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Artificial Intelligence in Nursing Practice: Opportunities, Ethical Challenges, Risks and Future Perspectives: A systematic Review

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Abstract

Artificial intelligence (AI) emerged as a crucial technological change in the healthcare sector where it has an impact on nursing practice, patient care, diagnosis, and healthcare management. This review paper discusses the use of AI in nursing practice, its opportunities, ethical issues, risks, and future views. Machine learning, predictive analytics, robotics, natural language processing, and smart monitoring systems are some of the AI technologies that are becoming more popular in enhancing clinical decision-making, patient monitoring, and efficiency in healthcare. The study highlights the benefits of AI, including reduced nursing workload, enhanced patient safety, improved diagnostic accuracy, and personalized healthcare delivery. Nonetheless, AI introduction also brings about a number of ethical and professional issues, such as privacy of data, bias in the algorithms, diminished human interaction, accountability, and reliance on technology. The review also outlines the weaknesses and implementation issues with AI in nursing. Altogether, AI has the possibility to revolutionize nursing care with ethical standards, adequate training, and human-centered medical practices.

Keywords; Artificial Intelligence, Nursing Practice, Patient Monitoring, Ethical Challenges, Healthcare Technology.

INTRODUCTION

Artificial Intelligence (AI) has become one of the most innovative technologies in healthcare that has impacted medical diagnosis, treatment planning, patient monitoring, and healthcare management significantly. AI is a capability of computer systems and machines to do what would otherwise be done by human intelligence including making choices, learning, solving problems, speech recognition, and analysis of data. Machine learning, deep learning, natural language processing, robotics, and predictive analytics are all AI technologies that are finding their way into clinical and administrative settings in healthcare to enhance the quality, efficiency, and access of healthcare services [1]. As a vital part of healthcare provision, nursing practice has undergone significant transformations as AI technologies have been implemented. Nurses are the crucial agents of patient care, health evaluation and medication administration, emotional support and communication between patients and health practitioners. Patient population, nursing staff shortages, increase in healthcare costs and the increasing demand of quality care have led to demand of advanced technological solutions. AI-based systems help nurses by automating their workflows, decreasing workloads, improving clinical decision-making, and increasing patient safety [2].

AI in nursing involves smart patient monitoring systems, virtual nursing assistants, robotic support systems, electronic health records, and predictive tools to detect disease risks and patient deterioration. The technologies assist nurses in delivering more precise, timely, and personalized care. Moreover, AI helps healthcare companies to handle vast amounts of patient information and enhance

efficiency in their work [3]. Although AI can offer nurses a variety of positive effects, the introduction of AI in nursing practice also presents ethical, legal, and professional issues. Potential concerns include privacy of data, bias in algorithms, a decrease in interpersonal interaction, and dependence on technologies. Thus, it is crucial to comprehend both the potential and the issues related to AI to ensure its safe and efficient use in nursing practice and health care systems [4].

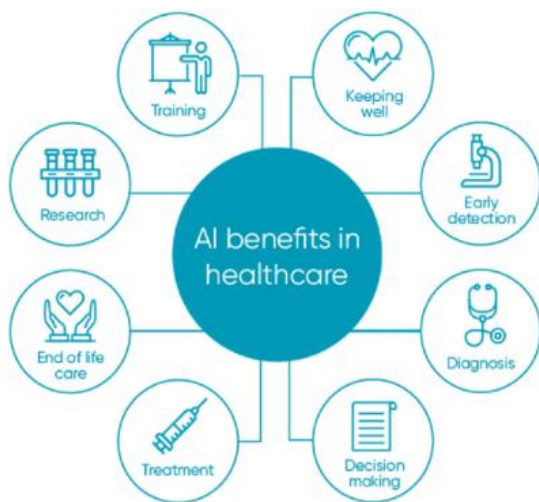


Figure 1: AI benefits in healthcare. [5]

Concept and Evolution of Artificial Intelligence in Nursing Practice

Artificial Intelligence in nursing practice is the utilization of smart computer systems and sophisticated technologies to assist nursing practice, clinical decision-making, patient care and health care management. The purpose of AI systems is to process vast quantities of healthcare data, find trends, forecast future results, and help medical workers in offering effective and quality patient care. Machine learning and robotics, virtual assistants, and natural language processing technologies are gradually being integrated into nursing practice to enhance healthcare delivery [6]. The development of AI in nursing has been a gradual process with the development of computer science and healthcare technology. In the early years, the healthcare systems were primarily based on rudimentary computerized record-keeping and administration software. The evolution of electronic health records, data analytics and clinical decision support systems allowed healthcare professionals over time to more efficiently access and analyze patient information. Over the past few years, AI technologies have advanced in sophistication and enable nurses to rely on

predictive tools to monitor patients, identify early diseases, or plan treatments [7], [8].

Nursing care is also changed with the introduction of robotic assistants and smart monitoring devices, which cut the number of manual operations and enhanced patient safety. The AI-based chatbots and virtual nursing assistants are also useful in providing patients with information about healthcare and reminders. The COVID-19 pandemic increased the uptake of AI technologies in the healthcare sector, especially remote monitoring and telehealth services. Nowadays, AI is regarded as a significant innovation of contemporary nursing practice. Its unceasing evolution will enhance the quality of healthcare, evidence-based practice, patient outcomes, and help nurses cope with complex healthcare issues. [9]

Artificial Intelligence in Patient Monitoring and Diagnosis

AI has greatly enhanced the monitoring and diagnosis of patients by assisting the medical field to gather, analyze, and interpret patient data more precisely and efficiently. AI-based monitoring systems in nursing practice aid in nurses constantly monitoring the vital signs of patients, including heart rate, blood pressure, oxygen levels, respiratory rate, and body temperature. Such smart systems are capable of identifying the abnormal trends and delivering early warning signs, which enables nurses and physicians to take crucial decisions before the situation of a patient is critical [10]. Machine learning and predictive analytics are AI technologies employed in the field of disease diagnosis and risk assessment. AI systems can help detect the symptoms, estimate the course of the disease and aid in clinical decision-making by processing a vast amount of medical data. To illustrate, AI is applicable in the diagnosis of cancer, diabetes, cardiovascular diseases, and neurological disorders. Healthcare technologies combining medical imaging with AI can precisely scan X-rays, CT scanning, and MRI scans and assist medical professionals detect diseases at an early stage [11].

Wearable devices and remote patient monitoring systems have gained prominence in the nursing care. These gadgets constantly send patient data to health practitioners enhancing patients monitoring even when they are not in hospitals. Another important area where AI is relevant is the intensive care unit where making fast decisions is critical to save lives [12]. Furthermore, AI-aided diagnosis eliminates human errors, increases the accuracy of diagnosis, and accelerates treatment planning. It also aids in personalized healthcare, which entails examination of single patient conditions and prescribing of the appropriate intervention.

Nevertheless, even in the context of these benefits, medical workers should make sure that the AI systems are adequately validated and used ethically to preserve the safety, reliability, and quality of care of patients [13].

Benefits and Opportunities of AI in Nursing Practice

Artificial Intelligence has a wide range of advantages and opportunities in nursing practice by enhancing the efficiency of healthcare, patient outcomes, and clinical decisions. Among the key benefits of AI is that it can decrease the workload of nurses by automating even its administrative functions like documentation, scheduling, medication reminders, and patient records [14]. This enables nurses to have additional time on direct patient care and emotional support. Clinical decision-making accuracy and speed are also enhanced with AI technologies. Smart systems are able to process extensive volumes of patient data, identify health risks, and help nurses to create suitable care plans. Predictive analytics can also prevent complications and enhance patient safety by early identifying diseases and deterioration and managing them. The use of AI-based monitoring systems offers real-time patient data, which helps nurses to act swiftly in emergency cases [15].

Personalized healthcare is another potential opportunity of AI in nursing. AI systems are able to analyze the personal conditions of patients, their medical history, and their response to treatment to give personalized care advice. Telehealth and remote monitoring technologies also contribute to the increased access to healthcare, particularly among patients in rural or underserved communities [16]. AI can also assist nursing education and professional development with virtual simulations and training tools, as well as evidence-based learning resources. Robotic technologies help in lifting patients, rehabilitation and taking care of the elderly, which helps to ease the physical burden on nurses. In general, AI can transform nursing practice by enhancing the quality, raising the operational efficiency, minimizing medical errors, and promoting patient-centered care. Its further development will open new possibilities of innovation and development of healthcare systems throughout the world [17].

Table 1: Benefits and Opportunities of AI in Nursing Practice

Benefit/Opportunity	Description	Impact on Nursing Practice
Automated Administrative Tasks	AI automates documentation, scheduling,	Reduces nurses' workload and

	billing, and record management.	saves time for patient care.
Improved Clinical Decision-Making	AI analyzes patient data and supports evidence-based decisions.	Enhances accuracy in diagnosis and treatment planning.
Early Disease Detection	Predictive analytics identifies health risks and patient deterioration at an early stage.	Improves patient safety and reduces complications.
Smart Patient Monitoring	AI-powered monitoring systems continuously track patient vital signs.	Enables quick response during emergencies and critical situations.
Personalized Healthcare	AI evaluates patient history and treatment responses for customized care.	Enhances patient satisfaction and treatment effectiveness.
Telehealth and Remote Monitoring	AI supports remote consultation and monitoring through digital platforms.	Improves healthcare accessibility in rural and remote areas.
Support for Evidence-Based Practice	AI provides access to updated clinical information and research findings.	Assists nurses in delivering scientifically supported care.

Ethical Issues in AI-Assisted Nursing Practice

The use of Artificial Intelligence in nursing has raised multiple ethical concerns that should be taken into consideration. Patient privacy and data confidentiality is one of the key ethical considerations. A lot of patient information, such as medical histories, diagnostic reports and personal data, is required by AI systems. Mishandling or unauthorized access to such data can lead to a loss of privacy and cybersecurity [18]. Another significant ethical concern is the bias and fairness of the algorithms. The development of AI systems is based on the existing healthcare data, which can be subject to social, racial, or economic biases. Consequently, AI tools can generate unequal or inaccurate results in regards to certain groups of patients, which results in healthcare delivery discrimination. Nurses and healthcare workers should make sure that AI systems are not obscured, prejudiced, and based on bias in decision-making [19].

Also of ethical concern is the minimization of human interaction in patient care. Nursing is a healing and caring

profession and as well as a technical one. Overreliance on AI technologies can decrease personal communication between nurses and patients, which influences the emotional support, empathy, and patient trust. Ethical issues also emerge in accountability and responsibility in AI-assisted decisions in healthcare [20]. When mistakes in diagnosis or unsuccessful treatment due to the use of AI systems occur, it will be difficult to define who is responsible between healthcare professionals and software developers and healthcare organizations. Moreover, there should be informed consent and patient autonomy in the use of AI technologies in healthcare. Patients must be told about the use of AI systems in patient care and how their information is being utilized. Thus, the concept of ethics and appropriate rules are needed to guarantee safe and responsible application of AI in nursing practice [21].

Risks and Limitations of Artificial Intelligence in Nursing Practice

Artificial Intelligence has multiple benefits to nursing practice, but there are also numerous risks and limitations, which can impact healthcare delivery and patient safety. The requirement of the high-quality and accurate data is one of the key limitations. The operation of AI systems is dependent on the training and analysis data. When the information is not complete, is old, or biased, then the system can come up with the wrong predictions, wrong diagnosis, or wrong treatment suggestion [1]. Another critical issue in AI-assisted healthcare is technical problems and system malfunctions. Failure of software, network or device failures can interfere with patient monitoring systems and clinical operations, which can cause delays in care and patient injuries. Healthcare organizations should thus be able to support and maintain the correct technical support and backup systems [2].

The other high-risk factor is the loss of human judgment and critical thinking among the health care workers. Overreliance on AI systems can restrain the autonomy of nurses in their clinical decision-making and decrease the levels of professionalism in the long term. AI technologies cannot completely replace human empathy, emotional intelligence, and compassionate care, which are essential components of nursing practice. The expensive nature of deploying AI technologies is another constraint, especially in the developing world and in small healthcare facilities [3]. Infrastructure costs, software development, training, and maintenance are some of the expenses that can limit the widespread implementation of AI systems. Also, there are cybersecurity issues and data breaches that are one of the

biggest threats of AI-based healthcare systems. This may jeopardize the confidentiality and trust in healthcare services when unauthorized individuals gain access to patient data. The practical implementation of AI is also a challenge due to legal and ethical uncertainties on accountability and regulation. Thus, although AI has tremendous potential in the nursing practice, it has to be carefully planned, trained, ethical, and human-supervised to reduce risks and provide safe and effective healthcare delivery [6].

LITERATURE REVIEW

(Anazia, 2026) [22] investigates the effects of AI on professional identity, patient safety, equity, responsibility, and nursing autonomy. Peer-reviewed literature (2010–2025) from clinical, educational, and administrative contexts was examined thematically under the guidance of PRISMA-ScR. Results show that while AI can improve outcomes and decision-making, there is a danger of algorithmic bias, data exploitation, depersonalized care, and unclear accountability when damage occurs.

Public trust, institutional governance, and individual nurses are all ethical issues. Nurse-led involvement in design and governance, open documentation and auditing, equity-centered evaluation (including calibration and clinical usefulness), and ongoing post-deployment monitoring are all necessary for the ethical integration of AI in nursing. Policies and practices that strike a balance between innovation and compassion are necessary to maintain human-centered care in the digital age, ensuring that technology advancement reinforces rather than weakens the moral and relational foundation of nursing.

(BHATIYA & SHARMA, 2026) [23] discusses how AI is transforming the healthcare sector, specifically with regard to automated diagnosis and real-time patient monitoring. AI can diagnose patients at least as effectively as human professionals in fields like radiology and pathology, as demonstrated by the use of neural network models to assess images using CNNs and time series data utilizing Transformers. Additionally, this paper clarifies the transition from traditional treatment methods to the idea of Remote Patient Monitoring (RPM), which is made possible by sophisticated AI wearables and contactless sensors and can anticipate a clinical decline in a patient's health up to 16 hours before any symptoms appear. Nevertheless, despite the remarkable skills shown, algorithmic biases and neural network opacity continue to be major barriers to building the ubiquitous trust. Thus, it can be said that AI significantly reduces diagnostic latency and relieves clinician stress;

nevertheless, XAI solutions and federated learning systems are the industry's future.

(Bodur et al., 2025) [24] Examine nurses' perspectives on the implications of artificial intelligence (AI) in nursing, paying particular attention to their comprehension, real-world applications, ethical issues, and perceived possibilities and risks. Following the Standards for Reporting Qualitative Research for methodological rigor, this qualitative study included semi-structured interviews to get thorough perspectives from clinical nurses. Researchers interviewed 25 clinical nurses in a semi-structured manner after receiving ethical permission. The interviews examined how nurses saw artificial intelligence (AI), including its fundamental ideas, practical applications in nursing, ethical and societal ramifications, and possible advantages and disadvantages.

The study found that although nurses have a fundamental grasp of AI, specific training, institutional readiness, and strong multidisciplinary collaboration are necessary for the ethical and successful integration of AI technology in nursing. It is essential to provide nurses with skills in digital literacy, ethical reasoning, and critical engagement with AI technologies in order to guarantee that AI enhances rather than undermines nursing principles. The results emphasize the need for organized educational initiatives and the creation of policies that take into account the technological and humanistic aspects of using AI in healthcare.

(Chaturvedi et al., 2025) [5] looks at how AI has changed virtual healthcare in terms of diagnosis accuracy, real-time health status monitoring, and patient participation and connection. The capabilities of key AI applications, such as teleconsultation platforms, predictive analytics, and AI-enabled diagnostic systems, in overcoming the drawbacks of traditional remote healthcare models are examined.

The applications of AI in many healthcare fields, including heart monitoring, diabetes management, mental health teletherapy, and dermatology, are covered in this overview through case studies. Additionally, it examines the ethical and legal issues that come up, including as bias in AI, data privacy, and responsibility, emphasizing the need for strong regulatory frameworks to protect patient safety. Emerging technologies that "will usher in a new era of remote healthcare delivery" include blockchain, IoMT, and 5G.

(Kwan et al., 2025) [25] Artificial intelligence (AI) has revolutionized a number of industries, including healthcare, in recent years. AI has the ability to transform traditional approaches, boost learning opportunities, and better patient outcomes in nursing practice, education, and research. In addition to improving research capacities in the field, integrating AI tools and techniques can provide nursing students more comprehensive and engaging learning environments and physicians more intelligent clinical solutions. Even with the bright future, there are a number of obstacles to overcome when integrating AI into nursing practice, education, and research.

First, the human-centric character of nursing care may be impacted if automation replaces human responsibilities in the field. Second, there are problems with nurses' lack of AI proficiency. Comprehensive AI training is often absent from nursing programs, which leaves students unprepared to use these tools efficiently. Finally, careful consideration must be given to the ethical ramifications of AI in healthcare, including data privacy, patient permission, and the possibility of biased algorithms. Reinvesting in humanistic practice, updating core skills and curricula, and creating new ethical norms are some of the strategic measures needed to fully utilize AI in nursing practice, teaching, and research.

(Ruksakulpiwat et al., 2025) [26] to compile published data on the applications, advantages, and difficulties of AI in nursing research, including empirical studies and expert opinions. PRISMA criteria were adhered to in this systematic review. Empirical studies that looked at the application of AI in nursing research or were carried out by nurses qualified as eligible papers. The Joanna Briggs Institute (JBI) critical assessment instruments were used to evaluate methodological quality.

JBI's convergent integrated technique was used to synthesis the data. The review contained fifteen papers. Applications of AI in nursing research, implementation difficulties, ethical issues, and prejudice, and advantages of AI were the three main topics that emerged. Natural language processing and traditional machine learning techniques were among the many AI approaches that were reported. The research' overall methodological quality was excellent. AI has revolutionary possibilities for nursing research. However, scientific rigor, active nurse participation, and consideration of sociotechnical concerns are necessary for ethical implementation.

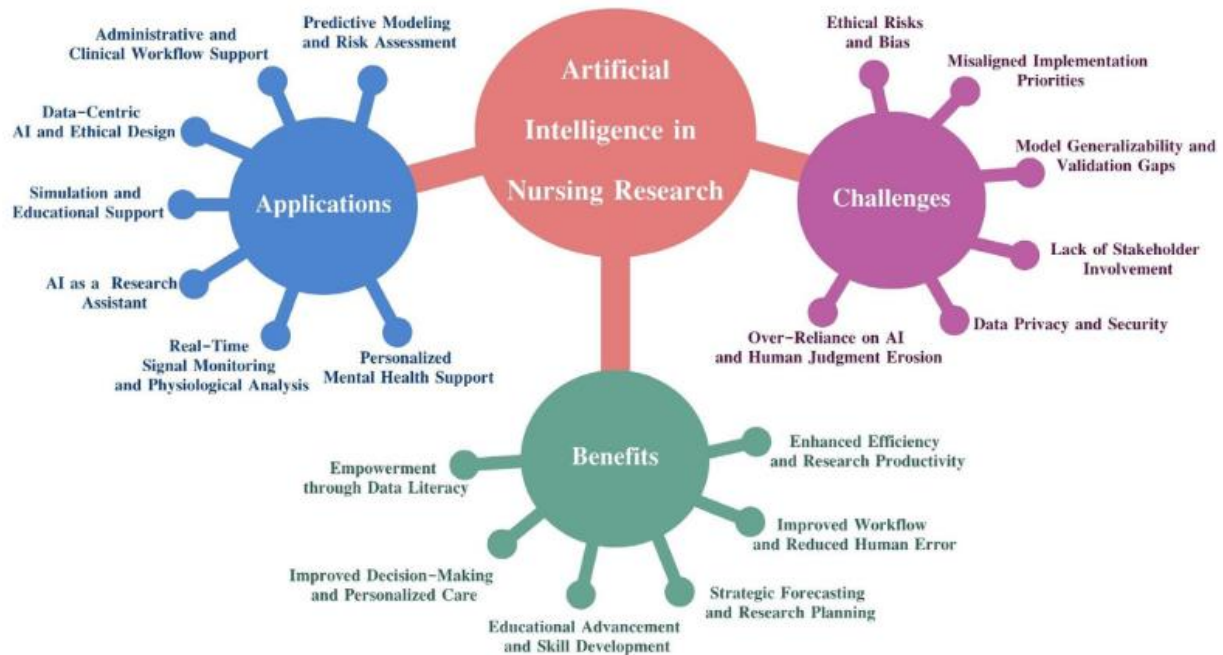


Figure 2: AI in the nursing research model. [26]

(Wei et al., 2025) [27] analyzes the use of AI in nursing, emphasizing its existing applications, constraints, and areas that need more research. A thorough examination of current research demonstrates the application of AI in nurse education, patient monitoring, and clinical decision support systems. However, a number of obstacles to successful adoption are noted, such as workforce adaption requirements, ethical quandaries, and technical limitations. There are also clear gaps in the research, such as the lack of thorough ethical frameworks suited to nursing situations, the scant development of AI tools dedicated to nursing, and inadequate long-term effect evaluations. AI's ability to transform individualized care, improve nurse robots, and solve global health issues is thoroughly examined. This study highlights the need to match AI developments with the particular requirements of nursing by integrating current knowledge and identifying important topics for future research. In order to effectively utilize AI's promise while lowering related dangers, closing these gaps would eventually improve nursing practice and patient outcomes.

(Ahmed, 2024) [28] examines the use of artificial intelligence (AI) in nursing and how it affects academic writing and healthcare research. Furthermore, AI has the ability to significantly advance the area by accelerating research cycles and encouraging collaboration in academic writing. However, there are drawbacks to this paradigm change, including worries about the disappearance of the

human touch in patient care, ethical conundrums surrounding algorithmic bias and patient data privacy, and the danger of relying too much on AI. A balanced strategy that prioritizes patient-centered treatment and respects ethical norms is needed to address these issues. In order to do this, researchers and nurses must actively engage in the development, use, and regulation of AI technologies, making sure that they are consistent with patient-centered ideals and clinical knowledge. To ensure that AI is used responsibly, clear rules and regulations must be established. Training programs should also give professionals the abilities they need to work with AI systems. The challenges of incorporating AI may be successfully addressed by encouraging cooperation, accountability, and transparency. This will unlock AI's revolutionary potential to alter patient care and promote knowledge discovery in the fields of nursing and healthcare research.

(S et al., 2024) [29] Examine the impact of implementing AI-based DSS in critical care units, learn about the challenges nurses have in their work, and assess the value of AI in improving patient care. 112 registered nurses working at CCUs in Amman, Jordan, were given self-developed questionnaires as part of cross-sectional research. Surveys about their encounters with these smart gadgets, as well as their perceived benefits, challenges, and training needs, were sent out. In critical care settings, the adoption of AI-based DSS appears to be beneficial in enhancing the scripting of

nurses' peak duties. However, for AI to be utilized as effectively as possible in nursing practice, difficulties like training for its usage and other technical problems, as well as ethical considerations, must be resolved. In order to train future nurses, further research should look at the positive impacts of AI that follow, how nurses may contribute to its progress, and how courses on the advantages of using AI in nursing can be included.

CONCLUSION

Artificial Intelligence is changing the nursing practice today through the fact that it is enhancing efficiency of healthcare, monitoring of patients, accuracy of diagnosis, and clinical decision making. Machine learning, predictive analytics, robotics, virtual assistants, and remote monitoring systems are the AI technologies that have opened up new possibilities to improve patient care and assist healthcare professionals with complex clinical tasks. Implementation of AI in nursing can help decrease the workload, enhance operational efficiency, reduce medical errors, and offer individual healthcare services. Moreover, AI plays an important role in nursing education, research and evidence based practice. Although these benefits are evident, there are also a number of ethical, technical, and professional issues associated with the application of AI in nursing. Issues associated with patient privacy, cybersecurity, bias in the algorithms, accountability, and the decrease in human interaction are to be paid special attention. Overreliance on AI systems can impact the critical thinking skills and the humane side of treatment in nurses. Moreover, the cost of implementation and insufficient training is another obstacle to a universal introduction of AI technologies in hospitals. Thus, AI integration into nursing practice should be based on the balanced interaction of technology and human knowledge to be successful. Effective regulations, code of ethics, lifelong education of professionals, and participation of nurses in the development of AI are key to safe, transparent, and patient-centered healthcare provision. The future innovations in AI must aim at complementing, and not substituting, the human values and care-giving that underlie the profession of a nurse.

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