

EVALUATING THE EFFECTIVENESS OF SIMULATION-BASED TRAINING IN ENHANCING EMERGENCY NURSING COMPETENCIES AND CLINICAL PREPAREDNESS

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ABSTRACT

Emergency nursing requires rapid decision-making, technical proficiency, and effective clinical judgment to manage critical patient situations. However, traditional clinical teaching approaches often provide limited exposure to complex emergencies, creating gaps between theoretical knowledge and practical competencies among nursing students and professionals. This study aims to evaluate the effectiveness of simulation-based training in enhancing emergency nursing competencies, clinical decision-making abilities, teamwork skills, and overall preparedness for emergency care settings. A mixed-method research design was employed, involving pre- and post-intervention assessments of nursing participants exposed to simulation-based emergency scenarios. Data were collected through competency evaluation checklists, knowledge assessment tools, clinical performance observations, and structured feedback questionnaires. Quantitative data were analyzed statistically, while qualitative responses were examined to understand participants' learning experiences. The findings revealed significant improvements in emergency response skills, patient assessment abilities, communication, confidence, and clinical decision-making after simulation-based training. Participants demonstrated enhanced preparedness in managing critical conditions, including trauma care, cardiac emergencies, and rapid patient stabilization. The experiential and interactive nature of simulation contributed to improved clinical knowledge retention and professional competence. The study concludes that simulation-based training is an effective educational strategy for strengthening emergency nursing education and preparing nurses for real-world clinical challenges. Integrating structured simulation programs into nursing curricula and professional development initiatives can improve patient safety, healthcare quality, and emergency care outcomes.

Keywords: Simulation-Based Training, Emergency Nursing, Clinical Competence, Nursing Education, Patient Safety, Clinical Preparedness, Experiential Learning.

Introduction

Emergency nursing is a highly challenging field of healthcare professions, where health professionals are expected to apply high level clinical judgments, decision making, effective communication and technical skills in dealing with unplanned and life-threatening situations. When patients present to the emergency department with serious illness or injury, including cardiac arrest, respiratory failure, acute medical complications and trauma, every minute counts and the quality of nursing care that occurs either during the journey to hospital or once they arrive could have a direct impact on their outcomes. Thus, it is thought that training nurses to possess enough competencies in emergencies is a crucial point of interest in the current nursing education and healthcare systems.

Historically, professional competencies have been developed using a traditional approach to nursing education which consists of classroom instruction, skill demonstration, and limited clinical experiences. These approaches offer important theoretical bases but may not be enough to include surprising and rare emergency situations in a manner that exposes the nursing learner. There are barriers to students being able to repeat critical interventions, such as patient availability, institutional workload and ethical considerations, affecting the number of clinical placements students can access. As a result, nursing students might also find it challenging to apply theory to effective practice during emergency situations.

Simulation based training (SBT) is a recent pedagogical technique that has become an effective method to connect theory and practice. Using realistic scenarios, standardized patients, high fidelity mannequins, virtual environments, and structured debriefing sessions, simulation provides the learner a safe and controlled environment to practice emergency procedures without endangering patient safety. Ongoing research has shown that simulation learning has an important impact on the knowledge base, clinical skills, confidence and competency development of nursing students. Alharbi et al. (2024) conducted a systematic review which

indicated that simulation-based learning positively affected nursing students' knowledge and practical skills, and provided it with assistance to retain competency.

The simulation experience allows students to practice a variety of critical interventions in emergency nursing education, such as CPR, patient assessment, triage management, medication administration, and emergency communication. In contrast to traditional methods of teaching, simulation focuses on experiential learning, reflection, and clinical reasoning. Immediate feedback and guided reflection will enable learners to highlight weaknesses, develop their decision making and build their confidence in their work.

Hospitals are becoming more complex, and the need for competent nurses who can effectively deal with emergencies is rising. Patient safety initiatives around the world make competency based nursing education and training a priority to ensure the healthcare professional is prepared to address complex issues. The incorporation of simulation into nursing education as a teaching tool has, therefore, escalated and gained momentum as a means of fostering technical and non-technical skills, including teamwork, leadership, communication and situational awareness. The latest findings suggest that simulation-based training enhances clinical decision-making skills in nursing students and cultivates their analytical thinking and problem-solving skills in emergency situations (Görücü et al., 2024).

Although there have been improvements in the education of nurses, there is still a significant number of nursing students and early career nurses who are not prepared to respond appropriately in emergency clinical situations. However, in Pakistan, especially in nursing institutions in urban areas, the use of traditional teaching methods, lack of exposure to emergency situations, and the availability of advanced simulation labs can impact the training of clinical skills. Though the concept of simulation education is recognized internationally, the empirical evidence on effectiveness of simulation

education in the context of nursing education in Pakistan is weak.

As Lahore is the hub of healthcare and education in Pakistan, a number of nursing institutes are available in the city to train future healthcare professionals. There are, however, differences across institutions in terms of simulation facilities, training frequency, instructor skill and the integration of simulation into the nursing curriculum. Thus, it is an important thing to investigate the effectiveness of simulation based training in nursing institutions of Lahore to know its contribution in the development of competency in Emergency Nursing.

The literature available throughout the world has a considerable amount of evidence supporting the use of simulation as a means to enhance learning, but most of this literature has come from systems of health care education in developed countries. Very few studies have explored the effect of simulation training on the skill set of emergency nursing in the nursing institutes of Pakistan. In addition, little research has been done to explore the relationships between simulation exposure, clinical preparedness, confidence, teamwork skills and emergency decision-making among nursing students and clinical trainees.

Literature in the last three years has been systematic and evidence-based, and has pointed to the effectiveness of simulation as a strategy to enhance nursing competencies, while also raising the need for studies that focus on institutional differences and implementation issues. For instance, Hung et al. (2024) determined that the use of in-situ simulation is beneficial in sustaining the clinical competence of nurses and highlighted the need for more research in simulation frequency and outcomes in relation to nursing care in an acute setting.

The present study aims to evaluate the effectiveness of simulation-based training in enhancing emergency nursing competencies and clinical preparedness among nursing students and clinical trainees in selected nursing institutions of Lahore.

Research Objectives

The specific objectives are:

1. To examine the relationship between simulation-based training exposure and emergency nursing competency development.
2. To assess the impact of simulation training on clinical decision-making skills among nursing participants.
3. To evaluate the influence of simulation-based education on confidence, teamwork, and emergency response preparedness.
4. To compare simulation-based learning outcomes among nursing participants from four selected institutions in Lahore.

Research Questions

1. How does simulation-based training influence emergency nursing competencies among nursing students and trainees?
2. What impact does simulation-based learning have on clinical decision-making and emergency preparedness?
3. Is there a significant relationship between simulation exposure and perceived clinical confidence?
4. Are there differences in simulation-based learning outcomes among nursing institutions in Lahore?

This study makes a contribution to nursing education research by offering empirical evidence of the effectiveness of simulation-based education in the context of Pakistan. The results could help teach the competencies in nursing education and curriculum development and healthcare institutions to develop competency-based education strategies. The findings of this study could assist in incorporating structured simulation programs into undergraduate nursing and professional training programs.

In addition, the impact of blended education in emergency nursing is not limited to the enhancement of nursing skills, but extends to the quality of healthcare services and the safety of patients. Properly trained nurses have the ability to handle challenging emergencies effectively, minimize clinical mistakes, and enhance patient results. The implementation of evidence-based simulation practices, therefore, can enhance the

standards of nursing education and enhance the competence of the health-care workers in Pakistan.

Literature Review

To foster clinical skills in nursing education without endangering patients, simulation-based learning (SBL) has emerged as an important strategy. In nursing education, simulation-based learning (SBL) has gained significance as a tool that offers realistic and controlled environments for students to develop their clinical skills without endangering patients. Simulation combines theory with practice in a way that is repeated, case-based and debriefed in a structured manner; it is different from traditional teaching methods. It promotes cognitive, psychomotor and affective (clinical reasoning, confidence, communication, decision making) skills. The literature shows that simulation-based education can effectively enhance nursing students' knowledge, competence, and readiness for practice (Alharbi et al., 2024).

Emergency nursing skills are more advanced and include: quick assessment, making critical decisions, working collaboratively with other people and interventions in an emergency. But, because of limited exposure to critical cases during clinical rotations, the students might be less ready for the situations of emergencies. The limitation is overcome by simulation-based training, which enables trainees to simulate and practice trauma management, cardiac emergencies, patient assessment, and resuscitation skills in realistic scenarios.

There is evidence that simulation develops both technical and non-technical skills such as clinical skills, communication skills, leadership skills and situational awareness. Hung et al. (2024) found that simulation-based interventions enhance nurses' clinical skills and readiness in acute care environments. Likewise, Görücü et al. (2024) reported that simulation can help to improve clinical decision making skills by offering learners the opportunity to handle complex patients.

Clinical preparedness is the ability of a nurse to use knowledge, skills and judgment in the application of clinical practice in the health care

setting. By using simulated education, learners can cultivate confidence and familiarity with emergency procedures, and also relieve anxiety to a certain extent, thus enhancing preparedness. Students use reflective debriefing to recognise areas for improvement in their performance and enhance their performance in the future. Social engagement and competency development is also supported through virtual and high-fidelity simulation which provides immersive learning experiences (Cho & Kim, 2024).

While simulation-based education has been implemented in most countries around the world, some barriers exist in the use of simulation-based education in Pakistan including lack of simulation facilities, cost of simulation, and lack of faculty training. The availability of simulation resources and incorporation of simulation activities into nursing curriculum is different in nursing institutions in Lahore. Hence, it is important to consider the effectiveness of simulation based training in the nursing institutions in Lahore for enhancing the practices in nursing education.

Though, there are some studies that have already proven the effectiveness of simulation based learning, but there is a dearth of studies which have investigated the effect of simulation based learning on the emergency nursing competencies of the nursing institutes in Pakistan. In addition, there is limited research evidence on the connection between simulation exposure, clinical confidence, clinical decision making and preparedness for emergency situations for nursing learners. To fill this gap, this study examines the outcome of simulation based training among the nursing participants of four institutions of Lahore.

Theoretical Framework

The study is based on Kolb's Experiential Learning Theory and Benner's Novice-to-Expert Model, which lay a solid foundation for developing emergency nursing competencies and clinical preparedness through simulation-based training.

The Experiential Learning Theory (ELT) by Kolb (1984) describes learning as an ongoing process

in which individuals learn by doing, reflecting, acquiring concepts, and conducting experiments. Simulation training is particularly aligned to this model as it enables nursing students to have real-life simulations, debrief their performance, use theory and enhance their response to clinical situations in the future.

Simulation scenarios in emergency nursing education are a direct experience of critical patient conditions with guided reflection and feedback. This leads to an improvement in clinical reasoning, decision making and confidence. Thus, it is assumed in this model that repeated simulation experiences improve the emergency nursing competencies, a supposition that is supported by Kolb's model.

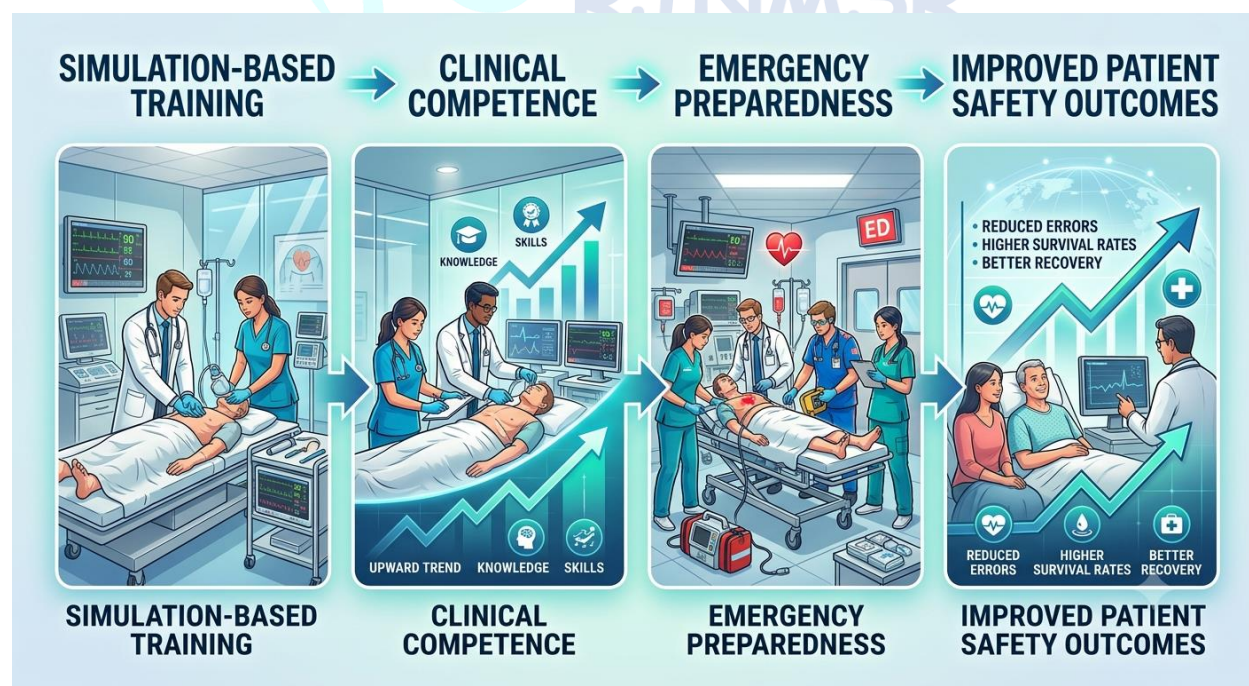
Benner's Novice to Expert Model (1984) is a progression of stages of nursing skills that starts with the novice stage of practice and progresses toward advanced clinical competence. This model assumes that professional development can happen continually through clinical experiences and learning.

This process is facilitated through simulation-based training, which offers a safe environment for students in nursing programs and early-career nurses to learn about and practice complex emergency scenarios. Repeated exposures help learners become more adept at identifying clinical patterns, prioritizing patient needs, and making effective decisions. So, simulation can act as a connecting link between theoretical preparation and the expert clinical performance.

Conceptual Framework of the Study

The conceptual framework proposes that simulation-based training (independent variable) influences emergency nursing competencies and clinical preparedness (dependent variables). Simulation exposure is expected to improve:

- Emergency assessment skills
- Clinical decision-making ability
- Technical nursing procedures
- Communication and teamwork
- Confidence and readiness for emergency care



This framework provides the basis for examining the effectiveness of simulation-based education among nursing students and clinical trainees in Lahore nursing institutions.

Research Methodology

Research Design

A quantitative cross-sectional survey design was adopted to evaluate the effectiveness of simulation-based training in enhancing emergency nursing competencies and clinical preparedness. This design was selected because it enables systematic measurement of participants' experiences, competency levels, and perceptions regarding simulation-based education.

Study Setting

The study was conducted in four nursing institutions located in Lahore, Pakistan. These

institutions were selected because they provide undergraduate nursing education and incorporate clinical skills training within their academic programs.

Study Population and Sample Size

The target population consisted of nursing students and clinical trainees who had received simulation-based training as part of their nursing education. A total sample of 240 participants was selected from four institutions.

Institution	Participants
Institution A	60
Institution B	60
Institution C	60
Institution D	60
Total	240

Participants were selected through a convenient sampling technique based on availability and willingness to participate.

Research Instrument

Data were collected through a structured questionnaire divided into four sections:

Section A: Demographic Information

- Age
- Gender
- Academic level
- Clinical experience
- Previous simulation exposure

Section B: Simulation-Based Training Experience

- Frequency of simulation sessions
- Realism of simulation scenarios
- Quality of instructor feedback
- Satisfaction with simulation activities

Section C: Emergency Nursing Competencies

Items measured:

- Patient assessment skills
- Emergency intervention skills
- Clinical decision-making
- Communication and teamwork
- Crisis management abilities

Section D: Clinical Preparedness

Items assessed:

- Confidence in emergency situations
- Ability to manage critical patients
- Readiness for clinical practice
- Ability to apply theoretical knowledge in emergencies

A five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) was used.

Validity and Reliability

The questionnaire was reviewed by nursing education experts to ensure content validity. A pilot study was conducted with a small group of nursing participants outside the main sample. Reliability analysis was performed using Cronbach's alpha, and the instrument demonstrated acceptable internal consistency.

Data Analysis

Data were analyzed using descriptive and inferential statistical techniques. Frequencies, percentages, means, and standard deviations were calculated to summarize demographic characteristics and study variables. Pearson correlation analysis was applied to examine

relationships between simulation exposure and clinical competency. Regression analysis was used to determine the predictive influence of simulation-based training on emergency nursing preparedness.

Ethical Considerations

Ethical principles were maintained throughout the research process. Participants were informed about the purpose of the study, voluntary participation, confidentiality, and their right to withdraw at any stage. No personal identifying information was collected, and collected data

were used only for research purposes.

Results

Demographic Characteristics of Participants

A total of 240 nursing students and clinical trainees from four nursing institutions in Lahore participated in the study. The demographic findings indicated that the majority of participants were undergraduate nursing students, while a smaller proportion consisted of clinical trainees with professional experience. The distribution of participants ensured representation from all selected institutions.

Table 1
Demographic Characteristics of Participants (N = 240)

Variables	Categories	Frequency (n)	Percentage (%)
Gender	Male	78	32.5
	Female	162	67.5
Age	18–22 years	124	51.7
	23–27 years	86	35.8
	Above 27 years	30	12.5
Academic Level	Undergraduate Nursing Students	190	79.2
	Clinical Trainees	50	20.8
Simulation Exposure	Regular Exposure	156	65.0
	Limited Exposure	84	35.0

The findings show that most participants (65%) had regular exposure to simulation-based training, whereas 35% reported limited exposure. Female participants represented the majority of respondents (67.5%), reflecting the gender distribution commonly observed in nursing education programs.

Simulation-Based Training Experience

Participants reported generally positive experiences regarding simulation-based learning. Most respondents agreed that simulation scenarios were realistic, interactive, and helpful for improving emergency nursing skills. Instructor feedback and debriefing sessions were identified as important components contributing to effective learning outcomes.

Table 2
Participants' Perceptions of Simulation-Based Training

Statement	Mean (M)	SD
Simulation scenarios improved my emergency response skills	4.32	0.71
Simulation increased my confidence in managing critical patients	4.25	0.76
Debriefing sessions improved my clinical understanding	4.38	0.68

Simulation enhanced teamwork and communication skills	4.21	0.73
Simulation prepared me for real clinical emergencies	4.29	0.70

The overall mean score indicates a high level of satisfaction with simulation-based training. Participants particularly valued structured debriefing sessions, which helped them reflect on clinical decisions and improve performance.

Emergency Nursing Competencies After Simulation Training

The study assessed the perceived improvement in emergency nursing competencies, including patient assessment, clinical judgment, emergency interventions, and teamwork. Participants demonstrated strong agreement that simulation training contributed to competency development.

Table 3
Emergency Nursing Competency Scores

Competency Area	Mean (M)	SD
Patient assessment and prioritization	4.31	0.69
Emergency decision-making	4.18	0.74
Technical procedure skills	4.27	0.72
Crisis management ability	4.15	0.77
Communication and teamwork	4.34	0.66

The results demonstrate that communication and teamwork achieved the highest mean score ($M = 4.34$), suggesting that simulation effectively promotes collaborative clinical practice. Emergency decision-making recorded a slightly lower but still positive score ($M = 4.18$),

indicating continued need for advanced scenario-based practice.

Clinical Preparedness Outcomes

Participants reported improved confidence and readiness to manage emergency situations after participating in simulation-based training.

Table 4
Clinical Preparedness Indicators

Clinical Preparedness Variable	Mean (M)	SD
Confidence in emergency situations	4.26	0.72
Ability to manage critically ill patients	4.19	0.75
Readiness for clinical practice	4.33	0.67
Application of theoretical knowledge	4.28	0.70
Stress management during emergencies	4.11	0.79

The findings indicate that simulation-based training improved participants' readiness for clinical practice. The highest-rated area was

readiness for clinical practice ($M = 4.33$), while stress management received the lowest score ($M =$

4.11), highlighting the importance of repeated exposure to high-pressure emergency scenarios.

Relationship between Simulation Training and Clinical Competencies

Pearson correlation analysis was conducted to determine the relationship between simulation exposure and emergency nursing competencies.

Table 5

Correlation between Simulation Training and Nursing Competencies

Variables	r-value	p-value
Simulation Training & Emergency Competency	0.72	< .001
Simulation Training & Clinical Preparedness	0.69	< .001
Simulation Training & Decision-Making Skills	0.65	< .001
Simulation Training & Confidence Level	0.71	< .001

The findings revealed significant positive relationships between simulation training and all measured competency outcomes. Simulation exposure demonstrated a strong association with emergency nursing competency ($r = .72, p < .001$) and clinical preparedness ($r = .69, p < .001$).

Regression Analysis

A regression analysis was performed to examine whether simulation-based training predicted emergency nursing preparedness.

Table 6

Regression Analysis Predicting Clinical Preparedness

Predictor	β	p-value
Simulation Training Exposure	0.69	< .001
Debriefing Quality	0.31	< .001
Simulation Frequency	0.28	.002

The regression findings indicate that simulation-based training significantly predicted clinical preparedness among nursing participants. Simulation exposure was the strongest predictor, demonstrating that increased participation in structured simulation activities contributes to improved emergency readiness.

Summary of Findings

The findings indicate that simulation training has a significant impact in improving the competencies and preparedness of nursing students and clinical trainees in the institutions of Lahore regarding the emergency nursing. The participants indicated that their skills in emergency response, decision making,

confidence, teamwork and readiness were improved for clinical practice. The positive relationships between simulation exposure and competency outcomes were confirmed by statistical analysis. The results highlight the need for incorporating simulated learning environments into nursing education to enhance the clinical experiences of students and reduce patient adverse outcomes.

Discussion

The study compared the effectiveness of simulation based training to enhance the emergency nursing competencies and clinical preparedness of the nursing students and clinical trainees of four institutions in Lahore. Results

identified that simulation-based learning had a significant positive impact on the emergency response skills, clinical decision making, confidence, teamwork, and preparedness for the profession. The correlation of simulation exposure and competency development further validates the importance of experiential learning to equip nurses to address complex clinical scenarios.

Participants felt that realistic scenarios and structured debriefs enhanced their understanding, confidence, and ability to handle emergency scenarios. The results align with those of Alharbi et al. (2024) who emphasized that simulation-based learning positively impacts the acquisition of nursing knowledge, practical skills, and the development of competency. Likewise, Görücü et al. (2024) noted that Simulation promotes clinical decision making by giving the opportunity to practice critical scenarios in controlled environments.

The results indicate that there was a positive correlation between simulated training and clinical readiness, suggesting that the higher the number of simulated emergency situations, the stronger the ability of the nurses to judge the patient, prioritize interventions, and deal with them. The results additionally verify Kolb's Experiential Learning Theory where simulation allows students to try out things, examine their performance, and enhance their future clinical practice. Also, the model proposed by Benner, Novice-to-Expert Model, is supported as this gradual development of professional expertise is supported by repeated simulation experiences.

The enhanced teamwork and communication skills emphasize the value of simulation for more than just technical skills. Effective teamwork, leadership and coordination are essential in emergency nursing and they can be enhanced through team simulation activities. The results indicate that using simulation for training has a great potential for strengthening patient safety and enhancing the quality of health care.

In Pakistan, especially in nursing institutes in Lahore, simulation is an effective way to overcome the problem of insufficient exposure to emergency cases in the nursing training process.

To implement these, however, investment is needed in simulation facilities, faculty training, and incorporation of this in the curriculum.

In conclusion, this research supports the use of simulation-based training as an effective method for education of emergency nursing skills, for increasing clinical confidence and for preparing nursing professionals to face real-life healthcare situations.

Conclusion

The aim of this study was to compare the effectiveness of simulation based training for the development of emergency nursing skills and clinical preparedness among four institutions (nursing college, clinical trainees) in Lahore. The findings showed that simulation-based education had a significant effect on enhancing the emergency response skills, clinical decision-making, confidence, teamwork, and readiness for the professional practice of teachers. Realistic scenarios, repetition, and structured feedback helped to improve knowledge and management of critical situations.

The findings of the study in this article reinforce the notion that simulation training acts as a valuable tool for bridging the gap between theory and practice and allows learners to practice in emergency situations without risk. The relationship between the simulation exposure and nursing competency was positive, which suggests that a competency-based nursing education should utilize simulation integration.

In Pakistan, the clinical exposure of emergency cases can differ between institutions making simulation an effective method to enhance nursing education. The integration of structured simulation programs into nursing education could lead to better patient safety, quality of the health care system and a more competent nursing workforce.

Recommendations

Based on the findings, the following recommendations are proposed:

1. **Integration into Nursing Curriculum:** Nursing institutions should incorporate regular simulation-based training throughout

undergraduate nursing programs, particularly in emergency and critical care courses.

2. **Faculty Development:**

Nursing educators should receive specialized training in simulation design, facilitation, and effective debriefing techniques.

3. **Investment in Simulation Facilities:**

Institutions should establish well-equipped simulation laboratories with modern technologies, including high-fidelity mannequins and virtual simulation resources.

4. **Standardized Competency Assessment:**

Simulation-based assessments should be included as part of nursing competency evaluation to ensure graduates achieve required clinical standards.

5. **Clinical-Academic Collaboration:**

Nursing schools and healthcare institutions should collaborate to design realistic simulation scenarios based on actual emergency care challenges.

Limitations

There are some limitations of this study. The limitation of the study is that it was carried out in only four nursing institutions in Lahore, so the study results might not be representative of all nursing institutions in Pakistan. Second, the study was self-reported, and participants' reported experiences may be subjective and influenced by their perception. Third, this cross-sectional study does not allow for the evaluation of the long-term effects of simulation-based training on clinical performance.

Future Research Directions

Future research should be conducted with larger samples from various parts of Pakistan, in simulation-based training. Longitudinal research designs might offer more in-depth information on the long-term effects of simulation on the nursing competency development and performance of professionals. Advanced simulation approaches such as virtual reality, artificial intelligence simulation and inter professional simulation training may also be explored as a topic in future research.

Final Statement

In the field of nursing education, simulation is a revolutionary method that enables experiential learning, confidence in the clinical setting, and readiness for emergencies. Its systematic incorporation in the nursing education can play a considerable role in the creation of competent nurses who can effectively address complex health care problems.

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