Original Scientific Paper

ATTITUDES OF ANESTHESIA AND INTENSIVE CARE NURSES TOWARD THE NEED FOR SAFETY TOOLS AND SIMULATION TRAINING FOR CRISIS SITUATIONS IN DAILY PRACTICE

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ABSTRACT

Background: Nurses in anaesthesia and intensive care frequently face emergency situations that demand high levels of preparedness. Safety tools and simulation-based training play a critical role in improving patient safety and team coordination.

Methods: A cross-sectional quantitative study was conducted among 138 nurses and technicians in Croatia. Data were collected via a structured online questionnaire and analysed using descriptive and inferential statistics with PSPP.

Results: A total of 91% of respondents found simulation training useful or partially useful, and 98% supported its mandatory implementation. Over one-third believed that safety tools in their institutions were not fully standardised. The most frequently reported barriers were time constraints, lack of equipment, and limited institutional support. A significant linear association was found between age and perception of usefulness ($p = 0,006$), while no significant difference was found by workplace ($p = 0,969$).

Conclusions: Nurses in intensive care and anaesthesia units clearly recognise the need for safety tools and regular simulation-based training. However, numerous barriers call for strategic planning, institutional support, and the standardisation of educational approaches.

Keywords: *Simulation training, safety tools, crisis situations, intensive care, anaesthesia.*

INTRODUCTION

Nurses in intensive care units and anaesthesiology departments work in complex clinical environments. These settings demand a high level of professional knowledge (1), rapid decision-making (2), and effective team coordination (3,4), especially in crises involving immediate threats to the patient's life. In this context, crisis situations are defined as sudden, high-acuity clinical events such as cardiac arrest, massive haemorrhage, anaphylaxis, or airway obstruction, which require immediate life-saving intervention and differ from other high-demand clinical tasks that do not pose an imminent risk to life. These are distinct from large-scale emergencies (e.g., mass casualty incidents, natural disasters, pandemics) that necessitate an institutional or multi-agency response. While both categories require preparedness, this study focuses exclusively on high-stakes events occurring in daily clinical practice in anaesthesiology and intensive care. In such work settings, which are confronted daily with unpredictable and high-risk clinical conditions, nurses and technicians play a key role in recognizing complications, performing emergency interventions, and ensuring patient safety (5). Strengthening their clinical readiness and self-confidence directly influences treatment outcomes (6). Safety tools such as standardized checklists, written protocols, and procedural algorithms have proven effective in increasing procedural consistency, reducing errors, and improving team communication (7). However, their implementation in everyday nursing practice is not always systematic or uniform, which may result in variability in the management of crisis situations. In addition to

formal tools, modern educational methods—including simulation training, virtual reality (VR), team-based scenarios, and high-fidelity drills—provide added value in preparing healthcare professionals in a timely manner. Simulation training enables the practice of clinical and communication skills in a safe, controlled environment that replicates real-life situations (8,9). Numerous studies show that such training increases self-confidence, team cohesion, and readiness to intervene in emergencies. Nevertheless, the availability, frequency, and formal integration of simulation-based education into continuous professional development systems vary across institutions (10-14), highlighting the need for deeper insight into current practices and user perceptions.

Although the benefits of simulation training and safety tools are well-documented internationally, there is a notable gap in Croatian and regional research systematically examining how nurses and technicians perceive and apply these strategies in high-risk clinical settings. Existing studies from other countries cannot be directly generalized due to differences in healthcare organization, available resources, and professional education systems. This gap underscores the need to explore local practices, barriers, and opportunities for integrating safety tools and simulation training into routine clinical work in Croatia.

Special attention in planning educational programs should be given to the perspectives of nurses - those in direct contact with patients and often the first to respond in emergencies. Their needs, experiences, and the obstacles they encounter in daily practice should serve as the foundation for designing effective, applicable, and sustainable educational models (15).

Given the importance of the topic, as well as the lack of studies systematically addressing the attitudes of nurses and technicians regarding the implementation of safety tools and simulation-based education in Croatia, this research aims to explore the perceptions and experiences of healthcare professionals employed in intensive care units and anaesthesiology departments. Specifically, the objective was to examine their views on the usefulness and necessity of safety tools and simulation training for crisis situations, as well as to identify existing barriers and needs for additional forms of education.

METHODS

The research was conducted as a quantitative cross-sectional study using a structured online questionnaire developed via Google Forms. The questionnaire was anonymous and designed in accordance with the research objectives.

PARTICIPANTS

The study included nurses and technicians employed in intensive care units and anaesthesiology departments in the Republic of Croatia. The total number of participants was 138. They represented different age groups, had varying levels of work experience, and were employed in various clinical settings, including exclusively anaesthesiology departments, intensive care units, or rotating positions that encompass both areas. A convenience sampling method was used. Participants were recruited via an online link shared through closed professional Facebook and WhatsApp groups of staff from anaesthesiology departments and intensive care units, as well as institutional email lists. All channels were restricted to verified healthcare professionals working in these specialties in Croatia. Participation was voluntary and anonymous.

EXAMPLE SURVEY QUESTIONS

To enhance transparency, several examples of the survey items are provided below.

Sociodemographic questions included:

• "Please indicate your age group" (Up to 30 years / 31–40 years / 41–50 years / 51 years and older)

• "How many years of experience do you have in anaesthesiology and/or intensive care?" (Up to 5 years / 6–10 years / 11–20 years / More than 20 years)

Attitude and practice-related questions included:

• "How useful do you consider simulation training for crisis situations?" (Extremely useful / Partially useful / Not useful / Not sure)

• "How often do you participate in simulation training for crisis situations?" (Multiple times a year / Once or twice a year / Less than once a year / Never)

• "Does your institution have standardized safety tools (e.g., checklists, protocols) for crisis situations?" (Yes / Partially / No)

• "What are the main barriers to implementing simulation training in your institution?" (Multiple choice: lack of time / lack of equipment / lack of institutional support / no formalized program / other)

The questionnaire consisted exclusively of closed-ended questions and was divided into two parts. The first part included sociodemographic data, such as age group, years of experience in anaesthesiology and/or intensive care, and current workplace. The second part focused on exploring participants' attitudes and experiences related to simulation training and response in crisis situations. The questions addressed the perceived usefulness of simulation training, the frequency of participation in such education, the presence of safety tools within institutions, and participants' opinions on

whether such tools should be made mandatory. One question addressed barriers to the implementation of such training, allowing respondents to select one or more of the listed options. The presentation of results includes the four most frequently identified barriers.

The questionnaire was distributed via an online link, shared through closed communication channels and social media platforms accessible to the target group.

ETHICAL CONSIDERATIONS

Participation in the study was entirely voluntary, anonymous, and without financial compensation. Prior to completing the questionnaire, participants were informed about the purpose of the research and the data processing procedures and provided informed consent to participate. No personal data that could lead to the identification of participants were collected. This research was exempt from formal ethical approval because it was conducted using an anonymous online questionnaire, participation was entirely voluntary, and no sensitive or personally identifiable information was collected. The study adhered to the ethical principles outlined in the Declaration of Helsinki (16), and all participants gave their informed consent electronically before taking part.

STATISTICAL DATA ANALYSIS

The data collected was analysed using descriptive and inferential statistics. Descriptive analysis was used to present the basic characteristics of the sample, with results shown as absolute numbers (N) and percentages (%), accompanied by tables and charts to provide a clearer insight into response patterns and prevailing opinions among participants.

To examine the associations between sociodemographic variables (age group, years of experience, workplace) and attitudes toward the usefulness of simulation training, Pearson's chi-square test (χ^2) was used. In the case of ordinal variables, the Linear-by-Linear Association test was additionally applied to identify potential linear trends in response distribution.

Statistical analysis was performed using the GNU PSPP software package. Statistical significance was assessed at the conventional level of $p < 0.05$. The results are presented in summary tables in the Results section, and key findings are further illustrated with graphs to facilitate interpretation.

RESULTS

The largest number of participants belonged to the 31–40 age group (N=8; 34.8%). A slightly smaller proportion was recorded in the 41–50 age group (N=35; 25.4%) and in the group up to 30 years of age (N=34; 24.6%). The fewest participants were in the group aged 51 years and older (N=21; 15.2%) (Table 1).

The highest proportion of participants had between 6 and 10 years of work experience (N=42; 30.4%), while 29.7% (N=41) had between 11 and 20 years of experience. Shorter work experience (up to 5 years) was reported by 21.0% of participants (N=29), and the most experienced group, with more than 20 years of service, accounted for 18.8% (N=26) (Table 1).

Most respondents were employed exclusively in intensive care units (N=58; 42.0%), while 28.3% (N=39) worked solely in anaesthesiology departments. Rotating positions that included both work environments (anaesthesiology and intensive care) were reported by 29.7% of respondents (N=41) (Table 1).

Table 1. Demographic and Professional Characteristics of the Participants (N = 138)

Category	Subcategory	Number of Participants (N)	Percentage (%)
Age group	Up to 30 years	34	24.6%
	31–40 years	48	34.8%
	41–50 years	35	25.4%
	51 years and older	21	15.2%
Work experience	Up to 5 years	29	21.0%
	6–10 years	42	30.4%
	11–20 years	41	29.7%
	More than 20 years	26	18.8%
Workplace	Anaesthesiology	39	28.3%
	Intensive care	58	42.0%
	Both (rotating)	41	29.7%

According to Figure 1, out of a total of 138 surveyed nurses and technicians working in anaesthesiology departments and intensive care units, a large majority (69%) consider simulation training to be extremely useful, while an additional 22% assess it as somewhat useful. More than four-fifths of respondents (91%) recognize a clear or at least partial benefit of such educational methods. In contrast, only 6% of participants "do not see much benefit," and 3% are uncertain.

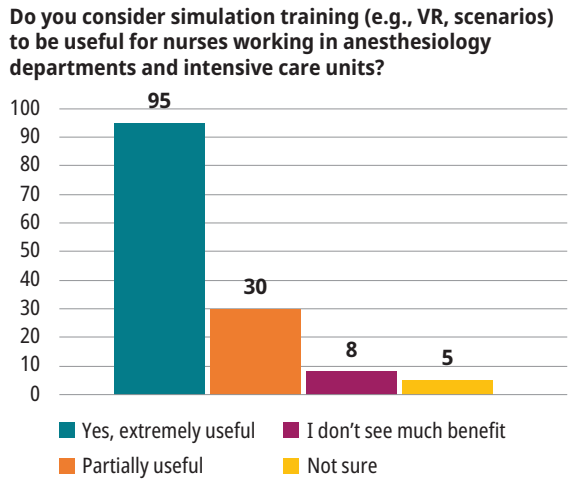

Figure 1. Perceptions of Nurses Regarding the Usefulness of Simulation Training in Anaesthesiology Departments and Intensive Care Units

As shown in Figure 2, the largest number of respondents (57; 41%) reported that they occasionally participate in training on crisis situations, approximately once or twice a year. Infrequent participation was reported by 38 respondents (28%), while only 22 participants (16%) stated that they regularly attend such training multiple times a year. A total of 21 respondents (15%) had never participated in this type of training. These data indicate that regular training on emergency situations is still not an established practice, despite the importance of preparedness for critical events. The results highlight the need for better organization of such training within healthcare institutions.

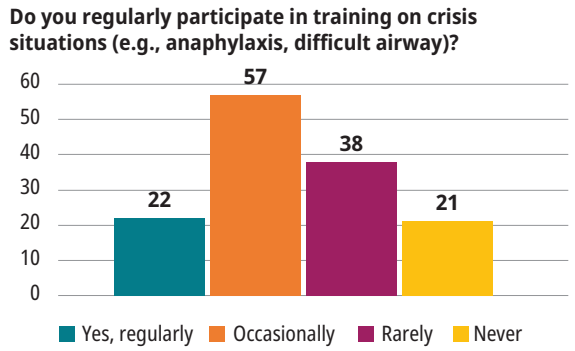

Figure 2. Frequency of Participation of Nurses and Technicians in Training on Crisis Situations (e.g., Anaphylaxis, Difficult Airway)

According to Figure 3, 64 respondents (56%) reported that their institution has established safety tools (e.g., checklists, protocols) that are actively used in crisis situations. An additional 48 respondents (35%) stated that such tools partially exist but are not standardized. Only 26 respondents (9%) reported that no formal safety tools exist in their institution. These results indicate a need for broader implementation of structured safety systems in clinical practice.

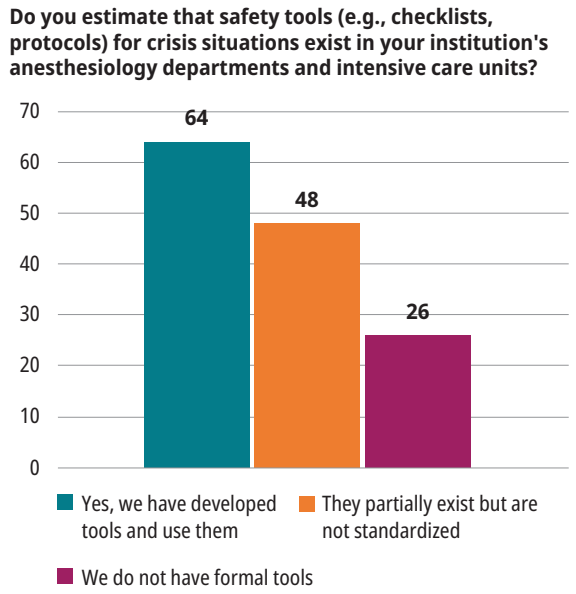

Figure 3. Assessment of the presence of safety tools for crisis situations in anaesthesia departments and intensive care units

A large majority of respondents, 118 (86%), support the idea of introducing mandatory simulation training for all nurses working in anaesthesiology and intensive care (see Figure 4). An additional 17 respondents (12%) agree with the proposal, provided it is organizationally feasible. Only 3 respondents (2%) believe that such training is unnecessary. This level of consensus clearly indicates a strong willingness to standardize and systematically incorporate simulation into professional development.

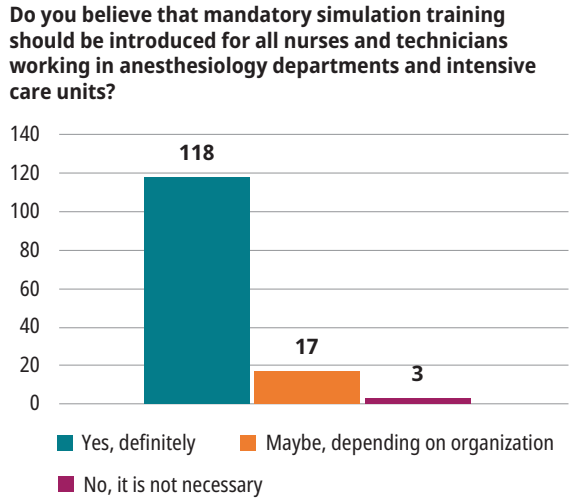

Figure 4. Attitudes Toward the Introduction of Mandatory Simulation Training for Nurses in Anaesthesiology Departments and Intensive Care Units

Regarding the barriers to implementing simulation training, the most frequently reported obstacle (Figure 5) was a lack of time due to staffing shortages, cited by 68 respondents. This was followed by the lack of equipment and dedicated space for simulation (44 respondents), and insufficient management support and funding (26 respondents). Additionally, 23 respondents noted that nurses would be interested in training, but their institution does not have a formalized program.

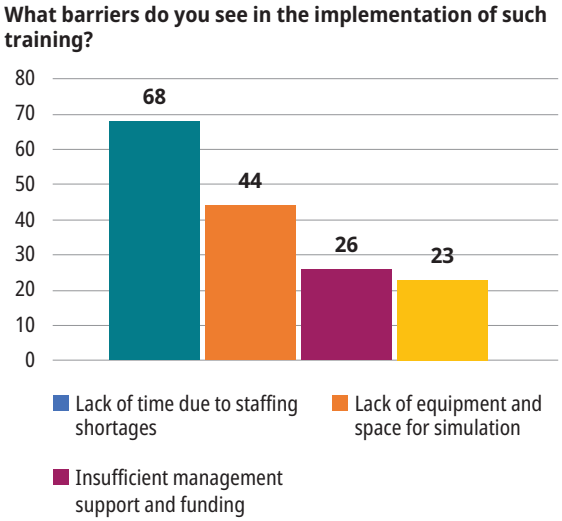

Figure 5. Perceived Barriers to the Implementation of Simulation Training in Anaesthesiology Departments and Intensive Care Units

Table 2 presents the distribution of responses from nurses of different age groups regarding the usefulness of simulation training. The highest number of respondents in the 31–40 age group considered simulation training to be extremely useful (N=35), while neutral or sceptical attitudes were more common among older age groups. According to Pearson's chi-square test, the observed difference between groups was statistically significant ($\chi^2 = 30.24$; df = 9; $p < 0.001$), indicating a significant association between age and perceived usefulness of simulation training.

Table 2. Attitudes of Nurses and Technicians Toward the Usefulness of Simulation Training by Age Group

Age group	Extremely useful	Partially useful	No perceived benefit	Not sure	Total
Up to 30 years	26	6	1	1	34
31–40 years	35	10	2	1	48
41–50 years	26	7	2	0	35
51+ years	8	7	3	3	21
Total	**95**	**30**	**8**	**5**	**138**

However, in the final and revised analysis (Table 3), the results of Pearson's chi-square test indicate borderline statistical significance (χ^2=16.59; df=9; p=0.056), meaning that the difference between age groups is not strong enough to be considered statistically significant at the conventional 0.05 level. On the other hand, the Linear-by-Linear Association test (χ^2=7.66; p=0.006) indicates a significant linear association, suggesting that with increasing age, the positive perception of the usefulness of simulation training declines.

Table 3. Chi-Square Test Results for the Association Between Age Group and Perception of the Usefulness of Simulation Training

Test	value (χ^2)	df	p- value
Pearson's Chi-square test	16.59	9	0.056
Likelihood Ratio	14.83	9	0.096
Linear-by-Linear Association	7.66	1	0.006
Number of valid cases	138		

Table 4 shows the distribution of nurses' and technicians' attitudes toward the usefulness of simulation training in relation to their workplace. In all three workplace groups (anaesthesiology, intensive care, and rotating positions), the prevailing opinion is that simulation training is extremely useful. The highest number of such responses was recorded among intensive care staff (N=35), followed by those in rotating positions (N=30) and anaesthesiology (N=25).

Similarly, the proportion of respondents who consider the training to be partially useful is relatively consistent across groups, while the number of those who see no benefit or express uncertainty is very small. This consistency in responses further confirms that simulation training is widely recognized as an educationally valuable tool in the context of crisis situations, regardless of workplace setting.

Table 4. Perceived Usefulness of Simulation Training by Workplace

Workplace	Extremely Useful	Partially Useful	No Perceived Benefit	Not Sure	Total
Anaesthesiology	25	10	2	2	39
Intensive Care	35	12	3	3	57
Both (rotating)	30	8	3	1	40
Total	**94**	**30**	**8**	**6**	**138**

The results of the statistical analysis presented in Table 5 further support the interpretation of the data shown in the previous table. Although there are minor differences in the distribution of responses among the groups, the results of Pearson's chi-square test (χ^2=1.34; df=6; p=0.969) indicate that these differences are not statistically significant. In other words, the perceived usefulness of simulation training does not differ significantly based on whether respondents work in anaesthesiology departments, intensive care units, or rotating positions. A high level of positive attitude toward simulation-based education is present in all three groups, indicating a universal recognition of its importance in high-risk clinical practice.

Table 5. Chi-Square Test Results for the Association Between Workplace and Perceived Usefulness of Simulation Training

Test	χ^2	df	p-value
Pearson's chi-square test	1.34	6	0.969

DISCUSSION

The results of this study clearly indicate a high level of recognition regarding the usefulness of simulation training and safety tools among nurses and technicians working in anaesthesiology departments and intensive care units in Croatia. The fact that most participants see clear or partial benefits of simulation-based education confirms that nurses and technicians in these high-risk settings are aware of the importance of continuous practice and preparation for crisis situations. These findings are consistent with numerous international studies showing that simulation training improves clinical safety, team communication, and healthcare staff confidence (17-21).

In this context, an extremely high proportion of respondents supporting the introduction of mandatory simulation training further confirms the staff's readiness to engage in structured educational models. Given that nurses and technicians often represent the first line of response to sudden clinical deterioration, this readiness provides a critical foundation for the development of sustainable and effective systems for quality assurance and patient safety.

At the same time, the findings reveal significant challenges in the implementation of simulation training. The most reported barrier was lack of time due to staffing shortages, which aligns with the literature identifying staff overload and logistical limitations as key obstacles to the integration of simulation into daily practice (22). Researchers also highlight issues such as lack of funding, equipment, and space, as well as insufficient institutional support, pointing to the need for strategic investments and organizational reform (23,24). These findings highlight the need for improved infrastructure and organizational support to translate existing staff motivation into practice.

Interestingly, the age-group analysis revealed differences in the perception of simulation training. Although Pearson's chi-square test did not show statistical significance, the Linear-by-Linear Association test indicated a significant linear relationship, suggesting that with increasing age there is a slight decline in enthusiasm for simulation education. This may be related to previous experience, technological readiness, or differing patterns of professional adaptation and workplace culture. Educational programs should therefore be adapted to all age groups, offering mentoring support and flexible learning approaches.

On the other hand, attitudes toward the usefulness of simulation training did not significantly differ according to workplace. Regardless of whether respondents worked exclusively in anaesthesiology departments, intensive care, or rotating positions, Pearson's chi-square test showed no statistically significant differences. This consistency in attitudes suggests a shared professional awareness and value orientation toward safety practices, regardless of specific work settings.

The issue of accessibility and standardization of safety tools also emerged as relevant. More than one-third of respondents believe such tools exist but are not fully formalized. This indicates the need for the introduction of clear, standardized checklists, protocols, and algorithms to reduce clinical errors and enhance team efficiency, as supported by previous research (25).

It is concerning that a portion of respondents had never participated in training on crisis situations, which points to an inconsistent approach to education among healthcare institutions. This situation clearly highlights the need to introduce a national standard defining the minimum frequency and content of simulation training in high-acuity clinical environments.

STUDY LIMITATIONS

This study has several limitations that should be considered when interpreting the findings. First, the cross-sectional design does not allow for establishing causal relationships between variables, only associations. Second, the use of a self-reported questionnaire may introduce response bias, as participants could overestimate or underestimate their perceptions and experiences. Third, the convenience sampling method and recruitment via closed social media groups, WhatsApp groups, and institutional email lists may have introduced sampling bias, as these

channels could disproportionately reach more engaged or technologically active nurses and technicians, potentially limiting the representativeness of the sample. Additionally, recruitment via online platforms may have excluded individuals with limited internet access or lower participation in digital communication channels. Finally, the study relied solely on quantitative data, without incorporating qualitative insights that could provide a deeper understanding of participants' attitudes and the contextual factors influencing them. Future research should address these limitations by using mixed-method designs, larger and more diverse samples, and longitudinal approaches to evaluate changes over time.

Ultimately, the findings of this study confirm a high level of awareness, motivation, and positive attitudes among nurses and technicians toward simulation training and safety tools. At the same time, the identified barriers call for a comprehensive, systematically planned approach that includes the development of national education policy, investment in infrastructure, management support, and tailored programs for different generations of employees. Such an approach could improve preparedness for crisis situations, strengthen team collaboration, and reinforce professional identity in nursing practice.

CONCLUSION

This study confirmed that nurses and technicians in anaesthesiology departments and intensive care units recognize the importance of simulation training and safety tools for improving clinical safety and team effectiveness. Most participants support their systematic and mandatory implementation, although organizational barriers such as lack of time, equipment, and institutional support persist. The strengths of this study lie in its direct insight into the attitudes of staff working in high-risk clinical environments, while limitations include the cross-sectional design and the subjective nature of self-reported assessments.

Recommendations for future research include:

- Evaluation of the actual impact of simulation training on clinical outcomes and patient safety;
- Longitudinal studies of attitude changes following educational interventions;
- Comparison of different simulation education models;
- Analysis of training effectiveness across various generations and experience levels of healthcare staff.

REFERENCES

1. Pann KJ, Buchner VK, Eßl-Maurer R, Bacher T, Glarcher M, Ewers A. International competencies of nurses with advanced practice in anesthesia nursing: An integrative review. Int J Nurs Stud Adv. 2025;8:100319.
2. Vincelette C, Carrier FM, Bilodeau C, Chassé M. Exploring intensive care unit nurses' acceptance of clinical decision support systems and use of volumetric pump data: A qualitative description study. Nurs Crit Care. 2025;30(2):e13274.
3. Joynt GM, Loo S, Taylor BL, Margalit G, Christian MD, Sandrock C, et al. Chapter 3. Coordination and collaboration with interface units. Recommendations and standard operating procedures for intensive care unit and hospital preparations for an influenza epidemic or mass disaster. Intensive Care Med. 2010;36 Suppl 1(Suppl 1):S21-31.
4. Burtscher MJ, Manser T, Kolbe M, Grote G, Grande B, Spahn DR, et al. Adaptation in anaesthesia team coordination in response to a simulated critical event and its relationship to clinical performance. Br J Anaesth. 2011;106(6):801–6.
5. Patrician PA, Campbell CM, Javed M, Williams KM, Foots L, Hamilton WM, et al. Quality and Safety in Nursing: Recommendations From a Systematic Review. J Healthc Qual Off Publ Natl Assoc Healthc Qual. 2024;46(4):203–19.
6. El Hussein MT, Harvey G, Bell N. The Influence of Nursing Simulation on Patient Outcomes and Patient Safety: A Scoping Review. Clin Simul Nurs. 2022;70:37–46.
7. Chance EA, Florence D, Sardi Abdoul I. The effectiveness of checklists and error reporting systems in enhancing patient safety and reducing medical errors in hospital settings: A narrative review. Int J Nurs Sci. 2024;11(3):387–98.
8. Seam N, Lee AJ, Vennero M, Emlet L. Simulation Training in the ICU. Chest. 2019;156(6):1223–33.
9. Rojo-Rojo A, Soto-Castellón MB, García-Méndez JA, Leal-Costa C, Adánez-Martínez MG, Pujalte-Jesús MJ, et al. Training with High Fidelity Simulation in the Care of Patients with Coronavirus-A Learning Experience in Native Health Care Multi-Professional Teams. Healthc Basel Switz. 2021;9(10):1260.
10. Lambert C, Wiencek C, Francis-Parr J. Effect of Simulation-Based Training on the Self-Confidence of New Nurses in the Care of Patients with Acute Deterioration and Activation of the Rapid Response Team. J Contin Educ Nurs. 2023;54(8):367–76.
11. Moslehi S, Masoumi G, Barghi-Shirazi F. Benefits of simulation-based education in hospital emergency departments: A systematic review. J Educ Health Promot. 2022;11:40.
12. Ballangrud R, Hall-Lord ML, Hedelin B, Persenius

M. Intensive care unit nurses' evaluation of simulation used for team training. Nurs Crit Care. 2014;19(4):175–84.

13. Edelbring S, Wangensteen S. Nurses' experiences of simulation-based team training in hospital settings: A qualitative study. Nurse Educ Today. 2022;108:105169.
14. Boling B, Hardin-Pierce M. The effect of high-fidelity simulation on knowledge and confidence in critical care training: An integrative review. Nurse Educ Pract. 2016;16(1):287–93.
15. Elias CE, Day T. Experiences of Newly Qualified Nurses in Critical Care: A qualitative systematic review. J Intensive Care Soc. 2020;21(4):334–43.
16. World Medical Association. Declaration of Helsinki: ethical principles for medical research involving human subjects. JAMA. 2013;310(20):2191–4.
17. Saleem M, Khan Z. Healthcare Simulation: An effective way of learning in health care. Pak J Med Sci. 2023;39(4):1185–90.
18. Abildgren L, Lebahn-Hadidi M, Mogensen CB, Toft P, Nielsen AB, Frandsen TF, et al. The effectiveness of improving healthcare teams' human factor skills using simulation-based training: a systematic review. Adv Simul [Internet]. 2022 Dec [cited 2025 Jul 11];7(1). Available from: https://advancesinsimulation.biomedcentral.com/articles/10.1186/s41077-022-00207-2
19. Elendu C, Amaechi DC, Okatta AU, Amaechi EC, Elendu TC, Ezeh CP, et al. The impact of simulation-based training in medical education: A review. Medicine (Baltimore). 2024 Jul 5;103(27):e38813.
20. Alrashidi N, Pasay An E, Alrashedi MS, Alqarni AS, Gonzales F, Bassuni EM, et al. Effects of simulation in improving the self-confidence of student nurses in clinical practice: a systematic review. BMC Med Educ. 2023;23(1):815.
21. Catena R, MacLean H. Speaking up for patient safety: Bringing simulation to the classroom. Teach Learn Nurs. 2025;20(3):e761–5.
22. Fawaz M, Anshasi HA. Senior nursing student's perceptions of an interprofessional simulation-based education (IPSE): A qualitative study. Heliyon. 2019;5(10):e02546.
23. Jee M, Murphy E, Umana E, O'Connor P, Khamoudes D, McNicholl B, et al. Exploring barriers and enablers to simulation-based training in emergency departments: an international qualitative study (BEST-ED Study). BMJ Open. 2023;13(9):e073099.
24. Lawaetz J, Soenens G, Eiberg J, Van Herzeele I, Konge L, Nesbitt C, et al. Facilitators and Barriers to Implementation of Simulation Based Education in Vascular Surgery in Europe. Eur J Vasc Endovasc Surg. 2023;66(3):428–36.
25. Ko HC, Turner TJ, Finnigan MA. Systematic review of safety checklists for use by medical care teams in acute hospital settings - limited evidence of effectiveness. BMC Health Serv Res [Internet]. 2011 Dec [cited 2025 Jul 11];11(1). Available from: https://bmchealthservres.biomedcentral.com/articles/10.1186/1472-6963-11-211