

Challenges in Adopting Artificial Intelligence to Improve Healthcare Systems and Outcomes in Thailand

Praditporn Pongtriang¹, Aranya Rakhab¹, Jiang Bian², Yi Guo², Kitkamon Maitree³

¹Department of Adult and Elderly Nursing, Faculty of Nursing, Surattani Rajabhat University, Surat Thani, Thailand

²Department of Health Outcomes and Biomedical Informatics, College of Medicine, University of Florida, Gainesville, FL, USA

³TELY 360 Co. Ltd., Bangkok, Thailand

Improving healthcare in today's rapidly changing world presents a significant challenge due to evolving socioeconomic and environmental factors, as well as the emergence of new diseases. Numerous countries are grappling with the task of addressing health issues within these varying contexts. Meanwhile, the past decade has also witnessed remarkable advancements in technology, particularly in the realm of artificial intelligence (AI) within healthcare. As a result, many countries' healthcare systems are developing and implementing AI tools to combat health issues among their populations [1]. For example, many organizations and industries have embraced AI technology to enhance quality of life, improving the quality and effectiveness of AI technology for disease prevention and investigation within the healthcare system

[2]. This article aims to shed light on ways of enhancing AI in healthcare, taking into account several factors. Specifically, it examines the health contexts, challenges, and strategies for developing improved health outcomes and systems in Thailand.

Thailand and other developing countries face multiple challenges when integrating AI technology into healthcare and public health systems. These challenges can impact the efficiency and success of using AI in healthcare. The first challenge is the age composition of the population, which needs to be considered when adopting AI technology to improve health outcomes. Thailand's age distribution has changed over time, with the elderly population increasing to consist of more than 17% of the entire population, making Thailand an aging society [3]. This demographic shift presents a challenge that government bodies must address due to the accompanying age-related declines in health and increasing prevalence of noncommunicable diseases linked to aging. As a result, there is a growing demand for long-term and continuous care for the aging population. The application of AI technology for this aging population requires careful design and implementation, considering various factors that affect their health. These factors include difficulties in accessing healthcare services and the necessity for continuous monitoring of vital signs to alert healthcare providers of potential emergencies. The ultimate goal is to improve health conditions and treatment outcomes, and to enhance the efficiency of future care.

Submitted: April 25, 2023

Revised: July 22, 2023

Accepted: July 23, 2023

Corresponding Author

Praditporn Pongtriang

Department of Adult and Elderly Nursing, Faculty of Nursing, Surattani Rajabhat University, 272 Moo 9, Khunthalee, Muang, Surat Thani, Thailand. Tel: +6677913375, E-mail: Praditporn.pon@sru.ac.th (<https://orcid.org/0000-0001-6477-5284>)

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

© 2023 The Korean Society of Medical Informatics

Financial investment in AI is a significant factor in planning its use in healthcare. The success of AI technology's development and implementation in healthcare systems requires the availability of funding and budgetary support. In developing countries with limited government budgets, it is necessary to examine the costs and resources required for AI implementation, as well as the ratio of potential costs to the effectiveness of care. However, government agencies play an essential role in improving healthcare quality by investing initial funds to evaluate the feasibility, acceptability, and benefits of AI in healthcare. When creating health systems that incorporate AI, it is important to consider national policies on AI and health to ensure alignment with government objectives. For example, Thailand has a policy to expand its role as a "Medical Hub," aiming to enhance the health service system to attract foreign patients and tourists, with the goal of becoming a leading health center in Asia. The government has also introduced "smart hospital" policies to raise the standard of health services through the use of advanced technology and AI for analysis, diagnosis, and care planning. These developments exemplify the importance of aligning AI development in health services with national policies is crucial for achieving government objectives. This alignment will facilitate a more seamless integration of AI into the overall health system.

Data mining is another essential component in enhancing the healthcare system through AI, as it increasingly influences healthcare policy decisions. Analytics of patient data are utilized for surveillance, prediction, and care planning to tackle health issues across various populations [4]. However, the integration of AI in healthcare still faces challenges related to accuracy, patient privacy and data security, and ethical considerations [5]. Moreover, many countries, including Thailand, face data-related challenges when implementing AI in healthcare. These challenges include a lack of expertise in healthcare data mining, insufficient research on AI's role in healthcare, and ambiguous policies regarding the use of machine learning in health [6,7]. Additionally, data from healthcare systems at the primary, secondary, and tertiary health service levels are not effectively interconnected due to the variety of platforms used for health information collection. This limits the use of these databases for effective care coordination and planning [8]. Therefore, it is necessary to modify government policies to address the integration of AI in healthcare and enhance the efficient use of health information for prediction, investigation, and care planning, thereby achieving sustainable health outcomes [9].

The challenges in integrating AI into healthcare in Thai-

land discussed so far are viewed from the population, financial, and policy perspectives. In addition to addressing these challenges, it is also critical to foster human resource development in health informatics. This can be achieved by offering short courses in health data science [6,10], and by advancing research in health informatics that involves multiple stakeholders, including the government, hospitals, and universities [11]. It is important for all stakeholders to work together in developing AI-enhanced healthcare systems that can achieve effective care outcomes.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Acknowledgments

The authors thanks for supporting by Suratthani Rajabhat University and The University of Florida.

ORCID

Praditporn Pongtriang (<https://orcid.org/0000-0001-6477-5284>)

Aranya Rakhab (<https://orcid.org/0000-0003-3496-9592>)

Jiang Bian (<https://orcid.org/0000-0002-2238-5429>)

Yi Guo (<https://orcid.org/0000-0003-0587-4105>)

Kitkamon Maitree (<https://orcid.org/0009-0003-5203-6160>)

References

1. Mudgal SK, Agarwal R, Chaturvedi J, Gaur R, Ranjan N. Real-world application, challenges and implication of artificial intelligence in healthcare: an essay. *Pan Afr Med J* 2022;43:3. <https://doi.org/10.11604/pamj.2022.43.3.33384>
2. Koski E, Murphy J. AI in healthcare. *Stud Health Technol Inform* 2021;284:295-99. <https://doi.org/10.3233/shti210726>
3. World Health Organization. Thailand's leadership and innovations towards healthy ageing [Internet]. Geneva, Switzerland: World Health Organization; c2023 [cited at 2023 Aug 2]. Available from: <https://www.who.int/southeastasia/news/feature-stories/detail/thailands-leadership-and-innovation-towards-healthy-ageing#:~:text=Of%20its%2067%20million%20population,for%2010%25%20of%20the%20population.>
4. Lee D, Yoon SN. Application of artificial intelligence-based technologies in the healthcare industry: oppor-

- tunities and challenges. *Int J Environ Res Public Health* 2021;18(1):271. <https://doi.org/10.3390/ijerph18010271>
5. Rajpurkar P, Chen E, Banerjee O, Topol EJ. AI in health and medicine. *Nat Med* 2022;28(1):31-8. <https://doi.org/10.1038/s41591-021-01614-0>
 6. Waldman CE, Hermel M, Hermel JA, Allinson F, Pintea MN, Bransky N, et al. Artificial intelligence in healthcare: a primer for medical education in radiomics. *Per Med* 2022;19(5):445-56. <https://doi.org/10.2217/pme-2022-0014>
 7. Thongprayoon C, Kaewput W, Kovvuru K, Hansrivijit P, Kanduri SR, Bathini T, et al. Promises of big data and artificial intelligence in nephrology and transplantation. *J Clin Med* 2020;9(4):1107. <https://doi.org/10.3390/jcm9041107>
 8. Aung YY, Wong DC, Ting DS. The promise of artificial intelligence: a review of the opportunities and challenges of artificial intelligence in healthcare. *Br Med Bull* 2021;139(1):4-15. <https://doi.org/10.1093/bmb/ldab016>
 9. Jassar S, Adams SJ, Zarzeczny A, Burbridge BE. The future of artificial intelligence in medicine: medical-legal considerations for health leaders. *Healthc Manage Forum* 2022;35(3):185-9. <https://doi.org/10.1177/08404704221082069>
 10. Masters K. Artificial intelligence in medical education. *Med Teach* 2019;41(9):976-80. <https://doi.org/10.1080/0142159X.2019.1595557>
 11. Hazarika I. Artificial intelligence: opportunities and implications for the health workforce. *Int Health* 2020;12(4):241-5. <https://doi.org/10.1093/inthealth/ihaa007>