

CONTRIBUTIONS OF ARTIFICIAL INTELLIGENCE TO NURSING PRACTICE: A LITERATURE REVIEW

CONTRIBUIÇÕES DA IA PARA A PRÁTICA DA ENFERMAGEM: UMA
REVISÃO DE LITERATURA

Ciências da Saúde • 25/06/2026

REGISTRO DOI: [10.70773/revistatopicos/782348937](https://doi.org/10.70773/revistatopicos/782348937)

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RESUMO

INTRODUÇÃO: A Inteligência Artificial (IA) tem promovido transformações na saúde, impactando a prática da enfermagem. Tecnologias como machine learning, redes neurais e sistemas de apoio à decisão permitem analisar grandes volumes de dados, favorecendo diagnósticos mais precisos, intervenções oportunas e melhoria da qualidade do cuidado. Além disso, contribui para a segurança do paciente e prática baseada em evidências, apesar de desafios éticos e de capacitação. **MATERIAL E MÉTODOS:** Trata-se de uma revisão integrativa da literatura, realizada em bases científicas nacionais e internacionais. Utilizaram-se descritores como “inteligência artificial”, “enfermagem” e “cuidado de enfermagem”, além de termos em inglês, combinados por operadores booleanos. Incluíram-se estudos a partir de 2020, nos idiomas português, inglês e espanhol, disponíveis na íntegra. Excluíram-se materiais duplicados ou sem rigor científico. **RESULTADOS E DISCUSSÃO:** A IA apresenta aplicações relevantes na enfermagem, especialmente no apoio ao Processo de Enfermagem, documentação clínica e predição de eventos críticos, promovendo maior segurança e eficiência. Também contribui para organização do trabalho e educação. Persistem desafios como vieses, limitações estruturais e necessidade de capacitação. **CONSIDERAÇÕES FINAIS:** A IA possui potencial para transformar a enfermagem, otimizando processos e apoiando decisões. Contudo, deve ser implementada de forma ética e crítica, com capacitação profissional e garantia de equidade, fortalecendo o cuidado centrado no paciente.

Palavras-chave: Inteligência artificial; Enfermagem; Cuidado de enfermagem.

ABSTRACT

INTRODUCTION: Artificial Intelligence (AI) has promoted

transformations in healthcare, directly impacting nursing practice. Technologies such as machine learning, neural networks, and decision support systems enable the analysis of large data volumes, contributing to more accurate diagnoses, timely interventions, and improved quality of care. Additionally, AI enhances patient safety and evidence-based practice, despite ethical and training challenges. **MATERIALS AND METHODS:** This is an integrative literature review conducted using national and international scientific databases. Descriptors such as “artificial intelligence,” “nursing,” and “nursing care,” along with their English equivalents, were combined using Boolean operators. Studies published from 2020 onward, in Portuguese, English, and Spanish, and available in full text were included. Duplicates and non-scientific materials were excluded. **RESULTS AND DISCUSSION:** AI has relevant applications in nursing, especially in supporting the Nursing Process, clinical documentation, and prediction of critical events, promoting greater safety and efficiency. It also contributes to workflow organization and education. Challenges include bias, structural limitations, and the need for professional training. **FINAL CONSIDERATIONS:** AI has the potential to transform nursing by optimizing processes and supporting decision-making. However, it must be implemented ethically and critically, with professional training and equity, strengthening patient-centered care.

Keywords: Artificial Intelligence; Nursing; Nursing care.

1. INTRODUCTION

The incorporation of Artificial Intelligence (AI) into the healthcare sector has promoted significant transformations in care, management, and educational processes, directly impacting nursing practice. Through technologies such as machine learning,

neural networks, and clinical decision support systems, AI enables the analysis of large volumes of data, contributing to more accurate diagnoses, timely interventions, and improved quality of care (Gomes *et al.*, 2025).

In the context of nursing, these technological innovations have the potential to optimize the work process, reduce professional overload, and strengthen patient safety, since they assist in the early identification of risks, prevention of adverse events, and standardization of care practices. In addition, the use of AI favors evidence-based practice by supporting clinical decision-making grounded in updated and reliable data (Raposo *et al.*, 2024).

However, despite the advances and associated benefits, the adoption of AI in nursing practice also raises important challenges, including ethical and legal issues, technological limitations, and the need to train professionals for the proper use of these tools. In this sense, it becomes essential to understand the contributions of AI to nursing, as well as its implications for healthcare delivery (Praxedes, 2024).

Given this scenario, this study aims to analyze, through a literature review, the main contributions of Artificial Intelligence to nursing practice, highlighting its benefits, applications, and challenges in the care context.

The choice of this topic is justified by the growing insertion of artificial intelligence in the healthcare field and by its potential to transform nursing practice. AI-based technologies have contributed to support the Nursing Process, clinical documentation, prediction

of critical events, and organization of care, promoting greater patient safety and care efficiency.

Therefore, this study is justified by its attempt to analyze the main contributions of artificial intelligence to nursing practice, identifying benefits, applications, and limitations in order to broaden understanding of the subject and support professional education and practice in the digital era.

2. THEORETICAL FOUNDATION OR LITERATURE REVIEW

2.1. Foundations Of Artificial Intelligence In Healthcare

Currently, the use of AI in healthcare has been advancing significantly, whether through the training of language systems such as *machine learning* and *deep learning*, or in relation to Big Data and Industry 4.0. These technologies can be used to capture words, phrases, or online opinions and cross-reference data with news, names, and media outlets in order to determine data correlations and provide solutions in precision medicine (Benke; Benke, 2018).

Large language models (LLMs) are advanced and revolutionary representatives of AI, generating and understanding texts, data, and insights and producing high-quality results in healthcare. They may fit into two models of use: general models adapted for medical applications, such as GPT-4, and specialized models developed specifically for this purpose, such as Med-PaLM and PMC-LLaMA. They can also be multimodal, analyzing and interpreting everything from radiological images to symptoms reported by the patient (Maity; Saikia, 2025).

In health education, AI advances the definition of populations to be studied, optimizes research protocols, systematizes knowledge, groups data and results, and generates images, graphs, and analyses that are more precise than those produced by the human eye (Costa *et al.*, 2024).

The outlook for AI use tends to increase as health technologies advance, since private investment in the development of artificial intelligence in healthcare rose from 11 billion dollars in 2022 to 109.1 billion dollars in 2024 (Artificial Intelligence Index Report 2022; 2025).

2.2. Nursing Practice Associated With Artificial Intelligence

For Artificial Intelligence tools such as ChatGPT® to be associated with nursing practice, professionals must deepen their knowledge of prompt engineering and generative AI, in which a *prompt* is the definition of an instruction that executes the AI creation command. Thus, prompt engineering consists of the development and refinement of instructions directed to AI language models such as GPT-4 (Sasso *et al.*, 2024).

The incorporation of these new technologies based on Artificial Intelligence into nursing directly impacts the practice of the Nursing Process, since it is the main part of the Systematization of Nursing Care, contributing to patient safety, optimization of care time, and support for the nurse's clinical judgment. Applications based on Artificial Intelligence have been used to assist clinical judgment by analyzing data such as vital signs, clinical information, and electronic health record data. By processing this information, these tools support decision-making in the diagnostic stage of the Nursing

Process, making it less subjective and contributing to more consistent and well-grounded clinical reasoning (Gomes *et al.*, 2025).

Bed bathing is one of the most frequently performed nursing interventions, especially in scenarios where the patient is in critical condition. Therefore, when it is carried out by fewer professionals, the procedure often takes longer to complete. With the integration of a radial basis function neural network, it became possible to calculate how long the nursing team takes to perform bed bathing in order to speed up the process and help the nurse organize the team more effectively by distributing patients more fairly. This reduces overload, improves safety, and makes care more efficient in the ICU (Toledo; Bhering; Ercole, 2024).

The integration of large language models into nursing practice has demonstrated potential to optimize clinical documentation, reducing the time spent preparing records and shift handovers without changing the care workflow. Artificial intelligence can generate drafts of nursing notes based on data from the electronic health record, allowing the nurse to focus more on direct patient care. However, the study reinforces that professional review and validation remain indispensable to prevent errors and system hallucinations, highlighting that AI should act as a decision-support tool rather than a substitute for human clinical judgment (Chen *et al.*, 2026).

Artificial intelligence has proven efficient in the early prediction of critical events in Intensive Care Units, allowing the detection of sepsis up to 12 hours before clinical diagnosis and the anticipation of cardiac arrest and respiratory failure 1 to 6 hours in advance, surpassing traditional alert systems (Ramos-Zaga, 2025).

2.3. Future Of Artificial Intelligence In Nursing

It is necessary to include disciplines on artificial intelligence, data science, computational thinking, and digital ethics in undergraduate and graduate nursing programs. Prompt engineering is fundamental to the training of nurses and should be added to the curriculum, since understanding it is necessary to maximize the use of tools such as ChatGPT® in clinical practice and teaching (Sasso *et al.*, 2024).

Language models are revolutionizing medical education by offering personalized learning, clinical case simulations, immediate feedback, and the development of interdisciplinary programs that combine medicine, AI, data analysis, and leadership, preparing professionals for an increasingly digital healthcare environment (Maity; Saikia, 2025). AI tools such as Elicit, Consensus, and ChatGPT optimize research, literature review, population delimitation, and data extraction, but they require nurses to be trained to use them ethically and critically (Gomes *et al.*, 2025). The field requires well-prepared professionals, since AI does not replace the nurse, but rather requires adequate training for safe and effective use (Chiavegatto, 2025).

Language models and applications should be developed with a focus on the real needs of nursing: the Nursing Process, patient classification, NANDA-I diagnoses, NOC/NIC interventions, care records, time management, and patient safety. Large language models (LLMs) optimize clinical documentation, decision support, diagnosis, individualized care planning, and report generation, allowing the nurse to devote more time to direct patient care (Maity; Saikia, 2025).

AI automates documentation, scheduling, and medication management, while decision-support systems guide nurses with evidence-based recommendations at the bedside, reducing cognitive load and improving confidence in decision-making. AI applications analyze vital signs, electronic health records, and clinical data, supporting diagnosis within the Nursing Process and making it less subjective, with more consistent and well-founded clinical reasoning (Gomes *et al.*, 2025). Natural language processing tools can transcribe and organize patient notes, preserving valuable time for practical care (Bender *et al.*, 2025).

It is necessary to ensure that AI does not increase inequalities. Strategies such as public-private partnerships, funding for smaller institutions, development of low-cost solutions, and digital inclusion policies can democratize access to technology. Algorithms trained on data from São Paulo may not be the best solution in Belém or Salvador, highlighting the need for representative and locally trained data so that the tools function properly in different Brazilian contexts (Chiavegatto, 2025).

Algorithms may reinforce prejudice and perpetuate inequalities if they are trained on data that are not representative of certain demographic groups, complicating the integration of AI with healthcare delivery (Bender *et al.*, 2025).

Gaps in digital knowledge among patients and healthcare professionals, in addition to the lack of digital infrastructure, such as inadequate access to devices and connectivity in some regions of the world, must be addressed to ensure effective and equitable AI implementation (Bender *et al.*, 2025). Equity and *fairness* are fundamental ethical challenges that need to be considered in the

development and implementation of LLMs in healthcare (Maity; Saikia, 2025).

The incorporation of Artificial Intelligence (AI) into healthcare represents a significant transformation in care models, management, and knowledge production, supported by advances in machine learning, deep learning, Big Data, and technologies associated with Health 4.0. In this context, large language models (LLMs) emerge as innovative tools capable of processing and interpreting large volumes of data, generating clinical insights, and supporting decision-making, especially when integrated with electronic health record systems and clinical databases (Benke; Benke, 2018; Maity; Saikia, 2025).

3. METHODOLOGY

This study is an integrative literature review aimed at analyzing and synthesizing the contributions of Artificial Intelligence (AI) to nursing practice, highlighting applications, benefits, and challenges. The review was conducted based on a systematic search in national and international scientific databases, accessed through open-access or institutional academic platforms. The search strategy used descriptors and keywords combined through Boolean operators, such as *"artificial intelligence," "nursing," "nursing care," "machine learning,"* and variations in English. Priority was given to publications in scientific journals, scoping, integrative, and narrative reviews, as well as original articles, conference abstracts, relevant technical materials, and books, published mainly from 2020 onward, in order to contemplate the most up-to-date scenario on the topic.

The inclusion criteria were: articles in Portuguese, English, or Spanish; studies that addressed directly or significantly the application of AI in nursing practice, care, management, or education; and full-text availability. Duplicate studies, opinion texts without an empirical basis, non-scientific materials without a consistent theoretical framework, and publications that did not allow full access to the content were excluded.

4. RESULTS AND DISCUSSION

It was found that artificial intelligence has contributed to nursing by supporting clinical decisions, improving records, anticipating risks, and organizing team work. At the same time, the studies highlight the importance of professional training and the ethical use of these technologies, since limitations related to bias, infrastructure, and inequality of access still exist. Below are the main findings described in the studies, divided by thematic axis and their respective bibliographic references.

Table 1 — Main findings on the contributions of artificial intelligence to nursing practice, according to the authors analyzed.

Thematic axis	Main findings	Bibliographic references
Foundations of AI in healthcare	Artificial intelligence has been expanding its presence in healthcare through machine learning, deep learning, big data, and large language models, with potential for data analysis, generation of clinical insights, and support for precision medicine.	BENKE; BENKE, 2018; MAITY; SAIKIA, 2025; COSTA <i>et al.</i> , 2024.

Support for the Nursing Process	AI-based applications and systems assist in the analysis of vital signs, clinical data, and electronic records, reducing the subjectivity of clinical judgment and strengthening diagnostic reasoning and care planning.	GOMES <i>et al.</i> , 2025.
Patient safety and prediction of critical events	AI has demonstrated usefulness in the early identification of critical events in the ICU, including sepsis, cardiorespiratory arrest, and respiratory failure, favoring early interventions and greater care safety.	RAMOS-ZAGA, 2025.
Organization of nursing work	The use of neural networks to predict bed-bathing time contributes to better team distribution, reduced overload, and greater efficiency of care in critical units.	TOLEDO; BHERING; ERCOLE, 2024.
Clinical documentation	Large language models can optimize nursing records and shift handovers, reducing the time spent on documentation without replacing professional review and validation.	CHEN <i>et al.</i> , 2026; MAITY; SAIKIA, 2025.
Nursing education	Tools such as ChatGPT, Elicit, and Consensus favor personalized learning, clinical simulation, literature review, and systematization of knowledge, expanding possibilities for teaching and professional training.	SASSO <i>et al.</i> , 2024; GOMES <i>et al.</i> , 2025; MAITY; SAIKIA, 2025.
Evidence-based practice	AI contributes to the organization of scientific knowledge, delimitation of populations, grouping of results, and support for evidence-based nursing practice.	COSTA <i>et al.</i> , 2024; GOMES <i>et al.</i> , 2025.

Management and decision support	Intelligent systems automate documentation, scheduling, and medication management, in addition to offering data-based clinical recommendations, reducing nurses' cognitive load.	BENDER <i>et al.</i> , 2025; GOMES <i>et al.</i> , 2025.
Professional training	Safe incorporation of AI requires education in artificial intelligence, data science, digital ethics, technological literacy, and prompt engineering in nursing courses.	SASSO <i>et al.</i> , 2024; CHIAVEGATTO FILHO, 2023; GOMES <i>et al.</i> , 2025.
Ethical, structural, and equity challenges	Limits remain related to algorithmic bias, unequal access, lack of digital infrastructure, low interoperability, and the risk of expanding regional and social inequities.	BENDER <i>et al.</i> , 2025; CHIAVEGATTO FILHO, 2023; PRAXEDES, 2024; MAITY; SAIKIA, 2025.
Expansion of AI use	The growth of global investments in artificial intelligence indicates a trend toward expansion of these technologies also in the health sector and, consequently, in nursing.	HUMANITIES, 2022; HUMANITIES, 2025.

Source: prepared by the author.

In the field of nursing, the use of AI demonstrates relevant potential to improve the Nursing Process, especially in the stages of data collection, diagnosis, and care planning. By analyzing clinical information, vital signs, and patient history, AI-based systems help reduce the subjectivity of clinical judgment, promoting greater consistency and foundation in care decisions (Gomes *et al.*, 2025). However, it is essential to emphasize that such technologies act as

support tools and do not replace the nurse's clinical reasoning and professional responsibility.

In addition, specific applications such as the early prediction of critical events in Intensive Care Units show important gains in patient safety, allowing early interventions in situations such as sepsis, cardiorespiratory arrest, and respiratory failure (Ramos-Zaga, 2025). Similarly, the use of neural networks to optimize care processes, such as bed bathing, demonstrates a direct impact on work organization, reduction of team overload, and improvement of care efficiency (Toledo; Bhering; Ercole, 2024).

Another relevant aspect refers to the use of LLMs in clinical documentation, enabling the automated generation of nursing records and contributing to the reduction of time spent on administrative activities. This optimization allows the professional to direct greater attention to direct patient care. However, studies emphasize the need for careful review of this information, considering the risk of errors and inconsistencies generated by the systems, which reinforces the indispensability of human supervision (Chen *et al.*, 2026).

In the educational sphere, AI also stands out as a support tool for nursing education, favoring personalized learning, the simulation of clinical cases, and the systematization of scientific knowledge. Tools such as Elicit, Consensus, and ChatGPT have been used to optimize literature reviews and data organization, requiring, however, the development of specific competencies such as prompt engineering and digital health literacy (Sasso *et al.*, 2024; Gomes *et al.*, 2025).

Despite these advances, the implementation of AI in nursing presents significant challenges, especially with regard to equity, ethics, and infrastructure. The use of algorithms trained on non-representative data may perpetuate biases and inequalities, compromising the quality of care in different population contexts (Bender *et al.*, 2025). In the Brazilian scenario, marked by regional inequalities, it becomes essential to develop solutions adapted to the local reality, with representative data and policies that promote digital inclusion and equitable access to technologies (Chiavegatto, 2025).

Additionally, gaps in digital knowledge among healthcare professionals and structural limitations, such as insufficient internet access and non-interoperable systems, constitute important barriers to the effective adoption of these technologies. In this sense, nursing education must incorporate content related to artificial intelligence, data science, and digital ethics, preparing professionals for critical, safe, and evidence-based performance in the context of digital health.

Thus, it is observed that Artificial Intelligence has high potential to transform nursing practice, promoting greater efficiency, safety, and quality of care. However, its effective integration depends on professional training, the quality of the data used, and the responsible and ethical implementation of these technologies, ensuring that their use contributes to strengthening patient-centered care rather than expanding existing inequalities.

FINAL CONSIDERATIONS

The evidence analyzed in this review demonstrates that Artificial Intelligence (AI) has a growing and strategic role in transforming nursing practice by contributing to the qualification of care, optimization of processes, and strengthening of patient safety. Its application in supporting the Nursing Process, predicting critical events, and automating administrative activities highlights significant gains in care efficiency and clinical decision-making.

However, despite technological advances, the incorporation of AI into nursing still faces relevant challenges, especially with regard to ethical issues, data reliability, algorithmic biases, and inequalities in access to technologies. These factors may directly affect the quality of care and reinforce inequities already existing in the healthcare system, especially in contexts with structural limitations, as observed in different regions of Brazil.

In this sense, the need for investments in digital infrastructure, development of technologies adapted to local reality, and implementation of public policies that promote digital inclusion and equity in access to innovations is emphasized. In addition, the reformulation of nursing education curricula becomes fundamental, with the inclusion of content related to artificial intelligence, data science, digital ethics, and technological literacy, preparing professionals for critical, safe, and evidence-based practice.

Finally, it is emphasized that AI does not replace the nurse, but enhances professional performance and should be used as a support tool for clinical reasoning and decision-making. Its integration must occur in a responsible, ethical, and patient-centered way, ensuring that technological advances effectively

contribute to improving the quality of care and to building more efficient, safer, and more equitable health systems.

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