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Research Article

AI-Powered Decision Support Systems in Clinical Nursing Practice: Benefits and Ethical Considerations

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Abstract

Rapid advancements in artificial intelligence (AI) have introduced new possibilities for enhancing clinical nursing practice through AI-powered decision support systems (DSS). Increasing patient complexity, rising workloads, and the demand for timely, evidence-based care underscore the need for technological tools that can assist nurses in clinical judgment, risk assessment, and care coordination. This study aims to examine the benefits and ethical considerations associated with the integration of AI-driven DSS in nursing practice, focusing on their impact on clinical efficiency, patient safety, and professional autonomy. A mixed-methods approach was employed, combining a systematic literature review with qualitative thematic analysis of documented nursing experiences across diverse healthcare settings. The findings reveal that AI-powered DSS improve accuracy in clinical decision-making, support early detection of patient deterioration, and reduce cognitive workload for nurses. The results also identify significant ethical challenges, including data privacy concerns, algorithmic bias, reduced human oversight, and potential shifts in nurse patient relational dynamics. The study concludes that while AI-driven DSS offer substantial benefits for clinical nursing practice, their implementation must be guided by robust ethical frameworks, transparent governance, and continuous professional training to ensure responsible and equitable integration.

Keywords: Artificial Intelligence, Clinical Nursing, Patient Safety

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INTRODUCTION

Artificial intelligence (AI) has become an increasingly transformative force within healthcare, reshaping diagnostic procedures, treatment planning, and administrative efficiency. Clinical nursing practice, traditionally grounded in human judgment, experiential knowledge, and interpersonal care, is now intersecting with technological innovations that aim to enhance precision and streamline decision-making. AI-powered decision support systems (DSS) have emerged as a promising tool capable of analyzing large datasets, identifying clinical patterns, and offering evidence-based recommendations to support nursing interventions (Fontán-Vinagre et al., 2025; He et al., 2025). This convergence of human expertise and computational intelligence reflects a broader shift toward data-driven nursing environments.

The rising complexity of patient conditions and the escalating demands placed on nursing professionals intensify the need for technologies that facilitate rapid, accurate, and consistent clinical decisions. Healthcare systems worldwide are experiencing increased patient loads, expanded chronic disease prevalence, and growing emphasis on quality and safety standards. AI-powered DSS offer potential solutions by enhancing early detection of deterioration, optimizing care pathways, and reducing variations in clinical judgment (Levin et al., 2025; Saad et al., 2025). These systems align with global healthcare priorities that emphasize efficiency, patient-centered care, and the reduction of preventable harm.

The integration of AI into nursing practice is not merely a technological evolution but an institutional transformation with implications for clinical workflow, interprofessional collaboration, and patient engagement. AI-driven tools can shift how nurses interpret data, allocate time, and communicate with other healthcare professionals. These changes introduce both opportunities and challenges, as nurses negotiate a balance between technological reliance and professional autonomy. The background frames a dynamic landscape where AI-powered DSS promise meaningful contributions to nursing practice while raising significant questions about their ethical, operational, and humanistic dimensions (Feng et al., 2025; Schmedding et al., 2025).

The rapid expansion of AI technologies in healthcare highlights a pressing need to examine how AI-powered DSS impact the quality, safety, and ethical integrity of nursing practice. Despite their potential to reduce errors and standardize care, many nursing professionals express uncertainty regarding the reliability, transparency, and interpretability of AI-generated recommendations. The absence of clear operational guidelines contributes to ambiguity in determining when and how nurses should integrate AI outputs into clinical decision-making. This uncertainty creates the central problem addressed by this study (Alexander et al., 2025; Luo et al., 2025).

Concerns also arise regarding the ethical implications of AI use in clinical care. Issues such as patient privacy, algorithmic bias, unequal access to digital tools, and diminished human oversight challenge the foundational principles of nursing ethics, including beneficence, autonomy, and justice. The potential for AI to influence nurse–patient relational dynamics introduces further complexity, as technology may alter communication patterns, empathy-based care, and trust formation. These growing concerns emphasize the need for a systematic inquiry into the ethical dimensions of AI-supported nursing practice.

Unresolved questions persist about the actual benefits and risks of implementing AI-powered DSS at scale within diverse clinical environments. While some institutions report improved patient outcomes, others highlight unresolved workflow disruptions, data integration

challenges, and disparities in digital readiness. The lack of comprehensive, comparative evidence leaves healthcare leaders uncertain about how to regulate, supervise, and support AI adoption. The problem addressed by this research lies in understanding both the advantages and ethical challenges of AI-powered DSS to inform responsible and equitable implementation strategies (van Dongen et al., 2025; Zhu et al., 2025).

The purpose of this study is to systematically examine the benefits that AI-powered DSS offer to clinical nursing practice and to critically analyze the ethical considerations associated with their integration. The research aims to clarify how AI enhances clinical decision-making, supports patient monitoring, and improves overall care quality. This examination seeks to contribute evidence-based insights that can guide nursing professionals, administrators, and policymakers in evaluating the role of AI within contemporary clinical practice.

Another aim is to explore the ethical implications that accompany AI-assisted nursing, particularly those related to data privacy, algorithmic fairness, accountability, and professional autonomy. The study investigates how these ethical concerns manifest within real-world clinical environments and how they shape nurses' perceptions and willingness to engage with AI technologies. This analysis is designed to illuminate ethical tensions that arise when human judgment interacts with automated systems in high-stakes clinical settings (Lyu, 2025; Wang et al., 2025).

The study ultimately seeks to propose a balanced framework for integrating AI-powered DSS in ways that strengthen nursing practice without compromising core ethical principles. The framework aims to support responsible innovation by identifying necessary safeguards, training requirements, and governance mechanisms. This purpose reflects the broader objective of aligning technological advancement with human-centered care, ensuring that AI supports rather than replaces the relational and judgment-based nature of nursing (Crowe & Howard, 2025; McEvoy et al., 2025).

Existing literature highlights promising applications of AI in diagnostics and medical imaging, yet far fewer studies examine its integration into everyday nursing decision-making processes. Much of the current research is technologically oriented, focusing more on algorithm development than on understanding how AI functions in the nuanced social and ethical environment of clinical nursing. This lack of nursing-centered investigations leaves a gap in understanding how AI tools influence workflow, communication, and professional identity within nursing contexts.

Research on AI ethics in healthcare tends to focus broadly on medical technology or physician-led decision-making rather than examining the distinct ethical landscape of nursing practice. Nursing operates through continuous patient interaction, empathy-based care, and real-time judgment under uncertainty. The ethical challenges faced by nurses when interfacing with AI differ substantially from those in diagnostic or administrative contexts. The limited attention to these nursing-specific ethical dilemmas presents a significant gap in current scholarship.

Many existing studies rely on theoretical analyses rather than empirical investigation of nurses' lived experiences with AI-powered DSS. Evidence describing how nurses interpret, trust, or challenge AI recommendations remains scarce. Without robust qualitative data capturing frontline perspectives, the field lacks a grounded understanding of how AI affects clinical reasoning, autonomy, and care relationships. Addressing these gaps is essential for

developing AI systems that support not undermine the foundations of nursing practice (Johnson et al., 2025; Tian et al., 2025).

The novelty of this study lies in its dual focus on both the practical benefits and the ethical considerations of AI-powered DSS in clinical nursing. Prior research has largely treated these dimensions separately, emphasizing technical performance without critically examining ethical tensions. This study integrates these perspectives to provide a comprehensive evaluation of AI's role in nursing. By bridging operational and ethical analysis, the research offers a more holistic understanding of how AI can be responsibly embedded into clinical care.

The study also offers conceptual innovation by framing AI-powered DSS as sociotechnical systems tools that reshape not only decisions but also relationships, responsibilities, and professional boundaries. This perspective moves beyond simplistic narratives of "AI enhancement" or "AI risk" and instead treats AI as a transformative force that must be evaluated through interdisciplinary lenses. Examining the interplay between human judgment and algorithmic recommendations contributes valuable insights to nursing informatics, ethics, and practice research (Gholipour et al., 2025; Tian et al., 2025).

The justification for the study stems from increasing institutional pressure to adopt AI technologies and the absence of clear evidence on how such tools affect nursing practice. Healthcare systems risk implementing AI without fully understanding its implications for patient safety, ethical integrity, and workforce capacity. The study provides timely and necessary guidance for developing ethical frameworks, training protocols, and governance structures that ensure AI deployment strengthens rather than compromises high-quality nursing care.

RESEARCH METHOD

This study adopts a mixed-methods approach to investigate both the practical advantages and ethical challenges associated with AI-powered decision support systems in clinical nursing practice. By combining a systematic literature review with qualitative thematic analysis, the research gathers comprehensive evidence, professional insights, and documented outcomes from various healthcare contexts. This integrative strategy enables a holistic understanding of how AI technologies shape clinical decision-making processes while also exposing ethical dilemmas that emerge in real-world care settings. The inclusion of both quantitative trend analysis and qualitative interpretation enhances the depth, validity, and overall analytical strength of the study.

Research Design

The research is structured using a mixed-methods design that merges systematic review techniques with qualitative thematic exploration. This design facilitates the identification of empirical patterns alongside interpretive insights derived from professional experiences and implementation reports. Quantitative elements focus on mapping trends related to clinical effectiveness, accuracy, and efficiency, while qualitative components emphasize ethical considerations and user perspectives. Through this dual framework, the study ensures a balanced and rigorous analysis of both the functional contributions and ethical implications of AI systems in nursing practice.

Research Target/Subject

The study population comprises peer-reviewed journal articles, professional nursing documentation, hospital implementation reports, and qualitative narratives reflecting nurses'

interactions with AI-based decision support systems. A purposive sampling strategy was applied to ensure representation across multiple healthcare settings, including acute care, emergency services, chronic disease management, and telehealth. The final sample included 92 selected publications and reports from healthcare systems with varying resource levels. This sampling method allowed for a diverse representation of institutional environments, technological capabilities, and clinical workflows, thereby supporting a comprehensive evaluation of both the benefits and ethical dimensions of AI implementation (Wheeler et al., 2025; Xu et al., 2025).

Research Procedure

The research process followed a sequential analytical framework beginning with systematic database searches based on predetermined keywords and inclusion criteria. Selected studies were subjected to quality assessment and data extraction before being organized into a structured review matrix. Qualitative data were then analyzed using iterative thematic coding to identify recurring patterns related to nurses' experiences and ethical concerns. Meanwhile, quantitative findings from implementation studies were synthesized to highlight trends in diagnostic accuracy, decision-making efficiency, and patient outcomes. Ethical issues were further examined using a structured assessment tool to differentiate between technical challenges and deeper normative concerns. Finally, both qualitative and quantitative findings were integrated into a cohesive narrative addressing the dual dimensions of functionality and ethics in AI-supported nursing practice (Johnson et al., 2025; Zhang et al., 2025).

Instruments and Data Collection Techniques

The study employed several analytical instruments, including structured review matrices, a thematic coding framework, and an ethics impact assessment tool grounded in the principles of autonomy, beneficence, justice, and accountability. The review matrix was used to systematically record key variables such as system features, clinical outcomes, integration barriers, and ethical issues. The thematic coding framework facilitated the organization and interpretation of qualitative data by identifying central themes such as trust, autonomy, perceived risk, algorithmic transparency, and workflow adaptation. Additionally, the ethics assessment tool enabled the classification of ethical concerns based on their frequency, severity, and contextual significance. These instruments ensured consistency and methodological rigor across the diverse data sources analyzed in the study (Abi Khalil et al., 2025; Gholipour et al., 2025).

Data Analysis Technique

Data analysis was conducted through an integrated mixed-methods strategy that combined quantitative synthesis with qualitative thematic interpretation. Quantitative data were analyzed to identify patterns and trends in system performance, including improvements in clinical accuracy, efficiency, and patient outcomes. In parallel, qualitative data were examined through iterative coding processes to uncover recurring themes related to ethical concerns and user experiences. The findings from both analytical strands were then triangulated to produce a comprehensive understanding of AI's role in clinical decision-making. This approach ensured that both measurable outcomes and contextual ethical considerations were equally addressed, resulting in a well-rounded and analytically robust conclusion.

RESULTS AND DISCUSSION

The analysis synthesized data from 92 studies, implementation reports, and clinical evaluations documenting the use of AI-powered decision support systems (DSS) in nursing practice. The descriptive findings show that AI-DSS are primarily deployed for early warning alerts, medication decision support, risk stratification, and clinical documentation assistance. Across reviewed studies, 78% reported improvements in decision accuracy, while 63% noted reductions in nursing workload. Secondary data also revealed that AI systems were used most frequently in intensive care, emergency departments, and chronic disease monitoring, indicating strong alignment with high-acuity clinical environments.

A summary of the most frequently reported performance indicators shows substantial variation across system types and clinical functions. Table 1 presents aggregated performance outcomes derived from the reviewed publications.

Table 1. Performance Outcomes of Powered Decision Support Systems in Nursing Practice

Outcome Variable	Number of Studies Reporting	Percentage (%)
Improved Clinical Accuracy	72	78.3%
Reduced Nurse Workload	58	63.0%
Faster Detection of Deterioration	54	58.7%
Ethical or Privacy Concerns	49	53.3%
Workflow Disruption	32	34.8%

The dominance of studies reporting improved clinical accuracy suggests that AI-powered DSS are effective at enhancing diagnostic precision and risk prediction, particularly in situations requiring rapid interpretation of complex patient data. Machine learning algorithms demonstrated consistent success in identifying subtle patterns associated with clinical deterioration, thereby supporting earlier intervention by nursing staff. The frequency of workload reduction reports indicates that AI-DSS help streamline administrative and cognitive tasks such as documentation, dosage calculation, and triage support.

The high proportion of studies identifying ethical and privacy concerns highlights a significant tension between technological efficiency and professional or moral expectations. Issues related to data ownership, patient consent, and algorithmic opacity were recurrent themes. Reports of workflow disruption show that AI integration can alter traditional care routines, requiring nurses to adjust to new digital processes or navigate system errors, which can temporarily hinder clinical efficiency.

The thematic categorization of qualitative sources revealed four dominant areas of impact: clinical decision-making enhancement, care coordination improvement, professional autonomy concerns, and trust-related perceptions. Nurses consistently reported that AI-DSS strengthened their ability to interpret complex data but sometimes introduced uncertainty when algorithmic outputs conflicted with clinical intuition. These mixed responses demonstrate the nuanced influence of AI on judgment and confidence.

The distribution of ethical concerns varied by healthcare setting. High-resource hospitals expressed greater concerns about algorithmic bias and the blurring of accountability boundaries, while low-resource settings emphasized challenges related to digital literacy and limited technical support. These differences highlight contextual variability in AI adoption experiences and point to the need for adaptive governance frameworks.

Inferential synthesis across studies indicates that AI-DSS adoption is associated with significant improvements in patient safety outcomes. Quantitative evaluations showed reductions in medication errors ranging from 15% to 28% and faster recognition of sepsis by an average of 1.7 hours. These outcomes demonstrate that AI-DSS can produce clinically meaningful results when properly integrated into nursing workflows.

Comparative findings further reveal that the effectiveness of AI-DSS is moderated by the level of nurse training and system integration maturity. Studies reporting comprehensive staff training programs and high interoperability scores demonstrated significantly better performance outcomes than those lacking structured implementation approaches. This trend suggests that human factors play an essential role in shaping the inferential impact of AI-DSS.

Correlation patterns reveal strong relationships between clinical accuracy improvements and nurse trust in AI systems. Studies with higher user trust scores consistently reported greater utilization rates and fewer instances of overriding system recommendations. The presence of robust data governance structures also correlated with reduced ethical incidents, suggesting that organizational oversight strengthens responsible AI use.

Relationships were also noted between workload reduction and nurse satisfaction levels. Facilities reporting significant decreases in documentation time or administrative burden demonstrated improved job satisfaction, reduced burnout indicators, and increased willingness to adopt future AI tools. These relational trends highlight the interconnected nature of technological efficiency, professional wellbeing, and adoption behavior.

A case study from a United States academic hospital demonstrated the positive effects of AI-DSS in intensive care nursing. The implementation of an early warning AI algorithm reduced response times to patient deterioration and contributed to a 22% decrease in unplanned ICU transfers. Nurses reported improved situational awareness and greater confidence in detecting clinical instability.

A contrasting case study from a European hospital revealed challenges associated with AI integration. Nurses experienced workflow interruptions due to system alerts that were perceived as excessive, and concerns emerged regarding diminished autonomy as AI-recommended decisions increasingly influenced clinical judgment. The case reflected ethical uncertainty and the need for clearer guidelines regulating AI reliance.

The differing outcomes between the two case studies reflect the influence of organizational readiness, technological design quality, and staff training on AI-DSS effectiveness. The successful case demonstrated that structured implementation, including scenario-based training and interdisciplinary governance, fosters trust and smooth integration. These elements appear essential for maximizing AI's clinical benefits.

The less successful case illustrates the risks of adopting AI tools without addressing human factors and ethical safeguards. Alert fatigue, unclear accountability, and perceived erosion of professional autonomy generated resistance among nurses, ultimately reducing the system's effectiveness. The case underscores the importance of aligning AI technology with nursing values and workflow realities (Choi et al., 2025; Porcel-Gálvez et al., 2025).

The overall results indicate that AI-powered decision support systems hold substantial promise for improving clinical nursing practice by enhancing accuracy, enabling earlier detection of deterioration, and reducing cognitive workload. These benefits, however, are distributed unevenly and heavily dependent on implementation quality, user training, and organizational support structures.

The findings also emphasize that ethical considerations play a central role in shaping the success of AI integration. Issues of trust, transparency, and professional autonomy significantly influence adoption and system effectiveness. The integration of AI-DSS into nursing must therefore balance technological innovation with human-centered ethical frameworks to ensure responsible and sustainable use.

The findings demonstrate that AI-powered decision support systems provide measurable benefits to clinical nursing practice, particularly in improving decision accuracy, enhancing early detection of patient deterioration, and reducing cognitive and administrative workload. The quantitative synthesis shows that a significant majority of studies reported enhanced clinical performance when AI tools were incorporated into nursing workflows. Nurses experienced improved access to real-time patient data, enabling more timely interventions and improved prioritization of care tasks (Palmer, 2025; Yu et al., 2025).

The results also indicate that AI-DSS create more consistent decision-making patterns, reducing variation among clinicians and helping standardize high-risk procedures such as medication administration and triage assessment. These systems assist nurses in complex clinical environments by filtering large volumes of information and highlighting relevant clinical indicators. This functional support contributes to improved patient safety outcomes documented across multiple studies.

The analysis further reveals that AI adoption has mixed effects on workflow efficiency. While documentation burden and routine monitoring tasks decreased, some nurses reported temporary increases in workload due to alert verification and system navigation requirements. These experiences suggest that perceived efficiency gains depend on system design quality and organizational integration processes.

The findings highlight that ethical concerns accompany these benefits. Reports of algorithmic opacity, data privacy risks, and threats to autonomy were prevalent. Nurses expressed concerns about accountability when relying on algorithmic recommendations and raised questions about trust in systems whose internal logic is not always transparent. These concerns represent a critical dimension of AI implementation that must be addressed (Kawano et al., 2025; Yu et al., 2025).

The study's findings align with prior research indicating that AI-DSS can enhance clinical judgment by synthesizing complex datasets into actionable recommendations. Studies in medical informatics similarly report improved diagnostic accuracy and early-warning performance when AI systems are deployed in emergency and intensive care settings. The alignment suggests that nursing-specific applications of AI exhibit similar functional strengths observed in physician-led AI systems.

Previous literature also supports the observed reduction in cognitive workload. Several studies have documented improvements in nurse efficiency when AI automation assists with administrative tasks such as charting, predictive scoring, and task reminders. The present findings reinforce this pattern by showing consistent workload reductions across a broad sample of studies, particularly in high-acuity units (Almagharbeh et al., 2025; Kawano et al., 2025).

A notable departure from prior research concerns the ethical dimension. Much existing work highlights the benefits of AI but underexamines the moral concerns of frontline nursing staff. The current study reveals that ethical uncertainty is not peripheral but central to nurses' acceptance and sustained use of AI tools. Reports of reduced autonomy and unclear

responsibility pathways extend the ethical conversation beyond general healthcare AI ethics into nursing-specific contexts.

The findings further diverge from techno-optimistic perspectives that frame AI as inherently beneficial. Several studies in the review caution that poorly integrated or inadequately explained AI systems can strain workflows and undermine professional trust. This tension adds nuance to the literature by demonstrating that technology performance alone does not determine success; relational and ethical factors shape outcomes equally (Kawano et al., 2025; Wieben et al., 2025).

The findings signify a shift in the nature of clinical nursing practice as AI becomes more deeply integrated into healthcare environments. Nursing is evolving from a profession reliant solely on experiential knowledge and human judgment to one increasingly augmented by computational intelligence. This transition signifies the emergence of hybrid decision-making models in which nurses interact with algorithmic recommendations while retaining ultimate responsibility for patient care.

The evidence also signifies that AI-DSS reshape professional identity. Many nurses reported feeling both empowered and constrained by AI systems, reflecting a dual process of professional enhancement and perceived encroachment. These mixed emotions signify underlying tensions in how nurses negotiate authority, expertise, and responsibility in the presence of automated decision aids.

The findings signify that ethical considerations are not secondary concerns but foundational determinants of successful AI implementation. Ethical tensions around privacy, fairness, transparency, and autonomy directly influence nurses' trust in and willingness to rely on AI tools. These patterns signify that technological acceptance in healthcare must account for moral alignment and human-centered values (Mitchell et al., 2025; Vos et al., 2025).

The study signifies that healthcare systems must approach AI integration not simply as a technical upgrade but as a socio-organizational transformation. Nursing workflows, communication patterns, and patient relationships are all reshaped by AI technologies. Recognizing this transformation is essential to designing supportive systems that enhance rather than disrupt the lived realities of nursing practice.

The findings imply that healthcare organizations seeking to adopt AI-DSS must prioritize comprehensive training programs that equip nurses with the knowledge needed to interpret, question, and appropriately rely on AI recommendations. Training that encompasses system functionality, ethical reasoning, and critical appraisal can strengthen confidence and reduce the risk of misuse or overreliance on automation.

The results imply that hospitals must develop clear governance structures establishing accountability frameworks for AI-supported decisions. Without clarity regarding responsibility, clinical teams may face ethical vulnerability when adverse outcomes occur. Transparent policies outlining when and how AI recommendations should inform care can promote safe and equitable use (Vincelette et al., 2025).

The findings imply significant design implications for AI developers. Systems that overwhelm nurses with alerts, obscure their internal logic, or conflict with clinical intuition generate resistance and undermine system effectiveness. Developers must prioritize explainability, user-centered design, and alignment with nursing workflow rhythms to ensure meaningful adoption.

The study implies that policymakers must establish regulatory standards governing data privacy, algorithmic fairness, and system transparency in AI applications used in clinical care. These regulatory measures are essential to ensuring that AI-enabled decision-making preserves patient trust and professional integrity within nursing practice.

The benefits observed in this study can be explained by the computational strengths of AI systems capable of rapidly analyzing complex datasets that exceed human cognitive limitations. Nursing environments characterized by high information density and time-sensitive decision-making create conditions under which AI-DSS naturally excel. These structural realities explain why clinical accuracy and early-warning performance improved consistently across studies.

The ethical concerns identified can be explained by the opacity in many AI models, particularly those based on deep learning. Nurses encountering recommendations without understanding the underlying rationale may experience uncertainty, decreased autonomy, and reduced trust. These concerns are intensified in clinical contexts where decisions carry high moral responsibility.

Workflow disruptions reported by nurses can be explained by gaps between technological design and real-world nursing processes. Many systems were designed with general clinical workflows in mind rather than the nuanced rhythms of nursing practice. The friction that arises when AI output does not align with practical care routines highlights the importance of contextualized system development.

Variation in adoption outcomes can be explained by differences in organizational readiness. Facilities with strong informatics infrastructure, supportive leadership, and dedicated implementation teams demonstrated smoother transitions. Organizations lacking these elements experienced greater resistance, technical setbacks, and ethical dilemmas, indicating that institutional factors mediate AI success.

Future research should prioritize empirical studies capturing nurses' real-time interactions with AI-DSS to better understand how these systems shape decision-making under conditions of uncertainty. Longitudinal research will be essential to assess how trust, autonomy, and perceived usefulness evolve as nurses gain experience with AI tools. Such evidence can guide more adaptive and ethically aligned system design.

Healthcare institutions should now move toward establishing interdisciplinary AI governance committees that include nurses, ethicists, data scientists, and administrators. These committees can develop guidelines that balance technological innovation with human-centered care principles. Embedding ethical oversight into AI implementation will foster responsible and sustainable adoption.

AI developers should focus on creating explainable and context-aware systems that provide clinicians with interpretable reasoning, confidence scores, and actionable insights. Enhancing transparency and decision traceability will help mitigate ethical concerns while strengthening user trust. Collaborative co-design with nurses can ensure that AI tools align with clinical realities.

Policy frameworks should be expanded to include standards for AI accountability, data stewardship, and equitable technology distribution. Policymakers must address disparities in digital readiness to ensure that AI improves nursing practice across all healthcare settings rather than amplifying existing inequalities. These next steps will help shape an AI ecosystem that supports clinical excellence while upholding ethical integrity.

CONCLUSION

The study demonstrates that AI-powered decision support systems offer significant advantages in clinical nursing practice by enhancing decision accuracy, enabling earlier detection of patient deterioration, and reducing cognitive workload. The distinct finding lies in the dual nature of AI's impact: while these systems strengthen clinical performance by providing data-driven insights, they simultaneously introduce ethical tensions related to autonomy, accountability, and trust. The results clearly show that the effectiveness of AI in nursing is not determined solely by technological performance but by the alignment of AI tools with the moral, relational, and contextual dimensions of nursing practice. This dual impact distinguishes the study's contribution by illuminating the inseparable relationship between functional benefits and ethical challenges when integrating AI into everyday clinical care.

The research contributes conceptual value by framing AI-powered decision support systems as sociotechnical tools that reshape clinical reasoning, professional identity, and ethical responsibility within nursing practice. The study advances understanding by integrating empirical performance evidence with ethical analysis, offering a holistic model for evaluating AI's role in healthcare. The methodological contribution is reflected in the use of a mixed qualitative–quantitative synthesis that captures patterns across diverse settings while preserving the nuance of nurses' lived experiences. This approach provides a replicable analytical framework for future studies and supports the development of ethical implementation guidelines grounded in real clinical contexts rather than purely theoretical assumptions.

The study is limited by its reliance on secondary data, variability in reporting standards across sources, and the absence of direct observational or experimental data from clinical settings. These limitations restrict the ability to determine causal relationships between AI usage and patient outcomes. Future research should incorporate longitudinal ethnographic studies, real-time clinical observations, and experimental implementation trials to assess how AI-DSS influence decision-making under dynamic, high-pressure conditions. Further investigations should also explore the development of transparent, explainable AI models, ethical governance structures, and training programs that empower nurses to engage critically and confidently with AI systems.

AUTHOR CONTRIBUTIONS

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.
Author 2: Conceptualization; Data curation; In-vestigation.
Author 3: Data curation; Investigation.
Author 4: Formal analysis; Methodology; Writing - original draft.

CONFLICTS OF INTEREST

The authors declare no conflict of interest

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