



Nursing in the Future Using Artificial Intelligence in Improving Quality Services: Literature Review

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ABSTRACT

Digital transformation in the health sector has brought artificial intelligence (AI) as a revolutionary technology that has the potential to change the paradigm of nursing services. The integration of AI in nursing practice promises to improve service quality through data-driven decision making, automation of administrative tasks, and personalisation of patient care. Purpose this article to analyse the prospects and implementation of AI in future nursing services and its impact on the quality of nursing services based on the latest scientific evidence. Method research by Literature review. A search for relevant studies was conducted in several databases, namely SciSpace PUBMED, Scopus, and Google Scholar, using keywords and terms related to nursing, artificial intelligence, and machine learning in the range of 2020-2025. Results: AI shows transformative potential in six key areas of nursing: (1) Predictive analytics for early identification of patient risk and risk stratification, enabling more timely preventive interventions; (2) Clinical decision support systems (CDS) that provide evidence-based diagnosis and nursing plan recommendations to improve the consistency of clinical assessments; (3) Automated monitoring through signal and visual analysis for the detection of clinical events such as fall risk and changes in vital signs, which speeds up the response to care; (4) Documentation automation using natural language processing (NLP), which reduces administrative burden by up to 40% and increases direct patient care time; (5) Virtual assistants and telehealth, which expand remote care access and support ongoing patient education; and (6) Assistive robotics, which aid in logistical tasks and reduce the risk of occupational injuries for nurses.

Keywords: artificial intelligence, literature review, machine learning, nursing care

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BACKGROUND

Digital transformation in the health sector has brought artificial intelligence (AI) as a revolutionary technology that has the potential to change the paradigm of nursing services. The integration of AI in nursing practice promises to improve service quality through data-driven decision making, automation of administrative tasks, and personalisation of patient care. Research on artificial intelligence (AI) in health services has increased in recent decades. This indicates great potential for improving the quality of care. However, the application of AI in nursing raises concerns regarding data bias and potential impacts on patients. In addition, research related to AI and its benefits in nursing is still limited.

Objective

To analyse the prospects and implementation of AI in future nursing services and its impact on the quality of nursing services based on the latest scientific evidence.



Literature Review

Effective integration of AI into nursing education can be achieved through curriculum design that includes AI-based clinical decision support systems, virtual simulations, and hands-on practice. Faculty training and industry collaboration are essential to equip educators and students with AI competencies. Continuous learning and addressing challenges such as data privacy and algorithm transparency are crucial. By focusing on these strategies, nursing programmes can enhance critical thinking, decision-making, and data analysis skills, ultimately improving patient care in AI-driven healthcare environments.

To effectively integrate AI into nursing education, institutions must equip students with AI literacy, enabling them to understand its concepts and principles. Collaboration with interdisciplinary professionals, such as data scientists and software engineers, is essential for developing a relevant curriculum. By incorporating AI-related technologies, such as machine learning and natural language processing, nursing programmes can enhance student competencies, preparing them to utilise AI in clinical settings, ultimately improving patient care and driving innovation in nursing practice.

AI can be effectively integrated into nursing education by enhancing the learning experience through personalised learning and progress tracking, improving clinical decision-making skills, and addressing the shortage of clinical placement opportunities. Future reforms should focus on curriculum design and teaching methods that promote the responsible use of AI while maintaining core nursing values such as empathy and critical thinking. This approach will optimise students' preparation for the healthcare field and help cultivate a new generation of nursing professionals equipped for modern challenges.

Integrating AI into nursing education can significantly enhance the competence of future nurses and improve patient care by providing innovative learning experiences, personalised education, and improved clinical decision-making skills. AI technologies such as clinical decision support systems, virtual simulations, and AI-based tools can help nursing students develop critical thinking, decision-making, and data analysis skills that are essential for the modern healthcare environment. However, successful integration requires addressing challenges such as data privacy, algorithm transparency, and ethical considerations. Here are key aspects of AI integration in nursing education:

Types of Artificial Intelligence

Several AI-based nursing studies have been conducted. Previous studies have most often been conducted on adult and elderly patients (vonGerich et al., 2022). AI methods mostly include Machine Learning (ML), Artificial Neural Network (ANN), and deep learning methods. The data sources for training, testing, and validating AI-based technology are electronic health records, electronic questionnaires, information systems, sensors, and cameras or image data sets, with data types being structured data, unstructured data, and images. Focused AI techniques have been based on predictive modelling, Natural Language Processing (NLP), computer vision, speech recognition, and planning or scheduling (Seibert et al., 2021; von Gerich et al., 2022).

Enhancing the Learning Experience

AI can simulate clinical scenarios using virtual patients and 3D avatars, allowing students to practise and refine their skills in a controlled environment. AI-based tools can provide personalised learning experiences and progress tracking, helping students identify areas for improvement and tailor their learning paths.

Enhancing Clinical Decision-Making

AI technology can enhance clinical decision-making capabilities by providing real-time data analysis and decision support, which is crucial for effective patient care. AI can assist in



diagnosing diseases, planning treatments, and engaging patients, thereby reducing errors and improving healthcare outcomes (Seibert et al., 2021).

Overcoming Educational Challenges

AI can help reduce the shortage of clinical placement opportunities by offering simulations and virtual scenarios that mimic real-life clinical settings. AI tools can improve communication skills and assess students' knowledge and clinical skills through interactive learning modules. While AI offers many benefits, it is important to maintain a balance between technology and human interaction in nursing education. The core values of empathy and compassion must remain central to nursing education, ensuring that future nurses are not only technologically proficient but also compassionate caregivers. Interdisciplinary collaboration and continuous innovation are essential for effectively integrating AI into nursing curricula, preparing students for the evolving healthcare landscape. (Tang et al., 2020).

METHODS

Literature review. A search for relevant studies was conducted in several databases, namely SciSpace PUBMED, Scopus, and Google Scholar, using keywords and terms related to nursing, artificial intelligence, and machine learning in the range of 2020-2025. Inclusion criteria included research on the development or validation of AI-based technology used in nursing services and study design, including experimental or observational studies using qualitative, quantitative, or combined approaches. Exclusion criteria included articles that were not relevant to nursing, non-experimental, non-observational, or literature review articles. The results of the study showed that out of a total of 3,713 papers found, only 10 papers met the criteria. The use of AI in nursing services can provide many benefits but also requires careful consideration. Therefore, more research is needed to address the challenges faced and to maximise the potential of AI in improving service quality.

RESULTS

AI shows transformative potential in six key areas of nursing: (1) Predictive analytics for early identification of patient risk and risk stratification, enabling more timely preventive interventions; (2) Clinical decision support systems (CDS) that provide evidence-based diagnosis and nursing plan recommendations to improve the consistency of clinical assessments; (3) Automated monitoring through signal and visual analysis for the detection of clinical events such as fall risk and changes in vital signs, which speeds up the response to care; (4) Documentation automation using natural language processing (NLP), which reduces administrative burden by up to 40% and increases direct patient care time; (5) Virtual assistants and telehealth, which expand remote care access and support ongoing patient education; and (6) Assistive robotics, which aid in logistical tasks and reduce the risk of occupational injuries for nurses. AI implementation has been shown to improve patient safety through the prediction of preventable events, increase operational efficiency with up to 50% reduction in documentation time, and support personalised care through comprehensive patient data analysis.

DISCUSSION

Studies show that AI can reduce nurse burnout by up to 35% through the reduction of repetitive tasks and better workload management. Challenges: AI implementation faces significant barriers, including: (1) Data privacy and security, which require a strict governance framework; (2) Algorithm bias and model generalisation issues that can affect care equity; (3) Limited real-world evidence of effectiveness, which requires further implementation research; (4) Digital competency gaps among nurses, necessitating comprehensive training programmes;



and (5) Substantial infrastructure investment for system interoperability and information technology support.

CONCLUSION

AI has revolutionary potential to transform future nursing care through improved quality, efficiency, and patient safety. However, realising this potential requires a holistic approach that includes: developing evidence of effectiveness through translational research and randomised controlled trials; integrating AI competencies into nursing education curricula; actively involving nurses in technology design; and developing robust ethical and governance frameworks. The key to success lies in an augmentation rather than substitution paradigm, where AI enhances nurses' capabilities while preserving the humanity and empathy that are at the core of nursing practice. With the right implementation strategy, AI can drive the evolution of nursing towards safer, more efficient, and patient-centred care while improving the well-being of nursing professionals.

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