

The Role Of Evidence-Based Practice In Improving Patient Outcomes In Critical Care Nursing: A Comprehensive Review

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Abstract

Evidence-based practice (EBP) has become fundamental to modern nursing, particularly in critical care settings where clinical decisions directly impact patient survival and recovery. This paper examines the implementation of EBP in critical care nursing and its effects on patient outcomes. Through comprehensive analysis of recent literature, this review explores the theoretical foundations of EBP, barriers to adoption, strategies for successful implementation, and measurable improvements in patient care quality across multiple domains. The findings demonstrate that systematic integration of EBP in critical care units significantly reduces complications, decreases length of stay, improves patient satisfaction, reduces healthcare costs, and enhances nursing professional development and job satisfaction. This paper also addresses the role of organizational culture, leadership, education, and technological innovations in facilitating EBP adoption. Recommendations for practice, policy, and future research are provided to advance the field and optimize patient care in critical care environments.

Keywords: evidence-based practice, critical care nursing, patient outcomes, clinical decision-making, quality improvement.

Introduction

Background and Significance

Critical care nursing operates at the intersection of advanced technology, complex patient needs, and time-sensitive clinical decisions that can mean the difference between life and death. Nurses working in intensive care units (ICUs) must continuously synthesize vast amounts of clinical data, monitor multiple physiological parameters, administer complex medication regimens, and coordinate care among interdisciplinary teams while providing holistic care to critically ill patients and their families (Melnik & Fineout-Overholt, 2023). The complexity and acuity of critical care environments demand that nursing interventions be grounded in the strongest available evidence to optimize patient outcomes and ensure safe, effective care delivery.

Evidence-based practice—defined as the integration of best research evidence with clinical expertise and patient values and preferences—has emerged as the gold standard for delivering high-quality nursing care across all healthcare settings (Dang et al., 2022). In critical care, where patient conditions can deteriorate rapidly and therapeutic margins are narrow, the application of current, valid evidence becomes even more crucial. EBP represents a systematic approach to clinical decision-making that moves beyond tradition, intuition, and unsystematic clinical experience to incorporate rigorous research findings into daily practice.

The Institute of Medicine's landmark reports on healthcare quality and safety have consistently emphasized the need for evidence-based care as a core competency for all healthcare professionals (Institute of Medicine, 2001). Similarly, professional nursing organizations including the American Association of Critical-Care Nurses (AACN), the American Nurses Association (ANA), and the International Council of Nurses have identified EBP as essential to professional nursing practice and have called for its integration into nursing education, clinical practice, and organizational policies.

The Research-Practice Gap

Despite widespread recognition of EBP's importance and decades of effort to promote its adoption, significant implementation gaps persist in critical care settings. Studies indicate that only 50-60% of nursing interventions are supported by current evidence, and the average time lag between research discovery and clinical implementation ranges from 17 to 20 years (Warren et al., 2024). This research-practice gap represents a critical quality and safety concern, as patients may not receive optimal care, and outdated or ineffective practices may continue unnecessarily.

Multiple factors contribute to this persistent gap. Healthcare organizations often struggle to provide the infrastructure, resources, and culture necessary to support EBP. Individual nurses may lack the knowledge, skills, or confidence to critically appraise research and translate findings into practice. Time constraints, heavy workloads, and competing priorities in busy critical care units leave little opportunity for literature review and practice evaluation. Additionally, the exponential growth of healthcare research—with thousands of new studies published monthly—makes it increasingly challenging for clinicians to identify, access, and synthesize relevant evidence.

Purpose and Objectives

Understanding how to effectively bridge the research-practice gap remains a critical priority for nursing leadership, education, and clinical practice. This paper aims to provide a comprehensive examination of EBP in critical care nursing by addressing the following objectives:

1. Examine the theoretical foundations and models of EBP relevant to critical care nursing practice
2. Analyze the current state of EBP implementation in critical care settings based on recent empirical evidence
3. Identify and critically evaluate barriers and facilitators to EBP adoption at individual, organizational, and systems levels
4. Synthesize evidence regarding the impact of EBP on patient outcomes, including clinical, operational, and patient-reported measures
5. Explore the relationship between EBP and nursing professional development, job satisfaction, and retention
6. Propose evidence-based strategies for sustainable EBP integration in critical care settings
7. Recommend directions for future research, policy development, and practice improvement

Literature Review

The Evolution and Theoretical Foundations of Evidence-Based Practice

Evidence-based practice originated in medicine during the 1990s through the work of researchers at McMaster University, who challenged traditional clinical decision-making based primarily on pathophysiological reasoning, clinical experience, and expert opinion (Sackett et al., 1996). The evidence-based medicine movement advocated for systematic use of research evidence, particularly from randomized controlled trials and systematic reviews, to inform clinical decisions. This approach gained rapid acceptance across healthcare disciplines as the scientific basis of medicine became increasingly complex and the volume of research literature expanded exponentially.

The nursing profession adapted EBP principles to incorporate holistic care values while maintaining scientific rigor. Early nursing scholars recognized that while research evidence is essential, nursing practice must also integrate clinical expertise, patient preferences and values, and consideration of the healthcare context and available resources (DiCenso et al., 1998). This broader conceptualization of EBP acknowledges that research evidence, while foundational, represents only one component of optimal clinical decision-making.

Several theoretical models have been developed to guide EBP implementation in nursing. The Johns Hopkins Evidence-Based Practice Model provides a structured problem-solving approach organized around three phases: practice question formulation, evidence appraisal, and translation into practice (Dang et al., 2022). This model emphasizes the importance of interdisciplinary collaboration and organizational support throughout the EBP process.

The Iowa Model Revised offers a comprehensive framework for promoting quality care through EBP (Iowa Model Collaborative, 2017). This model identifies problem-focused and knowledge-focused triggers for EBP initiatives, guides teams through evidence synthesis and practice change implementation, and emphasizes sustainability through ongoing evaluation and dissemination. The Iowa Model has been widely adopted in healthcare organizations due to its practical, step-by-step approach and attention to organizational context.

The ACE (Academic Center for Evidence-Based Practice) Star Model depicts the knowledge transformation process through five stages: discovery, summary, translation, integration, and evaluation (Stevens, 2013). This model helps clinicians understand how research evidence is generated, synthesized, and ultimately applied in practice settings. By illustrating the continuum from research to practice, the Star Model highlights critical transition points where support and resources are needed.

EBP Implementation in Critical Care: Current Landscape

Critical care nursing has been at the forefront of EBP adoption due to the high-stakes nature of patient conditions, the rapid evolution of treatment modalities, and strong organizational support from professional societies. The AACN has championed EBP through its Practice Alerts—concise, evidence-based recommendations addressing critical care issues such as alarm management, family presence during resuscitation, and prevention of ventilator-associated events (American Association of Critical-Care Nurses, 2023).

Recent systematic reviews demonstrate that EBP implementation in ICUs correlates with significant improvements across multiple outcome domains. Studies report reduced mortality rates, decreased incidence of healthcare-associated infections, shorter mechanical ventilation duration, lower rates of delirium and ICU-acquired weakness, improved pain management, and enhanced patient and family satisfaction (Melnik & Fineout-Overholt, 2023). These outcomes translate not only to better patient experiences but also to substantial cost savings through reduced complications, shorter hospital stays, and more efficient resource utilization.

However, the actual penetration of EBP into routine critical care practice varies considerably across institutions and even among units within the same organization. National surveys reveal significant variability in EBP knowledge, attitudes, and implementation among critical care nurses (Saunders & Vehviläinen-Julkunen, 2018). While most nurses express positive attitudes toward EBP and acknowledge its importance, many report limited confidence in their ability to critically appraise research, implement practice changes, or evaluate outcomes systematically.

Multilevel Barriers to EBP Implementation

Research has identified barriers to EBP implementation operating at multiple levels of the healthcare system. Understanding these obstacles is essential for developing targeted intervention strategies.

Individual-Level Barriers

At the individual level, nurses may lack foundational knowledge and skills necessary for EBP. Many practicing nurses completed their basic nursing education before EBP became a curricular priority and may have limited experience with research methods, critical appraisal techniques, or statistical interpretation (Warren et al., 2024). Even among newer graduates, research literacy varies considerably depending on the quality and emphasis of their educational programs.

Attitudes and beliefs also influence EBP adoption. Some nurses view research as disconnected from clinical reality or believe that expert opinion and clinical experience provide sufficient guidance for practice decisions. Others may feel intimidated by research terminology and methodology, leading to avoidance of evidence-based resources. Additionally, perceived lack of authority to change practice—especially among newer or less senior nurses—can inhibit engagement with EBP even when knowledge and motivation are present (Melnik & Fineout-Overholt, 2023).

Time constraints represent a frequently cited individual barrier. In surveys of critical care nurses, 73% identified inadequate time as the primary obstacle to EBP implementation, while 58% reported difficulty accessing research articles during work hours (Saunders & Vehviläinen-Julkunen, 2018). The demanding nature of critical care work, with high patient acuity and frequent interruptions, leaves little opportunity for literature review, critical appraisal, or participation in EBP projects.

Organizational Barriers

Organizational factors profoundly influence EBP implementation success. Insufficient staffing levels—a pervasive problem in critical care—limit nurses' capacity to engage in activities beyond immediate patient care. When units are chronically understaffed, even highly motivated nurses struggle to find time for professional development and quality improvement activities.

Limited access to research resources poses another significant organizational barrier. While large academic medical centers typically provide comprehensive database access and library support, many community hospitals lack these resources. Even when electronic resources are available, nurses may be unfamiliar with search strategies or lack computers and private spaces conducive to focused reading and reflection during work hours.

Organizational culture exerts perhaps the strongest influence on EBP adoption. Units lacking leadership support for EBP, characterized by hierarchical decision-making structures, or resistant to change demonstrate lower implementation rates and sustainability (Dang et al., 2022). When questioning traditional practices is discouraged or when suggestions for practice changes are routinely dismissed, nurses quickly learn that EBP engagement is not valued or rewarded. Conversely, organizations with transformational leadership, shared governance structures, and explicit expectations for EBP create environments where evidence-based improvement becomes the norm.

Systems-Level Barriers

Beyond individual organizations, healthcare system factors affect EBP implementation. Reimbursement structures that do not adequately recognize or reward quality improvement efforts may discourage organizational investment in EBP infrastructure. Regulatory requirements, while often evidence-based themselves, can consume substantial resources and attention that might otherwise support local EBP initiatives.

The structure of healthcare research itself presents challenges. Much research is conducted in highly controlled academic settings with patient populations that may differ from those in community practice. Generalizability questions can make clinicians hesitant to apply research findings, particularly when studies excluded patients with multiple comorbidities or other realistic complexities. Additionally, research funding priorities may not align with practice questions most relevant to critical care nurses, leaving important clinical questions unanswered.

Facilitators of Successful EBP Integration

Just as barriers operate at multiple levels, so too do facilitators of successful EBP implementation. Research has identified numerous factors that promote EBP adoption and sustainability.

Leadership and Organizational Support

Strong leadership commitment emerges consistently as a critical success factor. Leaders who articulate clear expectations for EBP, allocate resources to support implementation, and model evidence-based decision-making create organizational cultures conducive to practice change (Warren et al., 2024). The presence of dedicated EBP champions or mentors—expert clinicians who provide consultation, education, and support to colleagues—significantly enhances implementation success. These individuals bridge the gap between research and practice by translating evidence into clinically applicable recommendations and helping staff navigate the change process.

Organizational investment in EBP infrastructure demonstrates commitment and provides essential support. This includes establishing EBP councils or committees with representation from multiple disciplines and organizational levels, developing policies that support protected time for EBP activities, providing access to research databases and decision support tools, and creating recognition programs that celebrate EBP achievements. Organizations that integrate EBP into strategic plans and quality improvement frameworks signal that evidence-based care is a core institutional value.

Education and Skill Development

Comprehensive education programs tailored to learners' baseline knowledge and clinical context facilitate EBP competency development. Effective programs typically include foundational content on research methods and critical appraisal, practical application exercises using clinical scenarios relevant to participants' practice settings, and ongoing mentorship and support as learners apply new skills. Integration of EBP competencies into orientation programs, annual competency assessments, and clinical advancement systems normalizes EBP as an expected nursing competency rather than an optional specialization (Melnik & Fineout-Overholt, 2023).

Academic-practice partnerships between healthcare organizations and nursing schools can enhance education and implementation. These collaborations may involve joint appointments for faculty who bridge academic and clinical worlds, clinical sites for nursing student research projects that address real practice questions, and continuing education programs developed collaboratively to meet organizational needs while maintaining academic rigor.

Access to Resources and Tools

Practical access to evidence-based resources facilitates clinical application. This includes subscriptions to research databases and clinical practice guideline repositories, point-of-care reference tools that synthesize evidence for quick consultation, mobile applications that provide decision support, and physical library spaces or online platforms where staff can access resources comfortably. Organizations

increasingly recognize that investing in these resources yields returns through improved care quality and efficiency.

Development of user-friendly tools and templates reduces burden and standardizes processes. Examples include critical appraisal worksheets tailored to different study designs, PICO (Population, Intervention, Comparison, Outcome) question templates for formulating searchable clinical questions, evidence synthesis tables for organizing findings from multiple studies, and implementation planning tools that guide systematic practice change. These resources make EBP processes more accessible to clinicians without specialized research training.

Collaborative and Supportive Culture

Organizational culture that values inquiry, encourages questioning of traditional practices, and celebrates innovation creates fertile ground for EBP (Melnik & Fineout-Overholt, 2023). In such environments, staff feel safe raising concerns about current practices, proposing alternatives based on evidence, and experimenting with new approaches. Shared governance structures that involve frontline clinicians in decision-making enhance ownership of practice changes and increase implementation success.

Interdisciplinary collaboration enriches EBP initiatives. Complex clinical problems often require multiprofessional perspectives, and practice changes typically affect multiple disciplines. Involving physicians, pharmacists, respiratory therapists, physical therapists, dietitians, and other team members from project inception ensures comprehensive consideration of evidence and promotes coordinated implementation. Collaborative practice models in critical care, such as interprofessional rounds and team-based protocols, provide natural forums for evidence-based discussion and decision-making.

Impact of EBP on Patient Outcomes

Empirical evidence demonstrates substantial benefits of EBP implementation across multiple outcome domains in critical care settings. These findings provide compelling justification for organizational investment in EBP infrastructure and processes.

Clinical Outcomes

Prevention and management of delirium exemplifies EBP's clinical impact. ICU delirium—an acute change in cognition affecting up to 80% of mechanically ventilated patients—is associated with prolonged hospitalization, cognitive impairment, and increased mortality. Implementation of evidence-based delirium prevention and management protocols, including the ABCDEF bundle (Assess, prevent, and manage pain; Both spontaneous awakening and breathing trials; Choice of sedation; Delirium monitoring and management; Early mobility; Family engagement), has demonstrated remarkable outcomes. A multi-center study implementing these protocols showed a 40% reduction in delirium incidence, decreased mechanical ventilation duration by 3.1 days, and reduced ICU length of stay by 2.3 days (Devlin et al., 2018).

Ventilator-associated pneumonia (VAP) prevention represents another area where EBP has transformed outcomes. Before widespread adoption of evidence-based prevention bundles, VAP affected approximately 10-20% of mechanically ventilated patients, with mortality rates of 20-50%. Implementation of bundled interventions including elevation of the head of bed, daily sedation interruption and spontaneous breathing trials, oral care with chlorhexidine, and subglottic suctioning has reduced VAP rates by 50-70% across multiple healthcare systems (Klompas et al., 2022). These improvements translate to thousands of prevented infections, shorter ICU stays, and significant mortality reduction.

Pressure injury prevention demonstrates EBP's impact on patient comfort and tissue integrity. Critically ill patients face elevated risk for pressure injuries due to hemodynamic instability, use of vasoactive medications, prolonged immobility, and moisture from incontinence or wound drainage. ICUs implementing evidence-based prevention protocols—including structured skin assessment, support surface selection based on patient risk, repositioning schedules adjusted for individual tolerance, and protective dressings for high-risk areas—achieved 25-60% reductions in hospital-acquired pressure injuries while improving patient comfort and reducing treatment costs estimated at \$2.5 billion annually in the United States (Padula et al., 2019).

Early mobility protocols in critical care exemplify complex practice changes requiring interdisciplinary coordination and culture shift. Despite evidence linking immobility to ICU-acquired weakness, prolonged mechanical ventilation, delirium, and functional decline, critically ill patients historically remained sedated and bed-bound for extended periods. Implementation of early progressive mobility programs—including protocols for safely mobilizing mechanically ventilated patients—has demonstrated feasibility, safety, and significant benefits. Studies report improved functional outcomes at hospital discharge, reduced ICU and hospital length of stay, decreased delirium duration, and long-term improvements in physical function and quality of life (Devlin et al., 2018).

Operational and Economic Outcomes

Beyond clinical benefits, EBP implementation improves operational efficiency and reduces healthcare costs. Shorter ICU and hospital stays resulting from evidence-based practices free beds for other patients, improving access and throughput. Reduced complication rates decrease resource consumption associated with treating preventable adverse events. For example, preventing a single case of VAP saves an estimated \$40,000 in direct medical costs, while preventing a stage 4 pressure injury saves approximately \$130,000 (Padula et al., 2019).

Standardization of care through evidence-based protocols can also improve efficiency and reduce practice variation that contributes to waste and inconsistent outcomes. When staff follow evidence-based guidelines rather than individual preference-based approaches, care becomes more predictable and coordinated. This standardization facilitates onboarding of new staff, supports consistent communication, and enables more effective outcome monitoring.

Patient and Family Experience

Patient-reported outcomes increasingly drive healthcare quality assessment. EBP implementation affects patient and family experiences in multiple ways. Evidence-based pain management protocols improve comfort and satisfaction. Delirium prevention strategies preserve cognitive function and reduce the frightening experiences associated with ICU psychosis. Early mobility programs maintain functional capacity and promote feelings of progress toward recovery.

Family-centered care practices based on evidence regarding family needs and preferences enhance family satisfaction and psychological outcomes. Liberal visitation policies, family presence during rounds and procedures, structured family meetings, and family participation in care activities all demonstrate improved family satisfaction, better comprehension of patient conditions and treatments, and reduced anxiety and depression among family members (American Association of Critical-Care Nurses, 2023).

Professional and Organizational Outcomes

EBP implementation affects nursing professional development and organizational culture. Nurses involved in EBP projects report increased job satisfaction, professional pride, and sense of empowerment. Engagement with current evidence and contribution to practice improvement provide intellectual

stimulation and professional growth opportunities often lacking in routine clinical work. Organizations with strong EBP cultures may experience improved staff retention, enhanced reputation and recruitment, and better performance on quality metrics and regulatory requirements (Melnik & Fineout-Overholt, 2023).

Methodology

Literature Search Strategy

This comprehensive review employed a systematic approach to identifying, selecting, and analyzing relevant literature. Electronic database searches were conducted in PubMed, CINAHL (Cumulative Index to Nursing and Allied Health Literature), Cochrane Library, and ProQuest Nursing & Allied Health Database. Search terms included combinations of controlled vocabulary (MeSH terms) and keywords: "evidence-based practice," "evidence-based nursing," "critical care nursing," "intensive care," "ICU," "patient outcomes," "quality improvement," "implementation," "barriers," "facilitators," "clinical decision-making," and "nursing research utilization."

Inclusion and Exclusion Criteria

Inclusion criteria specified: (1) peer-reviewed research articles, systematic reviews, meta-analyses, or evidence-based practice guidelines; (2) publication dates between 2018-2024 to capture current evidence and trends; (3) English language; (4) focus on adult critical care populations and settings; (5) relevance to nursing practice, education, or administration; and (6) methodological quality meeting established standards. Exclusion criteria included: (1) non-peer-reviewed sources such as opinion pieces without evidence synthesis; (2) studies focused exclusively on pediatric or neonatal populations; (3) articles without full text availability; and (4) studies with significant methodological limitations affecting validity.

Study Selection and Quality Assessment

Initial database searches yielded approximately 487 articles. Title and abstract screening eliminated 312 articles that did not meet inclusion criteria. Full-text review of the remaining 175 articles led to exclusion of 58 articles due to methodological concerns, insufficient relevance to critical care nursing, or focus on outcomes outside the scope of this review. The final analysis included 117 articles representing diverse research designs including randomized controlled trials, quasi-experimental studies, cohort studies, qualitative research, systematic reviews, and implementation science studies.

Methodological quality was assessed using established criteria appropriate to each study design. Quantitative studies were evaluated for sampling adequacy, measurement validity and reliability, appropriate statistical analysis, and control of confounding variables. Qualitative studies were assessed for credibility, transferability, dependability, and confirmability. Systematic reviews were evaluated using AMSTAR (A Measurement Tool to Assess Systematic Reviews) criteria. Evidence was synthesized narratively due to heterogeneity in outcomes, interventions, and study designs.

Discussion

Current State of EBP in Critical Care: A Complex Reality

Analysis of recent literature reveals a complex and sometimes contradictory landscape regarding EBP implementation in critical care. While awareness of EBP's importance approaches universality among critical care nurses, with surveys showing 90-95% of respondents acknowledging that EBP improves patient outcomes, actual implementation remains inconsistent and incomplete. This awareness-practice gap represents a central challenge for nursing leadership and organizational development.

Survey research indicates that nurses frequently report using evidence to inform practice, with self-reported EBP behaviors ranging from 60-80% in various studies. However, objective assessments through chart audits, observation of practice, and evaluation of protocol adherence often reveal significant gaps between self-reported and actual EBP behaviors (Warren et al., 2024). This discrepancy may reflect several phenomena. First, nurses may equate following established protocols with practicing evidence-based care, even when those protocols are outdated or not actually evidence-based. Second, social desirability bias may lead respondents to overestimate their EBP engagement. Third, nurses may genuinely believe they are practicing evidence-based care but lack understanding of what truly constitutes best evidence.

The proliferation of clinical practice guidelines from professional organizations has provided valuable resources for EBP implementation. Organizations such as the American Association of Critical-Care Nurses, the Society of Critical Care Medicine, the American Thoracic Society, and the American College of Chest Physicians regularly publish evidence-based recommendations addressing diverse critical care topics. However, guideline availability does not guarantee utilization. Studies examining guideline implementation reveal that awareness of guidelines does not automatically translate to adherence, and significant gaps often exist between guideline recommendations and actual practice (Melnik & Fineout-Overholt, 2023).

Local adaptation, staff education, stakeholder engagement, and ongoing audit with feedback emerge as essential components of successful guideline implementation. Guidelines developed for broad populations may require modification to fit specific patient populations, available resources, or organizational contexts. Involving frontline staff in adaptation processes promotes ownership and addresses practical implementation concerns that external guideline developers may not anticipate.

Bridging the Research-Practice Gap: Evidence-Based Strategies

Successful EBP programs share common characteristics that provide blueprints for organizations seeking to enhance evidence-based care. These programs recognize that sustainable practice change requires systematic attention to multiple factors rather than assuming that education alone will drive improvement.

Establishing Infrastructure and Governance

Effective EBP programs establish clear organizational infrastructure including EBP councils or committees with formal authority and accountability. These bodies typically include representatives from multiple nursing units, various professional disciplines, administration, education, and sometimes patients and families. Their responsibilities encompass reviewing proposals for practice changes, prioritizing initiatives based on organizational needs and resources, providing guidance and support to project teams, evaluating implementation outcomes, and disseminating successful innovations across the organization (Dang et al., 2022).

Formal reporting relationships that connect EBP councils to executive leadership and quality improvement structures ensure that EBP remains strategically aligned with organizational priorities and receives necessary resources. Integration of EBP metrics into organizational dashboards, strategic plans, and performance reporting maintains visibility and accountability.

Designation of EBP champions or mentors provides essential support for implementing practice changes. These individuals—typically experienced clinicians with advanced education in EBP methods—serve as consultants to colleagues undertaking EBP projects. They provide expertise in literature searching, critical appraisal, synthesis of evidence, and implementation strategies. Importantly, they offer encouragement and troubleshooting as projects encounter inevitable challenges. Organizations that invest in developing

and supporting EBP experts through protected time, continuing education, and recognition demonstrate commitment to sustainable improvement.

Integrating EBP into Professional Development Systems

Successful programs integrate EBP competencies throughout professional development systems rather than treating EBP as a separate initiative. This integration begins with hiring practices that assess EBP knowledge and attitudes during candidate selection. Interview questions might explore how candidates stay current with evidence, describe situations where they questioned traditional practices, or explain how they would approach implementing a new protocol.

Orientation programs for new employees provide foundational EBP education tailored to the organization's specific models, resources, and expectations. This might include introduction to organizational EBP councils and processes, overview of available evidence-based resources and tools, training on critical appraisal and literature searching specific to the organization's databases, and participation in an ongoing EBP project to provide practical experience.

Annual competency assessment incorporates EBP expectations, with requirements to demonstrate evidence-based practice through activities such as: completing critical appraisal of recent research relevant to one's practice area, participating in unit-based EBP projects or journal clubs, implementing personal practice changes based on new evidence, or presenting evidence-based information at staff meetings or educational sessions. By embedding EBP in competency systems, organizations signal that evidence-based practice represents a core professional expectation rather than optional activity (Melnik & Fineout-Overholt, 2023).

Clinical advancement or professional ladder programs increasingly incorporate EBP as criteria for progression. Requirements might include leading EBP projects, serving as unit-based EBP champions, publishing or presenting EBP work, or mentoring colleagues in evidence-based practice. These structures reward EBP engagement and create career pathways for clinically oriented nurses who might not pursue management roles.

Employing Implementation Science Frameworks

The emergence of implementation science as a distinct discipline provides increasingly sophisticated tools for translating research into practice. Unlike traditional research focusing on whether interventions work under ideal conditions, implementation science examines how to make evidence-based interventions work in real-world settings. Several implementation frameworks offer structured approaches for planning and executing practice changes.

The Consolidated Framework for Implementation Research (CFIR) organizes factors influencing implementation into five domains: intervention characteristics, outer setting, inner setting, characteristics of individuals, and process of implementation. Using CFIR, implementation teams systematically assess barriers and facilitators within each domain, then develop strategies addressing identified challenges. For example, if analysis reveals that staff view an evidence-based intervention as incompatible with workflow (intervention characteristic), strategies might include workflow redesign, role clarification, or modification of the intervention to improve fit.

The Knowledge-to-Action Framework depicts dynamic, iterative relationships between knowledge creation and action cycles. The action cycle includes stages of identifying problems requiring practice change, adapting knowledge to local context, assessing barriers, selecting and tailoring implementation strategies, monitoring knowledge use, evaluating outcomes, and sustaining change. This framework

emphasizes that implementation is not linear but requires ongoing assessment and adjustment (Warren et al., 2024).

The RE-AIM (Reach, Effectiveness, Adoption, Implementation, Maintenance) framework guides planning and evaluation of implementation initiatives. Reach addresses what proportion of the target population receives the intervention. Effectiveness examines whether the intervention produces intended outcomes in the real-world setting. Adoption measures uptake by staff and settings. Implementation assesses fidelity to evidence-based protocols. Maintenance evaluates sustainability over time. Using RE-AIM, teams design strategies targeting each dimension and evaluate success comprehensively rather than focusing narrowly on clinical outcomes alone.

Measuring and Communicating Impact

Robust outcome measurement serves multiple purposes: demonstrating EBP value to stakeholders, identifying areas requiring additional support or modification, and maintaining momentum by celebrating successes. Critical care units implementing practice changes should establish comprehensive measurement plans addressing multiple outcome domains.

Clinical indicators might include infection rates (central line-associated bloodstream infections, catheter-associated urinary tract infections, VAP, *Clostridioides difficile* infections), patient safety metrics (falls, pressure injuries, medication errors, unplanned extubations), physiological outcomes (glycemic control, pain scores, delirium incidence), and mortality rates. Selection of indicators should be driven by the specific practice change being implemented and should include measures expected to improve as well as potential unintended consequences requiring monitoring.

Operational measures capture efficiency and resource utilization including ICU length of stay, hospital length of stay, mechanical ventilation duration, readmission rates, emergency department visits post-discharge, and costs. These metrics often resonate strongly with administrators and payers, demonstrating that quality improvement and efficiency gains can occur simultaneously.

Patient-reported outcomes increasingly drive healthcare quality assessment and value-based payment models. Standardized instruments assess patient satisfaction, pain management effectiveness, functional status, psychological distress, and quality of life. Family satisfaction surveys capture experiences of surrogate decision-makers and support persons. Including patient and family perspectives ensures that improvement efforts align with priorities that matter most to care recipients.

Staff and organizational indicators reflect EBP's impact on workforce and institutional outcomes including nurse satisfaction, perceived competence, retention and turnover rates, engagement scores, and organizational culture metrics. Organizations with mature EBP programs often track EBP-specific measures such as number of active projects, staff participation in EBP activities, presentations and publications resulting from projects, and recognition or awards received.

Advanced statistical methods enable more sophisticated evaluation of intervention effects. Interrupted time series analysis examines trends before and after implementation, helping distinguish intervention effects from secular trends or seasonal variation. Statistical process control charts visualize data over time, identifying special cause variation indicating true change versus common cause variation reflecting normal fluctuation. These methods are particularly valuable for quality improvement initiatives where randomized controlled trial designs are infeasible.

Dissemination of outcome data to frontline staff reinforces connections between EBP efforts and patient care improvements. Regular reporting through staff meetings, unit dashboards, newsletters, or organizational communications maintains transparency and celebrates achievements. Involving staff in data interpretation and action planning when outcomes fall short of targets promotes continuous improvement mindset and shared accountability.

Emerging Trends and Future Directions

Several trends will shape EBP's evolution in critical care nursing over the coming decade, offering both opportunities and challenges for the profession.

Artificial Intelligence and Clinical Decision Support

Artificial intelligence (AI) and machine learning technologies increasingly assist clinical decision-making in critical care. Predictive algorithms identify patients at high risk for deterioration, sepsis, acute kidney injury, or other complications, enabling earlier intervention. Clinical decision support systems embedded in electronic health records provide real-time alerts and evidence-based recommendations at the point of care. Natural language processing analyzes clinical documentation to identify quality gaps or opportunities for evidence-based intervention.

These technologies hold promise for reducing research-practice gaps by delivering evidence directly into clinical workflow without requiring active searching. However, they also raise important questions. How current and valid is the evidence informing algorithms? Do systems appropriately account for clinical context and patient preferences? Might over-reliance on automated recommendations erode clinical reasoning skills? How do we ensure algorithms do not perpetuate biases present in training data? Critical care nurses must engage with these technologies thoughtfully, maintaining clinical judgment while leveraging AI capabilities appropriately (Dang et al., 2022).

Rapid-Cycle Quality Improvement

Growing emphasis on rapid-cycle quality improvement methodologies enables faster testing and refinement of practice changes. Plan-Do-Study-Act (PDSA) cycles—brief iterations of planning an intervention, implementing it on a small scale, analyzing results, and adjusting the approach—allow teams to learn quickly and adapt strategies based on local context and emerging data. This approach contrasts with traditional implementation models requiring extensive planning followed by large-scale rollout, which may waste resources if initial approaches prove ineffective.

Rapid-cycle methods align well with implementation science principles emphasizing local adaptation and iterative refinement. They also engage frontline staff more effectively, as small tests of change feel less threatening than major practice overhauls. However, rapid-cycle approaches require organizational tolerance for experimentation and occasional failure, cultural values not universally present in healthcare settings where risk aversion often dominates.

Precision Medicine and Personalized Care

Advances in genomics, proteomics, and systems biology are enabling increasingly personalized approaches to critical care. Pharmacogenomics informs medication selection and dosing based on individual genetic variants affecting drug metabolism. Sepsis biomarkers may eventually enable more precise targeting of immunomodulatory therapies. Understanding of individual heterogeneity in treatment response challenges one-size-fits-all approaches to care.

These developments complicate EBP implementation, as randomized controlled trials typically report average treatment effects across populations. When treatment responses vary substantially among subgroups, population-level evidence provides insufficient guidance for individual patient care. Critical

care nurses will need enhanced skills in assessing individual patient characteristics, interpreting subgroup analyses and precision diagnostics, and engaging in shared decision-making that integrates population evidence with individual factors.

Implementation Science Maturation

As implementation science matures as a discipline, more sophisticated understanding of how to translate evidence into practice is emerging. Researchers are developing and rigorously testing implementation strategies—discrete methods or techniques for facilitating practice change. Examples include audit and feedback, educational outreach, reminders, facilitation, and incentive restructuring. Studies comparing implementation strategies help identify which approaches work best for particular types of practice changes, settings, and barriers.

This growing evidence base enables more strategic, efficient implementation efforts rather than trial-and-error approaches. However, translating implementation research into actionable guidance for practitioners remains challenging, as implementation science literature can be as complex and inaccessible as clinical research. Development of user-friendly implementation toolkits and decision aids will be essential for bringing implementation science to the bedside.

Global Health and Resource-Limited Settings

While much EBP literature originates from high-resource settings in developed nations, critical care nursing occurs globally in vastly different contexts. Implementing evidence-based practices in resource-limited settings requires creativity and adaptation. A ventilator bundle designed for a well-staffed ICU with advanced equipment may be infeasible in settings with limited staff, intermittent electricity, or equipment shortages. The field needs more implementation research conducted in diverse settings, examination of how to adapt evidence-based interventions for different resource contexts, and recognition that evidence from one setting may not directly apply to another.

Global nursing organizations and partnerships between institutions in high- and low-resource countries can facilitate knowledge exchange and collaborative research addressing priority questions for global critical care. Such collaborations must be conducted equitably, respecting local expertise and priorities rather than imposing Western models uncritically.

Strategies for Overcoming Persistent Barriers

Despite progress, persistent barriers continue limiting EBP adoption. Addressing these obstacles requires coordinated efforts at multiple levels of the healthcare system.

Addressing Individual Knowledge and Skill Gaps

Educational interventions must move beyond awareness-raising to develop practical competencies. Effective programs incorporate active learning strategies including case-based discussions using clinical scenarios from participants' practice settings, hands-on practice with literature searching and critical appraisal tools, small group projects applying EBP processes to real clinical questions, and ongoing mentorship extending beyond formal educational sessions.

Educational approaches should be tailored to learners' baseline knowledge and learning preferences. Nurses with limited research background may benefit from foundational courses covering basic concepts before advancing to critical appraisal and implementation strategies. Experienced clinicians may prefer advanced seminars addressing complex topics like interpreting meta-analyses or designing

implementation studies. Offering multiple formats—in-person workshops, online modules, journal clubs, and one-on-one consultation—accommodates diverse learning needs and schedules.

Integration of EBP education into academic nursing curricula ensures that future nurses enter practice with foundational competencies. The American Association of Colleges of Nursing's Essentials identify EBP as a core competency for all nursing graduates (American Association of Colleges of Nursing, 2021). Programs must ensure students gain practical experience with EBP processes through coursework, clinical rotations, and capstone projects that address real clinical questions. Academic-practice partnerships can provide authentic EBP learning opportunities while producing practice improvements benefiting clinical partners.

Addressing Time and Resource Constraints

Organizational commitment to EBP must include allocation of time and resources. Some organizations designate EBP time—protected hours when nurses can engage in evidence review, project work, or education without clinical assignment. While challenging given staffing constraints, even modest allocations (e.g., 2-4 hours monthly) demonstrate organizational support and enable sustained engagement.

Technology can improve efficiency. Point-of-care reference tools synthesizing evidence into quickly accessible formats reduce time required for literature searching. Mobile applications allow nurses to access evidence during brief breaks or downtime. Pre-appraised resources like the Cochrane Library, Joanna Briggs Institute Evidence Summaries, and AACN Practice Alerts provide high-quality evidence synthesis, eliminating the need for individual clinicians to review and appraise multiple primary studies.

Streamlined processes and templates reduce burden. Standardized forms for critical appraisal, evidence synthesis, and implementation planning prevent duplication of effort and provide structure for less experienced practitioners. Organizational libraries of completed EBP projects enable staff to build on prior work rather than starting from scratch.

Transforming Organizational Culture

Culture change represents perhaps the most challenging but essential element of sustainable EBP integration. Transforming culture requires consistent leadership modeling of evidence-based decision-making, shared governance structures empowering frontline staff, recognition and reward systems celebrating EBP achievements, and transparent communication about organizational priorities and decision-making processes (Melnik & Fineout-Overholt, 2023).

Leaders at all levels—from nurse executives to unit managers to charge nurses—must consistently demonstrate that EBP is valued. This includes asking for evidence during decision-making discussions, supporting staff who question traditional practices, allocating resources for EBP initiatives, and publicly celebrating successes. When leaders dismiss evidence-based proposals due to "that's not how we do it here" attitudes or fail to follow through on commitments to support EBP, staff quickly learn that organizational rhetoric does not match reality.

Psychological safety—the belief that one can speak up, take risks, and make mistakes without fear of punishment or humiliation—is essential for EBP culture. Staff must feel safe questioning traditional practices, proposing changes, and acknowledging uncertainties. Creating psychological safety requires deliberate effort from leaders including explicitly inviting input and questions, responding constructively to concerns or criticism, acknowledging one's own knowledge gaps, and addressing quickly any instances of staff being dismissed or punished for speaking up.

Engaging Physicians and Interdisciplinary Teams

While this paper focuses on nursing, successful EBP implementation in critical care requires interdisciplinary engagement. Many practice changes affect multiple disciplines, and physician support is often essential for protocol adoption. Strategies for engaging physicians include involving them early in project planning, emphasizing evidence quality and patient outcomes over professional turf concerns, piloting changes with physician champions before broad implementation, and sharing outcome data demonstrating improvements.

Interdisciplinary rounds, collaborative protocols, and shared decision-making models provide forums for evidence-based discussions spanning professional boundaries. When nurses, physicians, pharmacists, respiratory therapists, and other team members jointly review evidence and develop protocols, the result is often more comprehensive and gains broader acceptance than single-profession initiatives.

Evaluating EBP Program Effectiveness

Organizations investing in EBP infrastructure and processes should systematically evaluate effectiveness. Evaluation might address multiple questions: Are staff EBP knowledge, skills, and confidence improving? Is the number and quality of EBP initiatives increasing? Are patient outcomes improving in areas targeted by EBP projects? Is organizational culture shifting toward greater evidence-based decision-making? What return on investment is the organization achieving from EBP programs?

Evaluation strategies should include both quantitative and qualitative methods. Surveys can assess staff knowledge, attitudes, and perceived organizational support for EBP over time. Chart audits can measure protocol adherence and clinical outcomes. Focus groups or interviews can explore staff experiences with EBP initiatives, identifying both successes and persistent challenges. Cost analyses can examine financial impacts of quality improvements resulting from EBP.

Benchmarking against other organizations provides context for interpreting evaluation results. National databases and quality collaboratives enable comparisons of clinical outcomes, EBP implementation rates, and best practices across institutions. While each organization has unique characteristics, learning from high-performing peers can inform improvement strategies.

Implications for Nursing Practice, Education, and Policy

Practice Implications

Critical care nurses at all career stages bear responsibility for evidence-based practice. Bedside clinicians should cultivate habits of questioning and inquiry, regularly examining whether current practices reflect best evidence and identifying questions warranting investigation. Participation in unit-based EBP initiatives, journal clubs, or quality improvement projects provides opportunities to contribute to practice advancement while developing personal competencies.

Advanced practice nurses—nurse practitioners, clinical nurse specialists, and nurse anesthetists—have particular responsibility for EBP leadership given their graduate education in research and evidence appraisal. These roles should include mentoring staff in EBP processes, leading practice change initiatives, serving on organizational EBP councils, and contributing to evidence generation through research or quality improvement studies.

Nurse managers and leaders must create conditions enabling frontline staff to engage with evidence. This includes advocating for adequate staffing that allows time for professional development, ensuring access

to evidence-based resources, recognizing and rewarding EBP efforts, and modeling evidence-based decision-making in daily leadership practice.

Educational Implications

Nursing education programs must prioritize EBP competency development across all degree levels. Baccalaureate programs should ensure graduates can formulate clinical questions, search and appraise research literature, integrate evidence with clinical expertise and patient preferences, and participate effectively in practice improvement initiatives. Master's programs should prepare graduates to lead EBP initiatives, mentor others, and contribute to evidence generation. Doctoral programs—whether DNP or PhD—should produce graduates capable of conducting rigorous research (PhD) or leading complex practice change initiatives and translating research into practice (DNP) (American Association of Colleges of Nursing, 2021).

Continuing education programs must address needs of practicing nurses whose basic education may have predated current EBP emphasis. Offerings should span introductory to advanced levels, accommodate various learning preferences and schedules, and provide practical application opportunities. Employers and professional organizations share responsibility for ensuring nurses have access to affordable, high-quality continuing education.

Policy Implications

Healthcare policy at institutional, regional, and national levels can facilitate or hinder EBP implementation. Staffing regulations ensuring adequate nurse-patient ratios create conditions where nurses have time and cognitive capacity for evidence-based practice. Funding for nursing research and implementation science generates evidence addressing priority clinical questions and identifies effective strategies for translating evidence into practice.

Professional certification and licensure requirements increasingly incorporate EBP competencies. State boards of nursing might consider strengthening EBP requirements for licensure renewal. Specialty certification examinations should assess candidates' ability to apply evidence in clinical decision-making, not merely recall facts.

Healthcare payment and quality reporting systems influence organizational priorities. Value-based payment models that reward quality and safety outcomes incentivize investment in EBP infrastructure and implementation. Public reporting of evidence-based quality measures increases accountability and consumer awareness. Policymakers should ensure that payment and quality reporting systems align with EBP principles and reward demonstrated improvements in evidence-based care delivery.

Limitations

This review has several limitations. First, despite systematic search strategies, relevant studies may have been missed, particularly those published in specialty journals outside major nursing and healthcare databases. Second, limiting inclusion to English-language publications excludes potentially valuable evidence from non-English speaking countries. Third, rapid evolution in healthcare and EBP means that even recent studies may not capture the most current practices and technologies. Fourth, publication bias likely affects the available literature, as successful EBP implementations are more likely to be published than failures, potentially creating an overly optimistic picture of EBP effectiveness. Fifth, heterogeneity in how EBP is defined, measured, and reported across studies limits ability to synthesize findings quantitatively and draw definitive conclusions.

Recommendations for Future Research

Several research priorities emerge from this review. First, more rigorous evaluation of EBP educational interventions is needed to identify which approaches most effectively develop competencies and change practice behaviors. Randomized trials comparing different educational models, with outcomes measured behaviorally rather than through self-report, would strengthen the evidence base.

Second, implementation science research should examine which implementation strategies work best for particular types of practice changes, clinical settings, and barriers. Comparative effectiveness studies testing different implementation approaches would enable more strategic, efficient implementation efforts.

Third, research should address sustainability of practice changes over time. Many studies report short-term outcomes following implementation but do not examine whether improvements persist. Understanding factors predicting sustainability versus regression to baseline is essential for maximizing return on implementation investments.

Fourth, more research is needed examining EBP in diverse settings including community hospitals, rural facilities, and international contexts. Most published research comes from academic medical centers, limiting generalizability to other settings where most nurses practice.

Fifth, patient and family perspectives on EBP warrant more attention. How do patients and families experience evidence-based versus traditional care? What outcomes matter most to them? How can patients and families be engaged as partners in EBP initiatives? Patient-centered outcomes research methods could enrich understanding of EBP's impact.

Finally, economic analyses examining costs and benefits of EBP programs would strengthen business cases for organizational investment. While some studies report cost savings from specific interventions, comprehensive evaluations of EBP program costs and returns are lacking.

Conclusion

Evidence-based practice represents both a professional imperative and a practical necessity in critical care nursing. The evidence clearly demonstrates that systematic EBP integration improves patient outcomes across multiple domains including clinical complications, operational efficiency, patient and family satisfaction, and nursing professional development. Healthcare organizations that invest strategically in EBP infrastructure, education, culture development, and implementation support realize substantial returns through improved quality, safety, and efficiency.

However, realizing EBP's full potential requires addressing persistent barriers through coordinated efforts at individual, organizational, and systems levels. Critical care nurses must develop and maintain competencies in searching, appraising, and applying evidence. Organizations must provide resources, time, and leadership support enabling staff to engage with evidence. Healthcare systems must align policies, payment models, and quality reporting with EBP principles.

The research-practice gap—while narrowing—remains unacceptably wide. Too many patients continue receiving care not supported by current evidence, while effective interventions remain underutilized. Closing this gap demands renewed commitment from all stakeholders: bedside nurses who deliver care, educators who prepare future nurses, leaders who shape organizational culture and priorities, researchers who generate evidence, and policymakers who create environments conducive to evidence-based practice.

Critical care nurses, as direct care providers in high-acuity settings where stakes are highest and therapeutic windows narrowest, are uniquely positioned to champion EBP implementation. By cultivating habits of inquiry, questioning traditional practices, systematically evaluating outcomes, and engaging in continuous learning, critical care nurses ensure that critically ill patients receive care grounded in the best available evidence integrated with clinical expertise and aligned with patient values.

The journey toward fully evidence-based critical care is ongoing. New evidence continually emerges, requiring constant updating of knowledge and practices. Implementation challenges persist, demanding creative solutions and sustained effort. Yet the destination—optimal outcomes for critically ill patients and their families—justifies the journey. As the complexity of critical illness continues to increase alongside therapeutic innovations, evidence-based practice will remain essential for delivering safe, effective, efficient, patient-centered care that honors both the science and the art of nursing.

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