Effectiveness of Simulation Teaching on Neonatal Resuscitation Skill Procedure among Nursing Students

Archana Maurya

Professor & Head, Department of Child Health Nursing, SRMM College of nursing, DMIMS (DU), Maharashtra, India

Abstract: *To assess effectiveness of Simulation Teaching on Neonatal Resuscitation Skill Procedure among Nursing Students" Aim:- Effectiveness of Simulation Teaching on Neonatal Resuscitation Skill Procedure among Nursing Students" Method:- An Experimental research approach and design Pretest-posttest control group design was used this study, randomly select the sample for interventional group 25sample & Control group 25 sample from P.B.B.Sc. 1st year nursing student SRMMCON about knowledge and skill were taken was pretest and posttest over all finding was improved.*

Keywords: Simulation, teaching, neonatal resuscitation, skill, Procedure & Nursing students

1. Introduction

In the past, educators believed that, to produce competent nurses, it was enough to provide students with a variety of clinical experiences in which learners could apply classroom content. Today, however, experienced nurses, managers, and staff development educators find that many students and new graduates lack the critical thinking skills needed to work in the increasingly complex clinical environment [1]. Providing patient simulations is a relatively efficient method of teaching content and critical thinking skills safely and in collaboration with the instructor, without fear of causing harm to actual patients. Simulated experiences are very effective in identifying student strengths and weaknesses, simulated nursing experiences provide learning in a controlled environment that increases the student's confidence and enhances patient safety and comfort. Simulation is a teaching and learning strategy that is increasingly used in nursing education to prepare students for the clinical workplace [2].

According to Hovancsek et al. (2009), patient safety has become a priority concern, and the use of simulators can prepare nurses for mock disasters that involve other professionals such as military, police, fire-fighter, paramedics, and physicians. Interdisciplinary mock drills are held to better prepare communities for disasters. The study found the demand for higher quality healthcare both nationally and internationally has increased and the use of simulation will improve health care (Hovancsek et al.). This technology offers new avenues for teaching student nurses scenarios as well as critical thinking and reflection on lived experience and practice[3].

Ward-Smith (2008) noted that the first documented use of higher level simulators was with pilots during World War II. They continue to be used today to train pilots in simulated situations such as loss of power, engine failures, and poor weather conditions [4].

Safety is the reason behind using simulators in pilot training as well. In 2003 the Institute of Medicine adapted simulation as a teaching methodology to be used in programs in education (Ward-Smith) [4]. Sanford, P. G. (2010). *The Qualitative Report* July 2010 endorsed the use of simulations in order to prepare students in critical thinking and self reflection as well as preparing them for the complex clinical environment [5].

2. Need of the Study

In nursing, there is limited research on the effectiveness and outcomes when using simulators and simulations. In healthcare the emphasis is on giving accurate and safe care to patients, and simulators and simulations allow for the practice of this important goal in a less threatening environment. In 2003, the National League of Nurses (NLN) endorsed the use of simulations in order to prepare students in critical thinking and self reflection as well as preparing them for the complex clinical environment[6].

Simulation teaching ability to increase critical thinking and knowledge retention by using an active, student-cantered method of education. Simulation allows the learner to bring their existing knowledge and build on it, and use debriefing and reflection to contribute to a deeper understanding. Simulation has proven to be effective in improving teamwork, increasing communication, and is an innovative pedagogical approach. It has been demonstrated that there is a high level of student satisfaction with this type of training. Successful implementation of high-fidelity simulation in the medical and nursing fields has contributed to the saving of many lives.

3. Review of Literature

The review of literature is a summary of current knowledge about a particular practice, problem and includes what is known and what is unknown about the problem. Literature is reviewed to summarize knowledge for use in practice or to provide a basis for conducting a study [7].

3.1 Literature related to Simulation teaching

Gaba defines simulation as an instructional process that substitutes real patient encounters with artificial models, live actors, or virtual reality patients with the goal of replicating patient care scenarios in a realistic environment for the purposes of feedback and assessment [8].

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Sixteen literature or systematic reviews were included in the article database. These reviews covered a broad range of topics within simulation in undergraduate nursing education. For example, in a systematic review Lapkin *et al.* (2010) considered the effectiveness of patient simulation manikins in teaching clinical reasoning[9]. Leigh (2008) reviewed the use of high-fidelity patient simulation and nursing students' self-efficacy[10]; while Neil and Wotton (2011) completed a literature review on high-fidelity simulation debriefing in nursing education[11].

Simulation is a teaching technique in which the learner practices in a situation that mimics a real-life event. Simulation is used for learning skills in situations that are relatively uncommon or high-stakes, such as the need for an aircraft to make an emergency landing. In healthcare, simulation provides unique opportunities for learners to practice and hone clinical skills and critical thinking with the same complexities and distractions that are present in the real clinical setting. Skills such as error recognition and inter-professional team functioning can be taught without placing actual patients at risk or discomfort.

3.2 Literature related to effect of teaching teaching

Kadam,A.(2014) found that Structured education programme was highly effective to improve the knowledge score and to improve the attitude score of subjects/ caregiver towards colostomy care of patient [12]. Anjum, S.(2014)conducted study to assess knowledge of contraceptives methods and appraisal of health education among married women and concluded After the health education married women knowledge was improved to 100% about female sterilization followed by condom 99%, skin implants 86%, oral pills 85% and emergency contraceptives 85%.Sociodemographic variable were significantly associated with existing knowledge and level of married women specially age at marriage, age at first child, occupation,, income ,education [13][14].Babu, R. L. (2014) concluded that care takers had inadequate knowledge regarding non-curative care of terminally ill cancer patients. The planned education programme on non-curative care of terminally ill cancer patients was highly effective in improving the knowledge of care takers regarding non-curative care of terminally ill cancer patients [15]. Shinde M (2014) concluded in their

study that demonstration is effective regarding feeding of hemiplegic patient [16].

3.3 Literature related to Simulation teaching on neonatal resuscitation.

Guhde (2011) reports that the simple scenarios are as effective as complex role-playing scenarios and recommends that simple scenarios may meet learning objectives more effectively. The author recognizes that the student participants were also completing a clinical block concurrently with their theoretical simulations and this may have exposed them to similar clinical cases which may have enhanced their learning[18].

3.4 Literature related to simulation teaching improves psychomotor skill of student.

Kaplan and Ura's (2010) study used simulation to assist student confidence while enhancing the students' ability to prioritise, delegate and safely care for numerous patients. The authors recognised that the use of multiple concurrent simulators in undergraduate nursing was limited and so they developed a focused case study. The participants were 97 senior nursing students and the overall aim was to review the link between patient simulation and clinical performance improvement [19].

The intervention group obtained a significantly higher overall in-training performance score than the control group: mean checklist score 20.87 (SD 2.51) versus 19.14 (SD 2.65) $P = 0.003$ and mean global rating 3.25 SD (0.99) versus 2.95 (SD 1.09) $P = 0.014$. Post course performance did not show any significant difference between the two groups. Trainees who assessed peer performance were more satisfied with the training than those who did not: mean 6.36 (SD 1.00) versus 5.74 (SD 1.33) $P = 0.025$. Conclusion Engaging trainees in the assessment of peer performance had an immediate effect on in-training performance, but not on the learning outcome measured two weeks later. Trainees had a positive attitude towards the training format 25 questionnaires (80.6%) were analyzed.

An anonymous survey was placed on the course Blackboard site for the students to provide an evaluation of their experience. Uptake on completing this survey was high with 96 students reporting their simulation experiences. Primarily the students reported either strongly agreeing or agreeing that the simulation exercise increased their understanding of prioritising and delegating care, their confidence in team work and that the case studies increased their understanding of the clinical case. The students repeatedly reported that the simulation exercise was the most realistic of their previous simulations. However, the data also indicated that 26 *percent* of participants did not believe that the simulation enhanced their confidence or prioritisation abilities, and they reported feelings of inadequacy after the simulation as they realised their lack of knowledge and nursing skills.

The study was based on outcomes defined within the Nursing Education Simulation Framework of learning, skill practice,

learner satisfaction, critical thinking and self-confidence **(Jeffries, 2005).** The students completed three anonymous surveys to rate the effectiveness of the two different levels of simulation experiences. They evaluated the four simple vignettes together as one level of assignment and the complex scenarios were evaluated separately. In their results, both levels of assignment were viewed positively by the students with no significant differences between the vignettes or complex scenarios. The participants reported that both types of simulation helped improve their awareness of the importance of assessment skills, critical thinking, priority setting and the awareness of the nurses' role[20].

(Rowles and Brigham, 1998).Simulation may be presented using a variety of means including computer software, role play, case studies, games, or manikins that represent reality and actively involve learners in seeing the taught skills within their clinical context (Rowles and Brigham, 1998). Simulation goes much further than clinical skills demonstration. It not only provides a safe environment for skills development and confidence in skills delivery, but supports the student in approaching clinically based scenarios and making decisions about care delivery. Simulations provide an opportunity to relate and up to date evidence base to inform practice decisions and clinical confidence and competence[21].

4. Literature Related to Simulation Teaching in Nursing Courses

In a recent study, Bremner and associates examined the value of using the human patient simulator as an instructional strategy with novice nursing students. A sample of 41 students completed a questionnaire about their learning experiences with the human patient simulator. The simulator session was rated as good to excellent by 95 percent of the students, and 68 percent recommended it as a mandatory component of their educational program. Over 60 percent of the students indicated that the patient simulation experience increased their confidence in physical assessment skills. Limitations of the technology identified by students included not having enough time to work with the simulator, initial anxiety when first encountering the patient simulator, and a lack of realism [2].

Feingold, Calaluce, and Kallen [22] conducted a study to evaluate nursing student and faculty perceptions about patient simulations using the Laerdal SimMan Universal Patient Simulator. Using a 20-item tool, the researchers surveyed 65 students who had participated in simulations during 2 consecutive semesters. Four faculty members were surveyed using a similar 17-item tool. Findings showed that while the majority of students and faculty felt the simulations were realistic and valuable, only half of the students agreed that skills learned in the simulation were transferable to a real patient care setting. Faculty indicated that simulations reinforced clinical objectives and adequately tested clinical and decision-making skills. Concerns of faculty members relative to patient simulator use included extra preparation time and lack of faculty support to use the technology [22].

Alinier and colleagues demonstrated the effectiveness of scenario-based simulation training on nursing students'

clinical skills and competence. A sample of 99 undergraduate nursing students in the United Kingdom was divided into control and experimental groups, with the experimental group being exposed to patient simulation training using the Laerdal SimMan. Students in both groups completed a pretest and post-test as well as a questionnaire. There was a statistically significant difference in the mean scores of the two groups from pretest to post-test, with the experimental group demonstrating higher overall scores [23].

Rennie and Main, 2006. Therefore the scope for improvement was limited, as their initial knowledge was so great. This may reflect a change in local manual handling training within the faculty following a review of all manual handling provision in 2004 which has resulted in a more scenario and simulation based approach to skill development. Previous research has documented the benefits of using OSCE assessments to support the development of practice skills [24]. The Use of OSCEs in health care assessment has been in place for some time (Harden and Gleeson, 1979; Ali et al , 1996) predominantly in medicine and the allied health professions, though with some development seen in nursing[7]. Employed in this research, the results achieved are worthy of note. The difference seen in OSCE performance between the simulation and control groups was minimal. The proportion in the simulation group passing the OSCE was greater than the proportion in the control group. However, this was not a statistically significant increase, with the simulation group achieving a mean score of 77.8% and the control group a mean score of 74.2%. This may reflect limitations of the study, resulting from a small sample size being secured for the control OSCEs that included only 13 participants. This above research finding indicated the large sample is required for prominent finding.

4.1 Problem Definition

Assess the "Effectiveness of simulation teaching on neonatal resuscitation skill procedure among nursing students".

4.2 Aim

"Effectiveness of simulation teaching on neonatal resuscitation skill procedure among nursing students".

4.3 Objectives of the Study

1. To assess the level of knowledge of simulation teaching on neonatal resuscitation among nursing students.
2. To assess the psychomotor skill of procedure through simulation teaching on neonatal resuscitation among nursing students.

4.4 Material & Methods

a) **Research Approach -**An Experimental research approach

b) **Research Design-** Pretest-Posttest control group design

c) **Study Population:** Undergraduate Nursing Students from P.B.B.sc 1st year nursing

d) **Study Group:** Nursing Students

e) **Setting Of The Study:** SRMM CON Sawangi (M) Wardha

f) **Sampling Technique -** Random sampling

g) **Sample Size -**In this study sample size was 50 P.B.B.Sc1st year nursing students.

h) **Variables**
Independent Variable:
The simulation teaching

Dependent Variable:
The dependent variable in this study is knowledge & Skill among nursing students.

i) **Exclusion Criteria-**Repeater students & Prior attended any workshop or training on similar topic

j) **Description of the Tool**
Section 1: Structured questionnaire on knowledge the items were used MCQ four responses.
Section 2: Standardized Checklist for Neonatal Resuscitation three scales checklist.

k) **Scoring**
Section 1: Score was knowledge based structured questionner.
- Score 1 was given for every correct answer.
- Score 0 was given for every wrong answer.
- The maximum knowledge score 15.

Section 2: The level of skill is divided under following heading poor, average, good and excellent.
Scored using a rating scale total 24 item in checklist each item has 0, 1, and 2 score.
'0'=Not performed
'1' = performed, but incorrectly
'2' = performed correctly
The maximum performance score 48.

4.4 Method of Data Collection

- The subjects were explained about the nature and purpose of study.
- A written consent was obtained from the participants prior to their recruitment in the study.
- 25 students for interventional group & 25 student for control group sample randomly selected for the study
- Firstly taken pretest about knowledge on neonatal resuscitation through the administered questionner for both the group. The solved questionnaire was collected back after 15minuts.
- Psychomotor skill on neonatal resuscitation was checked through OSCE, in these prepared procedural stations on this station investigator checked skill with the help of checklist on neonatal resuscitation for both the group.

- Given simulation teaching to interventional group made five subgroup and given simulation teaching for the subgroup one by one.
- The control group didactic lecture on neonatal resuscitation.
- On the 7th day post test was taken for both the groups, provided knowledge base questionner to the students and collect back. Skill was checked for both the groups through OSCE. Then collected data for analysis.
- Provide stimulation teaching to control group then collected feedback about simulation teaching on neonatal resuscitation from both the group.

5. Observations and Result

Section A

Assessment with pretest knowledge score- 76% of the nursing students in control and 80% in Interventional group were having average level of knowledge score, 12% in control and 12% in Interventional group had good level of knowledge score, 12% in control and 8% in experimental had poor level of knowledge score.

Assessment with posttest knowledge score The above table shows that 80% of the nursing students in control were having average level of knowledge score, 8% in control and 4% in Interventional group had good level of knowledge score, and 96% in experimental had excellent level of knowledge score.

Comparison of pre test and post test Knowledge score in both the groups Student's paired t test-Mean knowledge score at pre test in control group was 5.56±1.98 and in experimental group it was 5.64±1.35 and Mean knowledge score at post test in control group was 8.20±2.10 and in experimental group it was 14.48±0.91. By using student's unpaired t test statistically no significant difference was found in pre test knowledge score between control and experimental group(t=1.21, p-value=0.56) and statistically significant difference is found in post test knowledge score between control and experimental group(t=15.37,p-value=0.000).

Group	Control Group	Experimental Group	t-value	p-value
Pre test	5.56±1.98	5.64±1.35	1.21	0.56 NS,p>0.05
Post Test	8.20±2.10	14.48±0.91	15.37	0.000 S,p<0.05

Comparison of pre test and post test Knowledge score in both the groups. Student's unpaired t test-By using student's unpaired t test statistically no significant difference was found in pre test knowledge score between control and Interventional group(t=1.21, p-value=0.56) and statistically significant difference is found in post test knowledge score between control and experimental group(t=15.37,p-value=0.000).

Absolute Learning Gain on Knowkedge –Interventional group 58.94% and Control group 2.94%

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Section B- This section deals with the assessment of psychomotor skill

Assessment with pretest skill score The above table shows that all 100% of the nursing students in control and 100% experimental group were having poor level of skill score.

Assessment with Post test skill score for both groups- The 100% of the nursing students in control had poor level of skill score and 2(8%) in experimental group had good and 23(92%) had excellent level of skill score.

Comparison of pre test and post test Skill score in both the groups Student's paired t test Mean skill score in control group at pre test was 1.92±1.07and at post test it was 2.08±1.15 whereas in experimental mean skill score at pre test was 1.72±0.90 and at post test it was 45.16±3.30

Comparison of pre test and post test Skill score in Control and Experimental group Student's unpaired t test- By using student's unpaired t test statistically no significant difference was found in post test skill score between control and experimental group(t=0.21, p-value=0.65) and statistically significant difference is found in post test skill score between control and experimental group(t=29.63,p-value=0.000).
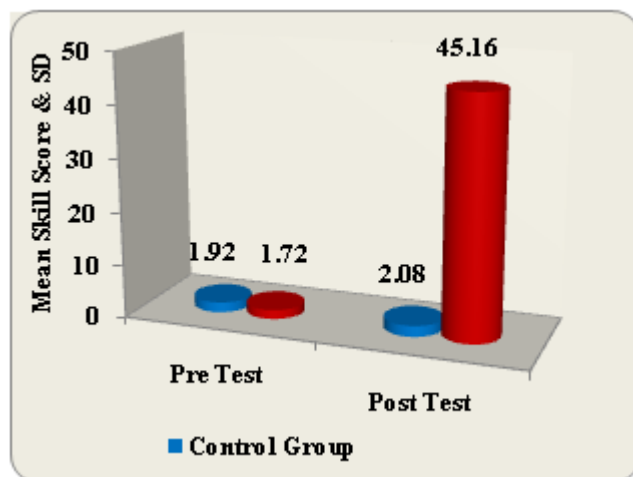
Absolute Learning Gain on Psychmotor Skill
Experimental 90.5% and Control groups 0.33%

Analysis of feedback of simulation teaching –The total 86% students strangle agree, 11% agree, 2% Neutral, 0.5% Disagree and 0.5 Strangle disagree.

6. Discussion

There were two main objectives of the study first was to assess the knowledge score of simulation teaching on neonatal resuscitation among nursing students, and second objective was assess the psychomotor skill score of simulation teaching. In our study there were the two groups control and experimental group Mean knowledge in control group at pre test was 5.56±1.98 and at post test it was 8.20±2.10 whereas in experimental mean knowledge score at pre test was 5.64±1.35 and at post test it was 14.48±0.91 in experimental group knowledge more increased. By using

student's paired t test statistically significant difference was found in mean pre and post test knowledge score in both the group(p=0.000).

Mean skill score in control group at pre test was 1.92±1.07and at post test it was 2.08±1.15 whereas in experimental mean skill score at pre test was 1.72±0.90 and at post test it was 45.16±3.30. By using paired t-test **no statistically significant** difference was found in mean pre and post test skill score in control group(p>0.05) and statistically significant difference was found in experimental group at pre and post test(p<0.05). **Simulation teaching was effective to in psychomotor skill score.**

 Overall simulation has been shown to be effective in development in knowledge & skills in the neonatal resuscitation and in clinical decision making. The result of simulation on simulation had a statistically significant effect on knowledge gain between pre and post test MCQ results in basic life support (BLS) as seen in previous resuscitation skills research (Moule, 2002)[14]. The proportion of students passing the BLS MCQ following simulation was considerably greater than seen in the pre-test. The proportion of students passing the manual handling MCQ did not significantly increase following simulation however, over 87% passed the pre-simulation test[14].

7. Conclusion

The study group (simulation teaching) increased the post test knowledge score and psychomotor score of nursing student on neonatal resuscitation the simulation teaching was more effective for nursing students. The use of simulation and skills rehearsal as a vehicle for increasing opportunities for students to familiarise themselves with skills before rehearsing and consolidating these skills in practice was reported on Phase one of the Review for Fitness for practice (Long, 2006)[12]. Ffeedback about simulation teaching 86% nursing students was strongly agree with simulation teaching because it's help to developed self confidence.

8. Future Scope

Nursing Services
It can be used as a guide for can serve as reinforcement for psychomotor skill on the bases of simulation in clinical area for other procedure.

Nursing Education
Simulation teaching will help students, colleagues, and junior staff to be trained in using current practice related to other aspect in clinical teaching without harm to actual patient.

Nursing Administration
Findings of the study can be used by the Nursing Administrators to the other procedure in hospital.

Nursing Research other researchers may utilize the suggestions and recommendations for conducting further study.

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Author Profile

Mrs. Archana Maurya is working as Professor and Head of Department of child health nursing, SRMM College of nursing, DMIMS (DU), Maharashtra, India

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