Effects of Simulation-Based Practice Education on Learning Satisfaction, Immersion, and Self-Efficacy of Nursing Students

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Abstract

The purpose of this study is to understand the effects of simulation-based practice education on learning satisfaction, immersion, and self-efficacy. Using the method of one-group pretest-posttest experimental research, this study selected total 70 nursing students (3rd year) as research subjects. The final research subjects were total 63 students excluding seven people with insufficient responses. From March to April 2021, total eight sessions of simulation practice education (4 hours per session) were conducted once a week. In the effects of the program, the immersion, learning satisfaction, and self-efficacy were measured. Using the SPSS Window Version 25.0, the immersion, learning satisfaction, and self-efficacy were analyzed through the mean, standard deviation, and paired t-test. In the results of this study, the learning satisfaction (t=-2.06, p=.003), immersion (t=-10.61, p<.001), and self-efficacy(t=-2.31, p= .024) were statistically significant. In the results of analyzing the correlations of immersion, learning satisfaction, and self-efficacy after the simulation practice education, the learning satisfaction showed significantly positive correlation with immersion (r= .647, p<.001). The immersion also had positive correlation with self-efficacy(r= .438, p<.001). The results of this study verified the improvement of immersion, learning satisfaction, and self-efficacy of nursing students after the simulation-based practice education. Thus, it would be necessary to develop the educational contents for various subjects, and also to expansively apply the simulation practice education.

Keywords: simulation, learning satisfaction, immersion, self-efficacy

1. Introduction

Nursing students should acquire and develop expertise to be equipped with competencies of nurse required in domestic/foreign medical sites. This is the reason why the importance of clinical field practice is more emphasized. In reality, however, there are limitations of clinical practice like limited direct nursing by nursing students, subjects' refusal, and protection of privacy. Simulation education composed of various and unpredictable clinical situations suitable for the learning purpose provides opportunities for learners to experience the process of directly participating in situations, performing roles, and solving problems, which could improve the problem-solving ability, self-efficacy, and critical thinking ability (Dool et al., 2016; Cant, & Cooper, 2017). For this reason, the simulation education is used as a method of replacing the clinical practice. The Korea Accreditation Board of Nursing Education allows that 12% of total clinical practice hours could be replaced with simulation learning (Korea Accreditation Board Of Nursing, KABON., 2016).

Various education methods are developed and applied in order to accomplish the high academic achievement through learners' active participation in learning (Chung et al., 2015). Especially, in the complex and unpredictable clinical field after graduation, the nursing students should have integrated thinking to quickly find a problem in subjects and to efficiently solve it, so the College of Nursing should put multilateral efforts to produce competent nurses required by the future society by educating them to be equipped with the problem-solving ability essentially needed in nursing site(Kim, 2017). Thus, the Department of Nursing is providing practice through various simulation scenarios, and especially, it is very urgently needed to have the intramural simulation practice that could replace the practice of Child Health Nursing that is hard to be experienced in a clinical practice situation. The strengths of simulation-based education could be mentioned as the students become active learners; they can learn and think in situations instead of

acquiring memorization-centered knowledge or finding a fact-centered answer(Jeffries, 2005). they can variously learn complex techniques in safe environment; and they can also learn how to manage mistakes without any serious problems. Thus, the professors should study effective simulation education methods. For the effects of simulation, the high academic achievement could be accomplished only when the learners actively participate in learning. The active participation could be explained in a word 'immersion', which could be defined as the status of performing the optimum learning by completely getting absorbed into it (Kwon, Bae., & Lee. 2008; Jang et al., 2018). The immersion arouses internal motive for learning, affects the academic achievement, and also influences the inspiration of self-efficacy (Lee, 2011; Park & Choi 2020). It could also expand the latent learning ability of learners (Bowman & Standiford, 2016). In a recently previous study, simulation-based education was effective in communication ability and self-efficacy (Park & Kim, 2018; Lopez 2021). Self-efficacy reduces clinical practice stress in nursing students (Hwang, 2006). Self-efficacy is an important factor for learning motivation (Cant & Cooper,2009), which has an effect on clinical performance(Lasater,2007), in case of developing education program, self-confidence is significant element that we must considered.

In the recent preceding researches that measured the immersion in simulation education, when the students were immersed more in simulation learning, there were positive correlations of learning ability, self-efficacy, simulation learning confidence, and satisfaction (Kim, Noh, & Im, 2017; Yoo & Kim, 2018). In the simulation class, a professor composes and evaluates the scenario by making the learners perceive themselves as real nurses in artificial situations, so it is very important to measure the degree of immersion in simulation learning. There was a preceding research on learning satisfaction, communication skills, and clinical competence of nursing students after the simulation-based practice education (Bae & Jeon, 2014). Even though the immersion is an important element of effective debriefing strategy and matter of success in simulation learning (Stokes-Parish, Duvivier., & Jolly, 2018), there are not many researches on it.

Therefore, this study aimed to provide the basic data for the efficient operation of simulation education that could increase nursing students' adaptability to clinical settings, by verifying the effects of simulation-based education on immersion, learning satisfaction, and self-efficacy of the third-year students of nursing department.

2. Materials and Methods

2.1 Research Design

This is an one-group pretest-posttest design experimental research for evaluating the effects of simulation-based practice education on immersion, self-efficacy, and learning satisfaction in Table 1.

Table 1. Research Design

Group	Pre-test	Intervention	Post-test
Experimental group	Ye1*	X**	Ye2***

*Ye1: General characteristics, Immersion, Learning Satisfaction, Self-efficacy

**X: Simulation learning.

***Ye2: Immersion, Learning Satisfaction, Self-efficacy

2.2 Research Subjects

Using the convenience sampling method, from March 2 to April 23, 2021, this study selected total 63 people who agreed to participate in this study from the third-year students without any experiences in simulation education in a college of nursing located in K province. The number of subjects was calculated by using the G* Power Program 3.1.9.2. Even though total 70 people were selected as research subjects by considering the drop-out rate, the final research subjects were total 63 people excluding seven people with insufficient responses.

2.3 Research Tools

The questionnaire was composed of six items for general characteristics, 16 items for immersion, 14 items for learning satisfaction, and 23 items for self-efficacy. To measure the immersion, this study used the immersion measurement tool developed by Ko(2020), which was composed of four subfactors and total 16 items on the basis of Likert 5-point scale(1point for 'Not at all', 5points for 'Very much so'). The Cronbach's α of this study was .90. As the learning satisfaction scale, this study used the learning satisfaction assessment tool developed by Lee(1996) and

then modified/complemented by Seong (2008), which was composed of four subfactors and total 14 items on the basis of 5-point scale(1point for 'Not at all', 5points for 'Very much so'). The higher score means the higher learning satisfaction. In this study, the Cronbach's α was .94.

To measure the self-efficacy, this study used the Self-Efficacy Scale (SES) produced by Shere et al (1982) and then adapted by Hong (1995). Self-efficacy is the belief that one can successfully perform the behaviors required to achieve desired and expected outcomes. This scale was composed of total 23 items including 17 items for general self-efficacy and six items for social self-efficacy. The subjects were asked to respond to each item in the self-report method according to how they felt and thought about themselves at ordinary times on the basis of Likert 5-point scale(1point for 'Not at all', 5points for 'Very much so'). The higher score means the higher self-efficacy. In this study, the Cronbach's α was .87.

2.4 Research Procedures

The research procedures are as follows. Before starting the simulation education, the purpose and methods of this study were explained in advance to the third-year nursing students of a university. They were also told that the participation in this study would not be compulsory; the contents of response that would be processed anonymously would not be used for other than the research purpose; and it would not affect the grade of subject. The subjects who agreed to participate in this study submitted a written consent form. The simulation-based practice education course(1 credit, 2 hours) was operated in the first semester for the third-year students. For total eight weeks from March 2 to April 23, 2021, the course was provided for four hours each week on the module of three scenarios. Each class was composed of 20 subjects and each team was composed of three people, so total three modules were operated targeting 63 people. As the class module of child nursing, the three practice modules were composed of normal neonate, transient tachypnea of newborn, and infants with bronchiolitis. The contents of handover, ambiguous prescription, report of unsafe situation, and oral prescription using the SBAR (Situation-background -Assessment-Recommendation) were applied to the scenario. Regarding the composed practice modules, the reality and content validity were verified, modified, and complemented by three nursing professors, two doctors, and two nurses before use. Before applying the practice modules, the pretest was conducted including one hour for orientation, one hour for introducing & how to use the simulator, and two hours for lecture on theories related to handover, ambiguous prescription, report of unsafe situation, and oral prescription using the SBAR. Before starting each module, the practice and assessment of core basic nursing skills were performed. After that, it was proceeded in the order of team assignment, scenario analysis, pre-debriefing, simulation driving, and post-debriefing. After the simulation practice ended, the whole debriefing, application of nursing process, and presentation were carried out by using the recorded video image. When the simulation for another team is driving, the rest students were told to submit a report applying their practice journal, debriefing introspection journal, and nursing process. After completing the education for eight weeks, the post-test was conducted with the same items as the pre-test on the 9th week.

2.5 Data Analysis Methods

Using the SPSS version 25.0, the collected data was analyzed through the descriptive statistics, independent t-test, Cronbach's α, Pearson's correlation coefficients, and ANOVA. The general characteristics of nursing students were analyzed with descriptive statistics. immersion, learning satisfaction, and self-efficacy were analyzed before and after simulation practice by t-test and ANOVA. after simulation practice, the relationship between immersion, learning satisfaction, and self-efficacy was analyzed with Pearson correlation coefficient.

3. Results

3.1 General Characteristics of Research Subjects

In the results of analyzing the general characteristics of research subjects, the mean age was 23.65Y. There were female students (N=54, 85.7%) and male students(N=9, 14.3%). In the motive for choosing the Dept. of Nursing, the most responses were "Consideration of aptitude(N=29, 46.0%)", which was followed by "Consideration of employment (N=25, 39.7%)" and "Encouragement by parents(N=9, 14.3%)". The satisfaction with nursing major was shown as "Satisfied (N=40, 63.5%)", "Very satisfied(N=10, 15.9%)", "Moderate(N=12, 19.0%)", and "Dissatisfied(N=1, 1.6%)", so majority of the students were satisfied. Regarding the grade in the previous semester, the grade "4.0 or up(N=27, 42.9%)" was the most, which was followed by "3.5~4.0(N=18, 30.2%)" and "3.0~3.5(N=17, 27.0%)" in Table 2.

Table 2. General Characteristics of the Subjects (N=63)

Characteristics	Division	n (%) or M±SD	n(%)
Age		22.65±6.42	
Gender	Male	9	14.3
	Female	54	85.7
Admission motivation	Consideration of employment	25	39.7
	Encouragement by parents	9	14.3
	Consideration of aptitude	29	46.0
Satisfaction with nursing major	Very satisfied	10	15.9
	Satisfied	40	63.5
	Moderate	12	19.0
	Dissatisfied	1	1.6
	Very dissatisfied	0	0.0
Grade in the previous semester	Lower than 3.0	0	0.0
	3.0~3.5	17	27.0
	3.5~4.0	19	30.2
	4.0 or up	27	42.9

3.2 Immersion, Learning Satisfaction, and Self-Efficacy Before/After the Simulation Practice

Table 3. Immersion, Learning Satisfaction, and Self-Efficacy Before/After the Simulation Practice (N=63)

Variable		Before Simulation	After Simulation	t	p
		Mean (SD)	Mean (SD)		
Immersion	total	3.76(0.50)	4.46(0.54)	-10.61	.000*
	Cognitive assimilation	3.73(0.56)	4.42(0.56)	-8.77	.000*
	Presence	3.60(0.70)	4.30(0.82)	-6.38	.000*
	Attention	3.80(0.68)	4.60(0.56)	-8.74	.000*
	Self-purposive experience	3.96(0.80)	4.55(0.67)	-5.54	.000*
Learning Satisfaction	total	4.41(0.44)	4.61(0.41)	-3.06	.003*
	Learning attitude	4.56(0.53)	4.67(0.50)	-1.54	.128
	Learning satisfaction	4.40(0.50)	4.56(0.50)	-2.11	.038*
	Suitability of learning contents	4.42(0.50)	4.60(0.48)	-2.37	.021*
	Academic achievement	4.38(0.50)	4.62(0.42)	-3.26	.002*
	Self efficacy	3.50(0.31)	3.58(0.45)	-2.31	.024*

*p<.05

Regarding the immersion according to before/after the simulation practice, the mean score of immersion after the simulation class was increased from 3.76(±.50) to 4.46(±.54), which was statistically significant(t=-10.61, p<.001). The area with the lowest mean score of immersion before the simulation class was <Presence> with 3.60(±.70), which was significantly different from the one after the class(4.30(±.30))(t=-6.38, p<.001). The simulation class had effects on four subareas(cognitive assimilation, presence, attention, self-purposive experience) of immersion in Table 3. The mean of learning satisfaction was significantly increased from 4.41(±.44) before the class to 4.61(±.41) after the class(t=-3.06, p=.003), and the <Academic achievement> of learning satisfaction showed the greatest effect from

4.38(±.50) to 4.62(±.42)(t=-3.02, *p*=.002). On the other hand, among the subareas of learning satisfaction, the mean score of <Learning attitude> was increased from 4.56(±.53) before the simulation class to 4.67(±.50) after the class, which was not statistically significant(t=-1.54, *p*=.128). Regarding the self-efficacy according to before/after the simulation class, the mean score of self-efficacy was increased from 3.50(±.31) before the class to 3.58(±.45) after the program, which showed a statistically significant difference(t=-2.31, *p*=.024) in Table 3.

3.3 Immersion, Learning Satisfaction, and Self-Efficacy After the Simulation Practice

The relations of immersion, learning satisfaction, and self-efficacy of nursing students after the simulation-based education are as Table 4. The learning satisfaction had a significantly positive correlation with immersion(r=.647, *p*<.001). The self-efficacy had a significantly positive correlation with immersion(r=.438, *p*<.001) in Table 4.

Table 4. Immersion, Learning Satisfaction, and Self-Efficacy after the Simulation Practice(N=63)

Variable	Immersion	Learning Satisfaction	Self-efficacy
		r(p)	
Immersion	1		
Learning Satisfaction	.647**	1	
Self-efficacy	.438**	.229 (.071)	1

***p<0.001*

4. Discussion

To provide the high-quality nursing to subjects with various nursing problems in the rapidly-changing medical site, the clinical adaptability of nursing students should be developed by applying various education methods.

This study aimed to provide the basic data for the development and efficient operation of simulation education program for enhancing the clinical adaptability of nursing students, by verifying the effects of simulation-based education on immersion, learning satisfaction, and self-efficacy of nursing students. The simulation-based education using three modules was carried out for eight weeks. In the results of this study, the simulation-based education had positive effects on immersion, learning satisfaction, and self-efficacy of nursing students.

In this study, the mean score of immersion was increased from 3.76(out of 5) before the simulation-based education to 4.46 after the education. This is similar to the results of the research by Oh & Kang(Oh&Kang, 2013) that applied the simulation education targeting the fourth-year students. In the simulation-based education program for eight weeks, the immersion must be improved by experiencing the active participation through active interactions and debriefing between team members. Based on this result, the use of strategies that could induce students' immersion in simulation education could bring about educational effects.

The mean score of learning satisfaction was increased from 4.41(out of 5) before the simulation class to 4.61 after the education. This could be interpreted that it had positive effects on learning satisfaction of students. Just as the research(Son, Song, & Choi, 2010) arguing that the high class satisfaction, positive learning attitude, and positive academic achievement would be essential elements for raising the critical thinking disposition, so the practice education using simulation must be the education method required for preservice medical personnel that should provide nursing to various patients in clinical settings. In the results of understanding the correlation between learning satisfaction and immersion of nursing students after the simulation practice education focusing on the scenario of child nursing, the learning satisfaction had a significantly positive correlation with immersion. According to how much the learners are immersed in learning, their belief in doing right and confidence in successful learning could make learners actively participate in class, which is led to their class satisfaction. Based on such results, it would be eventually necessary to promote the production of nurses fully equipped with adaptability to clinical settings by actively inducing students' voluntary participation through simulation education, giving positive feedbacks on it, and improving the learning satisfaction/attitude based on interest in learning and voluntary motivation through debates of various clinical cases. The mean score of self-efficacy was 3.50 out of 5.00, which was higher than 2.94 of the research by Kim & Park (2013). In the research by Kim & Park(2013), it was measured when the semester began before applying the simulation program to subjects. In this study, it was measured after learning all the basic nursing skills in the basic nursing practice class. Considering the continuity of class, the confidence must be a bit increased. Considering when the self-efficacy of nurses is higher, the formation of

relationships with subjects and adaptation to clinical settings can be performed well, the simulation education is helpful for improving the formation of therapeutic relationship with subjects by enhancing the confidence of nursing students. Thus, the nursing education would need to systematically establish the simulation education program for improving the self-efficacy of nursing students.

In this study, the simulation-based practice had statistically significant effects on immersion, learning satisfaction, and self-efficacy of subjects. The teaching/learning method applying the simulation was effective, and the scenario writing in group activity, utilization of simulation, and debriefing made learners be immersed more in learning. Also, the learning satisfaction and self-efficacy were increased together by performing the data collection, group debate, and group self-learning to write a scenario similar to clinical settings. This accords with the research by Oh & Kang(2013) in which the student-centered teaching method increased the immersion and problem-solving ability in the nursing simulation learning.

In this study, all the immersion, learning satisfaction, and self-efficacy showed statistically positive correlations with each other. When the learning satisfaction and self-efficacy were higher, the immersion was better, which showed positive correlations. The current observation-centered clinical practice experience in nursing education is not good enough for nursing students to directly acquire the nursing competence, knowledge, skills, and attitude(Kwon & Kim, 2020; Yee et al., 2018), so the problem-solving process and self-efficacy through immersion should be improved by providing opportunities of learning to experience the practice environment similar to clinical settings. The professors should endlessly make efforts to systematically compose the simulation-based education. However, this study was conducted in the one-group pretest-posttest design targeting the nursing students of a university due to the possible concern about the control over exogenous variables of experimental treatment. As this study did not set up a control group and randomization, it is limited to interpret the effects of experimental treatment. Therefore, the further researches would need to verify the effects of simulation-based education by setting up a control group or randomization in the future.

5. Conclusion

This study aimed to seek for the effective operation of simulation practice by verifying the effects of simulation-based practice program targeting total 63 nursing students of a university located in K province. In the results of this study, the simulation-based practice education was effective for immersion, learning satisfaction, and self-efficacy, and especially, the immersion was increased in the group with high self-efficacy. In addition, the factors affecting self-efficacy in simulation-based education were identified as learning satisfaction.

Based on such results of this study, the suggestions could be made as follows. First, it would be necessary to seek for the concrete measures for applying the simulation education using the simulation-based practice program with control group and experimental group instead of one-group. Second, there should be researches that compare and verify the effects of simulation-based program according to learning period through control group and experimental group. Third, it would be necessary to develop and apply a program that systematizes debriefing which is the core of simulation education.

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