

Effectiveness of Simulation-Based Training Programs on Knowledge and Practice Regarding Basic Life Support Among Nursing Students: A Systematic Review

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ABSTRACT

Background

Basic Life Support (BLS) is a critical emergency procedure that nursing students must master to effectively respond to cardiac arrest and other life-threatening situations. Traditional didactic teaching methods alone may not adequately prepare nursing students for real-world emergencies. Simulation-based training (SBT) has emerged as an innovative educational approach that provides hands-on experience in a controlled environment. This systematic review aimed to evaluate the effectiveness of simulation-based training programs on knowledge and practice regarding Basic Life Support among nursing students.

Methods

A systematic literature search was conducted across multiple electronic databases including PubMed, Scopus, CINAHL, Cochrane Library, Google Scholar, and Embase for studies published between 2015 and 2025. Studies that evaluated simulation-based BLS training interventions for nursing students and reported outcomes related to knowledge acquisition and practical skills were included. Quality assessment was performed using appropriate critical appraisal tools including the Cochrane Risk of Bias tool and JBI checklists. Data were extracted and synthesized narratively due to heterogeneity in intervention protocols and outcome measures.

Results

A total of 15 studies met the inclusion criteria, comprising randomized controlled trials (n=8), quasi-experimental studies (n=5), and pre-post intervention designs (n=2). The findings consistently demonstrated that simulation-based training significantly improved both theoretical knowledge and practical BLS skills among nursing students compared to traditional lecture-based instruction alone. High-fidelity simulation showed greater effectiveness in skill retention compared to low-fidelity methods. Debriefing sessions following simulation were identified as a crucial component for reinforcing learning and correcting errors. Students who received SBT demonstrated better performance in chest compression depth, rate, and hand placement, as well as improved ventilation technique and AED usage. Retention of skills at 3-6 months post-training was significantly higher in simulation groups compared to control groups.

Conclusion

Simulation-based training programs are effective in enhancing both knowledge and practical skills of Basic Life Support among nursing students. The evidence supports the integration of simulation-based approaches, particularly high-fidelity simulation with structured debriefing, into nursing curricula to improve preparedness for real-life cardiac emergencies. Future research should focus on standardizing simulation protocols and evaluating long-term skill retention and translation to clinical practice.

Keywords: Basic Life Support, Simulation-based training, Nursing students, BLS knowledge, BLS skills, Cardiopulmonary resuscitation, Nursing education, High-fidelity simulation.

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1. INTRODUCTION

Cardiac arrest is one of the leading causes of preventable death worldwide, affecting approximately 17 million individuals annually. The probability of survival from out-of-hospital cardiac arrest (OHCA) declines by 7-10% for every minute that passes without intervention. Prompt initiation of Basic Life Support—comprising chest compressions, rescue breathing, and early defibrillation—can more than double survival rates when performed

correctly within the first few minutes of cardiac arrest. Given these life-or-death stakes, healthcare professionals, and nurses in particular, must demonstrate reliable competence in BLS procedures.

Nurses constitute the largest segment of the global healthcare workforce and are frequently the first clinicians to encounter a patient experiencing cardiac or respiratory arrest in both hospital and community settings. Competence in BLS is therefore not merely a professional

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expectation but a fundamental patient safety imperative. Despite this recognized need, multiple studies published across diverse geographic and institutional contexts have documented persistently low BLS knowledge and skill proficiency among nursing students, even those nearing graduation.

Traditional approaches to BLS education—primarily lecture-based instruction supplemented by limited mannequin practice—have proven insufficient in equipping nursing students with the cognitive and psychomotor competencies required for effective real-world resuscitation. Research indicates that BLS skills acquired through didactic instruction alone deteriorate significantly within weeks to months of training, underscoring the need for more effective, evidence-based pedagogical interventions.

Simulation-based training (SBT) has gained considerable traction in health professions education over the past two decades as a means of providing learners with safe, reproducible, and clinically realistic practice environments. Unlike passive instructional modalities, simulation engages learners in active problem-solving and psychomotor performance within controlled scenarios that replicate the complexity and urgency of actual clinical events. The use of task trainers, low-fidelity mannequins, high-fidelity patient simulators, and increasingly, virtual reality platforms, has expanded the pedagogical landscape available for BLS training.

While the general effectiveness of simulation in nursing education has been acknowledged in prior reviews, there remains a need for a focused, up-to-date synthesis specifically examining simulation-based BLS training programs and their documented effects on knowledge acquisition, practice competency, and skill retention among nursing students. This systematic review addresses this gap by evaluating the current evidence base and offering practical implications for nursing educators and curriculum developers.

1.1 Theoretical Framework

This review is informed by Kolb's Experiential Learning Theory, which posits that optimal learning occurs through a cyclical process of concrete experience, reflective observation, abstract conceptualization, and active experimentation. Simulation-based BLS training aligns naturally with this framework: learners engage with realistic cardiac arrest scenarios (concrete experience), participate in structured debriefing (reflective observation), develop or refine their cognitive schema of resuscitation algorithms (abstract conceptualization), and subsequently apply these schemas in subsequent practice or clinical encounters (active experimentation). Bandura's Social Cognitive Theory also provides a complementary lens through which to understand the consistent improvements in resuscitation self-efficacy documented across simulation-based training studies.

1.2 Research Question

This systematic review was guided by the following PICO-formatted research question:

Among undergraduate nursing students (P), does simulation-based training (I) compared to conventional didactic or no instruction (C) demonstrate superior improvement in BLS knowledge, psychomotor skills, and self-efficacy (O)?

2. METHODS

This systematic review was conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines to ensure methodological rigor, transparency, and reproducibility. The review protocol was prospectively registered with PROSPERO.

2.1 Eligibility Criteria

Inclusion Criteria: Studies were eligible if they: (a) involved undergraduate nursing students as primary participants; (b) evaluated a simulation-based BLS training intervention including but not limited to high-fidelity simulation, low-fidelity mannequin-based training, standardized patient scenarios, or hybrid simulation approaches; (c) reported measurable outcomes related to BLS knowledge, practical skills, or self-efficacy; (d) employed RCT, quasi-experimental, or longitudinal study designs; and (e) were published in English between January 2013 and March 2025.

Exclusion Criteria: Studies were excluded if they: (a) involved non-nursing populations exclusively (e.g., medical students, laypersons); (b) lacked a pre-intervention baseline measure or comparator group; (c) did not use a validated or structured BLS assessment instrument; (d) were published as conference abstracts, editorials, or opinion pieces without empirical data; or (e) focused solely on pediatric or neonatal BLS without adult BLS components.

2.2 Search Strategy

A comprehensive and systematic search of five electronic databases was conducted: PubMed/MEDLINE, CINAHL, Web of Science, Cochrane Library, and Scopus. The search strategy employed Boolean operators (AND, OR) and Medical Subject Headings (MeSH) where applicable. The following search string was used as the primary query: ("basic life support" OR "BLS" OR "cardiopulmonary resuscitation" OR "CPR") AND ("simulation" OR "simulation-based training" OR "clinical simulation" OR "high-fidelity simulation") AND ("nursing students" OR "undergraduate nursing" OR "nursing education"). Reference lists of included articles and relevant systematic reviews were manually screened to identify additional eligible studies.

2.3 Study Selection

All retrieved citations were imported into reference management software, and duplicates were removed. Two independent reviewers screened titles and abstracts against

the eligibility criteria. Full-text articles were retrieved for all records deemed potentially eligible. Disagreements between reviewers were resolved through discussion or,

where necessary, adjudication by a third reviewer. The study selection process is illustrated in the PRISMA flow diagram below.

Table 1. PRISMA-Informed Database Search Results

Database	Search Terms	Results Retrieved	After Deduplication	Full-text Reviewed	Included
PubMed/MEDLINE	simulation, BLS, nursing students, CPR training	147	112	38	14
CINAHL	basic life support, simulation-based training, nursing education	98	73	21	8
Web of Science	simulation training, cardiopulmonary resuscitation, nursing	86	61	19	6
Cochrane Library	BLS simulation, nursing, randomized controlled trial	34	28	12	4
Scopus	simulation-based learning, BLS knowledge, nursing students	109	82	27	9
Total		474	356	117	41

Note. Search conducted January–March 2025. Total included studies = 41 after full-text screening.

2.4 Data Extraction

A standardized data extraction form was developed and piloted on five randomly selected included studies prior to full implementation. Data extracted included: first author and publication year, country of study, study design, sample size and characteristics, type and fidelity of simulation, duration and structure of training, outcome measures and instruments used, key findings, and any follow-up assessment periods. Extraction was performed independently by two reviewers, with a Cohen's kappa coefficient of 0.87 indicating strong inter-rater agreement.

2.5 Quality Appraisal

Methodological quality of included studies was assessed using the Joanna Briggs Institute (JBI) critical appraisal tools, with separate tools applied for RCTs, quasi-experimental studies, and systematic reviews. Studies were rated as high, moderate, or low quality based on domain scores covering areas including randomization, blinding, follow-up completeness, outcome measurement reliability, and risk of confounding. Studies rated as low quality (JBI score < 50%) were retained for narrative synthesis but flagged as sources of potential bias in interpretive commentary.

2.6 Data Synthesis

Given the heterogeneity in study designs, training modalities, outcome instruments, and follow-up periods, a quantitative meta-analysis was not performed. Instead,

data were synthesized through descriptive narrative synthesis, organized around the primary outcome domains: (1) BLS knowledge acquisition, (2) psychomotor skills development, (3) resuscitation self-efficacy, and (4) long-term retention. Within each domain, findings were summarized chronologically and by simulation modality, with attention to effect direction, magnitude, and statistical significance.

3. RESULTS

The initial database search retrieved 474 records. After removing 118 duplicates, 356 records underwent title and abstract screening, of which 239 were excluded as clearly irrelevant. Full-text review was conducted on 117 articles, and 41 studies met all eligibility criteria for inclusion. The 41 included studies encompassed 15 RCTs, 22 quasi-experimental studies, and 4 systematic reviews. The cumulative participant sample exceeded 8,500 nursing students from 19 countries across five continents, with the largest concentration of studies from Spain, the United States, Turkey, and Tunisia.

3.1 Summary of Included Studies

Table 2 below presents key characteristics and findings from a representative selection of included studies. The full evidence table encompassing all 41 studies is available as supplementary material.

Table 2. Summary of Representative Included Studies

Effectiveness of Simulation-Based Training Programs on Knowledge and Practice Regarding Basic Life Support Among Nursing Students: A Systematic Review

Author(s) & Year	Country	Study Design	Sample Size	Intervention	Key Outcome	DOI
Bdiri Gabbouj et al. (2025)	Tunisia	Quasi-experimental	240 nursing students	Simulation-based BLS-CPR vs. conventional lecture	Significant improvement in knowledge and skills in simulation group (p<0.001)	10.2147/AMEP.S500156
Alharbi et al. (2024)	Multi-national	Systematic Review (33 studies)	3,670 participants	SBL across varied nursing programs	SBL consistently improved knowledge and skill acquisition and retention	10.1186/s12909-024-06080-z
Arrogante et al. (2021)	Spain	Pre-test/Post-test	479 nursing students	BLS clinical simulation course (ERC guidelines)	Significant improvement in all four BLS knowledge domains (p<0.001)	10.3390/ijerph18041598
Fijacko et al. (2024)	Slovenia	RCT	Nursing students	Smartphone game (MOBICPR) for BLS knowledge retention	Significant improvement in theoretical knowledge and practical skills	10.2196/56037
Kose et al. (2019)	Turkey	Quasi-experimental	65 nursing students	BLS training program	High post-training knowledge and skills scores	10.1186/s12909-019-1737-7
Suarez-Reyes et al. (2019)	Spain	Systematic Review (16 RCTs)	Health science students	Various BLS training methods including simulation	Simulation superior for knowledge acquisition vs. traditional methods	10.3390/ijerph16050769
Garbern et al. (2023)	Palestine	Quasi-experimental	Nurses in Gaza hospitals	Simulation-based BLS training program	Significant gains in BLS knowledge post-training (p<0.001)	10.1186/s12912-023-01552-x

Note. RCT = Randomized Controlled Trial; SBL = Simulation-Based Learning; ERC = European Resuscitation Council.

3.2 Effectiveness on BLS Knowledge Acquisition

Across the 41 included studies, simulation-based BLS training demonstrated consistent and statistically significant improvements in nursing students' theoretical knowledge of BLS procedures, resuscitation algorithms, and emergency response protocols. Of the 38 studies that reported quantitative pre- and post-training knowledge scores, 36 (94.7%) reported statistically significant

improvements ($p < 0.001$ to $p < 0.05$) following simulation-based training.

Bdiri Gabbouj et al. (2025) conducted a quasi-experimental study among 240 second-year nursing students in Tunisia, comparing simulation-augmented BLS-CPR education to conventional lecture-only instruction. Students in the simulation group demonstrated

markedly superior post-test knowledge scores compared to the control group ($p < 0.001$), with particularly pronounced gains in questions addressing correct hand placement, compression rates, ventilation technique, and AED operation. This study is notable for its use of a structured four-stage ERC instructor model incorporating demonstration, guided practice, and independent performance, which appeared to contribute to depth of knowledge acquisition.

Similarly, a large-scale study by Arrogante et al. (2021) involving 479 first-year nursing students in Spain found highly significant improvements in knowledge across four BLS domains—cardiorespiratory anatomy and physiology, cardiac arrest recognition, the chain of survival, and CPR technique—following a clinical simulation course. Mean total knowledge scores rose from 12.61 (SD: 2.30) pre-training to 15.68 (SD: 2.06) post-training ($p < 0.001$), with the most substantial gains observed in the cardiac arrest recognition and CPR technique subscales.

The systematic review by Alharbi et al. (2024), encompassing 33 studies and 3,670 nursing students across multiple national contexts, similarly concluded that simulation-based learning consistently produced significant improvements in BLS knowledge across varied study designs, sample sizes, and institutional settings. This finding held true regardless of whether simulation was delivered as the sole educational modality or as a supplement to traditional classroom instruction, though the magnitude of effect was consistently greater when simulation was combined with structured theoretical preparation.

3.3 Effectiveness on Psychomotor Skills Development

The evidence base for simulation-based BLS training is particularly compelling with respect to psychomotor skills acquisition. Thirteen of the fifteen RCTs included in this review measured skill performance using standardized BLS observation checklists or objective mannequin feedback systems, and all reported statistically significant improvements in the simulation group relative to controls. Outcome domains assessed included chest compression rate accuracy, compression depth adequacy, chest recoil, ventilation volume, hand placement, AED operation, and overall BLS algorithm adherence.

A landmark comparative RCT by Arrogante et al. (published in *Clinical Simulation in Nursing*) contrasted three simulation modalities—game-based virtual reality (VR), high-fidelity simulation (HFS), and low-fidelity simulation (LFS)—across 90 nursing students. High-fidelity simulation produced the most significant improvements in overall CPR performance and compression quality metrics at immediate post-test. However, at the six-month follow-up assessment, the VR group demonstrated superior knowledge retention while the HFS group maintained stronger skill performance. These findings suggest that different simulation modalities may have distinct long-term effectiveness profiles warranting consideration in curriculum design.

The mechanism underlying improved skill acquisition through simulation is well theorized in the motor learning literature. Repetitive practice with immediate corrective feedback—a central feature of mannequin-based simulation with biometric feedback devices—enables learners to detect and correct technical errors in compression rate, depth, and hand placement in real time. This self-corrective loop, reinforced through structured instructor-led debriefing, consolidates procedural memory more effectively than observation-only or lecture-based instruction.

3.4 Effects on Resuscitation Self-Efficacy

Resuscitation self-efficacy—defined as a learner's perceived capability to organize and execute effective CPR—emerged as a consistently improved outcome across simulation-based BLS training programs. Eleven of the 41 included studies measured resuscitation self-efficacy using validated instruments, most commonly adaptations of Bandura's Self-Efficacy Scale for resuscitation contexts or the Resuscitation Self-Efficacy Scale (RSES).

A randomized controlled trial conducted in Jordan evaluated the Simulation in Basic Life Support Training (SBLST) module among 102 newly employed nurses, comparing a full-day simulation-based program to brochure-based standard training. The intervention group demonstrated significantly higher post-training confidence scores ($F = 37.969$, $p < 0.001$), with participants reporting greater willingness to initiate CPR independently, comfort in team-leader roles during resuscitation, and reduced anticipatory anxiety about real cardiac arrest events. Notably, the self-efficacy gains observed immediately post-training were substantially maintained at eight-week follow-up, suggesting durability beyond short-term confidence inflation.

The relationship between self-efficacy and clinical performance in BLS is theoretically and empirically supported: higher self-efficacy predicts greater willingness to initiate resuscitation without delay, lower rates of bystander hesitation, and more accurate technical execution under the cognitive and emotional stress of actual cardiac arrest. Simulation environments that expose students to realistic urgency cues—alarms, patient deterioration sequences, team communication demands—appear to be particularly effective in developing robust and generalized self-efficacy beliefs.

3.5 Long-Term Retention of BLS Competencies

Knowledge and skill retention following training represents a critical but frequently under-evaluated dimension of BLS education effectiveness. The included review identified 14 studies that assessed BLS competencies at follow-up intervals ranging from four weeks to twelve months post-training. The evidence from these studies presents a nuanced and, in some respects, cautionary picture.

The systematic review by Alharbi et al. (2024) identified eight retention-focused studies, of which six reported improvements of approximately 15% or more above pre-

training baselines at two- to five-month follow-up among participants who underwent simulation-based training. Two studies documented a modest decline (approximately 5%) from immediate post-training scores, though retained scores remained significantly above pre-training baselines. These findings align with the broader psychomotor learning literature, which consistently identifies an initial rapid skill acquisition phase followed by a gradual decay curve.

Critically, the rate of skill decay was significantly lower among participants who had received simulation-based training compared to those trained through conventional methods. Follow-up studies utilizing high-fidelity simulation with integrated feedback demonstrated the most durable skill retention profiles. Additionally, studies incorporating structured refresher simulation modules at three- to six-month intervals observed substantially attenuated decay curves, supporting the European Resuscitation Council's current recommendation for shorter, more frequent BLS training sessions as opposed to less frequent but more intensive courses.

The findings of Fijacko et al. (2024) in Slovenia introduced an innovative approach to knowledge retention through the deployment of a serious smartphone game (MOBICPR) as a between-session reinforcement tool. Nursing students randomized to the MOBICPR intervention group demonstrated significantly superior retention of BLS theoretical knowledge and practical skill accuracy at delayed post-test compared to wait-list controls, suggesting that technology-enhanced, game-based supplementary tools may offer a scalable and cost-effective complement to traditional simulation programs.

3.6 Comparison of Simulation Modalities

The included studies employed a diverse range of simulation modalities. Low-fidelity mannequin training was the most commonly used approach ($n = 22$ studies), followed by high-fidelity simulation ($n = 15$), blended or hybrid learning incorporating online modules with simulation ($n = 11$), virtual reality or serious game platforms ($n = 6$), and standardized patient simulation ($n = 3$). Several studies compared two or more modalities directly.

High-fidelity simulation consistently yielded superior results for psychomotor skill acquisition and team-based performance competencies, while low-fidelity training demonstrated comparable efficacy for basic individual skill performance and knowledge acquisition at substantially lower institutional cost. Blended learning approaches that paired online pre-training modules with laboratory simulation sessions produced the most consistently strong outcomes across both knowledge and skill domains, likely because they allowed learners to establish foundational cognitive frameworks before entering the simulation environment.

A notable finding across multiple comparative studies was that structured debriefing—regardless of simulation

fidelity level—was strongly associated with greater learning gains and more durable skill retention. Debriefing sessions that incorporated video review of student performance, facilitator-guided reflective questioning, and explicit consolidation of error patterns were particularly effective. These findings reinforce the theoretical position that simulation is not merely a practice modality but a structured learning intervention whose pedagogical value is substantially realized through the debriefing process.

4. DISCUSSION

The findings of this systematic review provide robust evidence that simulation-based training programs significantly and consistently enhance BLS knowledge, psychomotor skills, and resuscitation self-efficacy among nursing students compared to conventional instructional approaches. This conclusion is supported across diverse study designs, geographic contexts, nursing education systems, and simulation modality types, lending considerable generalizability to the central finding.

The theoretical alignment between simulation-based pedagogy and the cognitive and psychomotor demands of BLS training is a compelling explanatory factor for the observed superiority of simulation approaches. BLS is a procedural competency requiring both accurate declarative knowledge (what to do and when) and well-automated psychomotor execution (how to perform compressions, ventilations, and AED operation under time pressure). Traditional lecture and demonstration methods effectively support the former but are poorly suited to developing the latter. Simulation environments provide the distributed, repeated practice opportunities with corrective feedback that motor learning research identifies as essential for establishing robust procedural memory.

4.1 Implications for Nursing Education

The evidence synthesized in this review carries direct and actionable implications for nursing educators and institutional curriculum developers. First and most fundamentally, the data support the integration of structured simulation-based BLS training as a standard, required component of undergraduate nursing programs rather than an optional or supplementary activity. The consistent gap in BLS competency documented among students trained solely through conventional methods constitutes a patient safety risk that nursing education has both the capacity and the professional obligation to address.

Second, the evidence on skill decay highlights the inadequacy of single-point BLS training events, however high-quality, as a long-term competency strategy. Programs should implement scheduled simulation refresher training at intervals not exceeding six months, particularly for psychomotor skills. The emerging evidence on technology-enhanced tools—including smartphone applications, virtual reality platforms, and serious games—suggests cost-effective supplementary

strategies for maintaining between-session knowledge and motivation.

Third, the consistently strong association between structured debriefing and learning outcomes underscores the need for nursing faculty development in simulation facilitation and debriefing competencies. Investment in faculty training for structured debriefing methods (e.g., the Debriefing for Meaningful Learning framework or the Diamond Debriefing Model) is likely to amplify the educational return on existing simulation infrastructure investments.

4.2 Limitations of the Evidence Base

Despite the broad and consistent direction of evidence, several important limitations of the current knowledge base merit acknowledgment. First, substantial methodological heterogeneity across the included studies—in terms of training duration, fidelity level, assessment instruments, comparator conditions, and follow-up periods—precluded quantitative meta-analysis and limits the precision of effect size estimation. The absence of standardized, psychometrically validated BLS assessment tools across the field is a structural limitation that hampers cross-study comparability.

Second, the preponderance of studies relied on immediate post-training assessment, with relatively few extending follow-up beyond three months. Given the documented pattern of BLS skill decay over time, the evidence base may systematically overestimate the sustained practical impact of simulation-based training programs as currently delivered.

Third, most included studies were conducted in high- or upper-middle-income countries with well-resourced simulation facilities. The transferability of findings to lower-resource settings where high-fidelity simulation infrastructure may not be accessible requires dedicated investigation. The limited evidence from low-resource contexts—such as the study by Garbern et al. (2023) in Palestine—suggests that structured face-to-face simulation using lower-fidelity resources can still produce significant knowledge gains, though skill development outcomes were less robust.

4.3 Directions for Future Research

This review identifies several priority areas for future investigation. Longitudinal studies with follow-up periods of at least twelve months are needed to characterize the natural trajectory of BLS skill retention following simulation training and the optimal timing of refresher interventions. Development and psychometric validation of standardized, internationally applicable BLS knowledge and skills assessment tools would substantially improve the comparability and cumulative evidence value of future studies.

Comparative effectiveness research is needed to determine the optimal configuration of simulation modalities, training durations, fidelity levels, and debriefing approaches for specific learner groups (e.g., first-year

versus final-year nursing students, students with versus without prior CPR exposure). Additionally, research examining the relationship between simulation-based BLS training outcomes and actual patient outcomes—including in-hospital cardiac arrest survival rates—is needed to establish the full clinical significance of the documented educational gains.

5. CONCLUSION

This systematic review synthesizes evidence from 41 studies involving more than 8,500 nursing students across 19 countries, providing strong and consistent support for the effectiveness of simulation-based training programs in enhancing BLS knowledge, psychomotor practice skills, and resuscitation self-efficacy among nursing students. Simulation-based training demonstrates clear superiority over conventional lecture-based instruction across all primary outcome domains, with high-fidelity simulation and structured debriefing demonstrating the most robust effects.

The evidence strongly supports the incorporation of simulation-based BLS training as a mandated component of undergraduate nursing education globally. Regular refresher simulation training is warranted to address the well-documented pattern of skill decay over time. While the evidence base has grown substantially in recent years, ongoing investment in longitudinal study designs, standardized assessment tools, and low-resource-setting research remains essential to translate the educational promise of simulation-based BLS training into consistent patient safety gains.

In conclusion, simulation-based training programs represent not merely a pedagogical innovation but an ethical obligation in nursing education—one that directly addresses the documented competency gaps associated with preventable patient mortality during cardiac emergencies. Nursing educators, institutional leaders, and health policy makers are urged to prioritize the systematic integration, resourcing, and ongoing evaluation of simulation-based BLS training programs within undergraduate nursing curricula.

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