Shaping Safer ICU Admissions: A Systematic Literature Review of Nurse-Led Collaborative Handover Innovations in Critical Care

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Abstract *- This systematic literature review aimed to explore nurse-led collaborative handover innovations shaping safer ICU admissions. Guided by the Xiao and Watson (2019) systematic review framework, this study analyzed 15 articles published between 2020 and 2025. Studies were sourced from PubMed, ScienceDirect, and Web of Science using predefined keywords such as "ICU admission," "nurse-led handover," "collaborative communication," and "critical care safety" to ensure relevance, followed by a rigorous screening for credibility and quality. Findings revealed that longer handovers exceeding two minutes were associated with more complete information transfer, while time pressures and interruptions posed safety risks. Structured communication tools, including SBAR checklists and validated multi-item handover instruments, effectively reduced omissions and improved patient safety. Electronic Nursing Handover Systems (ENHS) and electronic checklists significantly enhanced efficiency and reduced clinical errors compared to paper-based methods. Themes emphasized the importance of transitioning handovers from life-saving to rehabilitative care to ensure continuity and safety. Standardized protocols reduced technical errors and omissions in OR-to-ICU transfers, while co-designed visual tools enhanced reporting in resource-limited settings. However, barriers such as high expectations, unilateral communication, staffing shortages, lack of standardized protocols, and inadequate management support continued to challenge handover effectiveness. Organizational factors, including ICU bed availability, staff experience, transfer networks, and hospital policies, further influenced admission decisions and handover practices. Overall, this review underscores the critical need for integrated structured communication tools and organizational support to optimize nurse-led collaborative handover innovations for safer ICU admissions.*

Keywords: *ICU Admission, Nurse-Led Collaboration, Critical Care Handover*

I. INTRODUCTION

Intensive Care Unit (ICU) admissions constitute one of the most critical phases in patient care, requiring precise communication and well-coordinated handovers to uphold patient safety and achieve optimal clinical outcomes. These transitions are particularly vulnerable, as even minor communication errors during handovers can result in significant, preventable adverse events that jeopardize patient safety (Valley et al., 2023). A 2024 quality improvement study conducted in Norway found persistent inconsistencies in compliance and the omission of critical patient information, despite structured ISBAR protocols being implemented (McCarthy et al., 2025; Reime et al., 2024). Meanwhile, recent innovations such

as electronic nursing handover systems, applied notably during the COVID-19 pandemic, have demonstrated substantial improvements in handover quality, significant reductions in error rates, and enhanced perceptions of patient safety compared to traditional, paper-based approaches (Tataei et al., 2023).

The impact of handover practices extends beyond patient outcomes, deeply influencing the psychological well-being of nurses. A 2025 scoping review highlighted that poorly structured handovers could increase nurse stress, anxiety, and burnout, whereas effectively executed handovers fostered peer support, team cohesion, and a stronger sense of control, crucial in the demanding ICU environment (Tomás et al., 2025). These findings illustrate that optimized handover processes not only safeguard patient care but also substantially support the mental health and resilience of nurses.

While recent nurse-led innovations, such as visual handover tools tailored specifically for low-resource ICUs, have shown promise in aligning with practical workflow needs and infection control requirements, comprehensive assessments of their impacts on patient safety and interdisciplinary teamwork remain limited (Tomás et al., 2025). Furthermore, nurse-led initiatives, such as escorting patients during transfers to the ICU, have been shown to reduce delays and improve communication between teams. For example, a 2023 study in Western Australia found that when nurses led inter-hospital transfers, they felt more confident in advocating for patient needs and ensuring safety during the handover process (Mndebele et al., 2024). However, there is still limited research reviewing the overall impact of these nurse-led transfer programs, especially their role in leading interdisciplinary communication and teamwork during ICU admissions.

This systematic review arises from the urgent need to address a crucial, yet underrepresented dimension of critical care: the proactive role nurses play in shaping safer ICU admission processes. Unlike existing studies predominantly focusing on medical perspectives or generic communication frameworks, this research uniquely emphasizes nurse-led collaborative innovations, recognizing nurses as central figures whose clinical insights, empathy, and coordination skills fundamentally redefine ICU admissions. By highlighting nurse-driven interdisciplinary strategies, this review aims not only to fill a critical gap in current literature but also to contribute actionable, human-centered strategies that could transform practice standards, nursing education, and ultimately, patient outcomes in critical care settings worldwide.

II. MATERIALS AND METHODS

This review adopted the systematic literature review process outlined by Xiao and Watson (2019), emphasizing methodological rigor and transparency over a required minimum number of included studies. The final set of 15 studies reflects the current state of evidence on nurse-led collaborative handover innovations during ICU admissions, highlighting both the emerging nature of this topic and the need for further research.

Unlike narrative reviews, a systematic literature review (SLR) uses a clear and organized approach to ensure comprehensive, unbiased, and reproducible findings. This method allows researchers to map existing studies, identify gaps, and recognize key trends. In

this study, the SLR provides a solid foundation for understanding the topic and guiding future research directions.

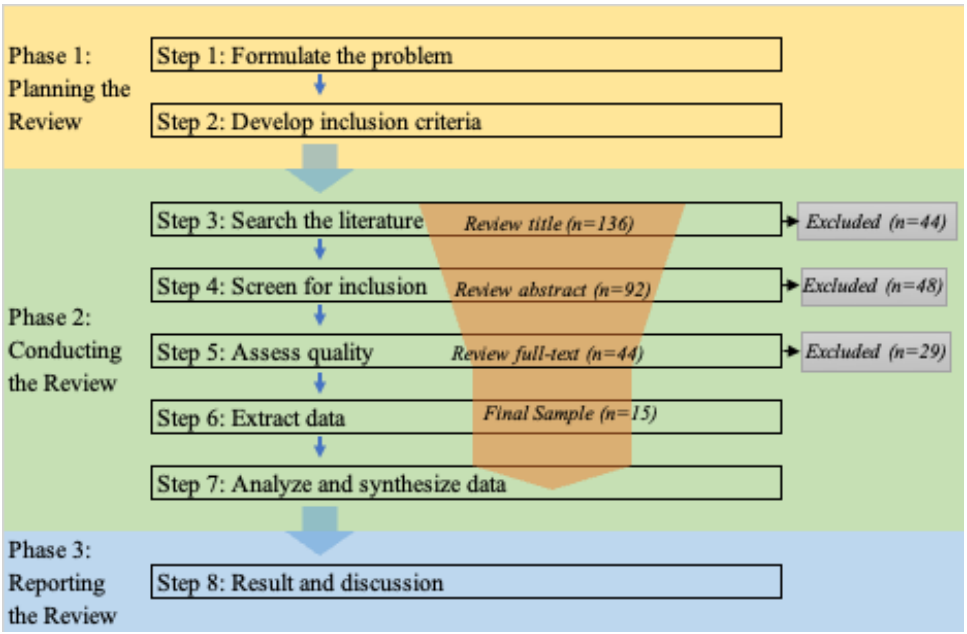

Figure 1. Process of systematic literature review (Xiao & Watson, 2019).

1. **Phase One**: Planning the Review. This study began by defining its central research question: How do nurse-led collaborative handover innovations improve the safety of ICU admissions? The planning phase focused on clarifying the impact of these nurse-driven strategies on communication quality, patient safety, and teamwork during critical care transitions. Inclusion criteria were established to select studies of high methodological quality published between 2020 and 2025. Databases searched included PubMed, ScienceDirect, and Web of Science using keywords such as "ICU admission," "nurse-led handover," "collaborative communication," and "critical care safety." These terms ensured the review captured studies directly addressing interdisciplinary handover practices led by nurses.

2. **Phase Two:** Conducting the Review. A comprehensive and systematic literature search was performed using the predetermined databases and search terms. Screening began with titles and abstracts, narrowing down to full-text articles that met the inclusion criteria. Studies with rigorous methodologies, reliable data, and clear outcomes evaluating nurse-led handover innovations were prioritized. Each study underwent a detailed quality assessment to ensure credibility, particularly examining their findings on improving patient safety and team communication during ICU admissions.

3. **Phase Three**: Reporting the Findings. The final phase involved synthesizing and presenting findings in a structured, clear, and accessible manner. Key outcomes summarized included improvements in patient safety, strengthened interdisciplinary communication, and enhanced teamwork as a result of nurse-led handover

innovations. Influential factors, such as protocol structures, nurse leadership roles, team dynamics, and institutional support, were highlighted. By sharing these insights, this review aims to empower nurses and critical care teams to shape safer ICU admissions, fostering compassionate, coordinated, and high-quality care for every patient.

III. RESULT AND DISCUSSION

Result

A. Handover Quality and Safety

Longer handover durations exceeding two minutes were significantly associated with more complete transfers, while factors such as time constraints and frequent interruptions posed risks to patient safety (Dusse et al., 2021). The implementation of structured communication tools, like the SBAR checklist, was found to effectively reduce information omissions, improve preparation, and enhance overall patient safety(Wang et al., 2022). Additionally, a validated 60-item tool encompassing eight crucial factors demonstrated reliability in substantially improving handover quality and safety(Abo Seada et al., 2022). Structured handover frameworks were emphasized as essential to align expectations between emergency department and ICU nurses, thus promoting safety through clearer information transfer(Mamalelala et al., 2023). Further, handover-specific training programs significantly enhanced nurses' handover competencies and positively correlated with achieving patient safety targets(Pamphila et al., 2024). The utilization of electronic nursing handover systems (ENHS) was superior to traditional paper-based methods, significantly improving handover efficiency, quality, and reducing clinical errors(Tataei et al., 2023). Similarly, electronic checklists resulted in higher handover evaluation scores, affirming their effectiveness in improving handover processes (Bonaconsa et al., 2024; Latifinasab et al., 2023). Themes such as "ritual of handover" and transitioning "from life-saving to rehabilitative care" were identified as critical, highlighting the impact of effective information alignment on continuity and patient safety (Herling et al., 2022). Furthermore, implementing standardized handover protocols significantly reduced technical errors and information omissions, demonstrating their efficacy in enhancing OR-to-ICU transfer quality (Nematollahzadeh et al., 2022).

B. Communication Tools and Structured Protocols

The use of an SBAR checklist effectively reduced missed items, enhanced preparedness, and decreased risks, thereby significantly improving patient safety(Wang et al., 2022). Similarly, a validated and reliable 60-item handover instrument encompassing eight key dimensions demonstrated substantial improvements in ICU handover quality and safety (Abo Seada et al., 2022). Moreover, the Electronic Nursing Handover System (ENHS) significantly elevated handover efficiency and quality, reduced clinical errors, and enhanced patient safety outcomes compared to traditional paper-based methods(Tataei et al., 2023). Electronic checklists also significantly outperformed paper-based approaches by yielding

higher Handover Evaluation Scale (HES) scores, reflecting improved handover completeness and quality(Latifinasab et al., 2023). The implementation of standardized handover protocols for operating room to ICU transfers significantly decreased technical errors and reduced the omission of vital information, markedly enhancing overall handover quality (Nematollahzadeh et al., 2022). Furthermore, the ISBAR communication framework effectively structured handover interactions, significantly reducing unstructured exchanges from 60% to 32%, thus underscoring its impact on improving structured communication in clinical transitions (Reime et al., 2024). Additionally, a co-designed visual handover tool notably improved the completeness of reporting and supported infection control and antimicrobial stewardship in resource-limited ICU environments (Bonaconsa et al., 2024).

C. Handover challenge and Organizational Barriers

Key barriers highlighted included high expectations for perfection, reliance on unilateral communication, and the lack of structured procedures, all contributing to increased stress among nurses and elevated patient safety risks(Ahn et al., 2021). Additionally, ICU admission delays were closely linked to organizational issues such as coordination gaps and resource management, although targeted interventions successfully reduced admission times by approximately 14 minutes (Jakobson et al., 2022). Nurses, despite feeling adequately skilled, reported persistent obstacles including staffing shortages, absence of standardized protocols, and deficiencies in management support (Murigi et al., 2022.). Moreover, critical organizational factors such as ICU bed availability, staff experience and interpersonal rapport, hospital transfer networks, and institutional policies significantly influenced ICU admission decisions and handover practices (Valley et al., 2023).

D. ICU Admission Decision Dynamics

Nurses reported feeling sufficiently capable of performing effective handovers; however, they encountered significant barriers such as staffing shortages, absence of standardized protocols, and management-related deficiencies(Murigi et al., 2022). Additionally, critical organizational factors—including ICU bed availability, staff experience and interpersonal rapport, hospital transfer networks, and institutional policies—played substantial roles in shaping admission decisions (Valley et al., 2023).

Discussion

This systematic literature review emphasizes that effective handovers are integral to ensuring patient safety and enhancing quality during ICU admissions. The duration and structure of handovers significantly influence their effectiveness, with longer, structured handovers (typically exceeding two minutes) yielding more comprehensive information transfer. However, clinical realities such as time pressures and frequent interruptions negatively affect handover completeness, potentially jeopardizing patient safety. Additionally, specialized handover training programs were demonstrated to significantly

boost nurses' competencies in executing handovers, leading to improved patient safety outcomes.

Communication tools and structured protocols emerged clearly as essential factors in elevating ICU handover effectiveness. The adoption of structured communication frameworks, such as SBAR and ISBAR, was effective in reducing missed information, minimizing errors, and enhancing overall preparedness among healthcare professionals. Electronic Nursing Handover Systems (ENHS) and electronic checklists significantly outperformed traditional paper-based methods, resulting in enhanced handover efficiency, fewer clinical errors, and improved patient safety. Co-designed visual handover tools further demonstrated efficacy by improving the completeness of reports, particularly in resource-limited ICU settings, underscoring the importance of adaptable and context-sensitive communication innovations.

Despite these promising innovations, substantial organizational barriers continue to challenge the effectiveness of nurse-led ICU handovers. Nurses frequently face significant obstacles such as staffing shortages, inadequate managerial support, and the lack of standardized handover protocols. These barriers are compounded by high expectations for perfection and unilateral communication practices, which collectively heighten stress and diminish patient safety. Furthermore, broader institutional factors—such as ICU bed availability, staff experience and rapport, hospital transfer networks, and organizational policies—play a crucial role in ICU admission decisions and the effectiveness of subsequent handovers. Thus, addressing these multifaceted organizational challenges is critical for the sustained success and implementation of nurse-led collaborative handover innovations.

IV. CONCLUSION

This systematic literature review aimed to explore nurse-led collaborative innovations that shape safer ICU admissions by strengthening handover quality, communication, and interdisciplinary coordination. The findings underscore that longer and structured handovers, the use of validated tools, and targeted training programs significantly enhance information completeness and patient safety, addressing the core objective of identifying effective handover practices in critical care. Structured communication frameworks such as SBAR and ISBAR, alongside electronic nursing handover systems and checklists, have proven to reduce information omissions, improve efficiency, and minimize clinical errors, demonstrating their relevance to advancing safety standards in ICU admissions.

Beyond these positive interventions, the study highlights persistent organizational barriers, including staffing shortages, lack of standardized protocols, unilateral communication practices, and management deficiencies, which continue to compromise handover effectiveness and patient safety. Importantly, the review also reveals that factors such as ICU bed availability, staff experience, interpersonal rapport, and hospital policies substantially influence admission decisions, reflecting the complexity of achieving seamless critical care transitions. These findings contribute to bridging knowledge gaps by offering an integrated understanding of handover challenges and innovations, with implications for nursing leadership, interdisciplinary teamwork, and patient safety in diverse healthcare contexts.

While this review provides valuable insights, limitations include its reliance on studies published within a specific time frame, potential language or publication bias, and the varied methodological rigor across included studies, which may affect generalizability. Future research should explore the long-term sustainability of nurse-led handover innovations, evaluate their impact on clinical outcomes across different healthcare systems, and examine strategies to overcome entrenched organizational barriers. Strengthening institutional support and investing in structured, technology-integrated handover training will be essential steps toward shaping safer and more effective ICU admissions worldwide.

AUTHORS' CONTRIBUTIONS

The author confirms sole responsibility for all aspects of this work. This includes the conceptualization and design of the study, development of the methodology, literature search and data extraction, critical analysis and interpretation of the findings, drafting and revising the manuscript, and approving the final version for submission.

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