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Literature Review

Policy issues in simulation-based nursing education and technology development

Hyunbong Park[b], Soyoung Yu[a,*]

[a] College of Nursing, CHA University, 120 Haeryong-ro, Pocheon-shi, Gyeongghi-do, Republic of Korea
[b] College of Nursing, Graduate school, Yonsei University

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ABSTRACT

Objectives: Simulation-based nursing education has increased dramatically in the past decade. Simulation as a pedagogy is considered a more effective teaching and learning method, appropriate to the rapidly changing environment of nursing education. Many studies have explored the positive aspects of simulation; however, barriers still exist in the implementation of simulation-based education. This report focuses on the policy aspects related to the various problems.

Methods: This review introduces the current status of simulation-based education, a major trend in the last decade, and focuses especially on the impact of policy changes within the education of health professionals with reference to the present situation in Korea.

Results: As a result of policy changes in nursing education, the use of simulators as recognition elements for obtaining nursing education accreditation, as well as the benefits of specialized simulation-based education, have allowed for the repetition of difficult specialty nursing skills being applied to specific patients under the current situation of insufficient hospitals for practice and increasing awareness of patient rights. Further, the changes in policy have led to the development of simulation technology.

Conclusion: Many barriers need to be resolved to further develop nursing simulation-based education. For this reason, standardized continuing education for professors and enhanced resources and an educational support system, especially in terms of policy improvement, should be provided.

Contents

Background

Clinical practice plays a key role in nursing education. It develops students' critical thinking, analytical, mental, and motor skills, as well as time management abilities and clinical performance confidence [1]. However, clinical training institutions have recently faced limitations in providing sufficient clinical practical education in clinical locations, such as hospitals. There is also a lack of clinicians and effective teaching methods, and insufficient cases for practice; however, at the same time, awareness of patients' rights is increasing [2].

It takes a long time for students to become proficient enough to provide care interventions directly to patients at clinical institutions. Moreover, in many countries, there is a high rate of patients refusing to be the subjects of nursing practice [3]. Because of

* Corresponding author.
E-mail address: yusso2012@daum.net (S. Yu).

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this, it is crucial to train nursing students to make important clinical decisions based on critical thinking in a similar clinical setting through simulation-based education [4].

Nursing in the Republic of Korea (hereafter "Korea") has evolved recently in terms of socioeconomic change in Korea, particularly in nursing education. The most notable change is that the number of nursing colleges grew from 128 in 2006 to 204 in 2017 [5]. Despite this sharp increase in the number of nursing schools, clinical practicum sites are lacking. In addition, nursing faculty faces severe competition in finding nursing units with good clinical education environments [6]. Specifically, a single two-credit clinical practicum lasts 90 h over two weeks (9 h/day for 10 days), and nursing students are required to complete at least 1000 clinical practicum hours to graduate [7]. In Korea, the clinical environment provides fewer opportunities for nursing students to experience hands-on clinical practice than in many Western countries [8]. In these educational environments, simulation-based nursing education is considered a more effective teaching and learning method, appropriate for the rapidly changing world of nursing education.

The implementation of new policy

Korea's simulation-based education began in earnest in 2005, starting with medical education. In 2006, many nursing schools began applying simulation methods to nursing education. At that time, the Korean Accreditation Board of Nursing Education proposed the use of a simulator as the recommended national standard for obtaining nursing education accreditation. This new policy has been implemented in nursing education. Since then, several nursing colleges have begun purchasing expensive, high-tech, and high-fidelity patient simulators [9].

In the early stages, simulation-based nursing education was applied to simple nursing skills to see the effects [10]. Recently, various methods of nursing simulation education have been conducted, and there has also been an increase in reports on the educational effects in Korea. In 2010, the Korean Accreditation Board of Nursing Education included as accreditation criteria a range of patient models programmed to present the same physiological response as is provided by an actual patient, with scenarios that enable the activation of the actual, mental, hyper-representative conditions in the clinical locations, and with adult, physical evidence that is not always feasible [7]. This change in policy has led to the development of highly developed and specialized simulators, and has also prompted the purchase of this technology in many nursing schools [9].

As shown in Fig. 1, through these policy changes the benefits of simulation-based education have allowed the repetition of difficult specialty nursing skills regarding specific patients in nursing care. In this way, the nursing school has started to operate as distinct from the existing hospital practice. The Korean Accreditation Board of Nursing Education has recommended and accepted the simulation practice only within 10% of the total clinical practice time, so the simulation-based training is conducted complementary to the existing practice. However, the limited criterion of 'within 10% of the total clinical practice time' will require reassessment in the future due to the growing need for simulation-based education. Just as the nursing education environment has been changed by policy decisions, the direction of policy in terms of future nursing education is important to consider within any country.

Effects of simulation-based education on the learning process

Research into nursing simulation education is divided into four classifications: high-fidelity simulator (HFS) application, standardized patient (SP), objective structured evaluation (OSCE) or clinical performance examination (CPX) for nursing skill training, and virtual-reality simulation (Table 1).

HFS is an actual-size-of-patient model that allows direct computer manipulation. HFS application reproduces patients' physiological responses like vital signs; pupil reaction; and heart, lung, and bowel sounds. Therefore, students can resolve problems actively in a similar situation with interest. Korea has hosted several studies using HFS in nursing education since 2006. Most were concerned with acquiring nursing skills under the patient's certain disease condition and showed the effectiveness of HFS for nursing students and newly graduated nurses [3,11–14]. High-fidelity simulation demonstrated significant positive correlations with certain learning outcomes—for example, self-confidence [11,14], communication skills [12], clinical competencies, critical thinking, and problem-solving [3,13].

An SP is a person trained to act like a real patient within a clinical scenario in a standardized manner. Most research using SPs in Korea focus on basic nursing skills like oral care, simple catheterization, and subcutaneous injection [15]. Recently, simulation using SPs has emerged as useful for therapeutic communication and professional attitude education [16]. Numerous studies have supported the finding that using SPs provides nursing students with empirical knowledge through direct interaction [2,15–17]. OSCE and CPX are methods for evaluating clinical practice. Previous studies related to these methods have been about developing and applying modules for various types of nursing skills in simulation education [18,19], and these studies report results in improving communication skills and clinical performances [18–20].

Most recently, simulation education using virtual reality (VR) has received active study in Korea. VR combines a computer-generated environment with tactile, auditory, and visual stimuli provided through sophisticated partial trainers to promote increased authenticity. In recent studies, VR simulations aimed at improving intravenous catheter insertion skills [21] and nursing care for chronic adult patients [22] were used for nursing college students. The VR simulation group scored highest on clinical performance [21,22]. Beyond nursing students' education, some university hospitals in Korea have begun to develop VR simulation programs for educating newly employed nurses on how to care for surgical patients. Development of VR simulations in nursing education requires development of virtual-specific components reflecting the changing nursing work environment and further study focused on evaluating the effectiveness of VR simulation.

Effects of experimental studies of these four classifications include improving knowledge, clinical skill performance, problem-solving ability, critical-thinking disposition, communication skills, self-directed learning ability, and self-efficacy. All these outcomes can be summarized in three categories: objective clinical skill evaluation including knowledge and clinical skill performances, coping ability in certain situations including communication skills and problem-solving ability, and self-evaluation including satisfaction and self-efficacy. Most quantitative studies have shown positive improvements in all three categories. Additionally, in qualitative studies most students evaluated the simulation education methods as positive [23,24]. Among them, the following outcome was observed in a study conducted in Australia. This study reported that simulation class increases nursing students' senses of preparedness regarding their clinical experience, thus reducing the negative impact of fear and concern [23]. Another study conducted in Canada showed that health care practitioners need educational opportunities to practice interprofessional collaboration skills through simulation learning. Results from this study lend support to using simulation activities to promote teamwork and learning about one's own profession [24]. To further develop nursing simulation education, there are many barriers that first need to be resolved. Recent studies related to simulation education in many countries around

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