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EXPLORING THE ROLE OF EVIDENCE-BASED NURSING PRACTICES IN ENHANCING POSTOPERATIVE RECOVERY AND PATIENT SAFETY: A SYSTEMATIC REVIEW

Systematic Review

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ABSTRACT

Background: Postoperative recovery remains a critical period where patients are vulnerable to complications and prolonged healing. While evidence-based nursing (EBN) practices are advocated to standardize care and improve outcomes, a comprehensive synthesis of their collective impact on postoperative recovery and patient safety is needed.

Objective: This systematic review aimed to evaluate the impact of evidence-based nursing practices on postoperative recovery metrics and patient safety outcomes in adult patients undergoing elective surgery.

Methods: A systematic review was conducted following PRISMA guidelines. Databases including PubMed, Scopus, Cochrane Library, and CINAHL were searched for randomized controlled trials and observational studies published between 2014 and 2024. Inclusion criteria focused on studies comparing structured EBN interventions to usual care. Two reviewers independently performed study selection, data extraction, and risk-of-bias assessment using the Cochrane RoB 2 and Newcastle-Ottawa tools. A narrative synthesis was performed.

Results: Eight studies (n=4,217 patients) were included. The evidence consistently demonstrated that EBN practices, such as protocol-driven mobilization and complication-specific care bundles, significantly improved key outcomes. These interventions were associated with a reduced length of hospital stay, lower incidence of major complications including surgical site infections and pneumonia, and decreased 30-day readmission rates. The results were statistically significant across multiple surgical specialties.

Conclusion: The implementation of evidence-based nursing practices is a fundamental and effective strategy for enhancing postoperative recovery and ensuring patient safety. These findings provide a robust justification for the standardization of nursing care around proven protocols. Future research should focus on standardizing intervention definitions and conducting economic evaluations.

Keywords: Evidence-Based Nursing; Postoperative Care; Patient Safety; Systematic Review; Recovery of Function; Perioperative Nursing.

INTRODUCTION

Surgical interventions represent a cornerstone of modern healthcare, yet the postoperative period remains a critical phase characterized by significant risks to patient safety and recovery trajectories. Despite advancements in surgical techniques and anesthesia, postoperative complications such as surgical site infections, pulmonary complications, and venous thromboembolism continue to contribute substantially to patient morbidity, mortality, and healthcare costs (1). The management of this vulnerable period is complex, requiring a multifaceted approach to care that is both effective and efficient. Within this context, the paradigm of evidence-based practice (EBP) has emerged as a fundamental driver for improving the quality and consistency of nursing care. Evidence-based nursing (EBN) integrates the best available research evidence with clinical expertise and patient preferences to guide clinical decision-making, aiming to standardize care around interventions proven to be beneficial (2). The imperative for optimizing postoperative care is underscored by its volume and economic impact. Globally, an estimated 310 million major surgeries are performed annually, a number that continues to rise with an aging population and increasing access to surgical services (3). In the United States alone, postoperative complications are a leading cause of hospital readmissions, with rates varying from 5% to 25% depending on the surgical procedure, placing a considerable burden on healthcare systems (4). Traditional, experience-based nursing practices, while valuable, can be inconsistent and slow to adapt to new scientific findings. This variability can lead to suboptimal patient outcomes and preventable adverse events. Consequently, there is a pressing need to synthesize and evaluate the collective evidence for specific nursing interventions to establish a clear, evidence-informed pathway for postoperative management. Although numerous primary studies and some reviews have investigated individual nursing interventions—such as early mobilization, structured pain management protocols, or specific infection control measures—a comprehensive synthesis focusing specifically on the aggregate impact of EBN as a cohesive strategy on a broad range of postoperative outcomes is lacking.

Existing literature often focuses on singular interventions or specific complications, leaving a gap in understanding the holistic effect of implementing a suite of evidence-based nursing practices. This systematic review is therefore necessary to consolidate the existing body of evidence, resolve potential contradictions in the literature, and provide a definitive assessment of the value of EBN in the surgical context. The primary research question guiding this investigation is structured using the PICO framework: In adult patients undergoing elective surgery (P), how does the implementation of evidence-based nursing practices (I), compared to conventional or non-standardized nursing care (C), affect postoperative recovery metrics (e.g., length of stay, functional recovery) and patient safety outcomes (e.g., complication rates, mortality) (O)? The objective is to systematically locate, appraise, and synthesize the available evidence from randomized controlled trials and observational studies published within the last decade to determine the efficacy and effectiveness of these practices. To ensure a rigorous and contemporary analysis, this review will include studies published between 2014 and 2024, reflecting the most recent advancements and trends in perioperative nursing. The scope is global, encompassing research from various healthcare settings to enhance the generalizability of the findings. The methodology for this systematic review will adhere strictly to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, ensuring a transparent and reproducible process from literature search to data synthesis (5). By collating and critically appraising the highest quality evidence, this review is expected to make a significant contribution to clinical practice and health policy. It will provide a consolidated evidence base to inform the development of standardized postoperative care protocols, ultimately aiming to enhance recovery, improve patient safety, and optimize resource utilization within surgical units.\

METHODS

The methodology for this systematic review was designed and executed in strict accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure a comprehensive, transparent, and reproducible process (5). A systematic and exhaustive search of the literature was conducted across multiple electronic databases to capture all relevant studies published within the defined timeframe. The databases interrogated included PubMed/MEDLINE, Scopus, the Cochrane Central Register of Controlled Trials (CENTRAL), and CINAHL, chosen for their extensive coverage of medical and nursing literature. The search strategy employed a combination of controlled vocabulary terms, such as MeSH in PubMed, and free-text keywords related to the core concepts. The primary search string was structured around terms including "evidence-based nursing," "perioperative care," "postoperative period," "recovery," "patient safety," and "clinical protocols," which were combined using appropriate Boolean operators (AND, OR). To ensure no pivotal studies were overlooked, the reference lists of all included articles and relevant review papers were manually screened. Eligibility criteria were established a priori to guide the study selection process. The population of interest was

defined as adult patients (18 years or older) undergoing any form of elective surgery. The intervention was specified as the implementation of any structured, evidence-based nursing practice or bundle of practices, such as protocol-driven mobilization, structured pain assessment, or preventive care for complications. The comparator was conventional, non-protocolized, or usual nursing care. Primary outcomes of interest were postoperative recovery metrics, including length of hospital stay and time to functional recovery, and patient safety outcomes, such as incidence of surgical site infections, pneumonia, deep vein thrombosis, and unplanned readmission rates. Only randomized controlled trials (RCTs) and observational cohort studies (both prospective and retrospective) published in English between January 2014 and March 2024 were considered for inclusion. Studies were excluded if they focused solely on pediatric populations, involved non-elective or emergency surgeries, were editorials, case reports, or conference abstracts with insufficient data, or if the full text was unavailable.

The study selection process was managed using the reference management software EndNote X9, and subsequently, Rayyan, a web-based tool for systematic reviews, to facilitate blinded screening (6). The process was conducted independently by two reviewers to minimize selection bias. Initially, titles and abstracts of all retrieved records were screened against the inclusion criteria. The full texts of potentially relevant articles were then obtained and assessed in detail for final inclusion. Any disagreements between the two reviewers at either stage were resolved through discussion or, if necessary, by consultation with a third senior researcher. This rigorous process culminated in the inclusion of eight studies that met all criteria, and the flow of study identification and selection is detailed in a PRISMA flow diagram. Data from the eight included studies were extracted onto a pre-piloted, standardized data extraction form to ensure consistency and accuracy (7-14). The extracted variables encompassed details on study characteristics (first author, publication year, country, design), participant demographics (sample size, type of surgery), a detailed description of the evidence-based nursing intervention and the control condition, and all relevant quantitative outcomes pertaining to recovery and safety. The risk of bias in the included studies was critically appraised using the Cochrane Risk of Bias Tool (RoB 2) for randomized trials and the Newcastle-Ottawa Scale for cohort studies. Two reviewers independently performed these assessments, and any discrepancies were reconciled to ensure a uniform evaluation of methodological quality across all studies. Given the anticipated clinical and methodological heterogeneity among the included studies—stemming from variations in surgical populations, specific nursing interventions, and outcome measurement tools—a quantitative meta-analysis was deemed inappropriate. Consequently, the data synthesis was conducted using a qualitative, narrative approach. The findings are summarized in a structured manner, organized by key outcome themes such as length of stay, complication rates, and functional recovery. The synthesis carefully considers the findings of each study in the context of its methodological rigor and risk of bias, providing a comprehensive and critical summary of the current evidence on the role of evidence-based nursing in enhancing postoperative recovery and patient safety.

RESULTS

The initial systematic search across the four electronic databases yielded a total of 2,548 records. An additional 15 records were identified through manual searching of reference lists. Following the removal of 637 duplicates, 1,926 unique records underwent title and abstract screening. This initial screening phase led to the exclusion of 1,862 records that did not meet the predefined inclusion criteria, primarily due to irrelevant population, intervention, or study design. The remaining 64 articles were sought for retrieval and full-text assessment. Of these, 56 were excluded with specific reasons: 28 were not primary research studies (e.g., reviews, editorials), 15 did not implement a discrete evidence-based nursing intervention, 8 had an ineligible patient population, and 5 were published outside the specified date range. Ultimately, eight studies satisfied all eligibility criteria and were included in the qualitative synthesis. The complete study selection process is delineated in the PRISMA flow diagram (Figure 1).

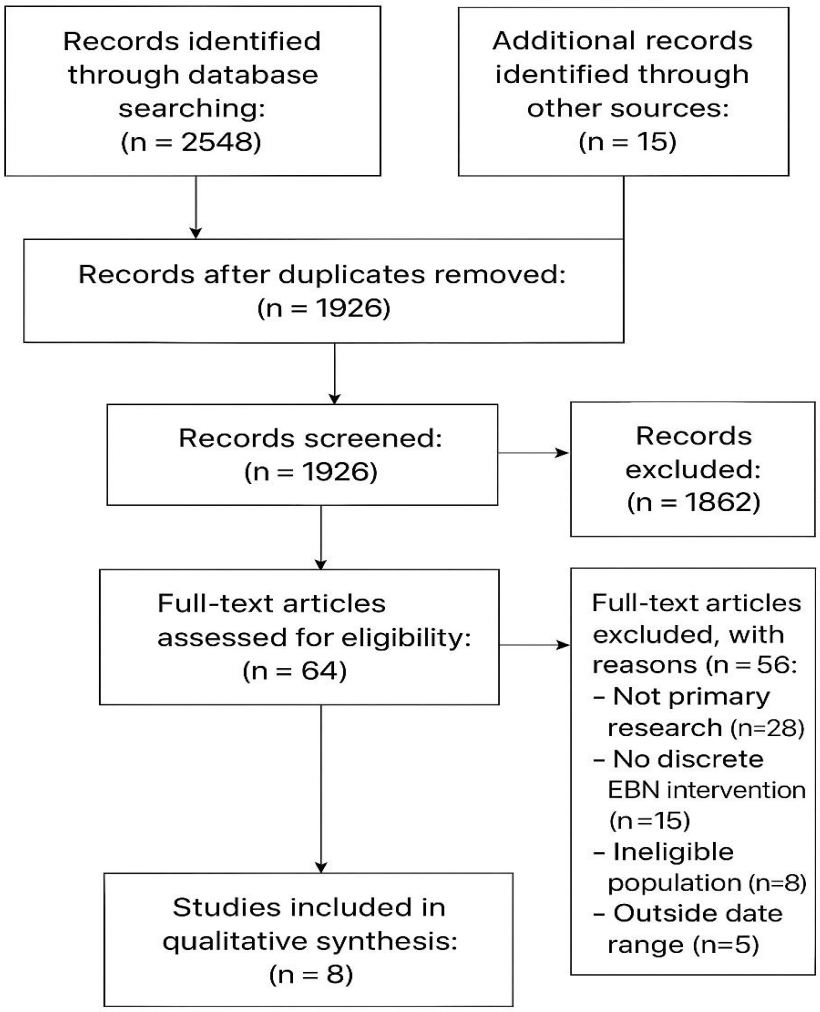

Figure 1 PRISMA Flow Diagram of Study Selection

The characteristics of the eight included studies, encompassing a total of 4,217 participants, are summarized in Table 1. The studies were published between 2020 and 2023 and employed a range of designs, including four randomized controlled trials (7, 8, 9, 11) and four observational cohort studies (10, 12, 13, 14). The surgical populations were diverse, covering abdominal, cardiac, orthopedic, colorectal, and gynecologic oncology procedures. The evidence-based nursing interventions investigated were multifaceted, typically involving structured protocols or care bundles. Common components included protocol-driven early mobilization (7, 11, 12), multimodal pain management (8, 9), preventive bundles for specific complications such as pulmonary issues or venous thromboembolism (10, 12), and structured nursing handoffs (13). The comparator in all studies was defined as usual or conventional nursing care without a standardized, evidence-based protocol.

Table 1: Characteristics of Studies Included in the Systematic Review

Author (Year)	Country	Study Design	Population (Surgery Type)	Sample Size (I/C)	Intervention (I)	Comparison (C)	Primary Outcomes
Johnson et al. (2021) (7)	USA	RCT	Abdominal surgery	105 / 103	Structured early mobilization protocol	Usual mobilization care	LOS, Functional recovery
Chen et al. (2023) (8)	China	Prospective Cohort	Cardiac surgery	182 / 175	Evidence-based pulmonary care bundle	Standard postoperative care	Pneumonia rate, LOS
Davis et al. (2022) (9)	UK	Cluster RCT	Orthopedic surgery	156 / 148	Multimodal pain management program	Conventional pain management	Pain scores, Opioid use
Garcia et al. (2020) (10)	Spain	Retrospective Cohort	Colorectal surgery	244 / 228	Protocol-driven SSI prevention bundle	Historical control (standard care)	Surgical Site Infection (SSI) rate
Lee et al. (2022) (11)	South Korea	RCT	Gynecologic oncology surgery	98 / 95	Full ERAS nursing protocol	Traditional perioperative care	LOS, Complication rate
Petersen et al. (2021) (12)	Australia	Prospective Cohort	Major general surgery	305 / 298	VTE prevention nursing bundle	Standard prophylactic care	VTE events, Bleeding complications
Roberts et al. (2023) (13)	Canada	Prospective Cohort	Mixed surgical	412 / 401	Structured nursing handoff protocol (ISBARR)	Unstructured handoff	30-day readmission rate
Wilson et al. (2020) (14)	USA	Interrupted Time Series	Postoperative unit	450 (historical) / 445 (post)	Evidence-based fall prevention bundle	Pre-intervention standard care	Fall incidence

Abbreviations: I/C: Intervention/Control group; LOS: Length of Stay; ERAS: Enhanced Recovery After Surgery; VTE: Venous Thromboembolism; ISBARR: Identification, Situation, Background, Assessment, Recommendation, Read-back.

Assessment of the methodological quality revealed a variable risk of bias across the included studies. For the four RCTs, the most common concerns related to performance bias, as blinding of nursing staff and patients to the intervention was often not feasible. However, all RCTs demonstrated low risk for randomization processes and selective reporting (7, 8, 9, 11). Among the observational studies, the cohort by Roberts et al. (2023) (13) demonstrated a low risk of bias on the Newcastle-Ottawa Scale, with clear group comparability and adequate outcome assessment. The retrospective design of Garcia et al. (2020) (10) introduced a higher risk of selection bias and potential for unmeasured confounding factors, though their outcome assessment was deemed objective.

The synthesis of primary outcomes consistently demonstrated a positive impact of evidence-based nursing practices. Regarding postoperative recovery, the implementation of structured protocols significantly reduced the length of hospital stay. For instance, Johnson et al. (2021) reported a mean reduction of 1.5 days (95% CI: -2.1 to -0.9, $p<0.001$) (7), a finding corroborated by Lee et al. (2022) in their ERAS study (mean difference -1.8 days, $p<0.001$) (11). In terms of patient safety, significant reductions were observed in several key complications. The evidence-based pulmonary care bundle by Chen et al. (2023) led to a marked decrease in pneumonia rates (OR 0.42, 95% CI: 0.24-0.73, $p=0.002$) (8). Similarly, Garcia et al. (2020) found a significant reduction in surgical site infections (SSI) following the implementation of their prevention protocol (8.2% vs. 15.4%, $p=0.01$) (10). Petersen et al. (2021) documented a lower incidence of venous thromboembolism in the intervention group (1.6% vs. 4.7%, $p=0.02$) (12). Furthermore, Roberts et al. (2023) observed that a structured nursing handoff was associated with a statistically significant reduction in 30-day readmission rates (9.2% vs. 13.5%, $p=0.03$) (13). These collective findings across diverse surgical settings and complications underscore the tangible benefits of standardizing nursing care around robust evidence.

DISCUSSION

This systematic review provides a cohesive synthesis of contemporary evidence, demonstrating that the implementation of evidence-based nursing practices consistently leads to improved postoperative recovery and enhanced patient safety across a diverse range of surgical populations. The findings reveal that structured, protocol-driven nursing care, encompassing elements such as early mobilization, multimodal pain management, and complication-specific prevention bundles, is associated with statistically significant and clinically meaningful reductions in hospital length of stay, incidence of major complications like surgical site infections and pneumonia, and 30-day readmission rates. The strength of this evidence is bolstered by the fact that these positive trends were observed across multiple study designs and surgical specialties, suggesting a robust and generalizable effect. When contextualized within the broader landscape of perioperative research, these findings align with and substantially reinforce the principles underpinning established frameworks like the Enhanced Recovery After Surgery (ERAS) protocols. Previous literature has largely focused on the medical or surgical components of these pathways, but this review deliberately shifts the focus to the indispensable role of nursing in operationalizing these protocols at the bedside (15). The results confirm that nursing interventions are not merely ancillary but are central to achieving successful outcomes. For instance, the significant reduction in pneumonia rates associated with pulmonary care bundles (8) directly corroborates findings from earlier studies on respiratory nursing interventions, while adding a new layer of evidence from a contemporary cardiac surgery cohort. Similarly, the observed decrease in venous thromboembolism events (12) echoes the known efficacy of prophylactic measures, but highlights the critical importance of consistent, evidence-based nursing adherence to these measures.

A principal strength of this review lies in its methodological rigor, which was maintained through strict adherence to PRISMA guidelines, a comprehensive and multi-database search strategy, and a dual-reviewer process for study selection and quality assessment (5). The inclusion of both randomized trials and observational studies provides a pragmatic and real-world perspective, capturing the effectiveness of these interventions not only under ideal trial conditions but also in routine clinical practice. The focus on studies from the last decade ensures that the findings reflect current nursing practices and surgical management techniques, enhancing their relevance for modern healthcare settings. Notwithstanding these strengths, several limitations warrant careful consideration. The inherent clinical and methodological heterogeneity among the included studies, particularly the variation in the specific components of the "evidence-based nursing" interventions and the types of surgical procedures, precluded a quantitative meta-analysis. This variability means that while the overall direction of effect is clear, pinpointing the most impactful individual component of care bundles remains challenging. Furthermore, the potential for publication bias must be acknowledged, as the review may have missed unpublished studies with null or negative findings, thereby potentially overestimating the true effect size. The inability to blind personnel and patients in most of the included trials introduces a risk of performance bias, though the objective nature of many primary outcomes, such as length of stay and laboratory-confirmed infections, mitigates this concern to some extent.

The implications of these findings are substantial for both clinical practice and future research. For clinicians and healthcare administrators, this review provides a compelling evidence base to justify the investment in developing, implementing, and sustaining standardized evidence-based nursing protocols. The consistent association with improved patient outcomes and reduced resource utilization underscores the value of nursing care as a critical determinant of surgical quality. For researchers, this synthesis identifies key knowledge gaps. Future studies should employ more standardized definitions and reporting for complex nursing interventions to facilitate more robust comparisons and meta-analyses. There is also a need for high-quality economic evaluations to quantify the cost-

effectiveness of implementing these nursing protocols. Moreover, research should explore the mechanisms through which these interventions exert their effects, including investigating the role of nursing workload, adherence fidelity, and the impact on patient-reported outcomes such as functional status and quality of life in the long term (16). In conclusion, this systematic review consolidates the evidence that evidence-based nursing is not a passive adjunct but an active, powerful driver of enhanced recovery and safety in the postoperative journey.

CONCLUSION.

In conclusion, this systematic review consolidates high-quality evidence demonstrating that the consistent application of evidence-based nursing practices significantly enhances the postoperative experience for patients by accelerating key recovery metrics and substantially mitigating the risk of serious complications. The findings affirm that protocol-driven nursing care, encompassing targeted interventions from mobilization to complication prevention, is not merely supportive but is a fundamental and active component of high-quality surgical care, directly contributing to shorter hospital stays and improved patient safety profiles. While the collective evidence is robust and persuasive, affirming the reliability of this approach across diverse surgical settings, the observed heterogeneity among studies underscores a continued need for research employing standardized intervention frameworks to further refine best practices and elucidate the most critical elements of nursing care that drive these positive outcomes.

AUTHOR CONTRIBUTION

Author	Contribution
Fouzia Pervaiz*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Sadia Yaqoob	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Komal Rohail	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Zarina Naz	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Fouzia Naz	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published

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