

Effectiveness of Simulation-Based Learning on Nursing Students' Knowledge and Skills in Conducting Normal Delivery

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Abstract

Background: In nursing education, simulation-based learning (SBL) is becoming more and more acknowledged as a successful teaching method, especially for skill-based abilities like performing a normal delivery.

Materials & Methods: A quasi-experimental one-group pre-test–post-test design was adopted. A total of 60 final-year B.Sc. Nursing students were selected using purposive sampling. Research setting B.Sc. Nursing Students, AKG Institute of Nursing, BKT, Lucknow. Tools included a structured knowledge questionnaire (30 items) and an observational skills checklist (25 steps) validated by experts. Pretest data were collected, followed by a structured simulation-based teaching program using mannequins and role-play. A posttest was conducted after one week.

Results: The mean pretest knowledge score was 14.25 ± 3.2 , which increased to 24.10 ± 2.9 in the posttest ($p < 0.001$). Similarly, the mean skills score improved from 12.8 ± 3.5 to 21.9 ± 2.8 ($p < 0.001$). A significant positive correlation ($r = 0.62$, $p < 0.05$) was found between knowledge and skill gain.

Conclusion: In nursing education, simulation-based learning (SBL) is becoming more and more acknowledged as a successful teaching method, especially for skill-based abilities like performing a normal delivery.

Keywords: Simulation-based learning; Nursing education; Normal delivery; Knowledge; Skills

Introduction

The goal of nursing education is to produce qualified individuals who can provide safe and efficient care for mothers and children¹. The ability to perform a normal vaginal delivery is one of the most important basic abilities for nursing students, particularly in the Indian environment where trained birth attendants are

essential for lowering maternal and newborn morbidity and mortality².

The clinical setting is unpredictable, and patient load, medico-legal concerns, and ethical considerations may limit opportunities to observe or perform a normal delivery under supervision^{3,4}. Traditional teaching methods, such as lectures and

demonstrations, frequently fail to provide nursing students with adequate hands-on exposure. Therefore, creative teaching-learning techniques are necessary to close the gap between clinical practice and theoretical knowledge⁵.

Simulation-based learning (SBL) has emerged as a promising pedagogical tool in health sciences education.⁶ It provides a safe, controlled, and standardized environment where learners can practice clinical procedures repeatedly without risk to patients.⁷ Simulation enhances critical thinking, psychomotor skills, and confidence, thereby improving clinical competence.⁸ Studies in developed countries have consistently shown that simulation significantly improves obstetric skill acquisition and retention.⁹

One educational approach that has shown promise in the teaching of health sciences is simulation-based learning (SBL)⁶. It offers a standardized, safe, and controlled setting where students can repeatedly perform clinical operations without endangering patients⁷. Simulation improves clinical competence by boosting confidence, psychomotor skills, and critical thinking⁸. Research from affluent nations has consistently demonstrated that simulation greatly enhances the learning and retention of obstetric skills⁹.

While simulation is slowly making its way into nursing courses in India, there isn't much actual data to support its usefulness in obstetric skill training¹⁰. In order to assess the impact of simulation-based learning on nursing students' knowledge and abilities to perform a normal delivery, the current study was conducted.

Objectives

1. To assess the pre-test and post-test knowledge scores of nursing students regarding normal delivery.
2. To assess the pre-test and post-test skill scores of nursing students in conducting normal delivery.
3. To evaluate the effectiveness of simulation-based learning in improving knowledge and skills.
4. To find the correlation between knowledge and skill scores of students.

Hypotheses

- **H₁:** The mean post-test knowledge scores will be significantly higher than mean pre-test knowledge scores of nursing students after simulation-based learning.
- **H₂:** The mean post-test skill scores will be significantly higher than mean pre-test skill scores of nursing students after simulation-based learning.

- **H₃:** There will be a significant positive correlation between post-test knowledge and skill scores.

Materials & Methods

Research Design: Quasi-experimental one-group pretest–posttest design.

Setting: B.Sc. Nursing Students, AKG Institute of Nursing, BKT, Lucknow

Sample and Sampling: 60 final-year B.Sc. Nursing students selected through purposive sampling.

Inclusion Criteria:

- Students enrolled in final year B.Sc. Nursing.
- Students willing to participate.
- Students available during the study period.

Exclusion Criteria:

- Students already exposed to advanced obstetric simulation training.

Tools:

1. Structured Knowledge Questionnaire

- 30 multiple-choice questions related to stages of labor, preparation, conduction of delivery, immediate care of newborn and mother
- Each correct answer scored 1, incorrect 0. Maximum score 30.
- Reliability (KR-20) = 0.82.

2. Observational Skill Checklist

- 25 procedural steps in conducting normal delivery (hand hygiene, preparation, aseptic technique, monitoring, safe delivery, active management of third stage, immediate newborn care).
- Each correct step scored 1, incorrect 0. Maximum score 25.
- Inter-rater reliability = 0.86.

Intervention: Simulation-based teaching on normal delivery using obstetric mannequin, role-play, and supervised practice sessions for 3 days.

Data Collection Procedure:

- Pre-test knowledge and skill assessment conducted.
- Simulation-based learning implemented.
- Post-test knowledge and skill assessment done after 7 days.

Data Analysis: Data analyzed using SPSS v25. Paired *t*-test applied for comparing pretest and post-test scores; Pearson correlation used to find relationship between knowledge and skills. Significance level set at $p < 0.05$.

Results

Table 1: Frequency and Percentage Distribution of Nursing Students According to Demographic Variables (n=60)

Demographic Variables	Categories	Frequency (f)
Age (years)	20–21	18
	22–23	28
	24–25	14
Gender	Female	54
	Male	6
Residence	Urban	32
	Rural	28
Previous Clinical Exposure to Normal Delivery	Yes	15
	No	45
Attendance in Obstetric Nursing Class	Regular	49
	Irregular	11

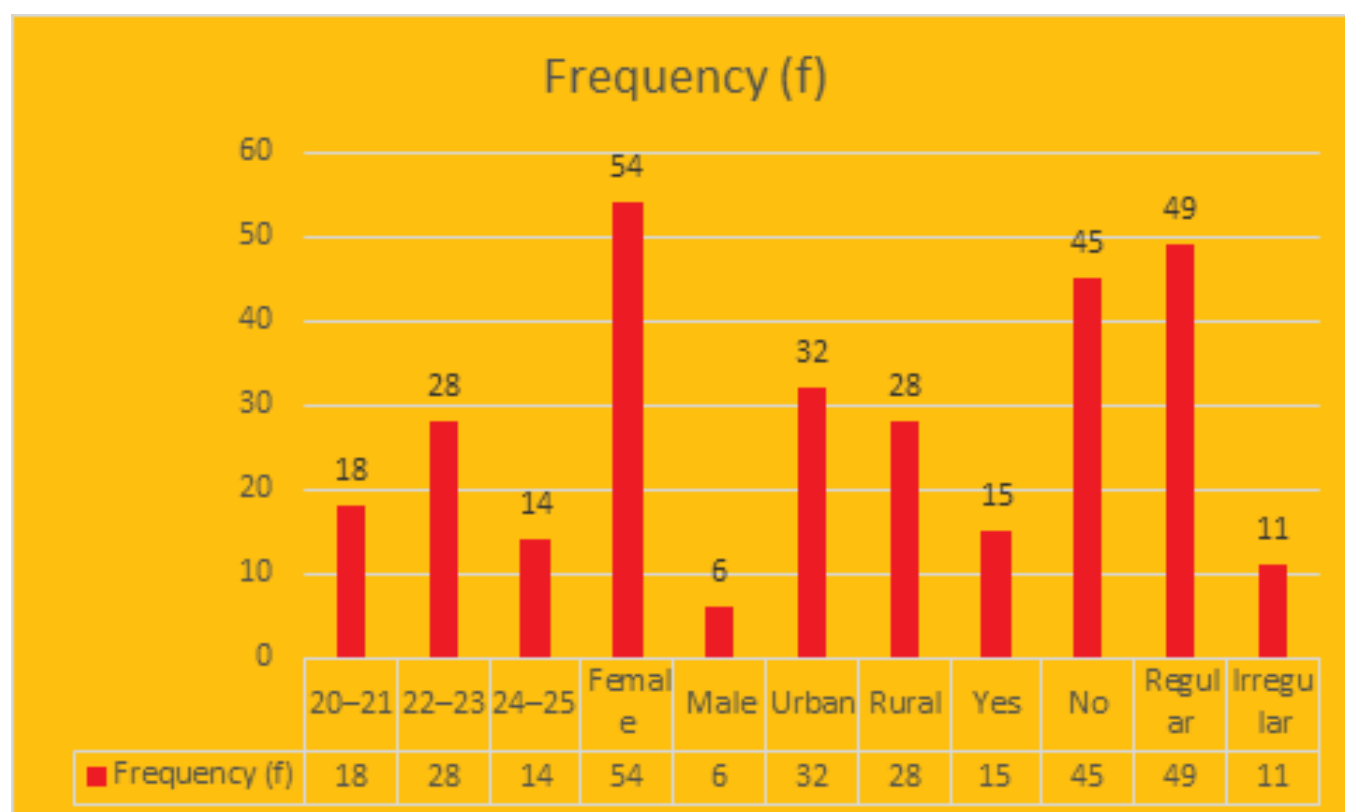


Figure 01: Distribution of Nursing Students

Table 2: Comparison of Pre-test and Post-test Knowledge Scores (n=60)

Knowledge Score	Mean $\pm$ SD	Mean Difference	<i>t</i> value	p value
Pre-test	14.25 $\pm$ 3.2	—	—	—
Post-test	24.10 $\pm$ 2.9	9.85	18.42	<0.001***

Significant at $p < 0.001$

Table 3: Comparison of Pre-test and Post-test Skill Scores (n=60)

Skill Score	Mean $\pm$ SD	Mean Difference	<i>t</i> value	p value
Pre-test	12.8 $\pm$ 3.5	–	–	–
Post-test	21.9 $\pm$ 2.8	9.1	15.76	<0.001***

Table 4: Correlation between Post-test Knowledge and Skill Scores (n=60)

Variables	<i>r</i> value	p value
Knowledge vs Skill	0.62	<0.05*

Discussion

The results showed that after being exposed to simulation-based learning, nursing students' knowledge and competence ratings significantly improved. Simulation improves cognitive learning, as evidenced by the fact that the posttest knowledge mean score (24.10) was substantially higher than the pretest score (14.25). In a similar vein, skill performance significantly improved, confirming the value of practical simulation exercise.

The findings are in line with earlier research by Park et al.^{11,12} and Sharma et al. which found that simulation training enhanced nursing students' procedural competency, confidence, and decision-making. Constructivist learning theory is supported by the positive association between knowledge and skill acquisition, which shows that theoretical information has a direct impact on psychomotor competence.

In order to close the gap between classroom instruction and clinical practice, our findings are in favor of including simulation-based learning into standard obstetric nursing education.

Conclusions

Nursing students can improve their knowledge and skills about normal delivery through simulation-based learning. It increases students' confidence and offers safe, supervised practice opportunities. In maternal health nursing, simulation should be a standard teaching method for nurse educators.

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