



## Effects of nursing process-based simulation for maternal child emergency nursing care on knowledge, attitude, and skills in clinical nurses☆☆☆



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### SUMMARY

**Background:** Since previous studies on simulation-based education have been focused on fundamental nursing skills for nursing students in South Korea, there is little research available that focuses on clinical nurses in simulation-based training. Further, there is a paucity of research literature related to the integration of the nursing process into simulation training particularly in the emergency nursing care of high-risk maternal and neonatal patients.

**Purposes:** The purpose of this study was to identify the effects of nursing process-based simulation on knowledge, attitudes, and skills for maternal and child emergency nursing care in clinical nurses in South Korea.

**Participants:** Data were collected from 49 nurses, 25 in the experimental group and 24 in the control group, from August 13 to 14, 2013.

**Methods:** This study was an equivalent control group pre- and post-test experimental design to compare the differences in knowledge, attitudes, and skills for maternal and child emergency nursing care between the experimental group and the control group. The experimental group was trained by the nursing process-based simulation training program, while the control group received traditional methods of training for maternal and child emergency nursing care.

**Results:** The experimental group was more likely to improve knowledge, attitudes, and skills required for clinical judgment about maternal and child emergency nursing care than the control group. Among five stages of nursing process in simulation, the experimental group was more likely to improve clinical skills required for nursing diagnosis and nursing evaluation than the control group.

**Conclusion:** These results will provide valuable information on developing nursing process-based simulation training to improve clinical competency in nurses. Further research should be conducted to verify the effectiveness of nursing process-based simulation with more diverse nurse groups on more diverse subjects in the future.

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### Introduction

The advent of the Millennium Project and subsequent development goals, specifically those that focus on reducing child mortality and improving maternal health, have focused worldwide attention on safety in maternity care (United Nations, 2013). Since these goals were set, maternal mortality rates have declined globally by an estimated 47% from 543,000 in 1990 to 287,000 in 2010 (WHO, 2014). Estimated

child mortality has also dropped by 41% from 87 deaths per 1000 live births in 1990 to 51 in 2011 (United Nations, 2013). Although high mortality is largely seen in less developed countries, advanced countries have also been challenged to improve the safety of maternal and neonatal health care. It appears to be even more difficult to reduce mortality rates when they are low than when they are high (WHO, 2014). A further decline in mortality rates needs a stronger focus on access to obstetric emergency care with skilled nursing personnel (United Nations, 2013).

South Korea's total fertility rate, the average number of children a woman has in her lifetime, reached the population replacement level of 2.1 children per woman in 1983. Ever since then, the total fertility rate of Korea continuously dropped from 1.48 in 1998, and 1.22 in 2010, to 1.19 in 2013, which currently ranks 219th out of 224 countries and has become one of the lowest fertility countries in the world. Despite the low fertility rate in South Korea, the number of premature and low birth-weight neonates with less than 1500 g at birth is growing

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rather than declining, together with the increased number of high-risk pregnancy in obstetric patients (Korean Ministry of Health and Welfare, 2012). The decreased total fertility rate and the increased maternal and infant mortality rates have become a serious social and health problem in South Korea.

Maternal and infant mortality rates are major indicators used to measure a nation's health condition (Beck et al., 2010). According to the Korean maternal mortality estimation, direct maternal mortality ratio in 2012 in Korea, caused mainly by bradycardia, postpartum hemorrhage, hypertensive diseases such as pre-eclampsia and eclampsia, and amniotic embolism, increased to 1.6 times more than previous years, while the indirect maternal mortality ratio, caused by high-risk pregnancy, increased by 6 times in 2012, which is mainly due to the rapid increase in the number of high-risk pregnant women aged over 35 and associated complications of pregnancy. In addition, because of the high-risk preterm birth from high-risk pregnant women, there is the increased rate of perinatal death showing low Apgar scores measured neonates' appearance, pulse, grimace, activity, and respiration at 1 and 5 minutes after birth (Lee et al., 2012).

Emergencies can happen at all times, and they are characterized by significant time pressure, high stakes decisions, and technical and ethical challenges associated with caring for mother and child simultaneously (Daniels et al., 2010). Provision of safe care in these situations requires the presence of skilled health personnel. In developing countries, this was only ensured in approximately 66% of births in 2011 (United Nations, 2013). Although professional attendance at birth is practically guaranteed in high-income countries, inappropriate management of emergencies can lead to maternal and neonatal mortality and serious morbidity (CEMACH, 2004). Therefore, appropriate and prompt clinical nursing skills are the first and foremost requirement of clinical nurses in dealing with emergency maternal and child patients.

#### *Simulation-Based Training for Emergency Nursing Care*

Since the importance of patients' rights was introduced to the medical field in order to guarantee fair and safe medical treatment as well as prompt access to emergency care and medical specialists, nursing activities in a clinical setting has been remarkably restricted in South Korea (Son, 2010). In order to solve such problems, simulation-based educational training both for nursing students and newly appointed nurses has been adopted in South Korea. Simulation training for nursing education first began in the United States, expanding to most of Asian countries, such as Japan, China, and South Korea (Central Intelligence Agency, 2014). In South Korea, a number of nursing colleges began offering simulation-focused emergency skill-focused educational programs from the year 2000, together with the active investigation of the effectiveness of these simulation-based educational programs. Simulation-based training has been demonstrated as an effective educational tool, especially for nursing care for patients at high risk, because simulation can be used as an effective training strategy to develop appropriate abilities to deal with complicated and unpredictable emergency situations (Burns et al., 2010). However, there has been little research done to develop nursing process-based simulation programs, nor to identify the effectiveness of such simulation (Dearmon et al., 2013; Hicks et al., 2003).

The types of simulation-based education can be classified by the types of fidelity, and more attention has been recently given to simulation with human patient simulator (HPS). Human patient simulator refers to a mannequin which is a model of the human body used as a tool to facilitate the simulated learning. The human patient simulator is fitted with computer software that allows the educator to replicate normal and abnormal bodily responses to events and therapeutic interventions (Yang, 2008; Sanford, 2010). Some advantages of simulation-based education using HPS for emergency maternal and child nursing care are that simulation provides learners with a safe learning environment, yet provides a lifelike emergency experience with no actual harm

to the patient, and that the learners are permitted to spend time practicing a wide variety of actual emergency measures over and over again (Hunziker et al., 2010).

Nursing process is a goal-oriented framework of comprehensive nursing care, involving five major steps of nursing assessment, diagnosis, planning, implementation, and evaluation. Nursing process provides the nurse with the direction in making clinical judgment about individualized and comprehensive nursing care, not just as a task-oriented approach that focuses only on the tasks that need to achieve a certain performance standard, but rather a thought-oriented approach that focuses more on a systematic progression of thinking and reasoning process that can apply to solving and rectifying health problems in patients. For this reason, there is a growing need for developing simulation in which nursing process is integrated (Burns et al., 2010).

Since previous studies on simulation-based education have been mainly conducted with nursing students in South Korea (Yoo, 2013), there is little or no research with clinical nurses in simulation-based training, not to mention clinical nurses' emergency nursing care skills for obstetric and neonatal patients at high risk. Problems may be encountered, especially when dealing with emergency situations in the intensive care unit for newborns and the delivery room if nurses are not sufficiently trained in clinical experience and emergency care unit. In this regard, the lack of practical skills and adaptability of many nurses have been reported in the precedent study (Jho, 2010). Furthermore, there is a need to study knowledge, attitudes, and skills of clinical nurses after simulation training that has scenario based on nursing process (Cant and Cooper, 2010). Therefore, this study was conducted to identify the effectiveness of a nursing process-based simulation educational program for high-risk maternal and child nursing care, tailored to develop emergency nursing competency in clinical nurses in South Korea.

## **Methods**

### *Study Question*

The purpose of this study was to identify the effects of a nursing process-based simulation training program for high-risk maternal and child emergency nursing care between the experimental group and the control group. The specific research question was as follows:

Is nursing process-based simulation training for clinical nurses effective for improving nursing knowledge, attitudes, emergency care skills such as assessing, diagnosing, planning, implementing, and evaluating that are related to maternal and child care?

### *Design*

This study was designed as an equivalent control group pre- and post-test experimental study to compare the differences in knowledge, attitudes, and skills in relation to maternal and child emergency nursing care between the experimental and the control groups. The experimental group was trained by the nursing process-based simulation training program, while the control group received training only with traditional methods and procedures for maternal and child emergency nursing care (Fig. 1).

### *Participants*

Through mailing out official documents, participants for this study were collected from the members of the Korean Hospital Nurses Association and the Seoul Nurses Association of Korea in August 2013.

The minimum number of the study participants required for this study was estimated at 45 nurses, using the calculation of sampling formula with the version 3.1.2 of G\* power program (Faul et al., 2007) at the significance level of 0.05, effect size of 0.5, and test power(1-β)

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