Frontiers in Health Informatics
ISSN-Online: 2676-7104
www.healthinformaticsjournal.com
2024; Vol 13: Issue 5
Open Access

ORIGINAL ARTICLE

Efficacy Of Simulation Based Educational Technique On Skill Regarding Newborn Resuscitation Among Nursing Students

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Cite this paper as: Kapil Vyas, Dr. Rahul Sharma (2024) Efficacy Of Simulation Based Educational Technique On Skill Regarding Newborn Resuscitation Among Nursing Students *Frontiers in Health Informatics, 13* (5), 414-433

ABSTRACT

Background: *Globally, each year millions of neonates do not breathe immediately at birth especially in developing countries and majority of them requires basic newborn resuscitation. Competency in newborn resuscitation skill among nursing students (future health professionals) is of prime importance to save the lives of newborn.*

Aim: *To assess the efficacy of simulation based educational technique on skill regarding newborn resuscitation among nursing students.*

Method: *Study was carried out during April-May, 2024 using quantitative impact evaluative approach and pre-experimental research design (One group pre-test post-test design). 40 nursing students of selected nursing training institute were selected using purposive sampling technique. Selected standardized checklist was used as tool to assess the skill regarding newborn resuscitation among nursing students during pre-test. Simulation-based educational sessions regarding newborn resuscitation were implemented after pre-test. After 7 days, posttest was given to same nursing students. Data was analyzed using SPSS version 22 and interpreted in form of tables and charts.*

Results: *Statistically significant improvement was found in skill regarding newborn resuscitation among nursing students as evidenced by shifting of mean value from 3.10 (pre-test) to 7.33 (post-test) after implementation of simulation-based educational session. Paired t-test was used to assess the efficacy of simulation based educational technique. Two tailed p-value associated with this t-test was found 0.000 ($p<0.05$) indicating extremely statistically significant difference between pre-test and post-test skill scores.*

Conclusion: *Simulation based educational technique is an effectual strategy for developing and refining the skill regarding newborn resuscitation among nursing students.*

Recommendation: *Simulation based educational approach must be incorporated in current educational (teaching – learning) methods in nursing education through setting up skill labs in nursing institutes.*

Keyword: Efficacy, Simulation, Skill, Newborn, Resuscitation, Nursing students.

INTRODUCTION

Ninety percent of newborn babies make the transition from intrauterine to extra uterine life requiring little or no assistance to begin spontaneous and regular respirations. Approximately 10% of newborns require some assistance to begin breathing at birth and only about less than 1% may need extensive resuscitative measures to survive. Birth asphyxia is a leading cause of mortality and morbidity in newborns. About 15% of neonatal deaths are caused due to asphyxia and sepsis is found to be the second major cause of neonatal deaths in India. These deaths can be averted by proper antenatal, intrapartum and postnatal care along with correct technique and steps of neonatal resuscitation.[1]

Neonatal resuscitation is a set of interventions used to assist the airway, breathing and circulation of a newborn

following birth. Aim of neonatal resuscitation is to implement the steps necessary to ventilate a newborn baby who is not breathing and to protect the life of baby. Neonatal resuscitation skills are essential for all health care providers who are involved in the delivery of newborns. The transition from fetus to newborn requires intervention by a skilled health professional. Every nurse must have the training and competency for resuscitation of an apneic or asphyxiated newborn baby.

In the olden days, educators believed that, to produce competent nurses, it was sufficient to provide students with classroom theoretical knowledge along with a variety of clinical experiences in which learners could apply classroom theoretical content. Today, however, experienced nurses, managers and staff development educators consider that many students and new graduates lack the critical thinking skills and confidence needed to work in the increasingly complex clinical environment.[2]

In above scenario, simulation-based clinical education is a useful educational strategy that provides nursing students opportunities to practice their clinical and decision-making skills through varied real-life situational experiences, without compromising the patient's well-being. Simulated experiences are very effective in identifying student strengths and weaknesses. Simulation based strategy provides learning in a controlled environment that increases the student's confidence and enhances patient safety and comfort. Simulation is a teaching - learning approach that is increasingly used in current trends of nursing education to prepare students for the real clinical workplace. Simulation-based learning integrates cognitive, technical and behavioral skills into an environment where learners believe the setting is real, act as they would responding in the field and feel safe to make mistakes for the purpose of learning from them. Critical situations can be investigated without risk.[3,4]

NEED OF THE STUDY

GLOBAL AND NATIONAL (INDIAN) OVERVIEW OF NEWBORN MORTALITY AND MORBIDITY

According to World Health Organization (WHO) fact sheet dated 14 march 2024, globally 2.3 million children died in the first 20 days of life in 2022. There are approximately 6500 newborn deaths every day, amounting to 47% of all child deaths under the age of 5 years. Sub-Saharan Africa and Southern and Central Asia are bearing the heaviest burden for newborn deaths. Sub-Saharan Africa had the highest neonatal mortality rate in 2022 at 27 deaths per 1000 live births, followed by Central and Southern Asia with 21 deaths per 1000 live births. Vast majority of newborn deaths take place in low and middle-income countries. Most neonatal deaths (75%) occur during the first week of life and about 1 million newborns die within the first 24 hours. Among neonates, the leading causes of death include premature birth, birth complications (birth asphyxia/trauma), neonatal infections and congenital anomalies. According to WHO, access to and availability of quality health care and health professionals skilled in neonatal resuscitation is the subject of prime attention in matter of life or death for newborns globally.[5,6]

According to UNICEF data, children face the highest risk of dying in their first month of life at an average global rate of 17 deaths per 1,000 live births in 2022. In developing countries like India more than 50 percent infant deaths occur in the first month of life out of total infant deaths every year and 40 percent of neonatal deaths happen during labor or the first 24 hours after birth (UNICEF 2020; The Million Death Study Collaborators 2010). Approximately 37 percent of all neonatal deaths are due to the prematurity or low birth weight (The Million Death Study Collaborators, 2010). Birth asphyxia, Low birth weight, Preterm birth, Intrapartum-related complications, Infections and Birth defects are major causes of neonatal deaths in India (WHO, 2019). Neonatal mortality always remained a major contributor and tolling higher deaths of newborns.[7,8]

According to the fact sheet of fifth round of national family health survey (NFHS 5), conducted during 2019-21, carried out by International Institute for Population Sciences (IIPS), Mumbai, a nodal agency designated by Ministry of Health and Family Welfare, Government of India, neonatal mortality rate per 1,000 live births, of India is 24.9.[9]

ROLE OF NEWBORN RESUSCITATIVE EFFORTS IN REDUCING NEWBORN MORTALITY

Efficient resuscitation at birth can prevent a huge percentage of neonatal deaths. A single intervention RESUSCITATION can deal with the problem of birth asphyxia as it occurs. The need for resuscitation should always be anticipated. An effective resuscitation is able to prevent most of the asphyxia deaths as well as it improves the outcome of surviving asphyxiated babies. Proficiency in neonatal resuscitation is an essential intervention for the survival of newborns and infants.

PRIME BENEFITS OF NEONATAL RESUSCITATION: Initiation of normal breathing, Maintenance of adequate tissue perfusion, Restoration of normal core temperature, Maintenance of adequate cardiac output. A study in Kenya showed that there was adequacy in initial resuscitation steps among trained observed participants compared with the untrained controlled group. They had knowledge of the sequential steps in neonatal resuscitation. Studies conducted in China, India and Uganda showed that training in resuscitation with the NRP (Neonatal Resuscitation Programs) reduced neonatal mortality caused by birth asphyxia. Findings of numerous global studies related to the effectiveness of neonatal resuscitation program training and adoption of different methodologies have indicated an evident increase in knowledge and skill scores after neonatal resuscitation training among health care professionals. Neonatal resuscitation training in facilities reduces term intrapartum-related deaths by 30%.[10,11]

PREPARATION OF NURSING STUDENTS (FUTURE HEALTH CARE PROFESSIONALS) IN THEIR TRAINING PERIOD TO MAKE THEM COMPETENT IN BASIC NEWBORN RESUSCITATION SKILL

Malpractices by nursing students & health professionals are frequent nowadays in the resuscitation of neonates. It is also observed that nursing students pay more focus on knowledge rather than to become competent in newborn resuscitation skill. Unfortunately, they are not giving prime attention to gain newborn resuscitation skill. This gap / loop between knowledge and skill regarding newborn resuscitation skill among nursing students is a crucial matter of concern. Competency in neonatal resuscitation is of prime importance among nursing students in the delivery rooms, neonatology units and pediatric intensive care units to ensure the safety and health of neonates. Nursing students must have sufficient skill (competency) to perform basic newborn resuscitation procedure in an adequate manner.

REVIEW OF LITERATURE

Globally several studies have been done in relation to the effect of simulation on skill regarding newborn resuscitation procedure. In 2000, Louis Halmalek et al. called for a “New Paradigm in Pediatric Medical Education: Teaching Neonatal Resuscitation in a Simulated Delivery Room Environment.” This was one of the first articles to highlight simulation as a method of teaching newborn resuscitation.[12]

All these studies highlighted more or less regarding impact of simulation based educational approach on the skill regarding newborn resuscitation. Here authors attempted to mention key findings of some of the relevant studies.

Table 1 - Relevant studies and their key findings

S. No.	AUTHOR	TITLE	KEY FINDINGS
1.	Cutumisu et al. (2024)	A study to ascertain participants' perceptions of the RETAIN (REsuscitation TrAINing) digital game simulator (DGS) and to compare the effects of the traditional method (lecture, video) and the digital game simulator, on participants' performance about neonatal resuscitation scenarios, over the time.	Participants were able to improve their neonatal resuscitation performance from the pre-test to the post-test, but this increase was not affected by the instructional method used (video lecture or digital game). This experiment has implications for the development of alternative methodologies and tools such as simulation based digital games that can be used in place of more traditional approaches for refreshing participants' neonatal resuscitation performance.[13]
2.	Nazari et al. (2023)	A quasi-experimental study with a control group (simulator with low similarity) and an interventional group (Helping Babies Breathe Program) to improve the ability / competency of nursing students in performing neonatal resuscitation.	Resuscitation training through the use of a high- similarity simulator was significantly more effective than utilizing a low-similarity simulator when performing basic neonatal resuscitation. Training through a low-similarity simulator allowed students to accelerate learning through conscious practice.[14]

3.	Yang and Oh (2022)	A quasi-experimental study to assess the effects (neonatal resuscitation nursing knowledge, problem-solving, clinical reasoning ability, self-confidence in practical performance, degree of anxiety and learning motivation) of a neonatal resuscitation gamification program using immersive virtual reality based on Keller's ARCS (attention, relevance, confidence and satisfaction) model.	Study concluded that neonatal resuscitation gamification program using immersive virtual reality was found to be effective in increasing neonatal resuscitation knowledge, problem solving ability,self-confidence and learning motivation of the nursing students who participated in the trial application process.[15]
4.	Mallick (2022)	A study to assess the effectiveness of simulation-based teaching on knowledge and practices regarding neonatal resuscitation among the nursing teachers.	Study concluded that post- test mean knowledge score regarding neonatal resuscitation was much higher than the pre-test. Regarding practices, the post-test mean practice score was higher than the pre-test. Simulation-based teaching proved very effective in developing practices related to neonatal resuscitation among the nursing teachers.[16]
5.	Lee and Lee (2022)	A study to evaluate the effects of neonatal resuscitation related simulation-based education on medical students' technical and non-technical skills.	Perceived performance of technical and non-technical skills was found to have significantly increased after the simulation. Performance of technical skills, such as diagnostic, therapeutic actions and non-technical skills, such as leader-ship, teamwork and task management improved significantly.[17]

6.	Hakimi et al. (2021)	A quasi-experimental study among midwifery students of semester 3, 4 and 5 undergraduate degrees to evaluate the effect of neonatal resuscitation simulation using the competency-based approach on knowledge, skill and confidence of midwifery students in an objective structured clinical examination (OSCE).	Study recommended that neonatal resuscitation simulation using the competency-based approach is an effective strategy to enhance the knowledge, skill and self-confidence along with their retention among midwifery students while managing neonatal resuscitation.[18]
7.	Bhatia et al. (2021)	A study to evaluate the impact of an ongoing in-situ interprofessional neonatal resuscitation simulation program (NeoSim) on participants' perception of its usefulness and resuscitation outcomes in clinical practice.	Professional development, communication and teamwork were the key learning outcomes identified. NeoSim was associated with perceived improvements in practitioner behavioral skills and a decrease in need for resuscitation at birth.[19]

STATEMENT OF THE PROBLEM

"A study to assess the impact of simulation as an educational technique on skill regarding newborn resuscitation among nursing students at selected nursing training institutes, Kota (Raj.)".

AIM

To assess the efficacy of simulation based educational technique on skill regarding newborn resuscitation among nursing students.

OBJECTIVES

1. To assess the skill regarding newborn resuscitation among nursing students before implementation of simulation as an educational technique.
2. To implement the simulation as an educational technique regarding newborn resuscitation among nursing students.
3. To assess the skill regarding newborn resuscitation among nursing students after implementation of simulation as an educational technique.
4. To assess the impact of simulation as an educational technique on skill regarding newborn resuscitation among nursing students by comparing their pre-test & post-test skill scores.
5. To find out the association of pre-test skill scores regarding newborn resuscitation among nursing students with their selected socio-demographic variables.

HYPOTHESES (At 0.05 level of significance)

H_{01}: There is no significant difference between pre-test & post-test skill scores regarding newborn resuscitation among nursing students at selected nursing training institutes, Kota (Raj.).

H_1: There is significant difference between pre-test & post-test skill scores regarding newborn resuscitation among nursing students at selected nursing training institutes, Kota (Raj.).

H_{02}: There is no significant association of pre-test skill scores regarding newborn resuscitation among nursing students with their selected socio-demographic variables.

H_2: There is significant association of pre-test skill scores regarding newborn resuscitation among nursing students with their selected socio-demographic variables.

OPERATIONAL DEFINITIONS

Assess: In the present study, the term assess refers to systematic, sequential process of collecting information from nursing students regarding skill needed to perform newborn resuscitation. For assessment, observation technique was opted.

Impact: In the present study, the term impact refers to an impression or resulting effect of simulation as an educational technique on skill regarding newborn resuscitation among nursing students.

Simulation: In the present study, the term simulation refers to an artificial creation / imitative representation of scenario related to newborn resuscitation in which nursing students get opportunity to learn basic newborn resuscitation skill.

Educational technique: In the present study, the term an educational technique refers to the teaching learning strategy based on simulation.

Skill: In the present study, the term skill refers to an ability to perform the steps of basic newborn resuscitation in right order and right manner according to the standardized checklist.

Newborn resuscitation: Set of interventions used to assist the airway, breathing & circulation of newborn (neonate or child under 28 days of age), if newborn baby does not start breathing spontaneously after birth. In the present study, procedure of basic newborn resuscitation is simulated on inflatable new born simulator.

Nursing students: In the present study, the term nursing students refers to those students who conform the two criteria, as mentioned here.

1. Students studying in the particular nursing program and will be registered as R.N (Registered Nurse) and R.M (Registered Midwife) after completing that particular nursing program.

(Reference --- Nursing Programs Section as listed on Indian Nursing Council website)

2. Students studying in second and third year of general nursing and midwifery program and third and fourth year of Basic B.Sc. (Bachelor of science) nursing program.

Nursing training institute: In the present study, the term nursing training institute refers to an educational organization which offers one or both of the following nursing programs in accordance with Indian Nursing Council, New Delhi.

✓ General Nursing and Midwifery

✓ Basic B.Sc. Nursing.

MATERIALS AND METHODS

This study was conducted as a feasibility study.
Research approach: Quantitative impact evaluative approach.

Research design: Pre-experimental research design (One group pre-test post-test design)
Research setting: Sudha College of Nursing and Sudha Nursing School, Kota, Rajasthan.
Study population: Nursing students of the selected nursing training institute, Kota (Raj.).

Study sample and sample size: In this study, nursing students of the selected nursing training institute in Kota (Raj.) were selected as sample, drawn from the study population of this study. Sample size was 40.

Sampling technique: Purposive sampling technique.

Variables*:* In this study, the independent variable is simulation as an educational technique regarding newborn resuscitation and the dependent variable is the skill regarding newborn resuscitation among nursing students. Selected socio-demographic variables are age, gender, preferred style of learning, studying in nursing program, subject of interest, provision of separate newborn care corner in clinical facility of nursing institution, attended any seminar or workshop related to new born resuscitation, observed newborn resuscitation procedure during clinical practice, assisted in newborn resuscitation procedure during clinical practice and attended any session based on simulation educational technique.

Criteria for sample selection:

Inclusion criteria: Nursing students (according to operational definition of term nursing students) of selected nursing training institutes, Kota (Raj.), who were amenable to participate as sample and available during the period of data collection and intervention phases of research study.

Exclusion criteria: Nursing students (according to operational definition of term nursing students) of selected nursing training institutes, Kota (Raj.), who were not amenable to participate as sample and not available during the period of data collection and intervention phases of research study

Data collection tool: It consisted of two sections.

*Section A***:** Socio-demographic profile

Section B: Standardized checklist to assess the skill regarding newborn resuscitation (consisted of 12 tasks). According to the nature of tasks, these tasks of checklist, grouped in two parts.

1. Tasks related to initial steps of newborn resuscitation. (Task 1 to 7)
2. Tasks related to use of bag and mask for newborn resuscitation. (Task 8 to 12)

Scoring criteria for skill assessment:

Table 2 - Scoring criteria for skill assessment Maximum Score =12

SCORE FOR EACH TASK / STEP	CRITERIA
1 (one)	Student performs task / step of newborn resuscitation skill in right order and right manner according to the selected standardized checklist of new born resuscitation.
0 (zero)	Student performs task / step in wrong order
0 (zero)	Student performs task / step in wrong manner
0 (zero)	Student does not perform task / step

Interpretation of scoring and determination of the skill level:

Table 3 - Determination of the skill level

OBTAINED SCORE	LEVEL OF SKILL
0 to 4	Poor
5 to 8	Average
9 to 12	Good

***Validity and Reliability of tool*:** The tool was validated by the experts in nursing education and simulation based educational strategy. All the experts endorsed the use of selected standardized checklist to assess skill regarding newborn resuscitation among nursing students.

Regarding the reliability of tool, since **selected checklist** is:

- **Issued by Maternal and Child Health Division, Ministry of Health and Family Welfare, Government of India**.
- **Endorsed by Indian Nursing Council (INC), New Delhi, prepared and published by INC in collaboration with United States Agency for International Development (USAID), Maternal and Child Health Integrated Program (MCHIP), Johns Hopkins Program for International Education in Gynecology and Obstetrics (JHPIEGO)**.
- Being used in various governmental training programs related to new born resuscitation with fruitful outcomes

Therefore, it is **already an authoritative, authentic and ethical assessment tool having high reliability and trustworthiness**.

DATA COLLECTION METHOD:

Observation technique was used as data collection method. Investigator observed the task performance of nursing students to assess their skill regarding new born resuscitation.

DATA COLLECTION PROCEDURE:

- During April-May, 2024, prior formal permission was obtained from the concerned administrative authority of the selected nursing training institute and 40 nursing students were selected by purposive sampling technique as participants / subjects.
- The purpose of study was duly explained among these participants. An informed written consent was taken from each participant before data collection. Advance intimation was provided to participants regarding the day, time and duration of scheduled pretest, simulation based educational session and post- test.

- Pretest was given to each participant. During pretest, socio-demographic data was collected from all these participants and skill regarding newborn resuscitation of each participant was assessed according to selected standardized checklist of new born resuscitation.
- After the pretest, scheduled simulation based educational sessions, according to their programming (complying with the prerequisites) were conducted for these participants. After 7 days, post-test was given to same participants.
- Data were analyzed using SPSS 22.0 software and interpreted in form of tables and charts.

RESULTS OF THE STUDY

SECTION A: Description of sample characteristics based on selected socio - demographic variables.
SECTION B: Findings related to skill assessment based on pre-test and post-test skill scores regarding newborn resuscitation among nursing students.
SECTION C: Findings related to the impact of simulation as an educational technique on skill regarding newborn resuscitation among nursing students.
SECTION D: Findings related to association of pre-test skill scores regarding newborn resuscitation among nursing students with their selected socio-demographic variables.

SECTION A: DESCRIPTION OF SAMPLE CHARACTERISTICS BASED ON SELECTED SOCIO - DEMOGRAPHIC VARIABLES

Table 4 - Frequency and percentage distribution of nursing students according to selected socio-demographic variables (At a glance)

N = 40

S.NO.	SOCIO-DEMOGRAPHIC VARIABLE AND RESPONSES		FREQUENCY	PERCENT (%)
1.	AGE (IN YEARS)	17 – 19	7	17.5
		20 – 22	11	27.5
		23 – 25	16	40.0
		ABOVE 25	6	15.0
2.	GENDER	MALE	29	72.5
		FEMALE	11	27.5
3.	PREFERRED STYLE OF LEARNING	AUDITORY	12	30.0
		LEARNING BY WRITING / READING	11	27.5
		VISUAL LEARNING	10	25.0
		LEARNING BY DOING	7	17.5
4.	STUDYING IN NURSING PROGRAM	G.N.M	18	45.0
		BASIC B.Sc. NURSING	22	55.0
5.	SUBJECT OF INTEREST	MEDICAL SURGICAL NURSING	11	27.5
		COMMUNITY HEALTH NURSING	14	35.0

		PAEDIATRIC NURSING	10	25.0
		OBSTETRICAL AND GYNAECOLOGICAL NURSING	5	12.5
6.	PROVISION OF SEPARATE NEWBORN CARE CORNER IN CLINICAL FACILITY OF NURSING INSTITUTION	YES	21	52.5
		NO	19	47.5
7.	ATTENDED ANY SEMINAR OR WORKSHOP RELATED TO NEW BORN RESUSCITATION	YES	19	47.5
		NO	21	52.5
8.	OBSERVED NEWBORN RESUSCITATION PROCEDURE DURING CLINICAL PRACTICE	YES	17	42.5
		NO	23	57.5
9.	ASSISTED IN NEWBORN RESUSCITATION PROCEDURE DURING CLINICAL PRACTICE	YES	19	47.5
		NO	21	52.5
10.	ATTENDED ANY SESSION BASED ON SIMULATION EDUCATIONAL TECHNIQUE	YES	21	52.5
		NO	19	47.5

***SECTION B*: FINDINGS RELATED TO SKILL ASSESSMENT BASED ON PRE-TEST AND POST-TEST SKILL SCORES REGARDING NEWBORN RESUSCITATION AMONG NURSING STUDENTS**

Level of skill regarding newborn resuscitation among nursing students (based on pre-test and post-test skill scores)

Table 5 - Level of skill based on pre-test and post-test skill scores

N = 40

LEVEL OF SKILL	PRE-TEST		POST-TEST	
	FREQUENCY	PERCENT (%)	FREQUENCY	PERCENT (%)
POOR	29	72.5	4	10.0
AVERAGE	9	22.5	25	62.5
GOOD	2	5.0	11	27.5

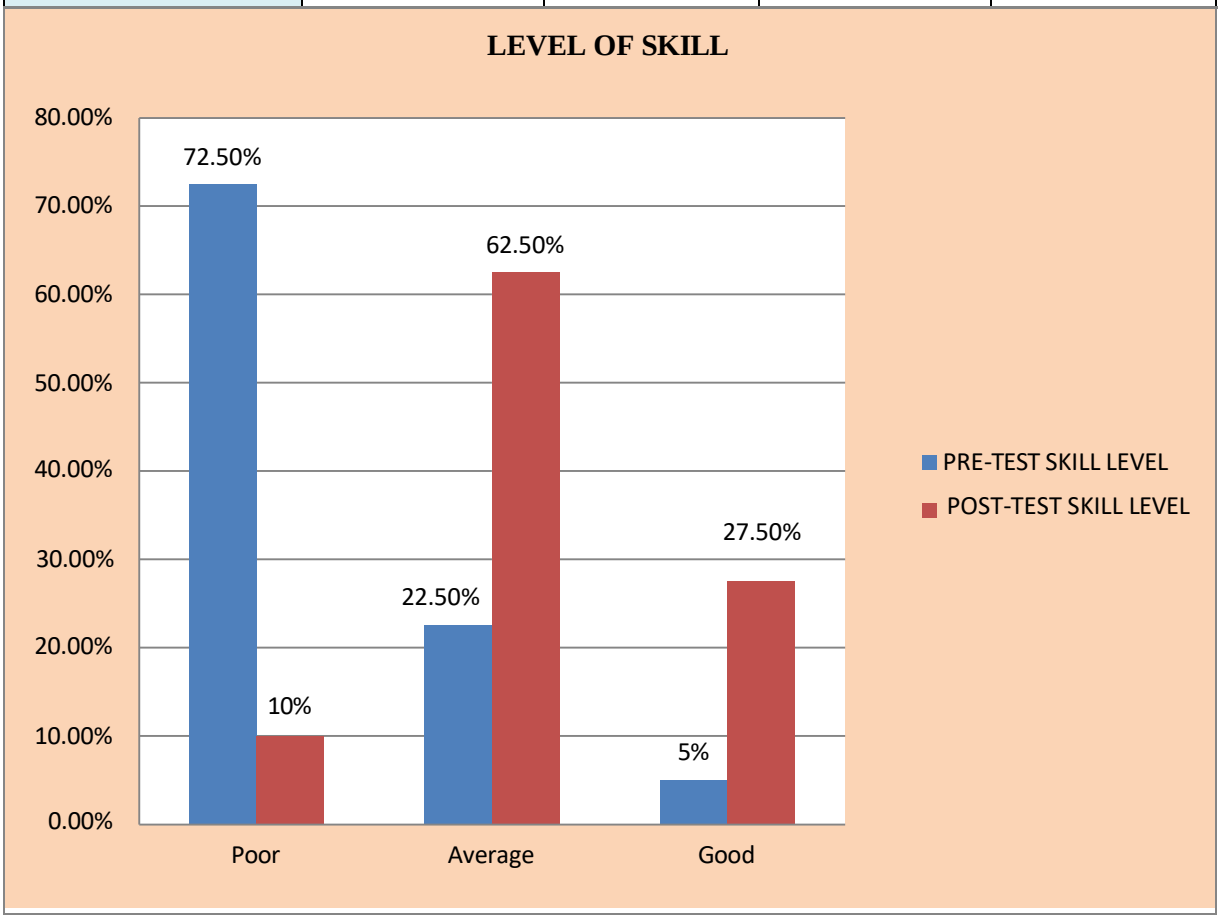

FIGURE 1 - CLUSTERED COLUMN CHART ILLUSTRATING LEVEL OF SKILL (BASED ON PRE-TEST AND POST-TEST SCORES)

Mean, median and standard deviation values based on pre-test and post-test skill scores regarding newborn resuscitation among nursing students.

Table 6 - Mean, median and standard deviation value based on pre-test and post-test skill scores

N = 40

TYPE OF ASSESSMENT	MAXIMUM SCORE	MEAN VALUE	MEDIAN VALUE	STANDARD DEVIATION VALUE
PRE-TEST	12	3.10	2.50	1.736
POST-TEST	12	7.33	7.00	2.093

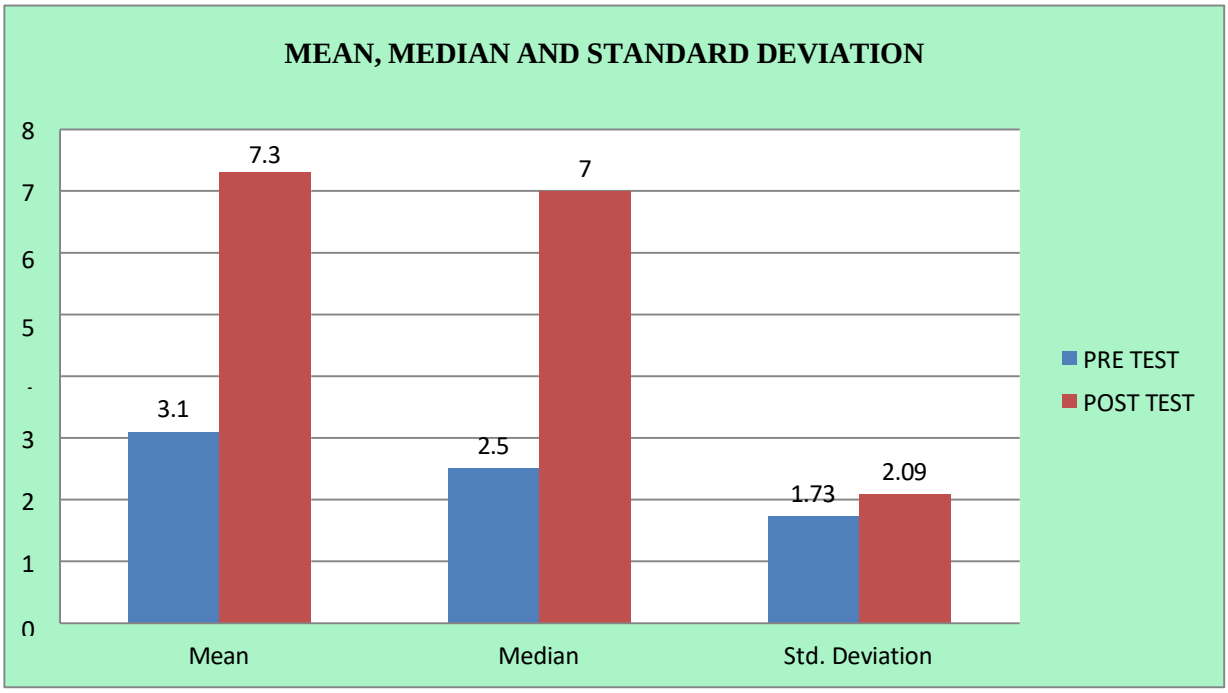

FIGURE 2 - CLUSTERED COLUMN CHART ILLUSTRATING VALUES OF MEAN, MEDIAN AND STANDARD DEVIATION (BASED ON PRE-TEST AND POST-TEST SKILL SCORES)

SECTION C: FINDINGS RELATED TO THE IMPACT OF SIMULATION AS AN EDUCATIONAL TECHNIQUE ON SKILL REGARDING NEWBORN RESUSCITATION AMONG NURSING STUDENTS

Table 7 - Paired sample t – test statistics for comparison between pre- test and post-test statistical values

PAIRED SAMPLE t – TEST								
COMPARISON PARAMETER	**PAIRED DIFFERENCES**					**t-VALUE**	**df**	**Sig. (2-tailed)**
	MEAN DIFF.	STANDARD DEVIATION OF THE PAIRED DIFF.	STANDARD ERROR OF THE DIFF. BETWEEN MEANS	95% CONFIDENCE INTERVAL FOR THE DIFF. OF MEANS				
PRE-TEST --- POST-TEST	4.225	1.625	0. 257	L.B.	U.B.	16.445	39	0.000
				4.745	3.705			

Key to abbreviations: DIFF. (Difference), L.B. (Lower bound), U.B. (Upper bound), df (Degree of freedom).

SECTION D: FINDINGS RELATED TO ASSOCIATION OF PRE-TEST SKILL SCORES REGARDING NEWBORN RESUSCITATION AMONG NURSING STUDENTS WITH THEIR SELECTED

SOCIO- DEMOGRAPHIC VARIABLES

Table 8 - Association of pre-test skill scores regarding newborn resuscitation among nursing students with their selected socio-demographic variables. **N=40, LEVEL OF SIGNIFICANCE=0.05**

S.no.	Socio-demographic variable and responses	F	Poor Scorers (0-4)	Average Scorers (5-8)	Good Scorers (9-12)	Chi -square value	df	p - value	Significant or Not Significant
1	Age (In years)								
	17-19	7	7	0	0	14.138	6	0.028	Significant
	20-22	11	10	1	0				
	23-25	16	11	4	1				
	Above 25	6	1	4	1				
2	Gender								
	Male	29	23	4	2	4.986	2	0.082	Not significant
	Female	11	6	5	0				
3	Preferred style of learning								
	Auditory Learning	12	12	0	0	20.053	6	0.002	Significant
	Learning by writing / reading	11	5	6	0				
	Visual learning	10	8	2	0				
	Learning by doing	7	4	1	2				
4	Studying in nursing program								
	G.N.M.	18	14	2	2	4.456	2	0.107	Not significant
	Basic B.Sc. Nursing	22	15	7	0				
5	Subject of interest								
	Medical Surgical Nursing	11	8	3	0	15.037	6	0.019	Significant
	Community Health Nursing	14	11	3	0				
	Pediatric Nursing	10	8	2	0				
	Obstetrical and Gynecological Nursing	5	2	1	2				
6	Provision of separate newborn care corner in clinical facility of nursing institution								
	Yes	21	12	8	1	6.222	2	0.044	Significant

	No	19	17	1	1				

S.no.	Socio-demographic variable and responses	F	Poor Scorers (0-4)	Average Scorers (5-8)	Good Scorers (9-12)	Chi -square value	df	p - value	Significant or Not Significant
7	Attended any seminar or workshop related to new born resuscitation								
	Yes	19	10	8	1	8.157	2	0.016	Significant
	No	21	19	1	1				
8	Observed new born resuscitation procedure during clinical practice								
	Yes	17	9	8	0	10.963	2	0.004	Significant
	No	23	20	1	2				
9	Assisted in new born resuscitation procedure during clinical practice								
	Yes	19	10	8	1	8.157	2	0.016	Significant
	No	21	19	1	1				
10	Attended any session based on simulation educational technique								
	Yes	21	12	8	1	6.222	2	0.044	Significant
	No	19	17	1	1				

KEY TO ABBREVIATIONS: F(Frequency), CV (Calculated value), df (Degree of freedom), p – value (Probability value).

DISCUSSION

Regarding Section A (Description of sample characteristics based on selected socio-demographic variables), Table 4 - Frequency and percentage distribution of nursing students according to their selected socio-demographic variables reveals that majority of the nursing students (40%) were in the age group of 23-25 years. 72.5% nursing students were male. Majority of the nursing students (30%) preferred auditory learning style. 55% nursing students were studying in Basic B.Sc. Nursing program and remaining were studying in G.N.M program. Most of the nursing students (35%) had interest in community health nursing subject. Majority of the nursing students (52.5%) responded yes regarding provision of separate newborn care corner in clinical facility of nursing institution. 52.5% nursing students did not attend any workshop or seminar related to newborn resuscitation. 57.5% nursing students did not observe newborn resuscitation procedure during clinical practice. 52.5% did not assist in newborn resuscitation procedure during clinical practice. Most of the nursing students 52.5% attended any session based on simulation educational technique.

Regarding Section B (Findings related to skill assessment based on pre-test and post-test skill scores regarding

newborn resuscitation among nursing students), Table 5 - Level of skill (based on pre-test and post-test skill scores) shows that in pre-test findings, majority of nursing students (72.5%) were found as poor skill scorers, nursing students with average skill scores were 22.5% and only 5% nursing students were found as good skill scorers. On the other side, in post-test findings, 27.5% nursing students were found as good skill scorers, 62.5% nursing students were found as average skill scorers and only 10% nursing students were found as poor skill scorers. These remarkable changes in skill scores indicated gain / improvement in skill regarding newborn resuscitation among nursing students.

Table 6 - Mean, median and standard deviation value shows that values of mean, median and standard deviation based on pre-test skill scores were found 3.10, 2.5 and 1.736 respectively. In contrast to this, values of mean, median and standard deviation based on post-test skill scores were found 7.33. 7.0 and 2.093 respectively. This change also suggested gain / improvement in skill regarding newborn resuscitation among nursing students.

Regarding Section C (Findings related to the impact of simulation as an educational technique on skill regarding newborn resuscitation among nursing students), Table 7 - Paired sample t – test statistics depicts that two tailed p-value associated with this t-test was found 0.000, which is less than conventional level of significance 0.05. This indicates that there is extremely statistically significant difference between pre-test and post-test skill scores. This finding leads to rejection of Null hypothesis (H_{01}) and favors Research hypothesis (H_1). Calculated t statistical value 16.445. {The critical t-value for df = 39 and alpha = 5% is approximately ±2.0227}. Calculated t statistical value is more than the critical value of t. This also suggest the rejection of null hypothesis and favors Research hypothesis (H_1).

On the bases of above findings, it was concluded that an increase in post-test skill scores, in contrast to pre-test skill scores, is due to significant positive impact of simulation based educational technique on skill regarding newborn resuscitation among nursing students.

Regarding Section D (Findings related to association of pre-test skill scores regarding newborn resuscitation among nursing students with their selected socio-demographic variables), Table 8 - Association of pre-test skill scores regarding newborn resuscitation among nursing students with their selected socio-demographic variables (at level of significance 0.05) shows existence of significant association between the level of skill regarding newborn resuscitation and age (p = 0.028), preferred style of learning (p = 0.002), subject of interest (p = 0.019), provision of separate newborn care corner in clinical facility of nursing institution (p = 0.044) {This finding was supported by studies conducted in Afghanistan[20], Ethiopia[21] and East Africa[22]}, attended any seminar or workshop related to new born resuscitation (p = 0.016){This finding was supported by studies conducted in Afghanistan[20] and Nepal[23]}, observed newborn resuscitation procedure during clinical practice (p = 0.004), assisted in newborn resuscitation procedure during clinical practice (p = 0.016) {This finding was supplemented with a study conducted in Nepal}[23] and attended any session based on simulation educational technique (p = 0.044).

In contrast to this, findings of table 8 shows that there is no significant association between the level of skill regarding newborn resuscitation and gender (p = 0.082), studying in nursing program (p = 0.107). This finding was supported by the study conducted in Ethiopia.[24]

CONCLUSION

This research study aimed to assess the efficacy of simulation based educational strategy on skill regarding newborn resuscitation procedure among nursing students. Based on study findings, it is evident that level of skill was poor among majority of nursing students regarding neonatal resuscitation procedure before the intervention (Simulation based educational sessions). Study findings also demonstrated that after the simulation based educational strategy as intervention, level of skill enhanced among nursing students.

In nutshell, it can be climaxed that simulation based educational strategy is an efficacious approach for enhancing the level of skill regarding newborn resuscitation procedure among nursing students. Integration of simulation as an effective educational strategy in current trends of nursing education is a key step for

improving confidence and satisfaction in applying clinical skills among nursing students. Adequate skill (competency) regarding newborn resuscitation among nursing students (future health professionals) is vital for qualitative neonatal nursing care. This approach will definitely lead to significant decrease in newborn morbidity and mortality. This attempt will provide a chance to every newborn for healthy start and survival.

RECOMMENDATIONS FOR INCORPORATION OF SIMULATION BASED EDUCATIONAL TECHNIQUE IN CURRENT TRENDS OF NURSING EDUCATION

- More emphasis should be given on development of skill learning among nursing students by means of simulation based educational approach.
- Simulation based educational approach must be incorporated in current educational (teaching – learning) methods in nursing institutes through setting up skill labs.
- Establishment of skill labs in all nursing institutes, in both government and private sector should be mandatory and existing skill labs in nursing institutes must be strengthened.
- Mandatory provision of demonstration, practice and evaluation sessions for neonatal resuscitation in skill labs in all nursing programs.
- Use of the standardized checklist for basic neonatal resuscitation by each student during practice sessions.
- Practice session of each student must be supervised by facilitator and constructive feedback to each student after his / her performance must be given by facilitator.
- De-briefing sessions must be strengthened with prime focus on rationale behind each action performed by student in simulation.
- Simulation-based events such as training programs, workshops and seminars related to newborn resuscitation and other clinical procedures must be regularly conducted by administration of nursing training institutes. Nursing students must be encouraged by administrative authorities and faculties of nursing institutes for taking active participation in such events.
- Periodic simulation based newborn resuscitation training programs / refresher courses for nursing officers and nurse educators should be organized as a part of their continuing nursing education for updating their knowledge and skill regarding lifesaving clinical skill such as newborn resuscitation. Provision should also be made for their mandatory active participation.

RECOMMENDATIONS FOR FURTHER RESEARCH

- More research studies with larger size of sample should be conducted for precise picture of knowledge and skill regarding newborn resuscitation procedure and better generalization of study findings.
- Similar research studies should be carried out with nursing officers and nurse educators.
- More research studies are vital for rigorous examination of the effect of simulation on learning outcomes to provide more evidences to establish simulation based educational strategy as foundational educational approach for professional development of nursing students.

ACKNOWLEDGEMENTS

Authors are grateful to the concerned authority of research setting and all participants who participated in the study.

ETHICAL APPROVAL

Formal ethical approval for the study was obtained from the Institutional Ethics Committee (IEC) of Jaipur National University, Institute for Medical Sciences and Research Centre, Jaipur (JNUIMSRC).

FINANCIAL SUPPORT AND SPONSORSHIP: None

CONFLICTS OF INTEREST: None

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