Effects of Emergency Nursing Simulation-based Education Program for Self-directed learning ability and Confidence in performance

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Abstract. This study is a non-equivalent control group pre-post test design in order to develop the emergency nursing simulation-based education program for hyperglycemia patients and to examine the effects of a simulation-based education program on self-directed learning ability and confidence in performance of nursing students. Study participants were recruited from 2nd grade nursing students who attend the department of nursing of S University located in Seoul and composed of a experimental group(n=30) and control group(n=30). As the study procedure, 1 hour lecture education on diabetes was carried out to both groups. And then, the team self-study was carried out to the experimental group for 1 week and then, simulation-based education was conducted. The results of the study showed that there was a significant improvement in the self-directed learning ability ($t=8.49$, $p=.005$) and confidence in performance($t=13.88$, $p<.001$).

Keywords: Hyperglycemia, Simulation, Self-directed Learning Ability, Confidence in Performance

1 Introduction

Since nursing science is a study for clinical performance ability based on specialized knowledge. Educational institutions should provide an opportunity for clinical practice education so that students can assess patients properly and conduct effective care[1]. However, due to the increasing awareness of health care consumers’ right increasing in recent years, nursing students could practice nursing technique learned in college directly in the clinical field in the past while these days, patients require only the intervention of a skilled nurse than clumsy nursing students. Thus, there are only a few hospitals where students can directly practice nursing techniques[2].

Nursing simulation-based education introduced to complement these limitations of clinical practice education has the advantages that there is no harm compared to tradi-
tional education and students can practice just as they do in the clinical site in a safe situation and repetitive practice is possible[3]. Therefore, it has been reported that learners are not only accustomed to nursing work through simulation education carried out in an environment similar to clinical site but also be improve their confidence in performance [4].

In the domestic previous studies, simulation education has been applied to nursing education in various fields and has had a positive impact on learners [5],[6] such as in self-directed learning ability, confidence in performance, learning satisfaction, clinical performance ability and critical thinking ability of especially. Especially the subjects who received a simulation education were found to be improved, proving that simulation education is effective in promoting a variety of clinical competences of educatees [7].

Thus, this study is to provide the basic data for simulation practice education in diabetes management and emergency care area by developing a simulation-based education program for hyperglycemia patient emergency nursing care and applying it to nursing students to verify its effectiveness.

2 Study Method

2.1 Subjects

Sophomores without simulation practice experience in the department of nursing science of S University, a four-year-course university located in Seoul was selected as subjects.

2.2 Development of Simulation Education Programs

We created a scenario on symptoms and nursing issues of hyperglycemia based on literature [8]. Actual clinical cases were referred to the advice on ER chief nurse’s clinical experience of K Hospital located in Seoul and 4 professors of nursing science supervised it. To achieve the learning objectives, the simulation hyperglycemia patient emergency care scenario conducted for 15 minutes. It was developed based on the nursing process. Based on the developed simulation scenario, Simulation Template including SimMan® algorithm, debriefing plan was developed.

2.3 Research Tools

① Self-directed learning ability

The self-directed learning ability was measured by using a tool measuring the self-directed learning ability among life abilities developed for students and adults by
Lee[9]. Each question consists of 5-point Likert scale and higher scores mean higher self-directed learning ability.

② Confidence in performance

The degree of confidence that can perform hyperglycemia patient emergency care was measured by using a tool of modifying and complementing a measuring tool developed by Yoo [4]. Each question is 5-point Likert scale and higher scores mean higher confidence that can perform hyperglycemia patient emergency care.

2. 4 Procedures and Methods

This study was carried out from September 1, 2014 to September 26, 2014. The researcher carried out the theory lecture education of 2 hours about diabetes and nursing with subjects and providing learning materials on a simulation-based education program for hyperglycemia patient emergency nursing care for 7 days from the next day and asked them to do self-study by dividing them into three people of each three teams. And then, general overview of the scenario and patient's body assessment and differential diagnosis were educated in the 1st simulation education program and education was conducted under the themes of therapeutic communication, medication, nursing intervention and patient education in the 2nd education program. A high-fidelity simulator was used in the study(SimMan 3G, Laerdal Medical, Norway). For simulation education, the subjects were operated in 3 teams with 3 people in one team and simulation practice orientation was 10 minutes, scenario operation per one team and all the three teams conducted debriefing for 50 minutes.

2. 5 Data Analysis

The study utilized the IBM SPSS 21.0 program to analyze the differences in each scenarios through independent t-test.

3 Results

The effect of simulation-based education program for hyperglycemia patient emergency nursing care on the self-directed learning ability of nursing students was 3.55 points in the experimental group and 3.27 points in the control group and the score of the experimental group who received a simulation education was significantly higher than that of the control group(t=8.49, t<.005). Confidence in performance was 3.69 points in the experimental group and 3.17 points in the control group and the score of the experimental group who received a simulation education was significantly higher than that of the control group (t=13.88, p<.001) <table 1>.
Table 1. Self-directed learning ability and Confidence in performance between experimental group and control group (N=60)

<table>
<thead>
<tr>
<th>Item</th>
<th>Experimental group (n=30)</th>
<th>Control group (n=30)</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-directed learning ability</td>
<td>3.55 ±0.38</td>
<td>3.27 ±0.51</td>
<td>8.49</td>
<td>.005</td>
</tr>
<tr>
<td>Confidence in performance</td>
<td>3.69 ±0.52</td>
<td>3.17 ±0.60</td>
<td>13.88</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

4 Discussion

The experimental group who obtained simulation-based hyperglycemia patient nursing education showed significantly higher self-directed learning ability scores than the control group. This result is consistent with the result that simulation practice education composed of learning contents including excretion, dosage, oxygenation and stability of basic nursing improved the self-directed learning ability of nursing students[2] and also consistent with the result that the self-directed learning ability of nursing students who received a simulation education on acute cerebrovascular disease management, normal newborn care and prenatal care of mothers by using a human patient simulator (HPS) has increased[10].

Thus, simulation-based education in this study is regarded as an effective teaching method for improving the self-directed learning ability of nursing students and repetitive studies in various areas providing proper preliminary study time that can explore the learning subject on the simulation-based education program in advance is considered to be necessary.

This study showed that confidence in performance of nursing students of the experimental group who received a simulation-based hyperglycemia patient education was significantly higher than that of the control group. This result is similar to the result of Yoo’s study[4] that the development and effects of a simulation-based newborn emergency care education program were analyzed.

Thus, this study is considered to have contributed to improving confidence in performance because simulation-based education using a model similar to real patients enabled students to actively participate in practice by providing a safe environment and reducing the psychological burden of students and directly apply what understood as only knowledge to simulated clinical situations.
References