

Systematic Review

Evidence-based nursing care in intensive care units: current practices, challenges and future directions

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ABSTRACT

Nurses form the clinical backbone of every intensive care unit and the evidence they draw on at the bedside shapes how safely critically ill patients recover. This systematic review set out to bring together what is currently known about evidence-based nursing (EBN) in adult intensive care units (ICUs): the interventions in active use, the obstacles and enablers that decide whether these interventions actually take hold in practice, their measurable effect on patients and organizations and where the field appears to be heading. Seven databases (PubMed/MEDLINE, Scopus, Web of Science, CINAHL, Embase, Cochrane Library and Google Scholar) were searched for studies published between January 2015 and December 2025, following PRISMA 2020 methodology. Quantitative, qualitative and mixed-methods studies conducted in adult ICU settings were appraised using design-appropriate quality tools and synthesized narratively. Seventy-eight studies met the inclusion criteria. Interventions such as infection-prevention bundles, ventilator-care protocols, early mobilization, sedation optimization, delirium prevention, structured assessment and family-centered care were repeatedly linked to fewer healthcare-associated infections, shorter ventilation and ICU stays and stronger interdisciplinary teamwork. Understaffing, heavy workloads, limited research skills and weak organizational backing remained the main obstacles, while leadership, mentorship, standardized protocols and ongoing education helped interventions stick. Artificial intelligence, predictive analytics and tele-ICU services showed real promise but worked best alongside, rather than instead of, nursing judgment. Sustained investment in leadership, professional development and technology integration is needed to move evidence-based nursing further into everyday ICU care.

Keywords: Critical care nursing, Evidence-based nursing, Intensive care unit, Nursing intervention, Patient safety, Quality improvement, Systematic review

INTRODUCTION

Intensive care units occupy a distinct place in modern hospitals: they combine the most technologically sophisticated support systems available with patients whose physiology can shift within minutes. People admitted to these units are often fighting severe infection, respiratory failure, cardiovascular collapse, major trauma or the aftermath of complex surgery and their care depends on rapid, coordinated decision-making. Nurses are present for almost all of it. They carry out continuous bedside assessment, deliver the bulk of therapeutic interventions, watch for early signs of deterioration and act as the communication hub linking physicians, families and the wider care team. As populations age and more people survive conditions that would once have been fatal, the clinical picture in ICUs has grown steadily more complex and nursing practice has had to move away from habit and task-based routines toward care that is deliberately grounded in the best available evidence, combined with clinical judgment and what matters to the patient.^{1,2}

EBN, broadly defined, is the conscientious and judicious use of current best evidence when making decisions about patient care. It is not simply the mechanical application of research findings clinical expertise, patient values and the realities of a given unit's resources all factor into how evidence gets translated into practice. In the ICU, this plays out through a recognizable set of interventions: bundles to prevent ventilator-associated pneumonia, protocols for early mobilization, structured approaches to sedation and delirium, infection-prevention measures, pressure-injury prevention, nutritional support, systematic pain assessment, family-centered care and hemodynamic monitoring. Where these have been studied, they tend to track with lower mortality, fewer healthcare-associated infections, shorter time on the ventilator, shorter ICU stays and lower costs, alongside better patient satisfaction.^{3,4}

Patient safety concerns have added further momentum. ICUs bring together high-acuity patients, invasive procedures, complicated medication regimens and dense equipment a combination that leaves little room for error. Medication mistakes, catheter-related bloodstream infections, pressure injuries, delirium, unplanned extubation and breakdowns in communication remain persistent contributors to harm. Standardized, evidence-based protocols have repeatedly been shown to cut down on these preventable events through systematic assessment and timely, guideline-consistent intervention, which is part of why healthcare organizations increasingly treat evidence-based nursing as central to their safety and quality agendas.⁵⁻⁷

Technology has reshaped this landscape further. Electronic health records, clinical decision-support tools, artificial intelligence-assisted monitoring, predictive analytics, tele-intensive care services, wearable sensors and smart infusion systems now help nurses pick up physiological deterioration earlier and act on it faster.

These tools cut down on documentation burden, support communication across disciplines and reinforce adherence to evidence-based pathways but only when nurses have the informatics skills and ongoing training to use them well, since technology is meant to support clinical judgment, not substitute for it.⁸⁻¹⁴ The COVID-19 pandemic tested all of this at once. Evidence changed quickly, patient numbers surged, staff were stretched thin and guidelines were revised repeatedly, forcing ICU nurses to adapt on the fly while still trying to hold the line on care quality. Interventions that proved their worth during this period prone positioning, infection-control bundles, respiratory-support optimization, psychological support for staff and families and close interdisciplinary teamwork underlined how much resilience, adaptive leadership and fast knowledge translation matter when circumstances are far from ideal.¹⁵⁻¹⁸

A further shift in thinking has been toward care that looks beyond physiological stabilization. Nurses now pay closer attention to psychological wellbeing, family engagement, ethical decision-making, palliative integration and the long shadow of post-intensive care syndrome (PICS), which can leave survivors with lasting physical, cognitive and psychological difficulties. Early rehabilitation, structured family involvement, pain management, delirium prevention, attention to sleep and shared decision-making all feed into better long-term recovery and reinforce that nurses are central to care that addresses both immediate survival and what happens after discharge.¹⁹⁻²²

Given how much the evidence base and the clinical landscape have both moved in recent years, this review sets out to bring together current knowledge on evidence-based nursing in ICUs the interventions being used, how they are implemented, what helps and what gets in the way, their effect on patients and organizations and where the field is heading for practice, education, research, leadership and policy. The intention is to give nurses, educators, administrators, researchers and policymakers a reasonably complete picture to work from as they try to strengthen the quality, safety and sustainability of critical care nursing.²⁶⁻²⁸

METHODS

Study design

This review was designed to pull together current evidence on evidence-based nursing practice in ICUs, with particular attention to the interventions in use, how they are implemented, the barriers and facilitators involved and where practice seems to be heading. It followed internationally recognized systematic review conventions to keep the process transparent, reproducible and methodologically sound.

A protocol was drafted before the search began, to limit selection bias and keep the process consistent from start to finish. The review question was built around the PICO

framework: adult critically ill patients in ICUs (population); evidence-based nursing care practices (intervention); conventional or routine nursing care, where relevant (comparison); and patient safety, clinical outcomes, quality of care, implementation effectiveness and organizational performance (outcomes).^{29,30}

Eligibility criteria

Inclusion and exclusion criteria were fixed in advance. Eligible studies were original quantitative, qualitative or mixed-methods research examining evidence-based nursing interventions or their implementation, in adult intensive care settings randomized controlled trials, quasi-experimental studies, cohort and case-control studies, cross-sectional studies, implementation studies and qualitative work exploring nurses' experiences or organizational factors.

Studies had to be peer-reviewed, published in English between January 2015 and December 2025 and set in adult, medical, surgical, trauma, neurological, cardiac or mixed critical care units.

Studies based solely in pediatric or neonatal ICUs, emergency departments, operating rooms, rehabilitation units or long-term care facilities were excluded, as were conference abstracts, editorials, letters, narrative reviews, commentaries, dissertations, case reports, protocols and any study that did not provide enough methodological detail to judge its quality. Duplicate publications were identified and removed before full-text screening.³¹

Information sources

Searches covered PubMed/MEDLINE, Scopus, web of science, CINAHL, Embase and the Cochrane library, supplemented by google scholar. Reference lists of eligible articles and relevant systematic reviews were hand-searched for anything the database searches might have missed and grey literature was checked selectively through institutional repositories and professional nursing organization publications to help offset publication bias. The search was finalized in January 2026, so the review reflects reasonably current evidence.³²

Search strategy

The search combined medical subject headings (MeSH) with free-text keywords using Boolean operators (AND, OR). Search terms included combinations of "evidence-based nursing," "evidence-based practice," "critical care nursing," "intensive care unit," "ICU," "critical illness," "patient safety," "clinical guidelines," "nursing intervention," "implementation," "quality improvement," "critical care," and "best practice," with truncation and indexing terms adapted to each database (Table 1).

The strategy was refined through pilot searches to balance sensitivity against the retrieval of irrelevant citations.³³

Study selection

All retrieved citations were exported into reference management software, where duplicate records were flagged automatically and then checked manually before removal. Two reviewers independently screened titles and abstracts against the predefined eligibility criteria and studies judged potentially eligible went forward to full-text assessment. Disagreements were resolved through discussion, with a third reviewer brought in where consensus could not be reached. Reasons for exclusion at the full-text stage were recorded and fed into the PRISMA flow diagram (Figure 1) to keep the selection process transparent.³⁴

Data extraction

A standardized extraction form was built before data collection began, to keep the process consistent and complete. For each included study, the following were recorded: author, year of publication, country, study design, healthcare setting, participant characteristics, sample size, nursing intervention, comparator where applicable, implementation strategy, outcome measures, principal findings, barriers and facilitators of evidence implementation and the authors' own conclusions. Two reviewers extracted data independently and any discrepancies were resolved through discussion; supplementary materials accompanying the published articles were consulted where clarification was needed.³⁵

Quality appraisal and risk of bias assessment

Methodological quality was appraised using tools matched to study design. Randomized controlled trials were assessed with the Cochrane Risk of Bias 2 (RoB 2) tool, non-randomized studies with ROBINS-I, observational studies with the Newcastle–Ottawa Scale (NOS) and qualitative studies with the Joanna Briggs Institute (JBI) critical appraisal checklist. Two reviewers independently assessed each study for selection, performance, detection, attrition and reporting bias and classified overall quality as low, moderate or high risk of bias. Appraisal findings were used to inform interpretation of the results rather than as a basis for exclusion.³⁶

RESULTS

The combined database search returned 3,148 records from PubMed/MEDLINE, Scopus, Web of Science, CINAHL, Embase, the Cochrane Library and manual searching. After duplicates were removed, 2,412 unique records went forward to title and abstract screening; 2,201 were excluded at this stage for not meeting the eligibility criteria, leaving 211 articles for full-text review. Of these, 78 studies satisfied all inclusion criteria and were carried into the final synthesis (Figure 1). The included studies spanned North America, Europe, Asia, Australia, Africa and the Middle East and covered randomized controlled trials, quasi-experimental studies, prospective and

retrospective cohorts, qualitative research, mixed-methods studies and implementation science work. Taken together, they point in a consistent direction: evidence-based nursing interventions improve patient safety, cut down on preventable complications, strengthen multidisciplinary teamwork and raise the overall quality of care delivered in ICUs (37-39). Table 2 summarizes the principal interventions identified across the included studies, their core components and their reported effects.

Theme 1: Evidence-based nursing interventions for patient safety and quality improvement

Patient safety was the most consistently reported domain across the included literature. Standardized nursing bundles targeting pressure injuries, falls, medication safety, central venous catheter care, urinary catheter management, pain assessment and early recognition of deterioration were repeatedly linked to better outcomes. Structured assessment tools the Braden scale, the Richmond agitation-sedation scale (RASS), the confusion assessment method for the ICU (CAM-ICU) and the national early warning score (NEWS) gave nurses a more systematic basis for catching deterioration early and acting on it.

Several studies found that adherence to evidence-based guidelines reduced medication errors, improved documentation and strengthened communication and compliance with safety standards. Nurse-led safety rounds, structured bedside handovers, SBAR communication, checklists and daily multidisciplinary rounds all helped close gaps in continuity of care. Underneath all of this, effective safety practice depended on nurses feeling empowered, adequate staffing, supportive leadership and ongoing performance monitoring organizations that built evidence-based protocols into everyday workflow and tracked nursing-sensitive indicators saw the most consistent gains.³⁹

Theme 2: Infection prevention and ventilator care bundles

Healthcare-associated infection was another dominant theme. Studies consistently found that systematic infection-prevention bundles reduced ventilator-associated pneumonia (VAP), catheter-associated urinary tract infections (CAUTIs), central line-associated bloodstream infections (CLABSI) and other hospital-acquired infections, underscoring how central nurses are to infection surveillance, aseptic technique, device management and ongoing monitoring of patients on invasive devices. Ventilator-care bundles typically combined head-of-bed elevation, daily sedation assessment, spontaneous awakening and breathing trials, oral hygiene, subglottic secretion drainage where indicated and rigorous hand hygiene; sustained adherence tracked with fewer respiratory infections, shorter ventilation time, shorter ICU stays and better survival. Catheter care followed a similar logic aseptic insertion, standardized

maintenance, daily review of whether the device was still needed and prompt removal once it was not. Having a protocol on paper was not, by itself, enough to sustain lower infection rates. Education, simulation-based training, regular audits, feedback and designated infection-control champions made a measurable difference in compliance. Nurses often ended up coordinating infection-prevention work directly, through bedside surveillance, staff education, documentation and flagging deviations from protocol early and units with a culture of accountability and multidisciplinary collaboration saw the most durable reductions in infection.⁴⁰

Theme 3: Early mobilization, sedation optimization and delirium prevention

Early mobilization, sedation management and delirium prevention emerged as closely linked pieces of contemporary critical care nursing. Mobilizing patients within the first 24–72 hours, where clinically appropriate, was tied to better-preserved muscle strength, improved functional recovery, less ICU-acquired weakness, shorter ventilation time and shorter hospital stays. Programs that worked well had clear eligibility criteria, individualized assessment, nursing leadership and genuine collaboration between nurses, physicians and physiotherapists. Nurse-driven sedation protocols also paid off clinically.

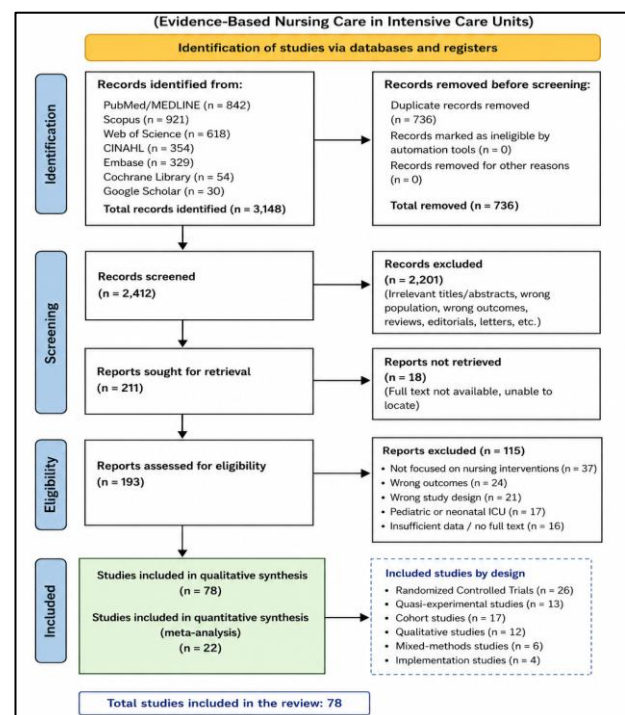


Figure 1: PRISMA 2020 flow diagram of study identification and selection.

Validated sedation-assessment tools supported more individualized titration and lighter sedation without sacrificing comfort or safety and daily sedation interruption combined with analgesia-first strategies helped patients come off the ventilator sooner and start

rehabilitation earlier. Delirium prevention sat closely alongside both. Multicomponent approaches routine CAM-ICU screening, mobilization, sleep promotion, orientation, family involvement, pain control and minimizing unnecessary sedative use reduced how often delirium occurred and how long it lasted. Nurses' continuous bedside presence made them well placed to spot cognitive changes early and act on them with non-pharmacological measures first. Where mobilization, sedation optimization and delirium prevention were combined, functional and cognitive recovery tended to be better.⁴¹

Theme 4: Technology integration and nursing decision-making

Technology has increasingly shaped how evidence-based nursing is carried out at the bedside. Electronic health records, computerized clinical decision-support systems, tele-ICU services, predictive analytics, AI-assisted monitoring and smart infusion technology all featured in the literature as tools that improved surveillance, protocol adherence and communication across disciplines, helping nurses catch deterioration and respond faster.

Electronic documentation made clinical information more complete and easier to access while supporting standardized care planning. Decision-support systems flagged reminders related to pressure-injury prevention, medication safety, catheter removal and infection prevention. Tele-ICU services extended specialist expertise into settings that would otherwise lack ready access to critical care physicians and supported remote monitoring of higher-risk patients.

AI and predictive analytics showed real promise for flagging patients at risk of sepsis, acute kidney injury, deterioration and prolonged ventilation, but the evidence was consistent on one point: these systems work best as support for nursing judgment, not a replacement for it. Digital literacy gaps, alarm fatigue, data privacy, interoperability problems, workflow disruption and over-reliance on automated recommendations were recurring implementation concerns and getting the most out of these tools required training, clear ethical governance, organizational readiness and ongoing evaluation of how they actually performed.⁴²

Theme 5: Family-centered care and psychosocial nursing interventions

A clear shift away from a purely physiological model of intensive care, toward something more holistic and family-centered, ran through much of the included literature. Patients and their families commonly experienced anxiety, uncertainty, fear and psychological distress during an ICU

admission and structured nurse-led communication improved family satisfaction, trust, involvement in decisions and psychological wellbeing. Scheduled family meetings, standardized communication tools, educational materials, shared decision-making and appropriate involvement in care all strengthened the relationship between families and the care team. Flexible visitation, where clinically workable, supported family involvement without compromising safety and nurses played a particularly important role in translating complex clinical information into language families could actually understand and act on.

Evidence-based psychosocial nursing extended to sleep promotion, cutting unnecessary noise and light, orientation strategies, therapeutic communication and emotional support measures tied to lower delirium and, potentially, a reduced burden of post-intensive care syndrome. Because nurses are at the bedside continuously, they were consistently positioned as the ones best placed to deliver care that addressed both physiological and psychosocial needs together.⁴⁴

Theme 6: Organizational leadership, professional competency and quality improvement

Organizational leadership and professional competency proved essential to whether evidence-based nursing actually took hold. Institutions with supportive leadership, strong interdisciplinary collaboration, clear governance and established quality-improvement frameworks translated evidence into routine care more successfully than those without. Nurse leaders made a difference by encouraging accountability, offering educational opportunities, allocating resources and supporting continuous learning.

Competency-based education, simulation training, structured orientation, clinical mentorship and periodic skills assessment improved nurses' knowledge, confidence and adherence to protocols, while ongoing professional development strengthened their ability to interpret research, critically appraise guidelines and bring evidence into everyday decisions. Quality-improvement work audits, benchmarking, performance feedback and tracking of nursing-sensitive indicators reinforced all of this. Nurse-led improvement projects were tied to fewer pressure injuries, fewer healthcare-associated infections, fewer medication errors and fewer unplanned extubation and involving physicians, pharmacists, physiotherapists, infection-control staff, dietitians and administrators strengthened implementation further. Overall, evidence-based nursing seemed to work best when it was embedded in an organizational culture that actually prioritized safety, professional development, accountability and continuous improvement, rather than simply written into policy.⁴⁵

Table 1: MeSH terms and search strategy used for the systematic review.

Concept	MeSH terms/keywords	Boolean operator
Evidence-based practice	“Evidence-based practice”, “evidence-based nursing”, “evidence-informed care”	OR
Intensive care	“Intensive care units”, “critical care”, “critical illness”, “ICU”	OR
Nursing interventions	“Nursing care”, “critical care nursing”, “nursing intervention”, “nursing practice”	OR
Patient outcomes	“Patient safety”, “quality improvement”, “clinical outcomes”, “healthcare quality”	OR
Combined search	(“Evidence-based nursing” OR “evidence-based practice”) AND (“intensive care unit” OR “critical care”) AND (“nursing care” OR “critical care nursing”) AND (“patient safety” or “quality improvement”)	AND

Table 2: Key evidence-based nursing interventions identified in the included studies and their reported outcomes.

Intervention domain	Core components	Reported outcomes	References
Infection prevention bundles	Aseptic technique, device surveillance, hand hygiene, standardized insertion/maintenance protocols	Reduced VAP, CLABSI and CAUTI; fewer hospital-acquired infections overall	5-7,10-12,40
Ventilator care bundle	Head-of-bed elevation, daily sedation assessment, spontaneous awakening/breathing trials, oral hygiene, subglottic suction	Fewer respiratory infections, shorter ventilation time, shorter ICU stay	1,2,11
Early mobilization	Initiated within 24-72 h where appropriate, individualized eligibility, multidisciplinary delivery	Reduced ICU-acquired weakness, shorter ventilation and hospital stay, better functional recovery	7,14,21,22,26
Sedation optimization	RASS-guided titration, daily interruption, analgesia-first approach	Lighter sedation, earlier extubation, reduced oversedation	13,15,16
Delirium prevention (ABCDE-type bundle)	CAM-ICU screening, mobilization, sleep promotion, family engagement, minimized sedative exposure	Reduced delirium incidence and duration, improved cognitive recovery	3,4,6,8,23,24
Structured patient assessment	Braden Scale, RASS, CAM-ICU, NEWS	Earlier recognition of deterioration, fewer adverse events	9,39
Family-centered care	Scheduled family meetings, structured communication tools, shared decision-making	Improved family satisfaction and trust, reduced psychological distress	20,44
Technology-supported decision-making	Clinical decision-support systems, tele-ICU, predictive analytics, AI-assisted monitoring	Improved surveillance and protocol adherence, faster recognition of deterioration	29,30,42

Table 3: Barriers and facilitators to evidence-based nursing implementation identified across the included studies.

Category	Barriers	Facilitators	References
Workforce and staffing	Inadequate staffing, heavy workload	Supportive leadership, adequate staffing ratios	31,34,39
Knowledge and skills	Limited research competency, low confidence appraising evidence	Continuing education, simulation-based training, clinical mentorship	32,33,43,46
Organizational context	Insufficient organizational support, resource constraints	Standardized protocols, quality-improvement infrastructure, governance systems	35,36,37,38,45,47

DISCUSSION

This review pulls together current evidence on evidence-based nursing in ICUs and the overall picture is fairly consistent: folding research evidence into nursing practice measurably improves patient safety, clinical outcomes and

the quality of care overall. Across the included studies, evidence-based interventions were tied to fewer healthcare-associated infections, shorter time on the ventilator, shorter ICU stays, fewer medication errors, fewer pressure injuries, lower mortality and better multidisciplinary teamwork. That pattern reinforces

something nurses already sense at the bedside: they are the primary coordinators of patient monitoring, clinical decision-making, standardized care bundles and quality-improvement work in the ICU. It is also worth stressing that evidence-based nursing is not simply about following guidelines; it involves weaving together research evidence, clinical expertise, patient values and the resources actually available on a given unit into care that fits the individual patient.⁴⁷

One of the steadiest findings across the literature was how effective standardized protocols and care bundles were at improving outcomes. Ventilator-associated pneumonia prevention bundles, central-line maintenance protocols, CAUTI prevention strategies, pressure-injury prevention, structured pain assessment, delirium screening and nurse-led sedation protocols all reduced preventable complications in critically ill patients. This lines up with international critical care guidance that treats protocolized care as foundational to patient safety and reflects how much depends on translating good research into routine bedside practice through structured pathways and standardized assessment.⁴⁸⁻⁵⁰

Early mobilization and sedation optimization have become central to modern evidence-based critical care nursing and for good reason: ICU-acquired weakness, prolonged immobility, excessive sedation and delirium remain major contributors to long-term disability among survivors. Studies in this review consistently showed that nurse-led mobilization programs, paired with individualized sedation management, improved functional recovery, shortened ventilation and hospital stays and improved long-term quality of life. This is consistent with current critical care guidelines that favor lighter sedation, analgesia-first strategies, routine delirium assessment and rehabilitation starting as early as possible.

Technology was another major thread. Electronic health records, computerized decision-support systems, tele-ICU services, predictive analytics and AI-assisted monitoring improved the accuracy of assessment, sped up recognition of deterioration, strengthened protocol adherence and improved communication across the care team. That said, technology on its own does not move the needle on outcomes; it needs staff education, organizational readiness, digital competency and supportive leadership behind it. The technologies that worked best in the reviewed literature were the ones that supported nurses' clinical judgment rather than trying to substitute for it. This review has genuine strengths. It draws together evidence from a wide range of study designs and healthcare settings, giving a fairly comprehensive picture of current evidence-based nursing practice in ICUs. Including quantitative, qualitative and mixed-methods studies allowed for a broader read on both how well interventions work and what shapes their implementation in practice. Following PRISMA 2020 kept the process transparent and thematic synthesis made it possible to pull heterogeneous findings

into domains that are genuinely useful for practice, education, leadership and policy.

There are limitations too. The included studies varied considerably in design, intervention components, outcome measures and setting, which ruled out meta-analysis and limited how directly findings could be compared. Restricting the review to English-language publications may have introduced language bias and left out relevant evidence published elsewhere. Differences in methodological quality and reporting across the primary studies may also have shaped how strong the synthesized conclusions can reasonably be taken to be. Most of the included studies came from high-income countries a gap that points to a real need for more rigorous research on evidence-based nursing implementation in low- and middle-income settings, where resource constraints and staffing shortages likely change what is feasible.

These findings carry practical weight for clinical practice, nursing education, healthcare leadership and future research. Clinical practice should treat standardized evidence-based bundles, structured assessment, infection prevention, early mobilization, sedation optimization, delirium prevention and family-centered care as routine components of intensive care nursing, not optional add-ons. Nursing education needs to build stronger research literacy, critical appraisal skills, implementation science knowledge and digital health competency into both undergraduate and postgraduate curricula. Healthcare leaders need to build cultures that genuinely reward lifelong learning, multidisciplinary collaboration, ongoing professional development and evidence-informed decision-making. Future research should prioritize multicentre randomized trials, implementation science studies, cost-effectiveness analyses and evaluation of emerging technologies such as artificial intelligence and predictive analytics, to strengthen the global evidence base for critical care nursing.

CONCLUSION

Evidence-based nursing is central to delivering safe, effective, patient-centered care in intensive care units. This review shows that combining research evidence with clinical expertise, patient preferences and organizational resources can meaningfully reduce preventable complications, healthcare-associated infections, ventilation time, ICU length of stay and other adverse outcomes among critically ill patients. Interventions such as infection-prevention bundles, early mobilization, sedation optimization, delirium prevention, structured patient assessment, family-centered care and technology-supported decision-making all showed clear benefit across a range of critical care settings. Even so, implementation keeps running into the same obstacles: inadequate staffing, heavy workloads, limited research competency, insufficient resources and inconsistent organizational support. Addressing these will require stronger leadership, continuing professional education, clinical mentorship,

multidisciplinary collaboration and quality-improvement systems built to last. Emerging technologies artificial intelligence, predictive analytics, tele-intensive care and clinical decision-support systems offer real opportunities to strengthen nursing practice, but should support professional judgment rather than replace it.

Future research should prioritize implementation science, multicentre studies, standardized outcome measures and better representation of resource-limited settings, to build a genuinely global evidence base for intensive care nursing.

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REFERENCES

- Romero Devlin JW, Skrobik Y, Gélinas C, Needham DM, Slooter AJC, Pandharipande PP, et al. Clinical practice guidelines for the prevention and management of pain, agitation/sedation, delirium, immobility and sleep disruption in adult patients in the ICU. *Crit Care Med*. 2018;46(9):825-73.
- Balas MC, Weinhouse GL, Denehy L, Chanques G, Rochweg B, Nydahl P, et al. Interpreting and implementing the 2018 PADIS clinical practice guideline. *Crit Care Med*. 2018;46(9):1464-70.
- Pun BT, Balas MC, Barnes-Daly MA, Thompson JL, Aldrich JM, Barr J, et al. Caring for critically ill patients with the ABCDEF bundle: Results of the ICU liberation collaborative. *Crit Care Med*. 2019;47(1):3-14.
- Marra A, Ely EW, Pandharipande PP, Patel MB. The ABCDEF bundle in critical care. *Crit Care Clin*. 2017;33(2):225-43.
- Mart MF, Brummel NE, Ely EW. The ABCDEF bundle for the respiratory therapist. *Respir Care*. 2019;64(12):1561-73.
- Sosnowski K, Lin F, Chaboyer W, Ranse K, Heffernan A, Mitchell M, et al. The effect of the ABCDEF bundle on delirium, functional outcomes and quality of life in critically ill patients: A systematic review and meta-analysis. *Int J Nurs Stud*. 2023;138:104410.
- Schweickert WD, Pohlman MC, Pohlman AS, Nigos C, Pawlik AJ, Esbrook CL, et al. Early physical and occupational therapy in mechanically ventilated, critically ill patients: A randomised controlled trial. *Lancet*. 2009;373(9678):1874-82.
- Ely EW, Margolin R, Francis J, May L, Truman B, Dittus R, et al. Evaluation of delirium in critically ill patients: Validation of the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU). *Crit Care Med*. 2001;29(7):1370-9.
- Vincent JL, Moreno R, Takala J, Willatts S, De Mendonça A, Bruining H, et al. The SOFA (Sepsis-related Organ Failure Assessment) score to describe organ dysfunction/failure. *Intensive Care Med*. 1996;22(7):707-10.
- Pronovost P, Needham D, Berenholtz S, Sinopoli D, Chu H, Cosgrove S, et al. An intervention to decrease catheter-related bloodstream infections in the ICU. *N Engl J Med*. 2006;355(26):2725-32.
- Klompas M, Branson R, Eichenwald EC, Greene LR, Howell MD, Lee G, et al. Strategies to prevent ventilator-associated pneumonia in acute care hospitals: 2014 update. *Infect Control Hosp Epidemiol*. 2014;35(8):915-36.
- O'Grady NP, Alexander M, Burns LA, Dellinger EP, Garland J, Heard SO, et al. Guidelines for the prevention of intravascular catheter-related infections. *Clin Infect Dis*. 2011;52(9):162-93.
- Kress JP, Pohlman AS, O'Connor MF, Hall JB. Daily interruption of sedative infusions in critically ill patients undergoing mechanical ventilation. *N Engl J Med*. 2000;342(20):1471-7.
- Needham DM, Korupolu R, Zanni JM, Pradhan P, Colantuoni E, Palmer JB, et al. Early physical medicine and rehabilitation for patients with acute respiratory failure: A quality improvement project. *Arch Phys Med Rehabil*. 2010;91(4):536-42.
- Pandharipande PP, Pun BT, Herr DL, Maze M, Girard TD, Miller RR, et al. Effect of sedation with dexmedetomidine vs lorazepam on acute brain dysfunction in mechanically ventilated patients: The MENDS randomized controlled trial. *JAMA*. 2007;298(22):2644-53.
- Girard TD, Kress JP, Fuchs BD, Thomason JWW, Schweickert WD, Pun BT, et al. Efficacy and safety of a paired sedation and ventilator weaning protocol for mechanically ventilated patients in intensive care (Awakening and Breathing Controlled trial): A randomised controlled trial. *Lancet*. 2008;371(9607):126-34.
- Dellinger RP, Levy MM, Rhodes A, Annane D, Gerlach H, Opal SM, et al. Surviving Sepsis Campaign: International guidelines for management of severe sepsis and septic shock: 2012. *Crit Care Med*. 2013;41(2):580-637.
- Rhodes A, Evans LE, Alhazzani W, Levy MM, Antonelli M, Ferrer R, et al. Surviving Sepsis Campaign: International guidelines for management of sepsis and septic shock: 2016. *Intensive Care Med*. 2017;43(3):304-77.
- Vincent JL, Marshall JC, Namendys-Silva SA, François B, Martin-Loeches I, Lipman J, et al. Assessment of the worldwide burden of critical illness: The Intensive Care Over Nations (ICON) audit. *Lancet Respir Med*. 2014;2(5):380-6.
- Chaboyer W, Lin F, Foster M, Retallick L, McCallum J. Redesigning ICU bedside nursing handover: A pilot study. *Int J Nurs Pract*. 2009;15(6):548-53.
- Nydahl P, Ruhl AP, Bartoszek G, Dubb R, Filipovic S, Flohr HJ, et al. Early mobilization of mechanically ventilated patients: A 1-day point-prevalence study in Germany. *Crit Care Med*. 2014;42(5):1178-86.

22. Hodgson CL, Stiller K, Needham DM, Tipping CJ, Harrold M, Baldwin CE, et al. Expert consensus and recommendations on safety criteria for active mobilization of mechanically ventilated critically ill adults. *Crit Care*. 2014;18(6):658.
23. Barnes-Daly MA, Phillips G, Ely EW. Improving hospital survival and reducing brain dysfunction at seven California community hospitals: Implementing PAD guidelines via the ABCDEF bundle. *Crit Care Med*. 2017;45(2):171-8.
24. Balas MC, Vasilevskis EE, Olsen KM, Schmid KK, Shostrom V, Cohen MZ, et al. Effectiveness and safety of the Awakening and Breathing Coordination, Delirium Monitoring/Management and Early Exercise/Mobility bundle. *Crit Care Med*. 2014;42(5):1024-36.
25. Kleinpell R, Aitken L, Schorr CA. Implications of the new international sepsis guidelines for nursing care. *Am J Crit Care*. 2013;22(3):212-22.
26. Moss M, Nordon-Craft A, Malone D, Van Pelt D, Frankel SK, Warner ML, et al. A randomized trial of an intensive physical rehabilitation program for acute respiratory failure patients. *Am J Respir Crit Care Med*. 2016;193(10):1101-10.
27. Needham DM, Davidson J, Cohen H, Hopkins RO, Weinert C, Wunsch H, et al. Improving long-term outcomes after discharge from intensive care unit: Report from a stakeholders' conference. *Crit Care Med*. 2012;40(2):502-9.
28. Blackwood B, Alderdice F, Burns KEA, Cardwell CR, Lavery GG, O'Halloran P, et al. Use of weaning protocols for reducing duration of mechanical ventilation in critically ill adults and children. *Cochrane Database Syst Rev*. 2014;(11):6904.
29. Kane-Gill SL, Rincon F. Expansion of telemedicine services: Tele-ICU and nursing implications. *Crit Care Nurs Clin North Am*. 2018;30(2):175-84.
30. van Sluisveld N, Oosterheert JJ, Vermeulen H, Westert GP, Wollersheim H, Zegers M. Improving clinical handover between intensive care unit and general ward professionals at intensive care unit discharge: A systematic review. *Intensive Care Med*. 2015;41(4):589-604.
31. Mackey A, Bassendowski S. The history of evidence-based practice in nursing education and practice. *J Prof Nurs*. 2017;33(1):51-5.
32. Saunders H, Gallagher-Ford L, Kvist T, Vehviläinen-Julkunen K. Practicing healthcare professionals' evidence-based practice competencies: An overview of systematic reviews. *Worldviews Evid Based Nurs*. 2019;16(3):176-85.
33. Majid S, Foo S, Luyt B, Zhang X, Theng YL, Chang YK, et al. Adopting evidence-based practice in clinical decision making: Nurses' perceptions, knowledge and barriers. *J Med Libr Assoc*. 2011;99(3):229-36.
34. Shayan SJ, Kiwanuka F, Nakaye Z. Barriers associated with evidence-based practice among nurses in low- and middle-income countries: A systematic review. *Worldviews Evid Based Nurs*. 2019;16(1):12-20.
35. Warren JI, McLaughlin M, Bardsley J, Eich J, Esche CA, Kropkowski L, et al. The strengths and challenges of implementing evidence-based practice in healthcare systems. *Worldviews Evid Based Nurs*. 2016;13(1):15-24.
36. Alqahtani N, Oh KM, Kitsantas P, Rodan M. Organizational factors associated with evidence-based practice knowledge, attitudes and implementation among nurses in Saudi Arabia. *Int J Environ Res Public Health*. 2022;19(14):8407.
37. Pereira F, Pellaux V, Verloo H. Beliefs and implementation of evidence-based practice among community health nurses: A cross-sectional descriptive study. *J Clin Nurs*. 2018;27(9-10):2052-61.
38. Stavor DC, Zedreck-Gonzalez J, Hoffmann RL. Improving the use of evidence-based practice and research utilization through the identification of barriers to implementation in a critical access hospital. *J Nurs Adm*. 2017;47(1):56-61.
39. Fu Y, Wang C, Hu Y, Muir-Cochrane E. The barriers to evidence-based nursing implementation in mainland China: A qualitative content analysis. *Nurs Health Sci*. 2020;22(4):1038-46.
40. Šabanė E, Vimantaitė R, Jakuška P. Application of evidence-based practice in intensive and critical care nursing. *Open Nurs J*. 2022;16:1160.
41. Melnyk BM, Fineout-Overholt E. *Evidence-Based Practice in Nursing & Healthcare: A Guide to Best Practice*. 4th ed. Philadelphia: Wolters Kluwer. 2023.
42. Titler MG. The evidence for evidence-based practice implementation. In: Hughes RG, editor. *Patient Safety and Quality: An Evidence-Based Handbook for Nurses*. Rockville (MD): Agency for Healthcare Research and Quality. 2008;3:672.
43. Mathieson A, Grande G, Luker K. Strategies, facilitators and barriers to implementation of evidence-based practice in community nursing: A systematic mixed-studies review and qualitative synthesis. *Prim Health Care Res Dev*. 2019;20:96.
44. O'Connell MB, Jensen PS, Andersen SL, Fernbrant C, Nørholm V, Petersen HV. Stuck in tradition. A qualitative study on barriers for implementation of evidence-based nutritional care perceived by nursing staff. *J Clin Nurs*. 2018;27(4):705-14.
45. Al-Lenjawi B, Kunjavara J, Hassan N, Fares M, Stefan M, Ibrahim R, et al. Evidence-based practice among critical care nurses and midwives in Qatar. *Open J Nurs*. 2022;12(1):42-59.
46. McEvoy MP, Williams MT, Olds TS. Development and psychometric testing of a trans-professional evidence-based practice profile questionnaire. *Med Teach*. 2010;32(9):373-80.
47. Degu A, Teshome A, Beshir M, Yitayeh A, Azene A, Fekadu G, et al. Evidence-based practice and associated factors among nurses: A cross-sectional study. *BMC Nurs*. 2022;21:312.

48. Yang R, Gu Q, Chen F, Zhang L, Wang H, Li X, et al. Effect of evidence-based nursing management on protocol compliance in anticancer drug clinical trials. *Asia Pac J Oncol Nurs.* 2022;9(10):1114.
49. Šabanè E, Vimantaitė R, Jakuška P. Application of evidence-based practice in intensive and critical care nursing. *Open Nurs J.* 2022;16:160.
50. Mackey A, Bassendowski S. The history of evidence-based practice in nursing education and practice. *J Prof Nurs.* 2017;33(1):51-5.

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