Review Article

The Artificial Intelligence Implementation in Nursing Services: Literature Review

Widiyono Widiyono[1], Ranti Ningsih Sumarni[1]

[1]Nursing Program Study, Departement Medical Surgical Nursing, Sahid University of Surakarta

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Corresponding author

Widiyono*
Sahid University of Surakarta
Jl. Adi Sucipto No.154, Jajar, Kec. Laweyan, Kota Surakarta, Jawa Tengah 57144
Phone**:** 0812-9555-2123
email : widiyono@usahidsolo.ac.id

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Abstract

Backgroud : Major changes to clinical practice are likely to occur as a result of the introduction of AI into the healthcare industry. Virtual assistants (e.g., AI documentation tools such as Nuance DAX and AI-enabled medical diagnostic tools) are one of the ways artificial intelligence has been applied in our daily lives; one example is its use in the documentation process in the nursing profession. However, there are concerns about false data and possible unintended effects on patients when AI is used in nursing care. In addition, there is only 2% research on AI and its potential benefits for nurses. There is a need for more in-depth research on the use of AI in nursing care.
Aims : This study to review the findings and evidence base related to the use of artificial intelligence (AI) in nursing care.
Methods : The research approach used was a literature review. Articles on the use of AI in nursing care were searched using topics and keywords related to nursing, artificial intelligence, and nursing care. Relevant research was searched using the Boelean formula and filtered for articles published between 2019 and 2024, including PUBMED, Scopus, and Google Scholar. Research involving the creation or verification of artificial intelligence (AI)-based technologies used in nursing care was considered for inclusion, as were research designs that included experimental or observational methods and quantitative or qualitative data analyses, or a mixture of both. The retrieved articles were screened and discussed according to the research criteria.
Results : The results of this study obtained 10 articles that met the criteria and met the requirements (out of a total of 2,490 publications) which were then discussed. The articles discussed the use and application of AI in nursing services for both clinical and academic purposes.
Conclutions : There are many potential advantages to implementing AI into nursing services, but they must be carefully considered. To overcome these barriers to the use of AI to improve nursing services, further research is needed. In the future, nurses need to be technologically literate.

Keywords: artificial intelligence, implementation, nursing services, literature review, search engine

INTRODUCTION

When computers are programmed to mimic human intellect in order to solve problems, make decisions, and identify patterns, we say that these machines have artificial intelligence (AI). Nurses and patient families may work together more effectively with the help of AI to coordinate nursing care (1), (2). The effort to boost operational efficiency and enhance the

quality of nursing care, hospitals and healthcare providers worldwide—particularly.

With the expansion of data ecosystems in medical-surgical nursing care systems, artificial intelligence (AI) has emerged as a prominent tool for assisting nurses in providing quality patient care in the last few decades. There is hope that AI-based support systems can help bring down healthcare costs, make these services more efficient, and build valuable systems that will benefit patients and the healthcare industry as a whole. This, in turn, should lead to happier patients and their families and better clinical safety for everyone involved (6), (7).

Opportunities from the implementation of AI include better disease care, increased patient engagement and participation, increased reduction of medical errors and quality of service, increased operational efficiency and reduction of medical costs, increased productivity and creation of new jobs, reducing health care costs (8). In addition, another opportunity is the use of AI can increase the effectiveness and efficiency of nurses' work towards patients, with the presence of nursing care robots, the work of nurses will be assisted by them, such as in lifting patients from bed to wheelchair, and others. The use of AI also has the potential to increase the recovery rate and reduce the death rate in patients, especially in the COVID-19 era (9).

As end-users of AI-powered healthcare systems, nurses have a unique position to influence and pioneer the field's AI advancements in the nursing profession [10]. The amount of nurse participation in research and development of artificial intelligence technology is unknown, despite the fact that clinical and research knowledge plays a significant role in the creation of technology that is pertinent to nursing (11). This study on artificial intelligence (AI) based technology in nursing aims to fill the knowledge gap by collecting research data and providing definitions and concepts relevant to AI in nursing.

Naturally, there are difficulties associated with any technology that also offers advantages and prospects. Indirectly as well as directly. A number of AI-related issues need significant attention, including the reliability of existing medical data, the degree to which people and computers can work together, and associated ethical concerns (12).

Along with the good effects, the incorporation of AI into nursing research has sparked public debates and worries. Some worry that AI will supplant human nurses, infringing on the ethics of care, while others are concerned that technology may eliminate the need for human nurses altogether (13). Many factors, including a lack of clinical validation of AI algorithms, regulatory costs, and patient unwillingness to (14), have contributed to the slow clinical acceptance of AI algorithms for medical imaging. Also, it's certain to happen that AI models for diagnosis and advice will surpass human physicians at some time. Similar to how antibiotics have supplanted other medications in the treatment of illnesses, these models will be compelled to embrace AI systems due to their better performance (15).

METHODS

Study Design

This study employed a structured literature review approach to identify and synthesize evidence regarding the definition, purpose, impact, barriers, and ethical considerations of artificial intelligence (AI) implementation in nursing care. The review focused on analyzing primary research studies published between 2019 and 2024.

Search Strategies

A comprehensive literature search was conducted in three major databases: PubMed, Scopus, and Google Scholar. The search was performed in August 2024, with a restriction to studies published within the last ten years (2019–2024) to ensure the inclusion of the most recent and relevant literature. Boolean operators ("AND," "OR") were used to combine the following keywords and their associated synonyms: "nurses," "artificial intelligence," "machine learning," and "nursing care."

Advanced search techniques and database-specific algorithms were applied to optimize the retrieval of pertinent articles.

Inclusion and Exclusion Criteria

Studies were considered eligible if they Involved the development, application, or validation of AI-based technologies directly related to nursing practice or nursing care, Employed experimental, observational, or mixed-methods study designs,

incorporating s, or combined data analysis, and Explicitly discussed the implications of AI for nursing practice, including but not limited to clinical care, education, decision-making support, or workflow optimization.

Studies were excluded if they did not specifically pertain to nursing practice or nursing care, were non-original research articles, such as literature reviews, opinion papers, editorials, or commentaries, and did not involve experimental or observational data.

Study Selection

The study selection process was conducted in two stages. First, titles and abstracts of the retrieved articles were screened for relevance based on the predetermined inclusion and exclusion criteria. Second, full-text articles were independently assessed by two reviewers to confirm eligibility. Any discrepancies between reviewers were resolved through discussion. The number of articles included at each stage was recorded to ensure transparency in the selection process.

Data Extraction

Relevant data were extracted systematically from the included studies, including author(s) and year of publications, study objective AI technology or application used, study design and methodology, main findings and conclusions, and relevance to nursing practice. A standardized data extraction form was utilized to ensure consistency across studies.

Data Analysis

The extracted data were synthesized descriptively. Findings were organized thematically based on the focus areas of the included studies, including the definition, purpose, impact, barriers, and ethical considerations of AI integration in nursing. Patterns, common themes, and gaps in the existing literature were identified and discussed to provide a comprehensive overview of the current evidence base.

RESULTS

The planned literature review has the potential to impact practice and policy related to patient care in critical care areas. Healthcare professionals will be aware of the opportunities for using artificial intelligence in patient care in the nursing area.
The results of the non-total article search items found were 2,490 but only 10 articles met the criteria. Researchers describe the definition, types, objectives, impacts, obstacles, ethical aspects of the application of AI in nursing.

Table 1. Summary of Included Studies

Researcher and year	*Result*
Tang et al., (2019)	Facilitating nurse decision making in nursing homes
Xiong et al., (2019)	Detects and records patient falls, and notifies to check video
Zampieri et al., (2019)	In ICU Setting, Lower in- hospital Mortality and ICU LOS
Yamamoto et al., (2020)	Evaluating hand washing skills performed by nurses
Ambagtsheer et al., (2020)	Identification of Weaknesses in Patients
Ye et al (2020)	Reduce the risk of patient falls
Seibert et al., (2021)	Impact on patient physical activity, movement, or response, detecting Length of Stay (LOS), death, ulcers, and hand washing skills
Lee & Yoon., (2021)	AI technology is used in hospitals to support patient diagnosis and treatment, as well as improve the efficiency of hospital operations and management.
Akzatria, et al., (2023)	AI technologies such as fuzzy logic, robots, deep learning, and machine learning are starting to be developed to help the performance of medical personnel, such as detecting work safety equipment, measuring air quality, and performing operations automatically.
Hofmann P, et al., (2024)	The successful operation of AI applications in healthcare requires new forms of management due to the specialization of AI technologies and healthcare domains.

DISCUSSION

The term "artificial intelligence" (AI) refers to computer programs that mimic human intellect in order to make machines seem smarter and more capable of learning and solving problems (2). Several AI-based nursing studies have been conducted (16).

The application of AI in health services aims to prevent risks, support direct care, and support the organization of care (17). Other goals in the application of AI in health services are monitoring activity and health, classifying data, supporting decision making, and generating information for coordination and continuity of care (18). Another purpose l of implementing AI is to detect fall risk, prevent falls, and classify fall risk. Further goals with the level of high specificity is recognition, classification, alarm reduction, risk prediction, and ulcer risk classification. In terms of nursing management, AI is often used to overcome the problem of nurse rosters or scheduling (19).

Measures for monitoring and evaluation looked studied how well a scalable camera monitoring system with AI could identify and document falls, as well as alert nurses to analyze the footage right away after each incidence (17). Strategies for reducing the incidence of wounds and length of stay in the intensive care unit via the use of a Bayesian network model for decision assistance in the prediction of hospital-acquired ulcers. The prevalence of HAIs was lower among patients who were part of the intervention group[18).

Artificial intelligence can improve the efficiency, accuracy, and effectiveness of health services, especially in the ICU, and can reduce the length of stay (LOS) (20). This technology can help identify and prevent medical errors, triage in the emergency unit, develop new scientific knowledge, organize nurse schedules, and improve communication between health workers (21). In addition, artificial intelligence can also help improve the efficiency and accuracy of disease diagnosis, improve clinical decision-making, and improve the overall quality of patient care (22).

Additionally, AI was used to assess the proficiency of nursing students in handwashing. Results showed an improvement in handwashing abilities when comparing students three months after their last training session. (23).

Researchers state that future studies should center on the ways in which digital technology influences the relationship among nurses, patients, and the environment, as well as on how nurses can use technology to increase patients' knowledge of themselves and their conditions. This builds on earlier work that synthesized nursing theory concepts to offer a theoretical perspective to digital nursing practice (24).

Nevertheless, there are a number of obstacles to using AI in healthcare, including issues with data privacy and security, an absence of high- quality clinical data, and worries about the displacement of human nurses (25).
Technological infrastructure, accuracy, precision, and data validation are some of the obstacles that might hinder the use of AI, particularly in the field of nursing care (26), (27). Therefore, the development of a solid ethical framework, strict security standards, and ongoing research is needed to ensure the responsible use of artificial intelligence and maximize its benefits (28).

Finding the areas where AI can really help nurses is a crucial first step in realizing the full potential of these technologies (29). It's cause of their dual roles as care specialists and prospective users of AI-based solutions, nurses are well positioned to guide the development of cutting-edge AI for the nursing profession (10). Despite the fact that nurses' research and clinical knowledge may greatly contribute to the development of nursing-related technologies, there is now a pitiful amount of nurse participation in these processes (11).

Precision medicine and AI are still in their infancy, and nurses are only brought in to lend a hand toward the last stages of testing, when their knowledge would have been more useful earlier on (30). Another obstacle to nurses participating in AI research and co-design is the alleged lack of common language and understanding between nursing and technology domain specialists (11). We may fill the gaps in our understanding of artificial intelligence (AI), its standard definitions, ideas, and theories in nursing by compiling the most recent research on AI-based technologies in the field.

Nurses can ensure the ethical use of AI in healthcare by being directly involved in the process of conceptualizing, developing, and implementing AI, especially when AI impacts nursing practice (31). The ethical issues surrounding AI in healthcare are extensive and need to be identified and adequately addressed in the best evidence-based manner (32,33).

In some countries, the use of artificial intelligence is not yet very familiar in the nursing area, so the results of this study can also contribute to the addition of literature related to artificial intelligence in the nursing area.

Implications

The integration of artificial intelligence (AI) technology into nursing services offers transformative potential for healthcare delivery. AI has demonstrated its ability to enhance the efficiency, accuracy, and effectiveness of clinical workflows, thereby contributing to improved patient outcomes. Specific benefits include supporting more accurate diagnoses, reducing medical errors, enabling better clinical decision-making, shortening hospital stays, minimizing fall risks, and streamlining the use of electronic medical records and telemedicine platforms. These advancements collectively enhance the quality of patient care and promote operational efficiency. Nevertheless, for AI to be fully and responsibly integrated into nursing practice, it is essential to address barriers such as data privacy concerns, inadequate quality of clinical data, ethical dilemmas, and trust issues surrounding AI-driven decisions. Efforts to develop clear regulatory frameworks, enhance digital literacy among nurses, and conduct longitudinal evaluations of AI applications are crucial to ensuring safe and effective AI utilization in nursing.

Limitations

This review has several limitations. First, the study focused exclusively on articles published between 2019 and 2024, which may have excluded foundational research published earlier. Second, only three databases were searched, potentially limiting the comprehensiveness of the review. Third, no formal risk of bias or quality assessment tools were applied to the included studies, which may affect the rigor of the synthesized evidence. Finally, due to the heterogeneity of study designs and outcomes, a meta-analysis was not feasible, and findings were synthesized narratively

CONCLUSION

Artificial intelligence holds significant promise in transforming nursing practice and enhancing healthcare delivery. While AI offers substantial advantages in improving clinical decision-making, patient safety, and service efficiency, critical challenges remain, particularly regarding data security, clinical data quality, and ethical considerations. To maximize the benefits while mitigating risks, continued interdisciplinary research, targeted technological development, and proactive education of the nursing workforce are imperative. AI has the potential to shift healthcare paradigms toward more innovative, efficient, and patient-centered models if implemented thoughtfully and responsibly.

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Author Contribution

WW : Conceptualization and Study Design, Methodology, Data Curation, Writing – Original Draft, Writing – Review & Editing
RNS : Methodology, Formal Analysis, Writing – Review & Editing

Conflict of Interest

The authors declare no conflicts of interest.

Data Availability Statement

All data generated or analyzed during this study are included in this published article. Further inquiries can be directed to the corresponding author.

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