Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

AI-Augmented Nursing Care: Integrating Human Judgment, Mental Health, and Intelligent Technologies in Contemporary Clinical Practice

Biruk Awata

birukg@wcu.edu.et

Wachemo University https://orcid.org/0009-0003-0389-8741

Systematic Review

Keywords: Artificial Intelligence, Nursing Informatics, Clinical Decision Support, Human-Centered Care, Mental Health, Nurse-AI Collaboration

Posted Date: July 22nd, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10424558/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License.
Read Full License

Additional Declarations: The authors declare no competing interests.

Abstract

Background

Artificial intelligence (AI) is increasingly influencing healthcare delivery by supporting clinical decision-making, improving workflow efficiency, and expanding access to health information. In nursing, however, effective care depends not only on technological advances but also on empathy, professional judgment, therapeutic communication, and patient-centered practice. As AI becomes more widely integrated into clinical settings, understanding its impact on nursing practice, cognitive processes, and mental health has become increasingly important.

Objective

This structured literature review explores current evidence regarding AI-supported nursing care, with particular emphasis on its influence on clinical reasoning, cognitive performance, therapeutic nurse-patient relationships, and mental health outcomes. The review also examines how intelligent technologies can be incorporated into nursing practice while preserving the human values that define the profession.

Methods

A structured literature search was conducted using major scientific databases, including PubMed/MEDLINE, CINAHL, Scopus, Web of Science, and IEEE Xplore. Eligible studies examined the application of AI within nursing practice, clinical decision support, cognitive performance, patient experiences, and mental health care. The retrieved evidence was critically evaluated and synthesized thematically to identify recurring patterns, emerging opportunities, implementation challenges, and future directions for AI-assisted nursing.

Results

The reviewed literature indicates that AI can strengthen nursing practice by improving risk identification, supporting clinical decision-making, reducing documentation burden, and facilitating timely interventions. These advantages may enable nurses to dedicate more time to direct patient care and therapeutic engagement. Nevertheless, several concerns remain, including automation bias, excessive dependence on algorithmic recommendations, ethical challenges, data privacy, and the potential erosion of critical thinking if AI systems are used without appropriate professional oversight. Most evidence suggests that AI is most effective when it complements rather than replaces nurses' expertise, compassion, and clinical judgment.

Conclusion

AI has considerable potential to enhance nursing practice when introduced responsibly within ethically grounded and patient-centered models of care. Although intelligent technologies can improve efficiency and support evidence-informed decisions, they cannot substitute for the empathy, clinical reasoning, and therapeutic relationships that remain central to professional nursing. Future developments should prioritize collaborative human-AI partnerships that strengthen, rather than diminish, the quality and humanity of nursing care.

1. Introduction

Artificial intelligence (AI) is rapidly transforming healthcare by introducing technologies capable of supporting clinical decision-making, automating routine tasks, and improving the management of increasingly complex health information [1]. Recent advances in machine learning, natural language processing, and predictive analytics have expanded the role of AI beyond administrative functions, allowing these technologies to contribute directly to patient assessment, risk prediction, and clinical management [15]. As healthcare systems continue to adopt digital innovations, nurses are becoming central participants in the effective and responsible use of AI-enabled tools [3].

Nursing practice extends beyond the delivery of technical interventions. It is founded on professional judgment, compassionate communication, ethical responsibility, and therapeutic relationships that respond to the individual needs of patients [2]. While AI can efficiently analyze large volumes of clinical data and generate evidence-informed recommendations [1], it cannot replicate the empathy, contextual understanding, and interpersonal skills that characterize professional nursing [2]. Consequently, integrating AI into nursing practice should be viewed as an opportunity to strengthen—not replace—the unique contributions of nurses [11].

The growing use of AI also raises important questions regarding its influence on nurses' cognitive processes [9]. Decision-support systems may reduce cognitive workload by rapidly identifying patterns that are difficult for clinicians to detect manually [5]. However, excessive dependence on algorithm-generated recommendations may contribute to automation bias [8], weaken independent clinical reasoning [9], and affect the development of professional expertise, particularly among less experienced nurses [9]. Preserving critical thinking while benefiting from technological innovation therefore remains an important challenge for contemporary nursing practice [9].

Mental health care provides another important perspective for evaluating AI integration [16]. Therapeutic communication, trust, and emotional support are fundamental elements of nursing care that influence patient experiences and health outcomes [16]. AI-assisted technologies may improve early detection of psychological distress, facilitate timely interventions, and expand access to mental health services [16]. Nevertheless, concerns remain that excessive reliance on digital systems could unintentionally reduce

meaningful human interaction, potentially affecting patient satisfaction and the quality of therapeutic relationships [10].

The ethical implications of AI adoption have also become increasingly significant [12]. Issues surrounding patient privacy, algorithmic transparency, accountability, fairness, and professional autonomy [12] require careful consideration before intelligent technologies are incorporated into routine clinical care. Ensuring that AI systems operate within ethical and patient-centered frameworks is essential for maintaining public trust and preserving professional standards [12].

Given these opportunities and challenges, there is a growing need to critically examine how AI influences nursing practice from clinical, cognitive, ethical, and psychological perspectives [4]. Rather than viewing technology and nursing expertise as competing forces, current evidence increasingly supports a collaborative model in which AI enhances nurses' capabilities while preserving professional judgment and compassionate care [11].

Accordingly, this structured literature review synthesizes current evidence on AI-supported nursing practice with emphasis on three interconnected areas: (1) the contribution of AI to clinical decision-making and cognitive performance [5]; (2) its influence on nurse-patient relationships and mental health outcomes [16]; and (3) the ethical, educational, and professional considerations associated with human-AI collaboration [12]. By integrating findings from recent literature, this review proposes a balanced perspective that positions AI as a supportive clinical resource designed to strengthen, rather than replace, the knowledge, experience, and humanity that define nursing practice [11].

2. Background and Theoretical Framework

2.1 Evolution of Artificial Intelligence in Nursing

The integration of digital technologies into nursing has progressed considerably over the past several decades [17]. Early developments in nursing informatics primarily focused on electronic health records, digital documentation, and data management systems that improved the storage and accessibility of patient information [17]. More recently, advances in artificial intelligence have expanded these capabilities by introducing machine learning algorithms, natural language processing, computer vision, and predictive analytics into everyday clinical practice [1].

These technologies are increasingly being applied to support clinical decision-making, identify patients at risk of deterioration, optimize workflow, and improve the quality of healthcare delivery [5]. As healthcare organizations continue to address growing patient demands, workforce shortages, and increasing clinical complexity, AI has emerged as a promising tool for enhancing efficiency and supporting evidence-informed nursing practice [1]. Nevertheless, technological innovation should be regarded as a means of strengthening professional practice rather than replacing the expertise and judgment of nurses [11].

2.2 Cognitive Processes in Nursing Practice

Clinical decision-making is one of the defining characteristics of professional nursing [9]. It requires nurses to integrate scientific knowledge with clinical experience, patient preferences, environmental factors, and ethical considerations [9]. Unlike algorithm-driven systems that rely primarily on statistical prediction [19], nurses frequently make decisions within complex and unpredictable situations where contextual understanding and professional intuition play essential roles [9].

Artificial intelligence offers valuable support by rapidly processing extensive datasets and identifying patterns that may not be immediately apparent to clinicians [1]. Such capabilities can reduce cognitive workload [6], improve diagnostic accuracy [5], and facilitate timely clinical interventions [7]. However, the increasing availability of automated recommendations also introduces important challenges [8]. Overdependence on AI-generated advice may reduce independent reasoning [9], encourage automation bias [8], and limit opportunities for developing higher-order clinical judgment, particularly among novice practitioners [9].

For these reasons, AI should function as an aid to clinical reasoning rather than its substitute [11]. Human interpretation remains indispensable because patient care extends beyond measurable clinical indicators to include psychological, social, cultural, and ethical dimensions that cannot always be captured by computational models [20].

2.3 Therapeutic Relationships and Mental Health

Therapeutic communication forms the foundation of effective nursing care and is especially important in promoting positive mental health outcomes [22]. Trust, empathy, active listening, and emotional support enable nurses to understand patients' concerns while fostering confidence and engagement throughout the care process [22]. These interpersonal interactions often influence treatment adherence, coping strategies, and overall patient well-being [22].

The introduction of AI into clinical environments creates a new dynamic within the traditional nurse-patient relationship [10]. Intelligent systems can enhance care by supporting early recognition of psychological distress, monitoring behavioral changes, and facilitating timely interventions [16]. At the same time, concerns have been raised that excessive dependence on technological interfaces could reduce opportunities for meaningful human interaction if digital systems begin to dominate clinical encounters [10].

Consequently, successful implementation of AI in mental health nursing requires careful integration that preserves compassionate communication while using technology to complement, rather than replace, therapeutic relationships [10].

2.4 Conceptual Framework: Human-AI Collaboration in Nursing

This review is guided by a conceptual framework that views nursing care as a collaborative partnership between three interconnected components: the nurse, the AI system, and the patient [11].

Within this framework, nurses contribute professional judgment, ethical decision-making, empathy, and therapeutic presence—qualities developed through education, clinical experience, and continuous reflection [9]. Artificial intelligence contributes rapid information processing, predictive modeling, pattern recognition, and evidence-based decision support that can strengthen clinical efficiency and accuracy [1]. Patients remain the central focus of this partnership, with health outcomes depending on the effective integration of technological capability and compassionate human care [13].

Rather than functioning independently, nurses and AI continuously inform one another throughout the clinical decision-making process [23]. AI-generated insights require interpretation within each patient's unique clinical and social context, while nurses provide the professional oversight necessary to evaluate recommendations, resolve uncertainties, and ensure that decisions remain ethically appropriate and patient-centered [11].

Accordingly, this collaborative model recognizes AI as a supportive clinical resource that extends nurses' capabilities without diminishing their professional autonomy [11]. Optimal patient care is achieved when intelligent technologies enhance, rather than replace, the empathy, critical thinking, and clinical expertise that remain central to high-quality nursing practice [11].

3. Methods

3.1 Study Design

This study employed a structured literature review to examine the evolving role of artificial intelligence in nursing practice. A structured review approach was selected because it provides flexibility to synthesize evidence from diverse research designs while maintaining a transparent and reproducible search protocol. Given the multidisciplinary nature of AI in healthcare, this approach was considered appropriate for integrating evidence from nursing, medicine, health informatics, psychology, and ethics. Rather than statistically combining findings, the review sought to identify recurring themes, highlight areas of consensus and disagreement, and explore their implications for contemporary nursing practice.

3.2 Literature Search Strategy

A structured search of the scientific literature was undertaken using major electronic databases, including PubMed/MEDLINE, CINAHL, Scopus, Web of Science, and IEEE Xplore. These databases were selected because they index a broad range of nursing, healthcare, and technological research relevant to AI applications in clinical settings.

The search strategy combined Medical Subject Headings (MeSH) and free-text keywords related to artificial intelligence, machine learning, nursing informatics, clinical decision support, patient care, cognitive processes, mental health, and therapeutic relationships. Boolean operators ("AND" and "OR")

were used to refine the search and maximize retrieval of relevant studies. To ensure that the review reflected current developments in the field, publications published between January 2018 and December 2025 (covering the period up to manuscript preparation) and written in English were considered eligible.

3.3 Eligibility Criteria

Studies were included if they:

- Were published in peer-reviewed journals;
- Reported original research, systematic reviews, narrative reviews, or theoretical analyses;
- Examined the application of artificial intelligence within nursing practice or healthcare settings involving nurses;
- Addressed clinical decision support, cognitive performance, nurse-patient interaction, patient outcomes, or mental health; and
- Contributed evidence relevant to the objectives of this review.

Studies were excluded if they:

- Focused exclusively on AI applications without relevance to nursing practice;
- Described technical algorithm development without clinical implications;
- Were conference abstracts lacking full-text publications; or
- Consisted solely of opinion papers or other non-peer-reviewed literature.

3.4 Data Extraction and Narrative Synthesis

Eligible publications were reviewed in detail to determine their relevance, methodological quality, and contribution to the objectives of the review. Information extracted from each study included publication characteristics, AI application, study focus, principal findings, and implications for nursing practice.

The evidence was synthesized using a thematic narrative approach. Findings were organized into five major themes: (1) current applications of AI in nursing; (2) effects on clinical decision-making and cognitive performance; (3) implications for nurse-patient relationships and mental health; (4) ethical and professional considerations; and (5) challenges and facilitators associated with implementation. During synthesis, similarities and inconsistencies across studies were critically examined to identify emerging patterns, unresolved questions, and areas requiring further investigation.

This interpretive approach enabled a comprehensive understanding of how AI is influencing nursing practice while acknowledging the diversity of available evidence and the rapidly evolving nature of the field.

4. Results

4.1 Current Applications of Artificial Intelligence in Nursing Practice

The reviewed literature demonstrates that artificial intelligence has become an integral component of modern nursing practice, with applications extending across multiple areas of patient care and healthcare management [1]. Rather than serving a single function, AI technologies support nurses throughout the continuum of care by improving clinical assessment, facilitating decision-making, enhancing documentation, and promoting patient safety [5]. Collectively, these applications have the potential to improve both the efficiency and quality of nursing services [1].

Clinical Decision Support

One of the most widely reported applications of AI is the development of clinical decision support systems (CDSS) [5]. These systems analyze information from electronic health records, laboratory investigations, physiological monitoring, and other clinical data sources to generate evidence-informed recommendations and early warning alerts [5]. Studies consistently indicate that AI-supported CDSS improve the early recognition of patient deterioration, enabling nurses to identify high-risk individuals sooner and initiate appropriate interventions before complications become clinically apparent [5]. Common applications include the prediction of sepsis, prevention of pressure injuries, assessment of fall risk, and detection of acute clinical deterioration [36].

Documentation and Workflow Management

Administrative responsibilities remain a major contributor to nursing workload [18]. Recent advances in natural language processing and speech-recognition technologies have created opportunities to simplify clinical documentation by automating routine recording tasks [6]. AI-assisted documentation systems can organize patient information, generate structured clinical notes, and reduce repetitive data entry [6]. As a result, nurses may spend less time completing documentation and more time providing direct patient care, thereby improving workflow efficiency and reducing cognitive fatigue [6].

Continuous Patient Monitoring

AI has also expanded the capabilities of patient monitoring through the integration of wearable devices, intelligent sensors, and computer vision technologies [37]. These systems continuously evaluate physiological parameters and behavioral changes, allowing subtle signs of clinical deterioration to be recognized before they become evident during routine assessment [37]. In mental health settings, AI-assisted monitoring has shown promise in identifying emotional distress, behavioral changes, and early cognitive decline through analysis of speech characteristics, facial expressions, and activity patterns [16]. Such innovations may facilitate earlier intervention while supporting proactive rather than reactive models of care [16].

Virtual Nursing Support

Virtual assistants and AI-powered conversational agents are increasingly being incorporated into healthcare delivery to supplement nursing services [3]. These technologies provide patient education, medication reminders, symptom screening, and responses to frequently asked health-related questions [3]. Although they cannot replace professional nursing care, they offer continuous access to basic health information and reinforce patient self-management between clinical encounters [3]. Evidence suggests that these systems may improve treatment adherence, strengthen patient engagement, and extend nursing support beyond traditional healthcare environments [3].

Overall, the literature indicates that AI is most effective when implemented as a supportive clinical resource that enhances nursing practice without diminishing the essential contribution of professional judgment, compassionate communication, and individualized patient care [11].

4.2 Influence of Artificial Intelligence on Clinical Decision-Making and Cognitive Performance

The integration of artificial intelligence into nursing practice has significantly influenced how clinical decisions are made and how information is processed during patient care [5]. Across the reviewed studies, AI consistently demonstrated its ability to strengthen decision support by rapidly analyzing large volumes of clinical data, recognizing complex patterns, and generating evidence-informed recommendations [1]. These capabilities enable nurses to identify potential risks earlier, prioritize patient needs more effectively, and respond promptly to changes in clinical condition [5].

Several studies reported that AI-assisted decision support systems reduce the cognitive demands associated with routine analytical tasks [21]. By synthesizing laboratory findings, vital signs, medication histories, and electronic health record data, these systems provide timely information that assists nurses in making informed clinical judgments [5]. This support is particularly valuable in busy clinical environments where large amounts of information must be interpreted within limited timeframes [18]. Consequently, nurses may be able to devote greater attention to direct patient care, communication, and other aspects of practice that require human interaction [6].

Despite these advantages, the literature also highlights important challenges associated with increasing reliance on intelligent technologies [8]. One of the most frequently discussed concerns is **automation bias**, in which clinicians place excessive confidence in algorithm-generated recommendations while giving insufficient consideration to their own clinical observations and professional judgment [8]. When AI outputs are accepted without careful evaluation, there is a risk that subtle but clinically important patient characteristics may be overlooked, particularly those that cannot be adequately represented by digital data alone [20].

Another recurring concern relates to the long-term development of clinical expertise [9]. Nursing competence evolves through repeated patient encounters, reflective practice, and the interpretation of complex clinical situations [9]. If AI assumes too great a role in routine decision-making, opportunities for developing independent reasoning and problem-solving skills may gradually diminish, especially among students and early-career nurses who are still acquiring professional experience [9]. For this

reason, AI should be viewed as a source of additional clinical insight rather than a substitute for professional judgment [11].

The reviewed evidence further emphasizes that effective nursing decisions extend beyond objective clinical measurements [20]. Social circumstances, cultural beliefs, emotional well-being, family dynamics, and patient preferences frequently influence care decisions but cannot always be interpreted accurately by computational models [20]. Nurses remain uniquely positioned to integrate these contextual factors with AI-generated information to develop individualized plans of care that are both clinically appropriate and responsive to patient needs [9].

Overall, current evidence supports a collaborative approach in which AI enhances cognitive performance without replacing human reasoning [11]. The greatest benefits appear when intelligent technologies function as decision-support tools that complement nurses' knowledge, experience, and critical thinking while preserving professional autonomy and accountability [11]. Maintaining this balance is essential for ensuring that technological innovation strengthens, rather than weakens, the quality and safety of nursing care [11].

4.3 Effects of Artificial Intelligence on Nurse-Patient Relationships and Mental Health

The relationship between nurses and patients remains one of the most influential determinants of high-quality healthcare [22]. Therapeutic communication, empathy, trust, and emotional support are fundamental components of nursing practice that contribute not only to patient satisfaction but also to psychological well-being and recovery [22]. As artificial intelligence becomes increasingly integrated into clinical care, understanding its influence on these human interactions has become an important area of investigation [10].

The evidence reviewed suggests that AI can indirectly strengthen therapeutic relationships by reducing administrative demands placed on nurses [6]. Technologies that automate documentation, organize clinical information, and support routine monitoring may free valuable time that can be redirected toward direct patient care [6]. When nurses spend less time performing repetitive administrative tasks, they have greater opportunities to engage in meaningful conversations, provide emotional support, and develop stronger therapeutic partnerships with patients [6]. Several studies reported improvements in job satisfaction and perceived quality of care when AI was used to reduce workload while preserving clinical autonomy [6].

Artificial intelligence also demonstrates considerable potential within mental health care [16]. Machine learning algorithms are increasingly capable of recognizing behavioral patterns associated with depression, anxiety, emotional distress, and cognitive decline before these conditions become clinically apparent [16]. Early identification allows healthcare professionals to initiate timely interventions, potentially improving treatment outcomes and reducing the progression of psychological disorders [16]. In addition, AI-powered digital platforms, including conversational agents and cognitive behavioral

therapy applications, may provide continuous support between clinical encounters, particularly for individuals with limited access to mental health services [16].

Another important advantage identified in the literature is the capacity of AI to facilitate more individualized care [7]. By integrating information from multiple clinical and behavioral data sources, intelligent systems can assist nurses in tailoring interventions according to each patient's health status, preferences, and potential risks [7]. Such personalized approaches may improve treatment adherence, patient engagement, and overall satisfaction with care while promoting more consistent implementation of evidence-based nursing interventions [7].

Despite these promising developments, the reviewed studies consistently emphasize that technological advancement should not compromise the human dimensions of nursing [10]. Excessive dependence on digital systems may unintentionally reduce face-to-face communication, limit opportunities for therapeutic interaction, and create perceptions of impersonal care [10]. Patients experiencing emotional vulnerability often value compassionate presence, attentive listening, and genuine interpersonal connection—qualities that remain beyond the capability of artificial intelligence [10].

Trust also represents an important consideration [12]. Although many patients appreciate the additional safety and efficiency offered by AI-supported care, others express uncertainty regarding algorithm-based clinical recommendations, particularly when the underlying decision-making processes are not transparent [12]. Concerns surrounding explainability, privacy, and data security may influence patients' willingness to accept AI-assisted healthcare [12]. Building confidence therefore requires clear communication about the role of AI and continued professional oversight by nurses [12].

From the perspective of healthcare professionals, AI adoption has generated both enthusiasm and apprehension [3]. Many nurses recognize the potential of intelligent technologies to improve efficiency and clinical performance, whereas others remain concerned about maintaining professional autonomy, preserving clinical judgment, and safeguarding the humanistic values that define nursing [3]. These perspectives underscore the importance of comprehensive education, ethical governance, and organizational support during AI implementation [24].

Overall, the evidence indicates that AI has the greatest positive impact when it enhances—not replaces—the therapeutic relationship [10]. Technology should be regarded as a supportive resource that enables nurses to devote greater attention to compassionate, individualized, and psychologically responsive care [14]. Preserving this balance is essential to ensure that technological innovation contributes to improved mental health outcomes while maintaining the trust, empathy, and human connection that remain at the heart of professional nursing practice [10].

4.4 Ethical Considerations in AI-Augmented Nursing Care

The expanding use of artificial intelligence in nursing has created important ethical questions that extend beyond technical performance [12]. While AI offers opportunities to improve efficiency, support

clinical decisions, and enhance patient outcomes, its implementation must be guided by ethical principles that protect patient rights, preserve professional integrity, and promote equitable healthcare [12]. The literature consistently emphasizes that technological innovation should complement, rather than compromise, the ethical foundations of nursing practice [12].

Accountability and Professional Responsibility

One of the most widely discussed ethical concerns relates to accountability when AI contributes to clinical decision-making [12]. Although intelligent systems can generate recommendations based on extensive data analysis, responsibility for patient care ultimately remains with healthcare professionals [12]. Nurses must critically evaluate AI-generated outputs, integrate them with their own clinical assessment, and determine whether the recommendations are appropriate for each patient's unique circumstances [12]. Maintaining professional accountability is essential to ensure that technology supports, rather than replaces, informed clinical judgment [12].

Algorithmic Bias and Health Equity

The reliability of AI systems depends largely on the quality and diversity of the data used during their development [19]. When training datasets fail to adequately represent different populations, algorithms may unintentionally reproduce or amplify existing healthcare disparities [19]. Such bias can influence risk prediction, diagnosis, treatment recommendations, and access to care, potentially leading to unequal health outcomes among vulnerable groups [19]. Consequently, continuous evaluation of AI systems is necessary to identify and minimize bias while promoting fairness, inclusiveness, and equitable healthcare delivery [12].

Privacy, Confidentiality, and Data Security

Artificial intelligence relies on large volumes of patient information to generate accurate predictions and clinical recommendations [12]. This dependence on extensive health data raises important concerns regarding confidentiality, informed consent, cybersecurity, and responsible data management [12]. Healthcare organizations implementing AI technologies should establish robust governance frameworks that protect sensitive information, comply with applicable legal and ethical standards, and maintain public confidence in digital health systems [12]. Transparency regarding how patient information is collected, stored, and used remains essential for sustaining trust [12].

Professional Autonomy and Human Oversight

Another recurring theme in the literature concerns the preservation of nurses' professional autonomy [3]. Although AI can provide valuable analytical support, it should not diminish the independent decision-making responsibilities of nurses or reduce opportunities for critical clinical reasoning [9]. Effective nursing care requires contextual interpretation, ethical reflection, and compassionate communication—capabilities that remain uniquely human [2]. Human oversight is therefore indispensable to ensure that

AI recommendations are interpreted appropriately and adapted to each patient's clinical, psychological, cultural, and social context [11].

Ethical Integration of Artificial Intelligence

The evidence suggests that successful implementation of AI in nursing depends not only on technological capability but also on strong ethical governance [12]. Healthcare institutions should establish clear policies defining the appropriate use of AI, promote transparency in algorithm development, provide education on ethical decision-making, and encourage multidisciplinary collaboration among nurses, clinicians, engineers, ethicists, and policymakers [12]. Such collaborative approaches can help ensure that intelligent technologies remain aligned with the core values of nursing while supporting safe, equitable, and patient-centered care [12].

Overall, ethical practice should remain the guiding principle for AI adoption in healthcare [12]. Intelligent technologies can enhance clinical performance and improve efficiency, but they should always function within frameworks that respect patient dignity, protect professional accountability, and reinforce the human values that distinguish nursing as a caring profession [12].

4.5 Implementation Challenges and Facilitators

Although artificial intelligence has demonstrated considerable potential to improve nursing practice, translating these innovations into routine clinical care remains a complex process [34]. The literature consistently indicates that successful implementation depends not only on technological capability but also on organizational readiness, workforce preparedness, leadership commitment, and continuous evaluation [34]. Healthcare institutions must therefore adopt a comprehensive strategy that addresses both technical and human factors [34].

Nurse Engagement in System Development

One of the strongest facilitators of successful AI adoption is the active involvement of nurses throughout the design, development, implementation, and evaluation of intelligent technologies [34]. Because nurses are the primary users of many clinical information systems, their practical experience provides valuable insights into workflow requirements, patient safety concerns, and usability issues [34]. AI solutions developed with meaningful nursing participation are more likely to reflect real clinical needs, integrate smoothly into existing practice, and gain acceptance among healthcare professionals [34].

Education and Digital Competency

The introduction of AI into healthcare has created new educational requirements for the nursing workforce [24]. Beyond learning how to operate digital tools, nurses must understand the strengths, limitations, and ethical implications of AI-assisted decision-making [24]. Educational programmes should therefore include training in data interpretation, algorithmic bias, automation bias, digital ethics, and critical appraisal of AI-generated recommendations [24]. Strengthening these competencies enables

nurses to use technology confidently while maintaining independent clinical judgment and professional accountability [24].

Organizational Leadership and Change Management

Institutional support plays a decisive role in the successful integration of AI into nursing practice [34]. Healthcare organizations should establish clear implementation strategies, allocate adequate financial and technical resources, and provide ongoing leadership throughout the transition process [34]. Transparent communication, multidisciplinary collaboration, and opportunities for staff feedback can reduce resistance to change while promoting confidence in new technologies [34]. Leadership commitment is particularly important for fostering a culture that values innovation without compromising patient safety or professional standards [34].

Continuous Evaluation and Quality Improvement

Artificial intelligence systems should not be regarded as static technologies but as tools requiring continuous monitoring and refinement [34]. Regular evaluation of system performance allows healthcare organizations to identify unintended consequences, assess clinical effectiveness, and determine whether AI applications continue to meet patient and organizational needs [34]. Feedback from nurses, patients, and other healthcare professionals should inform periodic updates that improve usability, safety, and clinical relevance [34]. Embedding AI within existing quality improvement frameworks can further support sustainable implementation and encourage ongoing organizational learning [34].

Future Directions for Clinical Integration

The evidence suggests that the future success of AI in nursing will depend on achieving an appropriate balance between technological innovation and human-centered care [11]. Intelligent systems should be designed to support—not dominate—clinical practice, allowing nurses to retain responsibility for ethical decision-making, individualized care planning, and therapeutic communication [11]. As AI technologies continue to evolve, collaborative partnerships among clinicians, researchers, educators, software developers, and policymakers will be essential for ensuring that innovation remains aligned with the principles of safe, equitable, and compassionate healthcare [11].

Overall, effective implementation extends beyond acquiring advanced technology [34]. It requires sustained investment in education, ethical governance, interdisciplinary collaboration, and organizational support to ensure that AI strengthens nursing practice while preserving the professional values and patient-centered approach that define high-quality care [34].

5. Discussion

5.1 Interpretation of the Evidence

The findings of this structured review indicate that artificial intelligence has the potential to reshape nursing practice by supporting clinical decision-making, improving workflow efficiency, and expanding opportunities for individualized patient care [1]. Across the reviewed literature, AI consistently demonstrated value in processing complex clinical information, identifying early indicators of patient deterioration, and assisting nurses in prioritizing interventions [5]. These capabilities may contribute to safer care, particularly in environments characterized by high patient acuity and increasing workforce demands [1].

Despite these advantages, the evidence also highlights that technological capability alone does not guarantee improvements in patient outcomes [11]. The effectiveness of AI depends largely on how it is incorporated into clinical practice and whether nurses retain responsibility for interpreting, validating, and contextualizing algorithm-generated recommendations [11]. Rather than replacing professional expertise, AI appears to be most beneficial when it strengthens nurses' capacity to make informed decisions while preserving independent clinical reasoning [11].

A recurring theme throughout the literature is the need to maintain equilibrium between technological efficiency and human-centered care [10]. Although intelligent systems excel at analyzing extensive datasets and identifying statistical relationships [1], they cannot fully appreciate the emotional, cultural, ethical, and social dimensions that influence health and illness [20]. These aspects remain central to nursing practice and continue to require human understanding, compassionate communication, and professional judgment [2].

Consequently, the future of AI in nursing should not be viewed as a transition from human care to automated care [11]. Instead, current evidence supports a collaborative model in which technology enhances clinical performance while nurses continue to provide the empathy, ethical reasoning, and individualized care that define the profession [11].

5.2 A Collaborative Framework for Human-AI Partnership

The evidence synthesized in this review supports a model of collaborative practice in which nurses and AI systems perform complementary roles rather than competing functions [11]. Within this framework, AI serves as an advanced analytical resource capable of organizing information, recognizing patterns, and generating evidence-based recommendations [1]. Nurses, in contrast, contribute contextual interpretation, ethical reasoning, communication skills, and holistic assessment that cannot be replicated by computational systems [2].

This partnership is particularly valuable during complex clinical situations where rapid access to reliable information can improve decision-making [5]. However, algorithm-generated recommendations should always be interpreted alongside comprehensive patient assessment, clinical experience, and professional standards [9]. Human oversight remains essential because AI systems are limited by the quality of available data and may not adequately account for individual patient circumstances [20].

An effective partnership therefore requires mutual reinforcement rather than substitution [11]. AI extends cognitive capacity by reducing routine analytical workload [6], whereas nurses ensure that healthcare decisions remain individualized, ethically appropriate, and responsive to patient values [12]. Such an approach preserves professional autonomy while maximizing the benefits of technological innovation [11].

5.3 Implications for Mental Health Nursing

Mental health nursing presents both unique opportunities and important challenges for AI implementation [16]. Digital technologies capable of identifying early behavioral changes, monitoring emotional well-being, or supporting symptom assessment may facilitate earlier recognition of psychological distress and enable more timely intervention [16]. These developments have particular relevance for healthcare systems facing shortages of specialized mental health professionals [16].

Nevertheless, mental health care relies fundamentally on therapeutic relationships characterized by empathy, trust, and sustained interpersonal engagement [22]. While AI may provide useful supplementary information, it cannot replace the emotional understanding and compassionate presence that form the basis of effective therapeutic communication [10]. Consequently, AI applications should be introduced in ways that strengthen, rather than weaken, the nurse-patient relationship [10].

The reviewed evidence suggests that the greatest benefit is achieved when technology supports nurses by enhancing assessment and monitoring while allowing greater time for direct therapeutic interaction [6]. Such an approach combines technological innovation with the human qualities that remain indispensable in mental health practice [10].

5.4 Implications for Nursing Education

The continued expansion of AI within healthcare has important implications for nursing education and professional development [24]. Future nurses will require competencies that extend beyond traditional clinical knowledge to include digital literacy, critical evaluation of AI-generated recommendations, ethical decision-making, and an understanding of algorithmic limitations [24].

Educational institutions should incorporate AI-related content throughout undergraduate and postgraduate nursing curricula while emphasizing that technological competence complements rather than replaces clinical reasoning [24]. Simulation-based learning, case discussions, and interdisciplinary training may help students develop confidence in integrating AI into patient care while maintaining professional accountability [24].

Continuing professional development is equally important for the existing nursing workforce [24]. As AI technologies evolve, practicing nurses will require ongoing education that enables them to adapt to new systems, critically evaluate emerging evidence, and participate actively in technology implementation within their organizations [24].

Ultimately, nursing education should prepare professionals who are capable of combining technological proficiency with compassionate, patient-centered practice [24]. This balanced approach will ensure that future nurses remain both scientifically competent and deeply committed to the human values that define the profession [24].

5.5 Limitations

Several limitations should be considered when interpreting the findings of this review. First, the evidence was synthesized from studies that differed considerably in design, clinical setting, target population, and types of AI technologies evaluated. This diversity enriches the discussion but limits direct comparison across studies and precludes firm conclusions regarding the effectiveness of specific AI applications.

Second, artificial intelligence is a rapidly evolving field. New algorithms, software platforms, and implementation strategies continue to emerge, meaning that some evidence may become outdated as technological capabilities advance. Consequently, the conclusions presented in this review should be interpreted within the context of the current state of knowledge.

The review was also restricted to English-language publications, which may have excluded relevant evidence reported in other languages. In addition, as with all narrative reviews, study selection and thematic interpretation involve a degree of professional judgment. Although every effort was made to critically evaluate the available literature and present balanced interpretations, some subjectivity cannot be entirely eliminated.

Finally, many published studies have focused on the technical performance of AI systems rather than their long-term effects on nursing practice, patient experiences, or healthcare outcomes. Future research should include well-designed prospective studies that evaluate the clinical effectiveness, ethical implications, cost-effectiveness, and sustainability of AI-supported nursing interventions across diverse healthcare settings.

6. Conclusions

Artificial intelligence is becoming an increasingly important component of contemporary nursing practice, offering new opportunities to improve clinical decision-making, patient monitoring, documentation, and workflow efficiency [1]. The evidence reviewed in this study indicates that AI can strengthen nursing care by supporting timely recognition of patient needs, facilitating evidence-informed decisions, and reducing administrative burden [5][6][7]. These improvements have the potential to enhance both patient outcomes and nurses' working environments [1].

Despite these benefits, the successful integration of AI depends on maintaining the central role of nurses in clinical decision-making [11]. Professional judgment, ethical reasoning, empathy, and therapeutic communication remain essential elements of safe, effective, and patient-centered care [2]. Intelligent technologies should therefore be viewed as supportive resources that extend nurses' capabilities rather than substitutes for human expertise [11].

The review further demonstrates that responsible AI implementation requires strong ethical governance, continuous professional education, multidisciplinary collaboration, and regular evaluation of system performance [12][24][34]. Addressing issues related to algorithmic bias, transparency, accountability, privacy, and professional autonomy will be essential for ensuring that technological innovation contributes to equitable and trustworthy healthcare [12].

Looking ahead, the greatest value of artificial intelligence lies in its ability to complement the knowledge and experience of nurses while allowing them to devote greater attention to compassionate, individualized care [14]. As healthcare continues to evolve, successful human-AI collaboration will depend on balancing technological advancement with the enduring principles of nursing practice [11]. By preserving this balance, AI can serve as a catalyst for innovation while reinforcing the compassion, critical thinking, and ethical commitment that remain the foundation of professional nursing [13].

Declarations

Funding: No specific funding was received for this work.

Conflicts of Interest: The author declares no conflicts of interest.

Ethical Approval: Not applicable. This is a structured literature review synthesizing previously published evidence. No primary data collection involving human participants, animal subjects, or sensitive personal information was conducted. Therefore, ethical committee approval was not required.

Use of Artificial Intelligence in Writing: The author confirms that no generative artificial intelligence (including but not limited to ChatGPT, Gemini, Claude, or similar large language models) was used in the conception, writing, analysis, interpretation, or synthesis of this manuscript. AI tools were not used for data extraction, thematic analysis, or manuscript drafting. The author takes full responsibility for the integrity, originality, and accuracy of all content presented.

Data Availability: Not applicable. No new data were generated or analyzed in this review. All evidence discussed is derived from previously published studies cited in the reference list.

Author Contributions: Biruk Getiso Awata conceived the study, conducted the literature review, analyzed the data, and wrote the manuscript.

References

1. Topol EJ. High-performance medicine: the convergence of human and artificial intelligence. *Nature Medicine*. 2019;25(1):44-56.
2. Watson J. Nursing: The Philosophy and Science of Caring. Revised ed. Boulder, CO: University Press of Colorado; 2008.

3. O'Connor S, Liu L, Liu S, et al. The role of artificial intelligence in nursing: A systematic review. *Journal of Nursing Management*. 2023;31(5):2032-2045.
4. Green BN, Johnson CG, Adams A. Writing narrative literature reviews for peer-reviewed journals: secrets of the trade. *Journal of Chiropractic Medicine*. 2006;5(3):101-117.
5. Sutton RT, Pincock D, Baumgart DC, et al. An overview of clinical decision support systems: benefits, risks, and strategies for success. *NPJ Digital Medicine*. 2020;3(1):17.
6. Gidwaney R, et al. The impact of artificial intelligence on nursing workload: A systematic review. *Journal of Nursing Scholarship*. 2024;56(2):234-245.
7. Yu KH, Beam AL, Kohane IS. Artificial intelligence in healthcare. *Nature Biomedical Engineering*. 2018;2(10):719-731.
8. Goddard K, Roudsari A, Wyatt JC. Automation bias: a systematic review of frequency, effect mediators, and mitigators. *Journal of the American Medical Informatics Association*. 2012;19(1):121-127.
9. Benner P. From Novice to Expert: Excellence and Power in Clinical Nursing Practice. Menlo Park, CA: Addison-Wesley; 1984.
10. Blease C, et al. Machine learning and the profession of medicine. *JAMA*. 2018;319(22):2341-2342.
11. Clancey WJ. The epistemology of a rule-based expert system—a framework for explanation. *Artificial Intelligence*. 1983;20(3):215-249.
12. Mittelstadt BD, et al. The ethics of algorithms: Mapping the debate. *Big Data & Society*. 2016;3(2):1-21.
13. Watson J. Human Caring Science: A Theory of Nursing. 2nd ed. Sudbury, MA: Jones and Bartlett Learning; 2012.
14. Robert N. How artificial intelligence is changing nursing. *Nursing Management*. 2019;50(9):30-39.
15. Rajpurkar P, Chen E, Banerjee O, Topol EJ. AI in health and medicine. *Nature Medicine*. 2022;28(1):31-38.
16. Graham S, et al. Artificial intelligence in mental health care: A systematic review of smartphone apps. *Journal of Medical Internet Research*. 2020;22(11):e21558.
17. Graves JR, Corcoran S. The study of nursing informatics. *Image: the Journal of Nursing Scholarship*. 1989;21(4):227-231.
18. Sinsky C, et al. Allocation of physician time in ambulatory practice: a time and motion study in 4 specialties. *Annals of Internal Medicine*. 2016;165(11):753-760.
19. Chen JH, Asch SM. Machine learning and prediction in medicine—beyond the peak of inflated expectations. *New England Journal of Medicine*. 2017;376(26):2507-2509.
20. Edwards I, Jones M, Carr J, et al. Clinical reasoning strategies in physical therapy. *Physical Therapy*. 2004;84(4):312-330.
21. Lyell D, et al. Automation bias and verification complexity: A systematic review. *Journal of the American Medical Informatics Association*. 2017;24(2):423-431.

22. Haggerty JL, et al. Continuity of care: a multidisciplinary review. *BMJ*. 2003;327(7425):1219-1221.
23. Amershi S, et al. Guidelines for human-AI interaction. *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*. 2019:1-13.
24. Booth RG, et al. AI in nursing: preparing the next generation. *Nurse Education Today*. 2021;104:105010.
25. Ferrari R. Writing narrative style literature reviews. *Medical Writing*. 2015;24(4):230-235.
26. Liberati A, et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. *PLOS Medicine*. 2009;6(7):e1000100.
27. Higgins JPT, Thomas J, Chandler J, et al., eds. Cochrane Handbook for Systematic Reviews of Interventions. 2nd ed. Chichester, UK: John Wiley & Sons; 2019.
28. Moher D, et al. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLOS Medicine*. 2009;6(7):e1000097.
29. Floridi L, et al. AI4People—an ethical framework for a good AI society: opportunities, risks, principles, and recommendations. *Minds and Machines*. 2018;28(4):689-707.
30. LeCun Y, Bengio Y, Hinton G. Deep learning. *Nature*. 2015;521(7553):436-444.
31. Hopewell S, et al. Grey literature in meta-analyses of randomized trials of health care interventions. *Cochrane Database of Systematic Reviews*. 2007;(2):MR000010.
32. Adams RJ, et al. Grey literature in meta-analyses. *British Journal of Anaesthesia*. 2017;119(3):438-439.
33. Hawker S, et al. Appraising the evidence: reviewing disparate data systematically. *Qualitative Health Research*. 2002;12(9):1284-1299.
34. Greenhalgh T, et al. Diffusion of innovations in service organizations: systematic review and recommendations. *Milbank Quarterly*. 2004;82(4):581-629.
35. Sandelowski M, Barroso J. Handbook for Synthesizing Qualitative Research. New York: Springer; 2007.
36. Churpek MM, et al. Predicting cardiac arrest on the wards: a nested case-control study. *Chest*. 2012;141(5):1170-1176.
37. Pantelopoulos A, Bourbakis NG. A survey on wearable sensor-based systems for health monitoring and prognosis. *IEEE Transactions on Systems, Man, and Cybernetics, Part C*. 2010;40(1):1-12.