The Impact and Issues of Artificial Intelligence in Nursing Science and Healthcare Settings

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Abstract

Research and development of artificial intelligence (AI)-based technologies systems in healthcare has increased over the past decade, highlighting the strong potential of AI to improve the quality of nursing care. To meet the new demands for nursing care, it is necessary that AI be integrated into nursing science and healthcare setting, especially in nursing care. The current challenge is to transform this expanded set of technology into clinical benefits for patients, through more advanced, accurate, practical, effective, efficient, and economical and personalized care. Along with the potential positive outcomes, AI technology also has unintended consequences that have the potential to negatively impact and adversely affect the nursing profession and the primary purpose of nursing practice in healthcare system. This aimed to explore and discuss the impact of applying AI in nursing science and healthcare system to provide approximate nursing care. Some of the impacts that can be evaluated and seen today in the context of using AI technology systems in the scope of nursing and healthcare are expanding access to quality medical care, improving medical records, and improving the quality of services. The use of AI technology systems also has some issues, such as bias and algorithms, which are drawbacks that need to be considered when evaluating the accuracy of the displayed results.

Introduction

Among the most popular applications of artificial intelligence (AI), those used in healthcare represent the largest proportion in terms of usage and expectations (Alazzam et al., 2022; Ronquillo et al., 2021). AI technologies are being developed, tested, evaluated, and applied to healthcare in many countries, with limited involvement of nurses across settings and specialties around the world (Ng et al., 2022; O'Connor et al., 2022). As technology, AI becomes more advanced, accurate, practical, effective, efficient, and economical for nursing care. This is another level of opportunities and also pressures to apply AI technology in nursing care (Stokes & Palmer, 2020; von Gerich et al., 2022). Under these conditions, it is urgent and necessary to rethink the principles that determine which interventions should be performed by nurses or AI devices. Therefore, critical thinking is required to separate the roles of nurses and AI in the delivery of appropriate care services to patients.

In general, the main purpose of any valuable technology is to solve problems or make improvements. For example, the use of speech recognition technology can speed up the process and/or improve accuracy, efficiency, reduce errors, and shorten the time it takes to complete nursing documentation (Joseph et al., 2020; Peivandi et al., 2022). In another example, machine learning has five algorithms and visualizes the best model using nomograms and web calculators to help nurses assess patients' cancer status and machine learning has reduced in-hospital mortality using early warning scores (Jin et al.,

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2022; Winslow et al., 2022). Therefore, it is worth to consider some of the problems and challenges that nurses face and how AI can solve them now and in the future. This will undoubtedly require further development and refinement of AI technology to optimize nurse performance in the nursing care process.

Research and development of AI-based technologies in healthcare have increased over the past decade, highlighting the strong potential of AI to improve the quality of nursing care (Ng et al., 2022; Randhawa & Jackson, 2020; von Gerich et al., 2022). From its inception to the present, there has been few research that goes beyond proof-of-concept studies or laboratory experiments and applies AI in real-world scenarios, and even less research that evaluates the impact of AI on clinical outcomes (Seibert et al., 2021). To meet the new demands for nursing care, it is necessary that the AI be integrated into nursing science and healthcare setting, especially in nursing care. However, the impact of applying these technologies in nursing has not been explored and discussed. Therefore, this article aimed to explore and discuss the impact of applying AI in nursing science and healthcare system to provide approximate nursing care. The purpose of this article is to assess the current use of AI technology systems in nursing and healthcare settings in order to provide an overview or stimulate further research useful for the development of AI technology systems that are perfectly suited for application in healthcare.

Discussion of Topic

This critical question is supported by many studies that have identified specific gaps in the application of AI in outcomes research and are unique to many different therapeutic areas, such as nursing homes, long-term care, and mental health settings (Hacking et al., 2022; Higgins et al., 2023; Sivajohan et al., 2022). Therefore, further consideration is needed before the use of AI can be incorporated into the health technology assessment decision-making process, especially in the context of medical use (Chen et al., 2022; Tucci et al., 2022). A gap was found in the use of some AI technologies developed in healthcare settings such as nursing homes, home care, and outpatient long-term care, as well as some AI solutions relevant for other nonhospital care settings. Currently, AI technology has great potential to enhance nurses' skills and enable them to provide evidence-based and personalized care to patients in a holistic, comprehensive, and integrated approach. Along with the potential positive outcomes, AI technology also has unintended consequences that have the potential to negatively impact and adversely affect the nursing profession and the primary purpose of nursing practice in the healthcare system.

Impact of AI

Expands Access to High-Quality Medical Care. AI technology in healthcare has the greatest potential to improve and expand access to high-quality medical care, providing personalized intervention and monitoring with reduced error rates and lower costs (D. Higgins & Madai, 2020). In this case, AI technology has improved care delivery by reducing time-consuming tasks that do not require specialized nursing skills or knowledge, freeing nurses to provide direct patient care.

Improves Medical Records. As electronic medical records (EMRs) are widely adopted and medical devices and instruments are digitized, the information capacity of hospital databases continues to expand (Dong et al., 2021). Therefore, there is a need for AI to organize existing EMRs so that they are easily accessible to relevant medical personnel and can help provide important patient-related information.

Improves Quality of Services. AI can be used to improve the quality of service in terms of efficiency, safety, and access to healthcare through collaboration, coordination, and communication between healthcare disciplines (Petersson et al., 2022). As a result, AI technology is indispensable in daily healthcare services, as AI can simplify the workload of nurses and other healthcare workers to maximize healthcare services.

Issues of AI

Biases. There is a risk that AI will perpetuate or systematically embed existing human biases or social bias into the AIs' system, potentially making the results obtained less accurate (van de Sande et al., 2022). In addition, Bias in AI technology systems can be categorized into algorithmic and social bias, which can arise from factors such as gender, race, or measurement error, leading to suboptimal and inaccurate outcomes for certain groups in healthcare settings.

Algorithm. Clinical decision algorithms introduced racial bias by prioritizing treatment for less sick white patients over sicker black patients in the United States (Obermeyer et al., 2019). However, AI technology systems can be problematic because there is still uncertainty about when AI algorithms are valid and reliable enough to become the standard of care for all patients who need it.

Current Insight and Interpretation

In the nursing setting, the advancement of AI technology is being greeted with excitement as a promising nursing innovation such as intelligence agents, machine learning, deep learning, natural language processing, robotic process automation, administrative applications, and explainable or interpretable AI (Hwang et al., 2022; Ronquillo et al., 2021; Wani et al., 2022). AI technologies may be able to improve the nursing care of various health conditions, provide complete information to support decision-making, manage medical

records, minimize medical errors, optimize nursing care processes, make healthcare more accessible, provide better patient experience, improve nursing care outcomes, and reduce per capita healthcare costs. However, one of the potential implications of replacing aspects of human expertise with autonomous AI system technology is the legal implications of clinical accountability (Choudhury & Asan, 2022). In this sense, accountability is a process in which health professionals have the potential responsibility to justify clinical actions to patients and take responsibility for the consequences. In the use of AI technology, accountability is still being questioned and debated, whether the results of AI are absolute or just a consideration.

Conclusions

Some of the impacts that can be evaluated and seen today in the context of using AI technology systems in the scope of nursing and healthcare are expanding access to quality medical care, improving medical records, and improving the quality of services. These positive effects can be the advantages and the urgency of using AI technology systems in healthcare so that healthcare services become more optimal. In addition, the use of AI technology systems also has some issues, such as bias and algorithms, which are drawbacks that need to be considered when evaluating the accuracy of the displayed results. This requires actions and updates to minimize the possibility of errors.

Declaration of Conflicting Interests

Funding

Ethical Approval

Not applicable.

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