

Title

Artificial Intelligence for Older Adult Health: opportunities for Advancing Gerontological Nursing Practice

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Acknowledgements

None

Declaration of Conflicting Interests

The author declares no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author received no financial support for the research, authorship, and/or publication of this article.

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Author Contributions

The sole author conceptualised this article, drafting and revising the final manuscript.

Keywords

Aging; Artificial Intelligence; Nursing

Guest Editorial

Artificial intelligence (AI) is an emerging technological trend that encompasses a range of advanced computational techniques, mainly machine learning and natural language processing (NLP). These techniques can be applied to health care datasets in many ways to try to improve the prediction of patient, health service, and other outcomes, which can be used to inform clinical decision making and care delivery (O'Connor et al., 2022). These predictive algorithms have many applications in the physical and virtual world, such as clinical decision support systems, robotics, remote monitoring systems, mobile applications, wearable devices, virtual reality, and gaming technologies. Hence, AI is starting to be used to support the care of older adults, which presents a new opportunity for gerontological nursing practice.

Applications of AI in Older Adult Health

Due to biological changes that accompany aging, physical health conditions that older adults may experience include hearing loss, poor vision, joint and muscle pain, diabetes, and dementia, among others. Older adults are also more prone to developing frailty and experiencing incontinence, falls, delirium, and pressure ulcers — areas of older adult health

where AI techniques could possibly help improve patient and other outcomes (O'Connor et al., in press). For example, a team that included a researcher from Penn State College of Nursing developed a machine learning system to identify additional preferences for everyday living of nursing home residents and proposed this “recommender system” could enhance delivery of person-centered care (Gannod et al., 2019). A group of nurses at Columbia University School of Nursing used NLP to identify patients in critical care who lacked surrogates and advanced directives (Song et al., 2022), a strategy that could be applied in gerontological nursing in a range of hospital and community settings to support older adults and their families. Robots often employ AI techniques in their internal software systems, particularly a branch of machine learning called *reinforcement learning*, to enable them to interact with and adapt to the world around them. Robotics is another area in which gerontological nurses can and are breaking new ground, as robotpets are being deployed to provide comfort and psychological support to older adults living in care homes to help address the loneliness and depression they sometimes experience (Abbott et al., 2019). Although many research studies examining how AI can improve older adult health have not included gerontological nurses, the approach used could be adopted by the profession. For instance, Bayen et al. (2021) developed and tested an AI-based video monitoring system among older adults with Alzheimer's disease and found it helped reduce the time they spent on the ground after a fall, as care staff were notified in real-time and able to respond quickly. This type of AI-based system could support gerontological nurses in their daily practice to help decrease secondary complications from falls and improve the prognosis of older adults' post-fall, while reducing health care costs. In another study, Al-Hameed et al. (2019) tested a proof-of-concept AI-based speech recognition system with older adults at home at risk of developing dementia to determine if linguistic changes indicative of the early stages of this neurodegenerative syndrome could be identified. These novel approaches to preventive care could enhance the care and support nurses provide for older adults and their families.

Limitations and Risks of AI

Like any technology, the various computational approaches that comprise AI have limitations and may introduce some risks. Algorithmic bias is one potential risk, as digital health datasets used to train and test AI algorithms can be missing information from certain populations. Poor quality datasets used to develop AI could skew the predictive models and lead to inappropriate clinical decision making, which could negatively impact older adult care and reinforce existing inequalities in health care (Chu et al., 2022). The retrospective nature of many health datasets that AI techniques are developed on may also reduce the ability to forecast future events, as probabilistic models might be missing key variables that could impact older adult health as seen during the coronavirus disease 2019 pandemic (Chin et al., 2020). Hence, gerontological nurses need to be aware of the limitations of AI-based systems and continue to use their clinical expertise to support the care of older adults. In addition, Stokes and Palmer (2020) highlight a number of ethical issues when AI is integrated into robotics, as there is some concern that robotic technologies may replace gerontological nurses or automate aspects of their caring roles. As robots lack human emotions, such as empathy, this could lead to less personalized care and poorer therapeutic relationships with older adults, which may compromise their physical, mental, and social health. Personal privacy is another worry when AI is introduced in robotic and home/remote monitoring technologies, as it could lead to increased surveillance and possible inappropriate disclosure and use of personal information (Hasal et al., 2021), which may impact older adults' autonomy and well-being. Interestingly, Galambos et al. (2019) evaluated perceptions of older adults and their families about the use of intelligent sensors and found they appreciated there may be a trade-off between the benefits of assisted living versus personal privacy. This finding suggests that as people age, the advantages, and disadvantages of using AI-based technologies could be something older adults and their carers consider.

Conclusion

Given the rapid pace of AI in older adult care, gerontological nurses need to be more aware of and knowledgeable about this technological trend as it will impact their practice and so they can provide guidance to patients about using AI-based tools. Therefore, nurses need more educational opportunities to learn about the range of AI techniques that are available and how to apply them to older adult datasets (Ronquillo et al., 2021). This knowledge will enable nurses to conduct AI research and assess if these predictive algorithms can benefit clinical decision making and patient care, and if it is worthwhile to introduce AI-based technologies into gerontological nursing practice. Nurses could collaborate with colleagues in computer science, engineering, and the technology industry, while encouraging active participation of patients to help co-design AI-based tools to meet the needs of older adults (Blakey et al., 2020). As the digital age accelerates, the nursing profession, particularly those working in gerontology, should embrace AI to help determine if it can support the health and wellbeing of older adults.

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