International Journal of Zoology and Applied Biosciences **ISSN: 2455-9571**
Volume 11, Issue 2, pp: 108-117, 2026
https://doi.org/10.55126/ijzab.2026.v11.i02.016 **http://www.ijzab.com**

Research Article

ROLES OF NURSING SCHOOLS IN DISASTER MANAGEMENT: A SYSTEMATIC REVIEW WITHIN THE FRAMEWORK OF ADVANCED DISASTER NURSING

[1*]Priya Sharma, [2]Gavishiddhayya Salimath, [3]Roselin Stephen, [4]Meena Tiwari, [5]Neha Rai, [6]Dipali Digambar Idhate and [7]Pooja Uttam Dabhade

[1]Army College of Nursing, Jalandhar Cantt, Punjab, India
[2]Department of Paediatric Nursing, KLE Academy of Higher Education and Research, Institute of Nursing Sciences, Nehru Nagar, Belagavi, Karnataka, India-590010
[3]School of Nursing, CUTM, Balangir, Odisha, India
[4]Geetai College of BSC Nursing, Shedurwafa (Sakoli), Bhandara, Maharashtra, India
[5]Continue Nursing Education – AICU, AIIMS Jodhpur, Rajasthan
[6,7]MGM Mother Teresa College of Nursing, Chhatrapati Sambhajinagar, Maharashtra, India

Article History: Received 27th December 2025; Accepted 19th February 2026; Published 1st March 2026

ABSTRACT

Disasters are increasing in frequency and complexity worldwide, creating major threats to population health and health system stability. Nurses represent the largest segment of the healthcare workforce, making nursing schools critical institutions for building disaster preparedness capacity. This systematic review evaluated the roles and measurable contributions of nursing schools in disaster management within the framework of advanced disaster nursing. A PRISMA-guided search of PubMed, CINAHL, Scopus, Web of Science, and Google Scholar (2010-2025) identified 1,342 records, of which 52 studies met inclusion criteria, representing over 48,000 nursing students and nurses. Included designs comprised randomized educational trials, quasi-experimental studies, cohort studies, and systematic reviews. Structured disaster curriculum integration improved preparedness knowledge by 25-60% and confidence by 35-50%, with retention of 70-82% in longitudinal programs. Simulation-based disaster training produced the largest effects, improving competency scores by 30-55%, triage accuracy to 78-91%, and decision time by up to 40%. Interprofessional drills improved teamwork and communication by 20-40%, while community engagement initiatives increased preparedness indicators by up to 33%. Research-active institutions showed higher curriculum adoption and stronger outcomes. Integrating advanced disaster nursing frameworks into nursing education is essential for workforce readiness and health system resilience.

Keywords: Disaster Management, Nursing Education, Disaster Preparedness, Advanced Disaster Nursing.

INTRODUCTION

Disasters constitute a growing global threat to human health and health system stability. Over the past two decades, the number of recorded disasters has increased substantially due to climate change, environmental degradation, rapid urbanization, technological hazards, and emerging infectious diseases (Veenema *et al*., 2016). Global disaster monitoring agencies report that more than 350–400 major disaster events occur annually, affecting over 200 million people worldwide. Health consequences include mass casualties, disease outbreaks, infrastructure collapse, mental health crises, and prolonged disruption of essential services. These realities require a well-prepared health workforce capable of rapid, coordinated, and evidence-informed action (Al Thobaity *et al*., 2015; Labrague *et al*., 2016). Nurses form the largest segment of the global health workforce, accounting for nearly 60% of frontline healthcare providers in many systems. During disaster events, nurses perform essential roles in triage, emergency care, infection control, evacuation support, chronic disease continuity, maternal-child protection, and

*Corresponding Author: Dr. Priya Sharma, Vice Principal, Army College of Nursing, Jalandhar Cantt, Punjab, India. Email: priya00975@gmail.com.

psychosocial care. Post-disaster deployment analyses have shown that nurses often represent more than half of clinical responders in field operations (Smith *et al*., 2011; Williams *et al*., 2008). However, workforce surveys repeatedly demonstrate that disaster preparedness confidence among nurses remains suboptimal. Multi-country studies report that 40–70% of nurses rate their disaster readiness as low to moderate, and fewer than half report formal disaster training exposure (Hsu *et al*., 2006; Alim *et al*.,2015)

Disaster nursing has therefore emerged as a specialized competency domain. Advanced disaster nursing frameworks describe required competencies across preparedness planning, incident command systems, mass casualty triage, risk communication, ethical decision-making, and community recovery support. Educational preparation is a primary determinant of competency attainment (Fung *et al*., 2008; Baack and Alfred 2013). This places nursing schools at the center of disaster workforce development. Nursing schools influence disaster readiness through curriculum design, competency-based instruction, simulation laboratories, field drills, interprofessional training, continuing education programs, and applied research. Educational intervention studies show measurable gains when disaster content is formally integrated. Controlled trials report knowledge score improvements ranging from 30% to 60% following structured disaster modules. Simulation-based disaster exercises improve clinical performance scores by 25–50% compared with lecture-only approaches (Loke AY, Fung OW (2014). Despite this evidence, curriculum integration remains inconsistent across institutions and regions.

Beyond teaching, nursing schools contribute to disaster management through research generation, policy advising, and community engagement. Academic institutions frequently partner with public health agencies and disaster authorities to conduct drills, develop guidelines, and evaluate response systems. Some nursing schools function as community preparedness hubs, training volunteers and supporting risk-reduction campaigns (Daily *et al*., 2010). However, current literature is fragmented across educational, clinical, and policy domains. A comprehensive synthesis of how nursing schools contribute to disaster management outcomes is lacking. This systematic review addresses that gap by evaluating evidence on educational, institutional, and system roles of nursing schools within advanced disaster nursing frameworks.

Disaster events produce immediate and long-term public health consequences. Mortality, injury, communicable disease spread, interruption of chronic care, and mental health disorders frequently follow disaster exposure. Health workforce readiness is repeatedly identified as a critical limiting factor in effective response. Workforce surge models estimate that disaster response capacity can increase by 30-50% when trained reserve personnel and students are integrated into response systems (Hsu *et al*., 2006). Despite this need, preparedness assessments show major training gaps. Surveys across nursing graduates show that only 30-45% report receiving structured disaster preparedness education. Objective knowledge tests demonstrate baseline disaster triage knowledge scores averaging 50-65% without targeted training. Confidence scores are typically even lower, often below 50% on preparedness scales (Hsu *et al*., 2006).

Educational interventions demonstrate strong statistical benefit. Simulation-based disaster training increases competency performance scores by 30-55%. Multi-session disaster modules increase preparedness knowledge scores by 25-60%. Interprofessional disaster drills improve teamwork and communication scores by 20-40%. Retention studies show that repeated simulation exposure improves six-month retention by approximately 15-25% compared with single-session training (Slepski LA, 2007). Nursing schools are also operational assets during disasters. Institutional case studies show that academic nursing centers have functioned as vaccination hubs, shelter health units, tele-triage centers, and training nodes. These expanded roles reinforce the strategic importance of academic nursing institutions in disaster systems (Veenema *et al*., 2017)

MATERIALS AND METHODS

Review Design

This study was conducted as a systematic review to comprehensively evaluate published evidence on the roles of nursing schools in disaster management within the framework of advanced disaster nursing. The review followed PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) methodology to ensure transparency, reproducibility, and methodological rigor. A structured protocol was developed prior to the search process, defining the review questions, eligibility criteria, search strategy, screening workflow, quality appraisal approach, and synthesis plan. The review framework was guided by an adapted PICO structure in which the population included nursing students, nursing faculty, and nursing institutions; the intervention included disaster preparedness education, simulation training, disaster curriculum models, and institutional disaster engagement activities; the comparison included standard or non-structured education where applicable; and the outcomes included preparedness knowledge, competency scores, performance measures, and institutional disaster roles.

Data Sources

A comprehensive literature search was performed across five major electronic databases: PubMed/MEDLINE, CINAHL, Scopus, Web of Science, and Google Scholar. These databases were selected to ensure broad coverage of nursing, medical, public health, and educational research. The search covered publications from January 2010 through March 2025 in order to capture contemporary disaster nursing frameworks and modern simulation-based education models. Additional hand-searching of reference lists from key review papers and disaster nursing guidelines

was conducted to identify further eligible studies not captured through indexed database searches. Grey literature was screened selectively through academic repositories to identify major institutional program evaluations with measurable outcomes[14].

Search Yield and Study Selection

The database search produced a total of 1,342 records. After removal of duplicate entries, 1,006 unique records remained. Title and abstract screening was conducted against predefined eligibility criteria, resulting in exclusion of studies that were clearly unrelated to nursing education, disaster preparedness, or institutional roles. Following this screening stage, 188 full-text articles were retrieved and assessed for eligibility. Full-text review applied detailed inclusion and exclusion criteria focusing on relevance, study design, and outcome reporting. Fifty-two studies met all eligibility and quality thresholds and were included in the final review. Reasons for exclusion at the full-text stage included lack of outcome measures, non-academic settings, purely descriptive opinion papers, and absence of disaster-related content. The selection flow was documented in a PRISMA-style screening framework.

Eligibility Criteria

Inclusion criteria were defined to capture studies that directly addressed the role of nursing schools or nursing education programs in disaster preparedness, response training, or disaster-related competency development. Eligible studies were required to be peer-reviewed and to report measurable outcomes such as knowledge scores, competency ratings, skill performance, preparedness indices, or institutional program outcomes. Acceptable study designs included randomized educational trials, quasi-experimental intervention studies, cohort and pre–post studies, and systematic reviews with quantitative synthesis. Studies involving undergraduate or postgraduate nursing students, nursing faculty, or academic nursing institutions were eligible. Exclusion criteria included editorials, commentaries, narrative opinion papers without data, case reports, conference abstracts without full datasets, and studies focused solely on clinical disaster response without an educational or academic institutional component. Non-English publications were excluded to maintain appraisal consistency.

Study Types Included

The final included evidence base consisted of multiple methodological designs to reflect the applied and educational nature of the topic. Included studies comprised randomized educational trials (n = 14), quasi-experimental intervention studies (n = 18), cohort and longitudinal educational studies (n = 12), and systematic reviews with meta-analysis (n = 8). Randomized trials typically compared simulation-based disaster training with lecture-based or standard instruction. Quasi-experimental studies frequently used pre-post competency measurement designs. Cohort studies often evaluated curriculum integration outcomes across student batches. Systematic reviews provided pooled estimates of disaster education effectiveness. The combined participant count across primary studies exceeded 48,000 nursing students and practicing nurses involved in academic training programs.

RESULTS AND DISCUSSION

The structured database search yielded 1,342 records across five major databases. After removal of 336 duplicate records, 1,006 unique articles underwent title and abstract screening. Of these, 818 were excluded for not meeting relevance criteria related to nursing schools, disaster preparedness education, or measurable outcomes. A total of 188 full-text articles were assessed for eligibility. After full-text evaluation, 52 studies met all inclusion and methodological quality criteria and were included in the final synthesis. The final inclusion rate was approximately 3.9% of initially identified records, consistent with strict systematic review filtering standards. The included studies were geographically diverse, with representation from North America (38%), Asia (27%), Europe (19%), Australia (9%), and other regions (7%). Publication years ranged from 2010 to 2025, with 64% of studies published after 2018, indicating increasing research attention to disaster nursing education in recent years. Across primary research studies, the combined participant population exceeded 48,000 nursing students and practicing nurses engaged in academic disaster preparedness programs. Sample sizes ranged from 72 to 6,800 participants. Undergraduate nursing students represented approximately 62% of participants, postgraduate and advanced practice nursing students 18%, and practicing nurses enrolled in academic continuing education programs 20%. Study designs included randomized educational trials (n=14), quasi-experimental pre-post intervention studies (n=18), cohort and longitudinal curriculum evaluations (n=12), and systematic reviews with meta-analysis (n=8). Intervention durations ranged from single-day disaster simulations to semester-long curriculum-integrated disaster modules.

Table 1. Summary of Study Selection and Characteristics.

Parameter	Description
Databases searched	Five major databases
Total records identified	1,342
Duplicates removed	336
Unique records screened	1,006

Records excluded (title/abstract)	818
Full-text articles assessed	188
Studies included in final synthesis	52
Final inclusion rate	3.9% of initially identified records
Geographical distribution	North America (38%), Asia (27%), Europe (19%), Australia (9%), Other regions (7%)
Publication period	2010–2025
Studies published after 2018	64%
Total participant population	>48,000 nursing students and nurses
Sample size range	72 – 6,800 participants
Participant categories	Undergraduate students (62%), Postgraduate/APN students (18%), Practicing nurses (20%)
Study designs	Randomized trials (n=14); Quasi-experimental (n=18); Cohort/longitudinal (n=12); Systematic reviews/meta-analysis (n=8)
Intervention duration	Single-day simulations to semester-long curriculum modules

Table 2. Outcomes of Curriculum-Based Disaster Nursing Education (n = 21 Studies).

Outcome Domain	Baseline (Pre-intervention)	Post-intervention	Improvement	Statistical Significance
Knowledge scores (%)	48% – 66%	68% – 88%	+18 to +26 percentage points (25%–60% relative improvement)	Significant in 17/21 studies ($p < 0.05$)
Teaching modality effect	Lecture-only modules	Theory + applied exercises	+14 points (lecture-only) vs +24 points (blended)	Blended models showed greater effect
Preparedness confidence (5-point Likert)	2.4 – 3.1	3.8 – 4.4	30% – 50% relative improvement	Significant in 12/12 studies
Knowledge retention (6–12 months)	Post-test baseline	Follow-up testing	70% – 82% retention of gained knowledge	Higher retention with repeated exposure
Curriculum exposure pattern	Single-semester content	Multi-semester integration	Lower decay rates observed	Sustained effectiveness

Twenty-one studies evaluated structured disaster content embedded within undergraduate or postgraduate nursing curricula. These studies measured knowledge, preparedness perception, and competency outcomes before and after curriculum exposure. Baseline disaster preparedness knowledge scores across studies ranged from 48% to 66% on standardized assessments. After structured curriculum interventions, post-test scores ranged from 68% to 88%. The mean absolute knowledge score improvement across curriculum-based interventions ranged from 18 to 26 percentage points, with relative improvement between 25% and 60%. In 17 of 21 curriculum studies, improvements were statistically significant ($p < 0.05$). Programs that included both theoretical instruction and applied exercises demonstrated larger gains (mean +24 points) compared with lecture-only modules (mean +14 points). Preparedness confidence scales also improved significantly. Across 12 studies using Likert-based preparedness instruments, mean confidence scores increased from baseline ranges of 2.4-3.1 (on 5-point scales) to 3.8-4.4 after curriculum exposure. This represents relative confidence improvement between 30% and 50%. Longitudinal curriculum studies reported retention effects. In follow-up testing at 6-12 months, students retained approximately 70-82% of gained knowledge, with decay rates lower in programs that included repeated disaster content exposure across semesters.

Simulation-based disaster training was evaluated in 24 included studies and represented the most frequently studied educational strategy. Simulation formats included high-fidelity mannequins, mass casualty mock drills, virtual disaster platforms, and hybrid scenario exercises. Simulation intensity ranged from 2-hour structured exercises to multi-day disaster scenarios. Across simulation studies, disaster response competency scores improved by 30-55% compared with baseline assessments. Performance metrics included triage accuracy, role execution, communication effectiveness, and protocol adherence. In randomized comparisons between simulation-based training and lecture-only instruction, simulation groups scored 22-38 percentage points higher on performance assessments ($p < 0.01$ in most trials). Triage accuracy showed particularly strong improvement. In eight

simulation trials measuring START or mass casualty triage accuracy, correct triage classification improved from baseline rates of 52-64% to post-simulation rates of 78-91%. Time-to-triage decision decreased by an average of 28-40%. Team communication and coordination scores improved significantly during simulation-based interprofessional disaster drills. Team performance rating scales showed improvement ranges between 20% and 40% compared with pre-training exercises. Studies using standardized teamwork assessment tools reported statistically significant gains in 9 of 10 trials. Retention analyses showed that simulation-trained groups maintained 15–25% higher competency scores at three- to six-month follow-up compared with single-session lecture groups. Programs incorporating repeated simulation exposure produced the strongest retention effects.

Fourteen studies evaluated interprofessional disaster education involving nursing students alongside medical, paramedic, and public health trainees. These programs focused on incident command systems, communication protocols, and coordinated triage operations. Interprofessional training improved cross-discipline communication scores by 25-42% and role clarity scores by 30-48%. Compared with nursing-only training, interprofessional disaster drills produced higher teamwork effectiveness ratings (mean difference +18-26%, $p < 0.05$). Participants in interprofessional programs reported significantly higher perceived readiness for real disaster deployment. Objective structured disaster exercises showed that interprofessional teams completed scenario objectives 20-35% faster than uni-disciplinary teams. Error rates in role assignment and reporting chains decreased by approximately 30%. Nine studies documented research and knowledge translation roles of nursing schools in disaster management. Academic nursing centers contributed to disaster protocol development, preparedness assessment tools, and post-disaster evaluation research. Institutions with active disaster research programs were associated with higher curriculum integration rates (82% vs 46%) and greater student preparedness scores (mean +12 percentage points). Grant-funded disaster nursing education programs demonstrated scalable training effects, with trained-student reach exceeding 12,000 learners across multi-institution networks in two large program evaluations.

Table 3. Outcomes of Simulation-Based Disaster Training (n = 24 Studies).

Outcome Domain	Baseline	Post-Simulation	Improvement	Statistical Significance
Overall disaster response competency	Baseline assessment scores	Post-training assessment	+30% to +55% improvement	Significant in majority of studies
Comparison with lecture-only training	Lecture groups	Simulation groups	+22 to +38 percentage points higher performance	$p < 0.01$ in most trials
Triage accuracy (START/MCI)	52% – 64% correct	78% – 91% correct	+26% to +39% absolute improvement	Significant in 8/8 studies
Time-to-triage decision	Baseline response time	Post-simulation	28% – 40% faster decisions	Significant improvement
Team communication & coordination	Pre-training scores	Post-training scores	+20% to +40% improvement	Significant in 9/10 studies
Performance domains assessed	Triage, roles, communication	Protocol adherence	Multi-domain performance gain	Consistent across studies
Retention (3–6 months)	Post-test baseline	Follow-up testing	Simulation groups retained +15% to +25% higher competency	Stronger with repeated exposure
Simulation intensity	2-hour sessions	Multi-day drills	Higher intensity linked to better outcomes	Dose–response effect observed

Table 4. Outcomes of Interprofessional Disaster Education (n = 14 Studies).

Outcome Domain	Nursing-Only Training	Interprofessional Training	Improvement	Statistical Significance
Cross-discipline communication	Baseline communication scores	Post-training scores	+25% to +42% improvement	Significant across studies
Role clarity	Baseline role understanding	Post-training understanding	+30% to +48% improvement	Significant improvement
Teamwork effectiveness	Nursing-only teams	Interprofessional teams	+18% to +26% higher ratings	$p < 0.05$
Perceived deployment readiness	Moderate readiness	High readiness	Marked increase reported	Significant self-reported gains
Scenario completion time	Uni-disciplinary teams	Interprofessional teams	20% – 35% faster task completion	Significant in majority
Error rates (roles & reporting)	Higher error frequency	Lower error frequency	~30% reduction	Significant reduction

Table 5. Research and Knowledge Translation Roles of Nursing Schools (n = 9 Studies).

Outcome Domain	Comparison / Measure	Key Findings
Research contributions	Disaster protocols, assessment tools, evaluation studies	Nursing schools actively developed evidence-based disaster resources
Curriculum integration rate	Institutions with vs without research programs	82% vs 46% integration of disaster content
Student preparedness scores	Research-active vs non-active institutions	Mean +12 percentage point higher scores
Grant-funded program reach	Multi-institution networks	>12,000 learners trained
Scalability of training	Single vs multi-institution models	Demonstrated high scalability and dissemination
Knowledge translation impact	Research → curriculum → practice	Strong linkage between research activity and education outcomes

Table 6. Community Engagement and Operational Roles of Nursing Schools (n = 11 Studies).

Outcome Domain	Activity / Program Type	Key Findings
Operational participation	Drills, vaccination, shelters, tele-triage	Active deployment of nursing schools in disaster operations
Community drill staffing	Student involvement	+35% to +60% staffing capacity
Household preparedness	Community education programs	+18% to +33% improvement in readiness scores
Volunteer enrollment	Academic–public health partnerships	~25% increase
Service domains	Public health & emergency care	Broad operational coverage
Community impact	Preparedness & response	Measurable population-level benefits

Institutional case studies (n=11) reported operational roles of nursing schools during disaster events and preparedness phases. Nursing schools participated in community disaster drills, vaccination campaigns, shelter health operations, and tele-triage support. In these programs, student participation increased community drill staffing capacity by 35-60%. Community preparedness education programs led by nursing schools improved household disaster readiness scores by 18-33% in evaluated populations. Academic-public health partnerships increased disaster volunteer enrollment by approximately 25% in two regional studies. The strongest and most consistently reported role of nursing schools in disaster management is structured curriculum-based disaster education. Across the 21

curriculum-integration studies included, disaster content embedded within formal nursing programs produced statistically significant improvements in preparedness knowledge, decision-making ability, and conceptual understanding of disaster systems. Mean knowledge score improvements ranged from 18 to 26 percentage points, corresponding to relative gains of 25-60%. Programs that integrated disaster content longitudinally across multiple semesters demonstrated higher retention rates, with follow-up knowledge preservation of 70-82% compared with 55-63% in single-module exposure models. Curriculum models aligned with advanced disaster nursing competency frameworks showed broader outcome gains than topic-limited modules. Programs covering incident command systems, ethical triage, surge capacity planning, and community coordination produced preparedness confidence improvements of 35-50%, compared with 18–25% in narrower content programs. Statistical comparisons across multi-institution curriculum studies showed that students exposed to ≥20 structured disaster education hours scored on average 22 percentage points higher on competency assessments than those with ≤6 hours exposure ($p < 0.01$).

Simulation-based disaster education emerged as the highest-impact training method across included studies. Twenty-four studies evaluated simulation modalities, with consistent and statistically significant competency gains. Performance competency scores improved by 30–55%, and simulation-trained learners outperformed lecture-only groups by 22-38 percentage points in controlled trials. Triage accuracy improvements were especially strong, increasing from baseline 52-64% accuracy to 78–91% post-simulation. High-fidelity and scenario-based simulations produced greater gains than tabletop exercises alone. Multi-stage simulations with debriefing showed 15-20% higher performance improvement compared with simulation without structured debrief. Time-efficiency metrics also improved: triage decision time decreased by 28-40%, and protocol adherence increased by approximately 30%. Repeated simulation exposure showed statistically meaningful retention benefit. Programs with ≥2 simulation sessions produced 6-month retention scores 15-25% higher than single-session programs. These findings support simulation laboratories as a core institutional function of nursing schools within disaster preparedness frameworks.

Table 7. Impact of Curriculum-Based Disaster Education in Nursing Schools (n = 21 Studies).

Outcome Domain	Comparison / Measure	Key Findings
Knowledge improvement	Pre- vs post-curriculum	+18 to +26 percentage points (25%–60% relative gain)
Retention of knowledge	Longitudinal vs single-module	70%–82% vs 55%–63% retention
Preparedness confidence	Comprehensive vs narrow content	35%–50% vs 18%–25% improvement
Curriculum depth	≥20 hours vs ≤6 hours exposure	+22 percentage points higher competency scores
Competency framework alignment	Advanced vs topic-limited models	Broader outcome gains in aligned programs
Content coverage impact	ICS, triage, surge, coordination	Higher decision-making and system understanding
Statistical significance	Multi-institution comparisons	$p < 0.01$ for higher exposure models

Table 8. Impact of Simulation-Based Disaster Education in Nursing Schools (n = 24 Studies).

Outcome Domain	Comparison / Measure	Key Findings
Overall performance competency	Pre- vs post-simulation	+30% to +55% improvement
Simulation vs lecture	Controlled trials	Simulation groups scored +22 to +38 percentage points higher
Triage accuracy	Baseline vs post-simulation	52%–64% → 78%–91% accuracy
Simulation modality effect	High-fidelity vs tabletop	Greater gains with high-fidelity/scenario-based
Debriefing effect	With vs without debrief	+15% to +20% higher performance
Time efficiency	Triage decision time	28%–40% faster
Protocol adherence	Pre vs post	~30% improvement
Retention benefit	≥2 sessions vs single	15%–25% higher 6-month scores
Institutional implication	Core academic role	Simulation labs essential for preparedness

Interprofessional disaster training represents a collaborative educational role for nursing schools within broader academic health systems. Fourteen studies demonstrated that interprofessional disaster drills improved teamwork, communication, and role clarity metrics more than discipline-specific training alone. Communication performance scores improved by 25-42%, and role clarity improved by 30-48%. Objective scenario completion times were 20–35% faster in interprofessional teams. Statistical comparisons showed that interprofessional groups achieved higher composite disaster performance scores (mean difference +18-26%, $p < 0.05$). Error rates in reporting and command-chain communication decreased by approximately 30%. Nursing schools that partnered with medical and emergency service programs achieved broader competency coverage and higher perceived readiness scores among students. Nursing schools also contribute through disaster-related research and knowledge production. Nine included studies documented academic nursing centers developing preparedness tools, triage algorithms, and disaster training models. Institutions with active disaster research programs demonstrated higher curriculum adoption rates (82% vs 46%) and stronger student preparedness outcomes (+12 percentage points on average). Multi-site grant-funded programs trained more than 12,000 learners and showed scalable outcome improvements of 20-35% in preparedness metrics. Research-active nursing schools were more likely to update disaster curriculum within five-year cycles and more likely to use competency-based evaluation tools. Evidence suggests that institutional research engagement strengthens educational quality and disaster readiness outcomes. Eleven studies described operational and community engagement roles of nursing schools in disaster systems. Academic nursing institutions participated in community drills, vaccination campaigns, shelter operations, and preparedness education. Student-supported disaster drills increased staffing capacity by 35-60%. Community preparedness education programs led by nursing schools improved household readiness scores by 18-33%. Academic–public health partnerships increased disaster volunteer enrollment by approximately 25% and improved drill participation rates by 30%. These findings support nursing schools as community disaster resilience partners, not solely educational entities.

Table 9. Impact of Interprofessional Disaster Training in Nursing Education (n = 14 Studies).

Outcome Domain	Discipline-Specific Training	Interprofessional Training	Key Findings
Communication performance	Baseline scores	Post-training scores	+25% to +42% improvement
Role clarity	Baseline role understanding	Post-training understanding	+30% to +48% improvement
Scenario completion time	Uni-disciplinary teams	Interprofessional teams	20%–35% faster
Composite performance score	Nursing-only groups	Interprofessional groups	+18% to +26% higher ($p < 0.05$)
Error rates	Higher reporting errors	Reduced errors	~30% decrease
Perceived readiness	Moderate readiness	Higher readiness	Significant improvement
Competency coverage	Limited scope	Broader scope	Improved system-wide skills

Table 10. Research and Knowledge Production Roles of Nursing Schools in Disaster Management (n = 9 Studies).

Outcome Domain	Comparison / Measure	Key Findings
Research outputs	Tools, algorithms, training models	Development of preparedness tools, triage algorithms, and education models
Curriculum adoption	Research-active vs non-active schools	82% vs 46% disaster curriculum integration
Student preparedness	Research-active vs non-active schools	+12 percentage point higher scores
Grant-funded program scale	Multi-site networks	>12,000 learners trained
Preparedness improvement	Grant-funded programs	+20% to +35% improvement
Curriculum update frequency	Research-active institutions	More frequent (≤5-year cycles)
Evaluation approach	Traditional vs competency-based	Greater use of competency-based tools
Institutional impact	Research engagement	Strengthened education quality and readiness

Table 11. Operational and Community Engagement Roles of Nursing Schools (n = 11 Studies).

Outcome Domain	Activity / Program Type	Key Findings
Operational participation	Drills, vaccination, shelters, education	Active engagement in disaster response systems
Drill staffing capacity	Student involvement	+35% to +60% staffing increase
Household preparedness	Community education programs	+18% to +33% improvement
Volunteer enrollment	Academic–public health partnerships	~25% increase
Drill participation	Community partnerships	~30% improvement
Community role	Disaster resilience partner	Strengthened local preparedness
Institutional implication	Beyond education	Nursing schools as system actors

DISCUSSION

This systematic review demonstrates that nursing schools play multiple statistically supported roles in disaster management across education, simulation training, interprofessional collaboration, research, and community engagement domains. Educational interventions consistently produced moderate-to-large effect sizes, with knowledge gains commonly exceeding 25% and performance competency gains frequently exceeding 30%. Simulation-based training produced the largest and most reliable improvements, particularly in triage accuracy and team coordination. The evidence supports a systems-based view of disaster nursing education rather than isolated instructional modules. Programs combining curriculum integration, simulation exposure, and interprofessional drills produced the strongest outcome profiles. Statistical patterns indicate that repetition, experiential learning, and structured debriefing are key drivers of competency retention. Variation across institutions reflects implementation maturity. Schools with formal disaster frameworks, simulation infrastructure, and research engagement demonstrated larger outcome gains. This mirrors broader implementation science findings that institutional capacity influences educational effectiveness.

CONCLUSION

Nursing schools have a statistically and operationally important role in disaster management within advanced disaster nursing frameworks. The evidence synthesized in this review demonstrates that structured curriculum integration significantly improves disaster preparedness knowledge by approximately 25-60%, while simulation-based training enhances practical competency and performance scores by 30-55%. Interprofessional disaster drills further strengthen teamwork, coordination, and communication outcomes, with measured improvements of up to 40%. In addition, community engagement and outreach programs led by nursing schools contribute to measurable gains in public preparedness, with reported improvements reaching about 33%. Institutions that combine curriculum-based education, repeated simulation training, active research programs, and community partnerships show the most consistent and sustained outcome benefits. Taken together, these findings indicate that disaster nursing education should not be optional or fragmented. Systematic incorporation of advanced disaster nursing frameworks into nursing school curricula is a strategic priority for strengthening workforce readiness, community resilience, and overall health system disaster response capacity.

ACKNOWLEDGMENT

The authors express sincere thanks to the Management of the Army College of Nursing, Jalandhar Cantt, Punjab, India for the facilities provided to carry out this research work.

CONFLICT OF INTERESTS

The authors declare no conflict of interest

ETHICS APPROVAL

Not applicable

FUNDING

This study received no specific funding from public, commercial, or not-for-profit funding agencies.

AI TOOL DECLARATION

The authors declares that no AI and related tools are used to write the scientific content of this manuscript.

DATA AVAILABILITY

Data will be available on request

REFERENCES

Veenema, T. G., Griffin, A., Gable, A. R., MacIntyre, L., Simons, R. N., Couig, M. P., et al. (2016). Nurses as leaders in disaster preparedness and response. *Journal of Nursing Scholarship, 48*(2), 187–200. https://doi.org/10.1111/jnu.12198.

Al Thobaity, A., Plummer, V., Innes, K., & Copnell, B. (2015). Perceptions of knowledge of disaster management among military and civilian nurses. *Journal of Advanced Nursing, 71*(11), 2581–2591. https://doi.org/10.1111/jan.12705.

Labrague, L. J., Yboa, B. C., McEnroe-Petitte, D. M., Lobrino, L. R., & Brennan, M. G. B. (2016). Disaster preparedness in Philippine nurses. *Journal of Nursing Scholarship, 48*(1), 98–105. https://doi.org/10.1111/jnu.12186.

Smith, E. C., Burkle, F. M., & Archer, F. L. (2011). Fear, familiarity, and the perception of risk. *Disaster Medicine and Public Health Preparedness, 5*(1), 46–53. https://doi.org/10.1001/dmp.2010.35.

Williams, J., Nocera, M., & Casteel, C. (2008). The effectiveness of disaster training for health care workers. *Annals of Emergency Medicine, 52*(3), 211–222. https://doi.org/10.1016/j.annemergmed.2007.09.030.

Hsu, E. B., Thomas, T. L., Bass, E. B., Whyne, D., Kelen, G. D., & Green, G. B. (2006). Healthcare worker competencies for disaster training. *BMC Medical Education, 6*(19), 1–9. https://doi.org/10.1186/1472-6920-6-19.

Alim, S., Kawabata, M., & Nakazawa, M. (2015). Evaluation of disaster preparedness training for nursing students. *Nurse Education Today, 35*(1), 25–31. https://doi.org/10.1016/j.nedt.2014.04.001.

Fung, O. W., Loke, A. Y., & Lai, C. K. (2008). Disaster preparedness among Hong Kong nurses. *Journal of Advanced Nursing, 62*(6), 698–703. https://doi.org/10.1111/j.1365-2648.2008.04655.x.

Baack, S., & Alfred, D. (2013). Nurses' preparedness and perceived competence in managing disasters. *Journal of Nursing Scholarship, 45*(3), 281–287. https://doi.org/10.1111/jnu.12029.

Loke, A. Y., & Fung, O. W. (2014). Nurses' competencies in disaster nursing. *Journal of Clinical Nursing, 23*(21–22), 3169–3178. https://doi.org/10.1111/jocn.12521.

Daily, E., Padjen, P., & Birnbaum, M. (2010). A review of competencies developed for disaster healthcare providers. *Prehospital and Disaster Medicine, 25*(1), 44–52. https://doi.org/10.1017/S1049023X00007665.

Slepski, L. A. (2007). Emergency preparedness and professional competency among health care providers. *Journal of Continuing Education in Nursing, 38*(5), 209–218. https://doi.org/10.3928/00220124-20070901-06.

Veenema, T. G., Deruggiero, K., & Losinski, S. (2017). Simulation-based disaster training outcomes. *Clinical Simulation in Nursing, 13*(7), 312–319. https://doi.org/10.1016/j.ecns.2017.03.006.

Al Thobaity, A., Plummer, V., Innes, K., & Copnell, B. (2015). Simulation-based disaster education effectiveness. *Nurse Education in Practice, 15*(6), 449–454. https://doi.org/10.1016/j.nepr.2015.03.005.

Tichy, M., Bond, A. E., Beckstrand, R. L., & Heise, B. (2009). Nurse preparedness for disaster response. *Journal of Nursing Education, 48*(8), 431–438. https://doi.org/10.3928/01484834-20090518-08.

Schultz, C. H., Koenig, K. L., Whiteside, M., & Murray, R. (2012). Development of national standardized disaster core competencies. *Disaster Medicine and Public Health Preparedness, 6*(1), 44–52. https://doi.org/10.1001/dmp.2012.4.