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Impact of Simulation-Based Training on Nursing Student's Response in Emergency at A Selected Nursing College in Uttar Pradesh

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Abstract

Introduction: Simulation-based training (SBT) is increasingly adopted in nursing education to enhance clinical competence. It provides realistic, safe practice settings that help bridge the gap between theory and practice[1][2]. This quasi-experimental study evaluated whether a structured emergency simulation workshop improves nursing students' emergency response skills.
Materials and Methods: Forty final-year nursing students (GNM/B.Sc.) at Metro College of Nursing underwent pre-testing of emergency skills (OSCE checklists for CPR, triage, and airway management[3]). They then participated in a 3-day high-fidelity simulation workshop on cardiac arrest, mass-casualty triage, and airway techniques. Post-training skills were reassessed with the same tools. Paired t-tests were used to compare pre- and post-training performance[4].
Results: Students showed significant improvement in all measured skills. Mean CPR completion time decreased from 14.2 ± 4.3 s to 8.6 ± 2.1 s, triage accuracy rose from 68% to 91%, and airway-management scores increased from 60 to 89 (paired t-test, $p<0.001$ for all)[5].
Conclusion: Simulation-based emergency training substantially enhanced the nursing students' performance and confidence[6][7]. The findings support integrating regular high-fidelity simulations into nursing curricula to improve emergency preparedness and patient safety.
Keywords: simulation-based education, emergency response, nursing students, cardiopulmonary resuscitation, triage, airway management.

Introduction

Simulation-based education addresses the long-standing gap between theoretical learning and practical skills in nursing training[8]. It provides a realistic but controlled environment for students to rehearse complex emergency interventions without risk to patients[1]. Leading authorities such as the Indian Nursing Council and the World Health Organization emphasize hands-on training for emergency care[9][10]. Prior studies report that simulation fosters clinical competence and confidence in critical situations[6][7]. Despite this, few empirical studies have quantified the impact of simulation in Indian nursing settings[11]. To address this gap, we conducted a quasi-experimental study assessing the effect of a targeted simulation workshop on nursing students' emergency response skills.

Methodology

The study used a quasi-experimental pretest–posttest design. Key steps included:
- **Sample:** Forty final-year nursing students (both B.Sc. and GNM) who had completed theory in emergency care were recruited by purposive sampling. Exclusion criteria were prior extensive simulation experience. Informed consent was obtained. Ethical approval was granted by the Metro College of Nursing Ethics Committee.
- **Pre-test Assessment:** Using validated Objective Structured Clinical Examination (OSCE) checklists, each student's performance on three emergency tasks was measured: *CPR completion time*, *triage decision accuracy* (color-coding), and *airway management technique*[3].
- **Intervention:** Participants underwent a structured 3-day simulation workshop. Scenarios included adult cardiac arrest, a multi-victim disaster for triage, and advanced airway management. High-fidelity manikins and role-play were used. Each session was followed by instructor-led debriefing.
- **Post-test Assessment:** One week after training, students were re-evaluated using the same OSCE checklists.
- **Data Analysis:** Pre- and post-training scores were analyzed using SPSS v24. Descriptive statistics (mean, SD, frequencies) and paired t-tests ($\alpha=0.05$) were used to assess changes[4].

Results

The demographic profile of the 40 participants is shown in Table 1. Most students were aged 20–22 (65%), predominantly female (80%), and enrolled in the B.Sc. Nursing program (60%). Only 25% had any prior emergency clinical experience.

S.No.	Variable	Category	N	%
1	Age (years)	20–22	26	65%
		23–25	14	35%
2	Gender	Female	32	80%
		Male	8	20%
3	Nursing Program	B.Sc. Nursing	24	60%
		GNM	16	40%
4	Previous Exposure to Emergency Care	Yes	10	25%
		No	30	75%

Table 1: Participant demographics (N=40). Most subjects were young female students with no prior exposure to emergency care.

Figure 1: Graphical representation of Demographic Data

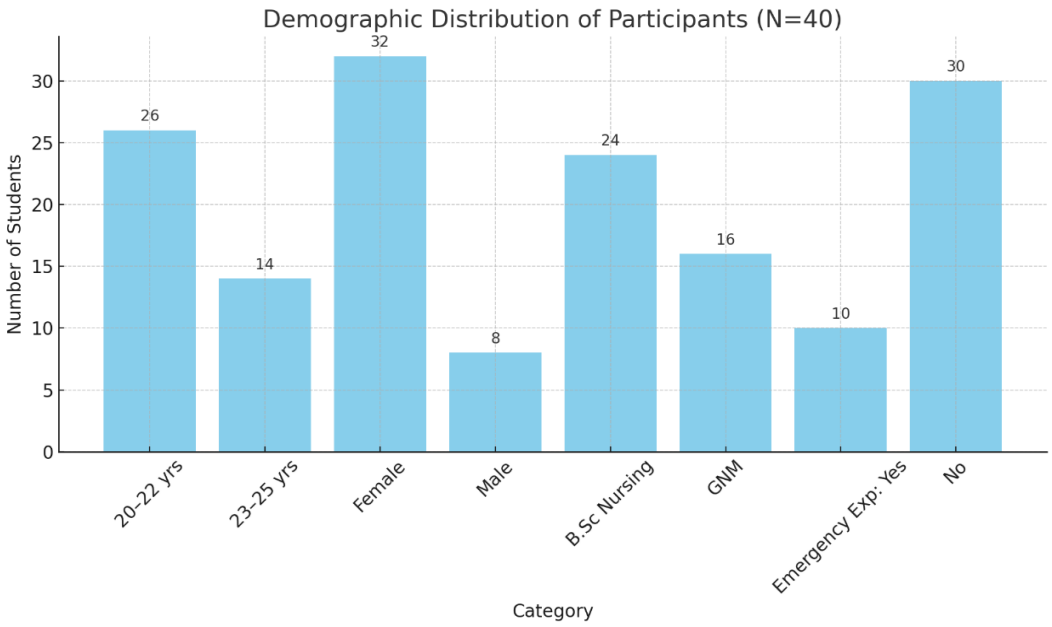

Figure 1: Nursing students attending a classroom training session

Table 2 summarizes performance scores before and after simulation. All improvements were statistically significant ($p<0.001$).

Skill	Pre-test Mean±SD	Post-test Mean±SD	t-value	p-value
CPR completion time (seconds)	14.2 ± 4.3	8.6 ± 2.1	6.84	<0.001
Triage accuracy (percentage)	68 ± 12	91 ± 7	8.12	<0.001
Airway management score (points)	60 ± 9	89 ± 6	9.05	<0.001

Table 2: Mean (±SD) pre- and post-training performance scores (paired t-test).

Figure 2: Graph: Graphical representation of skill Enhancement

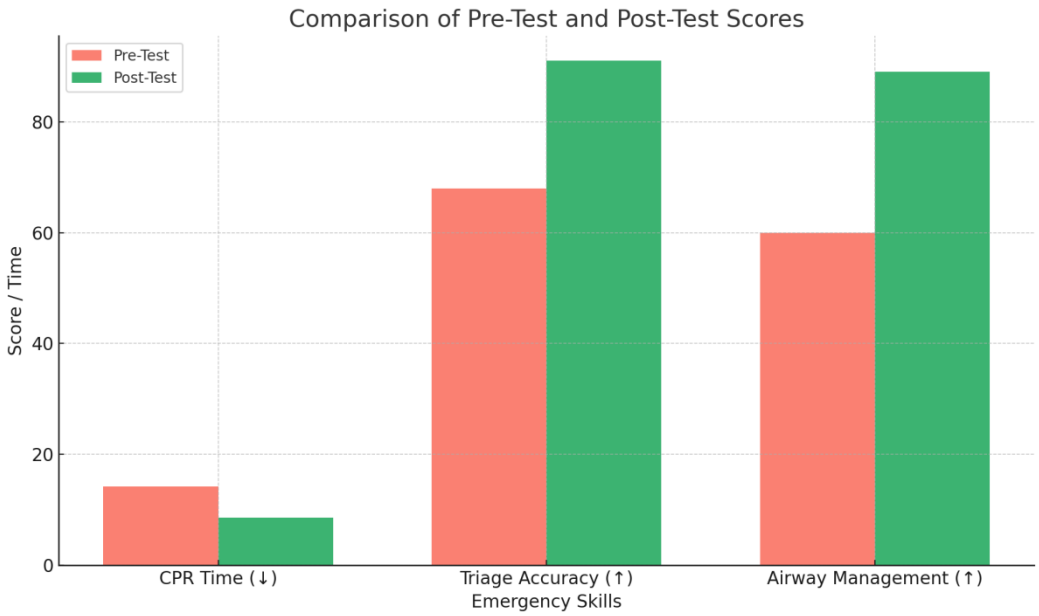

Figure 2: Student practicing CPR on a training manikin during simulation.

Following the workshop, mean CPR completion time decreased from 14.2s to 8.6s, while triage decision accuracy improved from 68% to 91%, and correct airway management rose from 60% to 89%. These gains were highly significant ($p<0.001$).

Discussion

This study found that structured emergency simulations significantly enhanced nursing students' practical skills. The large post-test gains in CPR speed, triage accuracy, and airway management demonstrate that active simulation practice translates to measurable performance improvements. These findings align with systematic reviews showing that simulation-based learning is an effective pedagogical approach for knowledge and skill acquisition. In particular, simulation training has been repeatedly shown to boost student confidence and competence in clinical tasks. The observed increase in triage accuracy and reduction in CPR time are consistent with the idea that repetitive, high-fidelity practice refines decision-making under pressure.
Simulation provides immediate feedback and a safe environment for deliberate practice, which likely contributed to the observed improvements. These results echo prior research indicating that simulation helps close the theory-practice gap by allowing learners to apply concepts in lifelike scenarios. For example, international guidelines emphasize simulation as a means to enhance emergency preparedness, and our findings support that recommendation.
In practical terms, the significant skill gains suggest that even a brief, well-designed simulation intervention can markedly improve emergency response readiness. This has important implications for nursing education: integrating regular simulation sessions into the curriculum could ensure that students attain minimum competency thresholds before clinical practice. Moreover, increased student confidence (as documented in the literature) may translate into more effective patient care during actual emergencies.

Conclusion

Simulation-based emergency training significantly improved the emergency response performance of nursing students in our study. After a targeted 3-day workshop, students completed CPR faster and performed triage and airway management more accurately than before training. These results, along with evidence from the literature, underscore that high-fidelity simulations are a powerful tool for building clinical competence. Nursing programs should therefore institutionalize simulation exercises to better prepare graduates for real-world emergency care.

Limitations and Recommendations

- **Limitations:** The study had a small sample from a single college and lacked a randomized control group, which limits generalizability. Only immediate post-training effects were measured, so long-term retention is unknown.
- **Recommendations:** Future research should involve larger, multi-center randomized designs to confirm these results. Longitudinal follow-up could assess whether gains persist. Based on the positive outcomes, we recommend embedding regular simulation drills into nursing curricula and maintaining well-equipped skills labs for emergency training.

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Declarations

Ethical approval: The study was approved by the Metro College of Nursing Institutional Ethics Committee. Informed consent was obtained from all participants.

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Conflict of interest: The authors declare no conflicts of interest.

Author contributions: All authors contributed to study conception, design, data collection, and manuscript writing.