Original Article

The Effect of High Reality Simulation on Nursing Students' Knowledge, Satisfaction, and Self-Confidence Levels in Learning

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Abstract

Background: Many benefits of using the simulation method in nursing education have been reported.
Aim: The study was conducted to determine the effect of simulation method on nursing students' knowledge, satisfaction and self-confidence levels in learning.
Methodology: 61 students were randomly assigned to the experimental and control groups. The effect of simulation about diabetes and hypoglycemia on students' knowledge, satisfaction and self-confidence levels in learning was evaluated.
Results: No significant difference was found between the diabetes and hypoglycemia knowledge pretest mean scores of the experimental and control groups (p>0,05). Diabetes and hypoglycemia knowledge post-test and 1st month scores of the experimental group were statistically significantly higher than the control group (p=0,00; p<0,01).
Conclusions: Satisfaction and self-confidence levels of those who received education with simulation were high. Using simulation in nursing education increased students' knowledge, satisfaction and self-confidence levels.

Key Words: simulation, education, nursing, satisfaction, self-confidence in learning

Introduction

The purpose of nursing education is to educate a professional member who is responsible, self-confident, questions, researches, thinks freely, uses his/her skills creatively, and at full capacity and approaches to problems scientifically. Therefore, it is necessary to use the educational methods that enable students to gain cognitive, affective and psychomotor skills. Simulation, one of these methods, has become compulsory to be used in nursing education in accordance with the planned learning goals (Brown & Chronister, 2009).

Nursing education is a whole including theoretical and practical parts. Today, the high number of students in nursing departments, the low number of faculty members, incompatibility/inadequacy of laboratory facilities, and difficulties encountered in clinical practice fields constitute the most important obstacles in achieving the expected goals in clinical practice. Therefore, practices made with the simulation in laboratory environment before the clinical practice increases the student's competence and equipment. These experiences also contribute to providing patient's safety, preventing medical errors, and improving the quality of healthcare services. Trainings made with simulation aims to improve the student's critical thinking, analyzing, psychomotor, communication and management skills before the clinical applications and to increase the self-confidence while performing the nursing profession (Cant & Cooper, 2010; Ergol, 2011; Sendir, 2013; Sarmasoglu, Dinc & Elcin, 2016).

Students gain the skills of care giving, technical skills, decision making, evaluation, teamwork and management skills in a safe environment without fear of failure (Mıdık & Kartal, 2010; Robertson et al., 2010). Providing regular feedback to students through advanced simulation applications is also important for the students to have knowledge about the applications (Olgun, 2012). The feedback given to the students in the trainings made with simulation allows them to gain experience by learning from their mistakes without harming patients (Sarmasoglu, Dinc, & Elcin, 2016)

Although the use of especially the high fidelity simulation method in nursing education has become common in Turkey in recent years, the number of studies conducted on this subject in Turkey are limited. In this context, the study was conducted to determine the effect of simulation on nursing students' knowledge, satisfaction and self-confidence levels in learning.

Methods

Desing and Sample

The study was a randomized controlled experimental trial consisting of pre-test and post-test. The sample of the study was composed of 61 second-year students who were studying in the nursing department of a public university in Istanbul province during 2017-2018 academic year, met the inclusion criteria, and agreed to participate in the study. Voluntary students who were taking the course of Internal Medicine Nursing for the first time, were not graduate of vocational school of health, were speaking Turkish, and had no communication problem were included in the study.

Data collection

As data collection tools, "Information Form" including sociodemographic characteristics, "Diabetes and Hypoglycemia Knowledge Test" measuring the knowledge level about diabetes and hypoglycemia, and "Student Satisfaction and Self-Confidence in Learning Scale" were used.

Information Form

It is a form prepared by the researchers according to the literature (Alkan, & Enc, 2014; Hogan et al., 2015). It includes questions about the socio-demographic characteristics of the students.

Diabetes and Hypoglycemia Knowledge Test
It was prepared by the researchers in accordance

with the related literature in order to measure the knowledge levels of students about diabetes and hypoglycemia (Jeffries, & Rizzolo, 2006; Gurol et al., 2016). Test was composed of 10 multiple choice questions with 5 choices. Each question is rated over 10 points. Maximum total score is 100. The content validity of the test was provided in accordance with four expert opinions including two faculty members in the Department of Nursing Fundamentals, one faculty member in the Faculty of Measurement and Evaluation in Education, and a faculty member from the Department of Medical Education and Informatics.

Student Satisfaction and Self-Confidence in Learning Scale

The scale which is widely used to measure students' attitudes and beliefs about simulation was published by the National League for Nurses (NLN) (Franklin, Burns & Lee, 2014). It is composed of a total of 13 items and two subscales as "Satisfaction with learning" (5 items) and "self-confidence" (8 items). The answer options are 5 = Strongly agree, 4 = Agree, 3 = Undecided: Neither agree nor disagree, 2 = Disagree, 1 = Strongly disagree. The participant is asked to mark the number that best expresses his/her opinions for each item (Jeffries, & Rizzolo, 2006; Karacay & Kaya, 2017). The score taken is obtained from the sum of the scale items. The highest score to be obtained from the scale is 65 and the lowest score is 13. High score from overall scale refers to high satisfaction and self-confidence. Its Turkish validity and reliability study was conducted by Karacay and Kaya (2017) and the internal consistency coefficient of the scale was found as 0.94. 16 The internal consistency coefficient of the scale was found 0.877 for this study.

Ethical considerations

The data of the study were collected after obtaining the institutional permission from the ethics committee (Number:B.08.6.YÖK.2.ÜS.0.05.0.06/2018/487) and the university. After the students were informed about the study and their written consents were taken, they were included in the study.

Data analysis

The data were analyzed by using SPSS® 21.0 (Statistical Package for the Social Science)

package program in the computer environment. Shapiro Wilks test was used to determine whether or not the data meet normal distribution. Percentage, distribution and mean (min-max) were used to analyze the socio-demographic data of the students. Mann Whitney U and Wilcoxon Signed Rank Tests were used because the data did not meet normal distribution. The statistical significance level of the variables was accepted as $p < 0.05$ and evaluated at confidence interval of 95%.

Study Period

The students were asked to randomly choose from the experimental and control written cards and randomization (experimental n = 31, control n = 30) was provided. The study was conducted in 2 steps including preparation and application. The preparation step of the study included the determination of learning objectives, formation of the scenario, preparation of guidelines for diabetes and hypoglycemia, and the preparation of the educators and students. The preparation step of the study was carried out between 18 January 2018 and 15 March 2018.

In the preparation step of the study, the aim and learning outcomes of the education related to the management of hypoglycemia and diabetes were determined and accordingly, the course contents were prepared. The experimental and control groups were trained in the classical method concerning diabetes and its complications. Power point presentation technique and verbal expression method were used in the training.

A scenario was prepared by the researchers for the simulation in accordance with the literature. The patient's information in the scenario included sociodemographic characteristics such as educational status, marital status, etc., background information such as previous diseases, hospitalization status as well as vital signs and physical examination results. The scenario was developed in accordance with the educational objectives concerning initiating and maintaining communication with the patient, collecting data about the patient's complaints, conducting and interpreting the physical evaluation of the patient, applying emergency procedures related to the care of the patient developing hypoglycemia, and realizing the training needs of the patient. Within the context of the preparation works, guidelines were prepared to facilitate the adaptation of the educators and students. All guidelines included

the rationale, purpose, method, research calendar and informed consent form of the study. An informative meeting was held for the preparation of the students and they were informed about the purpose and process of the study.

The application step of the study included reading the scenario to the students, answering their questions, orienting them to the environment, determining the roles with drawing method (prebriefing), applying the scenario in the simulation, conducting the debriefing part, applying the knowledge post-test for diabetes and hypoglycemia, and application of student satisfaction and self-confidence scale. After the application, students' knowledge levels at the end of the 1st month were measured again with diabetes and hypoglycemia knowledge test. Application step of the study was carried out between 20 March 2018 and 02 April 2018 and the simulation was also conducted in the control group in the same scenario (Figure1).

Results

Of the students forming the sample group, 82% were female and their mean age was 19.39 ± 0.89.

The mean scores of the experimental and control groups from the diabetes and hypoglycemia test were calculated (Table 1). No statistically significant difference was found between the pre-test mean scores of the groups ($p > 0,05$), but a statistically highly significant difference was determined between their mean scores of both the post-test and 1st month test ($p < 0,01$). Post-test and 1st month test scores of the experimental group were found to be significantly higher than the control group ($p < 0,01$).

When the in-group assessments were examined, it was found that while there was no statistically significant change between the pre-test and post-test mean scores of the control group ($p > 0,05$), a statistically significant change was observed both between the pre-test and 1st month test mean scores and between the post-test and 1st month test mean scores ($p < 0.05$).

In the experimental group, a statistically highly significant difference was determined between the pre-test and both the post-test and 1st month test mean scores ($p < 0,01$). Also, a highly significant difference was determined between the post-test and 1st month test mean scores ($p < 0,01$). It was determined that the students in both groups received the highest score from the post-test (Table 1).

Table 1. Averages Scores of Diabetes and Hypoglycemia Knowledge Test (n=61)

Diabetes and Hypoglycemia Knowledge Test		Groups		Test Score
		Experimental (n=31)	**Control** (n=30)	p
Pretest	Mean±SD	72.58±13.15	72.66±13.62	Z: -.007 [a].994
Posttest	Mean±SD	94.51±6.23	75.00±6.82	Z:-6.415 [a].000**
Follow-up 1	Mean±SD	87.74±4.97	65.33±7.76	Z: -6.647 [a].000**
Pretest - Posttest	Difference	21.93±13.76	2.33±15.90	Z: -4.379 [a].000**
	Test Score	Z: -4.43	Z: -0.788	
	p	[b].000**	[b].431	
Pretest - Follow-up 1	Difference	15.16±13.63	6.77±13.75	Z: -5.142 [a].000**
	Test Score	Z: -4.129	Z: -2.726	
	p	[b].000**	[b].006*	
Posttest-Follow-up 1	Difference	6.77±5.99	9.67±8.360	Z: -1.782 [a].075
	Test Score	Z: -4.185	Z: -4.057	
	p	[b].000**	[b].000**	

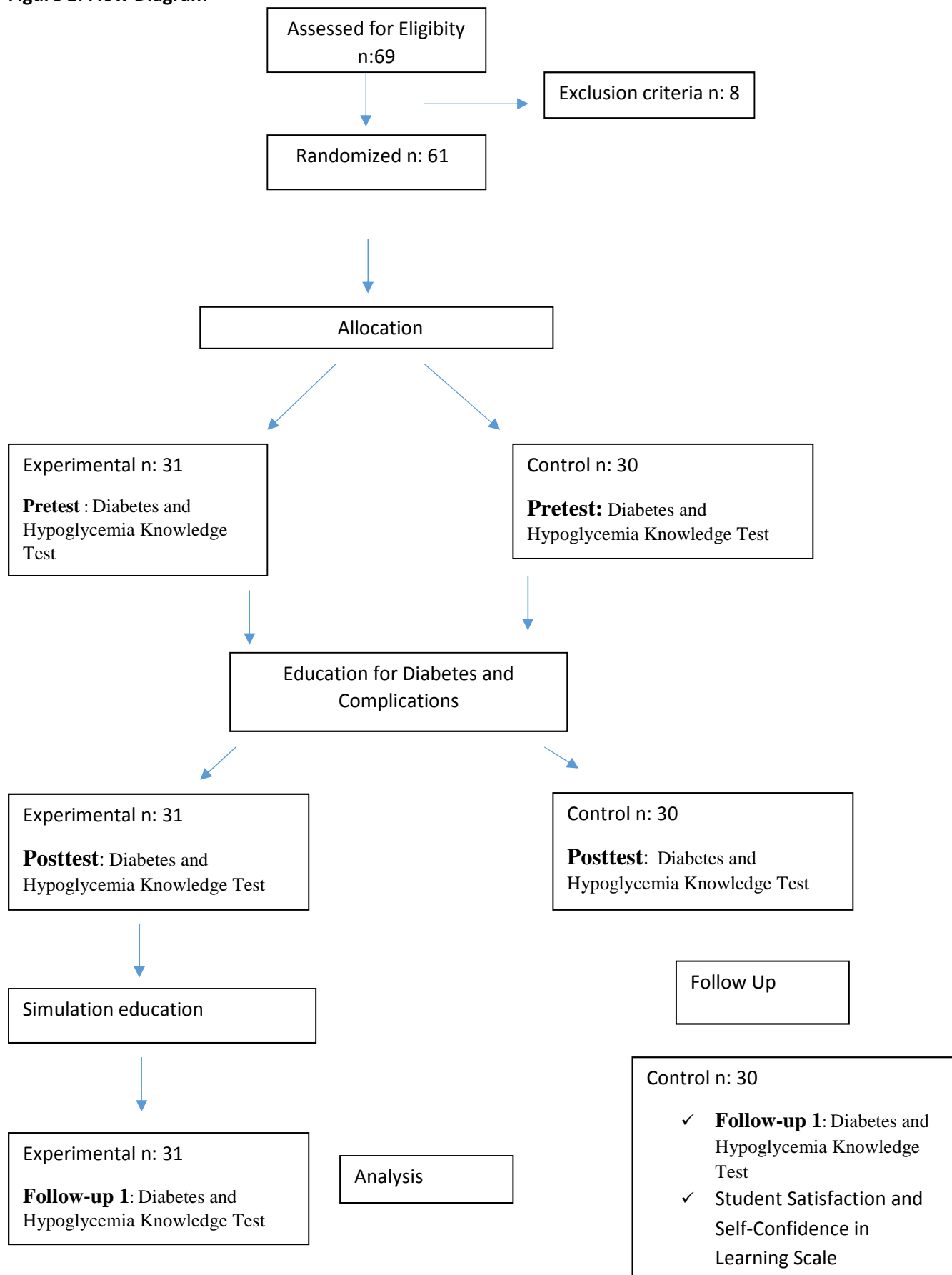[a] Mann Whitney U Test   [b]Wilcoxon Ranks Test   * p<0.05   ** p<0.01

Table 2. Average Scores of Student Satisfaction and Self-Confidence in Learning Scale (n=31)

Subscales	Mean±SD	Min-Max
Satisfaction with learning	23.45±2.07	17-25
Self-confidence	31.16±3.05	30-40
Total Score	59.61±4.54	47-65

Table 3. Average Scores of Student Satisfaction and Self-Confidence Learning Scale subscale according to gender (n=31)

Gender	n	Satisfaction with learning		Self-confidence	
		Mean±SD	Min-Max	Mean±SD	Min-Max
Female	**26**	23.58±1.69	20-25	36.37±2.74	31-40
Male	**5**	23.00±3.21	17-25	35.42±4.11	30-40

Figure 1. Flow Diagram

Total mean scores of satisfaction and self-confidence levels in learning of the students in the experimental group was 59.61±4.54 (min-max:47-65). Satisfaction subscale mean score of the student was 23.45±2.07 (min-max:17-25). Their mean score of self-confidence in learning subscale was 31.16±3.05 (min-max:30-40)'tir (Table 2).

While student satisfaction subscale mean score of the female students in the experimental group was 23.58±1.69 (min-max:20-25), their self-confidence subscale mean score was 36.37±2.74 (min-max:31-40). While student satisfaction subscale mean score of the male students was 23.00±3.21 (min-max:17-25), their self-confidence subscale mean score was 35.42±4.11 (min-max:30-40) (Table 3). It was determined that the satisfaction and self-confidence levels of the students in the experimental group were high.

Discussion

In the study where the simulation method was used in nursing education, knowledge, satisfaction and confidence levels in learning of the students were investigated. Education with simulation was found to have a positive effect on learning, satisfaction, and self-confidence. Similarly, there are various studies in literature using the simulation method in nursing education (Terzioglu et al., 2012; Alinier, Hunt & Gordon, 2006; Karadag, Calıskan & İseri, 2015; Gurol, Balcı & Ejder, 2016). In a systematic review, it was found that simulation was useful in creating a learning environment which contributes to knowledge, skills, safety, and confidence (Norman, 2012).

In the study, the scores in the post-test and 1st month test where the knowledge of the students in the experimental group about diabetes and hypoglycemia was evaluated were found to be statistically significantly higher than the control group. Increasing knowledge levels of the students will also increase the quality of service they will provide to the patients in the clinical environment. It is stated in the literature that the ways medical personnel present their knowledge and skills, especially patient-nurse relationship play an important role on patient satisfaction (Yilmaz, 2001). In this context, it can be asserted that simulation is a method that increases the knowledge level.

In the study, knowledge level of the experimental group about diabetes and hypoglycemia increased by creating a statistically very significant difference in both post-test and in the 1st month test compared to the pre-test. This is an important result showing the permanent effect of simulation in learning and its importance in academic success. Tabatabaeian et al., (2018) showed in their study that 2 weeks after the training, the results of intergroup comparison showed that the mean score of performance in the simulation group was significantly higher than the blended group and the lecture group.

In the study, it was determined that satisfaction and self-confidence levels in learning of the students in the experimental group were high. It was thought that the satisfaction and self-confidence levels of the nurses affected the quality of patient care. The study revealed the benefits of using simulation method in nursing education. Based on the result of the present study showing that the simulation was a method increasing the satisfaction and self-confidence, it can be asserted that using simulation in nursing education is important. Similarly, Lubbers and Rossman (2016, 2017) reported in their study that simulation increased the satisfaction and self-confidence level of the students.

Limitations: The limitations of the study are that the study was conducted with 2nd-year students of only a university, the individual learning styles of the students were ignored, and there was an inequality of the number of male and female students. In addition, since the measurement of the students' satisfaction and self-confidence levels should be conducted after the simulation, pre-test application could not be performed. This is also one of the limitations of the study.

Conclusion: In this study, the effect of simulation on the nursing students' knowledge, satisfaction and self-confidence levels in learning was investigated. After the application of simulation method, students' knowledge, satisfaction and confidence levels in learning were found to increase. It is recommended to focus on the use of simulation methods in nursing students' knowledge acquisition process. Presence and measurement of cognitive, affective and psychomotor gains are important in the determination of educational objectives. With this study, only the knowledge levels of the students were measured. It is recommended to make measurements for these three fields in further studies. It can be recommended to conduct new studies with larger samples

including students receiving education as a control group with classic method and to investigate the individual differences, learning styles, and alternative learning methods for a better education integration as stated by Tınmaz (2012). 28

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