simulation based practicum education on urinary catheterization care for women than pre-test of learning attitude.

2. Research Method

2.1. Research Design

After developing of simulation scenario of urinary catheterization care for women, researcher practiced simulation-based practicum education using simulation scenario to nursing students. This study design was a comparison of pre-test and post-test results tested effects of education on knowledge, clinical competency and learning attitude.

2.2. Sampling of Research Subject

This study subject was sampled from the junior of nursing students. Researchers of study explained purpose, contents, schedule of research and caution of security to students. And students could give up this study any time if they want and then they signed consent form from July 3 to July 28, 2017 in a university, G province who

- 1) was from 20 to 29 years old,
- 2) has no disease in sense of smell or mental disorder,
- 3) was able to communicate, understand the study and voluntarily agreed to it

A final number of 26 participants in the control group and 23 participants in the experimental group for a total of 49 participants were employed in this experiment due to absent or insincere responses. Because Durham and Alden(2008) [16]. stated that the small simulation group for nursing education should be no more than five, the number of participants assigned to each group was three or four for the simulation practicum education.

2.3. Measurements

2.3.1. Knowledge

To measure knowledge of urinary catheterization care for women, a test with 10 questions was developed by researchers by referring to text books on fundamental nursing and NCLEX-RN. The validity of the test was verified by two professors of nursing and a physician. If the answer to a question was correct, one point was given, and if the answer was wrong, zero points were given; the scores ranged from 0 to 10, with higher scores representing greater knowledge.

2.3.2. Clinical Competency

To measure clinical competency of urinary catheterization care for women, a test with 25 questions of urinary catheterization for women was developed by researcher. The validity of the scale was verified by two professors of nursing and a physician. If a student practices perfectly, five point was given, and if a student doesn't practice at all, a point was given, with higher scores representing greater clinical competency. The Cronbach's α was .97 in the current study.

2.3.3. Learning Attitude

To measure learning attitude of urinary catheterization care for women, a test with 25 questions of learning attitude. To measure learning attitude on urinary catheterization care for women, a test with 16 questions of learning attitude was developed by Korean educational development institute(1992). If a student does always, five point was given, and if a student doesn't do at all, a point was given, with higher scores representing greater learning attitude. The Cronbach's α was .96 in the current study.

2.4. Research Procedure

2.4.1. Developmental Stage of Simulation Scenario

Researchers made a simulation scenario, handouts and evaluation checklists for practicum education out. They had conference four times for evaluation with professors and modified them and made a simulation scenario, handouts and checklists for evaluation evidence-based of clinical case reports and textbook of nursing depending on physician's opinion about the simulation education program. And then two nursing professors and one pediatric doctor evaluated content validity of assessment tools. And then two students practiced according to the simulation scenario in advance. The scenario was revised and available to execute in 15 minutes. The simulation scenario of simple urinary catheterization for women was made up monitor setting, manikin action and student intervention for nursing process (Assessment, Diagnosis, Intervention and Evaluation). The situation of scenario was in a state 29 years old primi-gravida woman hospitalized in the delivery room at 38 weeks and 3 days of pregnancy. Her cervical dilation was 4cm, cervical effacement is 75%, station is -2. She was not determined for induced labor and gave a groan, and complains that she cannot urinate with bladder inflation.

Table 1. Simulation Scenario on Urinary Catheterization Care for Women

An-dong Kim, a 29-year-old primi-gravida woman, was hospitalized in the delivery room at 38 weeks and 3 days of pregnancy. Now cervical dilation is 4cm, Cervical effacement is 75%, Station is -2. The subject was not determined for induced labor. The subject gives a groan, and complains that she cannot urinate with bladder inflation.			
Time (min)	Monitor setting	Manikin Action	Student Intervention
Initial Phase	- T : 36.6°C, P : 87 x/min, R : 25 x/min, BP : 130/90mmHg, - Fetal heart rate :120~140 x/min - Fetal station : -2 - Cervix condition : 4cm dilation, 75% effacement - Uterine contraction: Interval - 4', Duration - 50"		
0-5 min	- T : 36.8°C, P : 88 x/min, R : 24 x/min - BP : 125/90mmHg - Fetal heart rate : 120~140 x/min	- Mother: Groaning with frown and complaining labor pain "Umm, how long will the labor pains continue?"	- Wash hands - Identify ID band - Introduce self - Assess contraction of uterine and vital sign
6-8 min	- T : 36.7°C, P : 89 x/min, R : 26 x/min - BP : 130/90mmHg - Fetal heart rate :130~140 x/min	- Mother: "The low abdomen feels inflated, but I can't urinate well."	- Report the patient's condition on the telephone in the delivery room to have prescription of simple urinary catheterization
9-13 min	- T : 36.7°C, P : 88 x/min, R : 25 x/min - BP : 120/80mmHg - Fetal heart rate : 120~140 x/min	- Mother: Touching her abdomen with hands Because of abdominal pain. "The baby's going to have no problem?"	- Explain the mother that simple urinary catheterization will be performed - Conduct simple urinary catheterization when the patient has no pain - Assess pt
14-15 min	- T : 36.7°C, P : 89 x/min, R : 27 x/min - BP : 120/90mmHg - Fetal heart rate : 130~150 x/min - Fetal station : -1 - Cervix condition : 5cm dilation 80% effacement - Uterine contraction: Interval - 3' Duration - 55"	- Mother: Shows face with comfortable look	- Report of pt to doctor condition - Record nursing activity and patient's response - Bed making - Arrange the used items

2.4.2. Sampling Stage of Data

After selection participants, researcher explained the procedure and caution to participants and received consent form junior nursing students and practiced the simulation class from July 3 to 28, 2017. Researcher received pre-test paper of knowledge, clinical competency and learning attitude from nursing students and practiced simulation-based education and had post-test of knowledge, clinical competency and learning attitude. Questionnaire on the general features as well as their knowledge, practical ability and learning attitude was conducted before and after education indicated.

2.5. Analysis of Data

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 24.0. Descriptive statistics for mean and standard deviation were used. Comparisons between pre-test and post-test scores were undertaken. Before and after education practicum, an average of knowledge, clinical competency and learning attitude was calculated to get symmetric data then compared over the two time periods with paired t-test. The reliability of assessment tool was tested Cronbach's α .

3. Result

3.1. General Characteristics of Subjects

The results of study on the levels differing by the general characteristics is shown in Table 2. Of the female nursing student subjects, 26 were between the ages of 21 and 26. When asked about their economic status, 84.6% of the respondents answered "ordinary", 11.5% answered "difficult", and only 3.8% answered "good". Regarding the physical health of the subjects, 3.8% replied that they were "unhealthy", 30.8% responded as "ordinary", 61.5% replied as "general healthy", and 3.8% responded as "very healthy".

61.5% of the subjects' fathers are college graduates and 53.8% of the subjects' mother are college graduate Table 1.

Table 2. General Characteristics of Subjects (N=26)

Variables	Categories	N	%
Gender	female	26	100
Economic Status	difficult	1	3.8
	ordinary	22	84.6
	difficult	3	11.5
Father's education	graduated elementary school	1	3.8
	graduated high school	7	26.9
	college graduate	16	61.5
	master degree	2	7.7
Mother's education	graduated middle school	1	3.8
	graduated high school	11	42.3
	college graduates	14	53.8
Religion	none	11	42.3

Health Status	christian	4	15.4
	buddhism	11	42.3
	unhealthy	1	3.8
	ordinary	8	30.8
	general healthy	16	61.5
	very healthy	1	3.8

3.2. Test of Hypothesis

3.2.1. Hypothesis 1

‘There will be higher degrees of post-test of knowledge treated with simulation based practicum education on urinary catheterization care for women than pre-test of knowledge.’ The mean of knowledge from participants were 7.46 in the Pre-test and 7.42 in the Post-test. Since there was no significant difference in knowledge ($t=.290$ $p=.774$), hypothesis 1 was rejected (Table 3) [17].

3.2.2. Hypothesis 2

‘There will be higher degrees of post-test of clinical competency treated with simulation based practicum education on urinary catheterization care for women than pre-test of practical ability.’ The mean of clinical competency were 65.34 in the Pre-test and 69.38 in the Post-test. Since there was a significant difference in clinical competency ($t=-2.593$ $p=.016$), hypothesis 2 was adopted [17].

3.2.3. Hypothesis 3

‘There will be higher degrees of post-test of learning attitude treated with simulation based practicum education on urinary catheterization care for women than pre-test of learning attitude.’ The mean of learning attitude treated with simulation-based practicum education were 62.15 in the Pre-test and 63.73 in the Post-test. Since there was no significant difference in learning attitude ($t=-1.304$ $p=.204$), hypothesis 3 was rejected Table 3 [17].

Table 3. Comparison on Pre-test and Post-test of Knowledge, Clinical Competency and Learning Attitude (N=26)

Variables	Pre-Mean	Post-Mean	Paired Difference		t	p
			Mean	SD		
Knowledge	7.46	7.42	.0385	.6771	.290	.774
Clinical Competency	65.34	69.38	-4.0385	7.9422	-2.593	.016*
Learning Attitude	62.15	63.73	-1.5769	6.1655	-1.304	.204

* $p < .05$

The participants of study were college students in a university and educated with simulation-based education practicum. When looking at the result of this study, the nursing students significantly improved their clinical competency after they received the simulation-based urinary catheterization nursing program for women Figure 1.

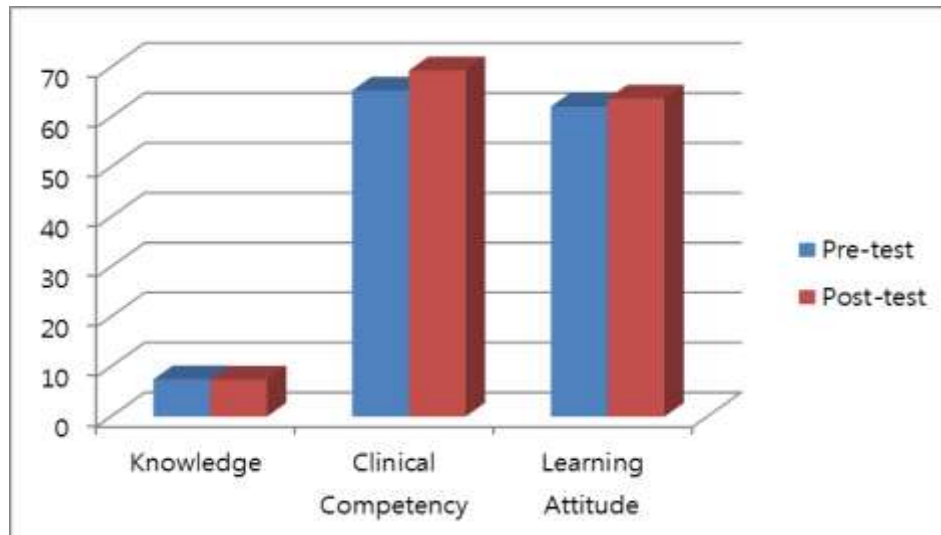


Figure 1. Histogram of Comparison on Pre-test and Post-test of Knowledge, Clinical Competency and Learning Attitude

4. Discussion

The purpose of study was to identify if developing of simulation scenario based urinary catheterization for women can affect knowledge, clinical competency and learning attitude of nursing students after simulation based practical education in simulation room similar to clinical situation.

When looking at the result of this study, the nursing students significantly improved their competency after they received the simulation-based female urinary catheterization nursing program. This was consistent with the study result that the clinical performance of the study group that received the simulation-based education was more improved than the control group that received lecture-type education in the 6-week simulation-based education in the sophomore nursing students in the study by Yang(2008) [15]. In addition, the current result was like the findings of the study of Alinier *et al.*, (2006) in which nursing students who experienced simulation significantly increased their duty capability[18].

The result of this study did not show significant differences in knowledge and learning attitude, which was different from the result of Brannam *et al.*, (2008)[19] that the knowledge score was significantly high when HPS was applied to the acute myocardial infarction nursing in junior nursing students and the result of Baek(2006) that the knowledge score was significant high when the advanced cardiac life support training was given to the experienced nurses from the intensive care unit and emergency room[13]. To increase the effects on nursing knowledge and learning attitude, therefore, it should be considered that the study on intervention effect which increased the education times for knowledge and learning attitude will be necessary.

The significance of this study was in showing the possibility of developing and applying simulation-based practicum education program on urinary catheterization care for woman by demonstrating improvements in students' clinical competency.

Therefore, it is believed that the simulation-based female catheterization nursing education is very effective training method for improvement of the clinical capability necessary for job performance of nursing students.

5. Conclusion and Suggestion

This study is to see if the simulation-based practicum education on urinary catheterization for women can affect knowledge, clinical competency and learning

attitude of nursing students in simulation room similar to clinical situation. Total subjects are 26 of nursing students. Period of collecting data is from July 3 to 28, 2017. For the data analysis, we used SPSS WIN VER. 24.0.

The results of this study were as follows.

The hypothesis 1: 'There will be higher degrees of post-test of knowledge treated with simulation based practicum education on urinary catheterization care for women than pre-test of knowledge.' was rejected ($t=.290$ $p=.774$) [17].

The hypothesis 2: 'There will be higher degrees of post-test of clinical competency treated with simulation based practicum education on urinary catheterization care for women than pre-test of practical ability.' was adopted ($t=-2.593$ $p=.016$) [17].

The hypothesis 3: There will be higher degrees of post-test of learning attitude treated with simulation based practicum education on urinary catheterization care for women than pre-test of learning attitude.' was rejected ($t=-1.304$ $p=.204$) [17].

These results confirmed that the nursing students significantly improved their clinical competency after they received the simulation-based urinary catheterization nursing program for women.

Based on the above results, researcher propose the following:

First, the simulation-based nursing program must be conducted with diverse clinical situation in practicum class for nursing students.

Second, studies should be conducted in the future using a variety of measures and examining the effectiveness of these simulation-based nursing program.

Third, studies with diverse numbers of subjects should be conducted in order to better generalize the results.

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