



Artificial Intelligence in Nursing in Low-income Settings: Readiness Criteria

Boniface Francis Kalanda ^{a,b*}
and Asseneth Jerotich Cheboi ^b

^a University of Malawi, Chancellor College, Zomba, Malawi.

^b University of Walden, College of Health Sciences and Public Policy, United States of America.

Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

In this paper, we explore required criteria for low-income countries to exploit the potential of AI in nursing. We had dubbed this as "Readiness Criteria". Generative artificial intelligence tools summarize data into text for expedited information-gathering and content creation. They are gaining use in clinical settings to help nursing staff improve productivity. There are knowledge gaps between experts in AI and nursing professionals. Bridging such gaps, will be the starting point for appropriately applying AI in nursing. As use of AI in nursing becomes prominent, appropriate risk mitigation measures need to be put in place, including, appropriate risk governance frameworks and tools to manage AI driven nursing practices. Most important, low resource settings need to put in place readiness criteria to support them to enjoy the fruits of AI in nursing. Such readiness criteria include having in place data governance frameworks, addressing knowledge gaps, and investing in public data infrastructure.

*Corresponding author: Email: bkalanda@yahoo.com;

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1. INTRODUCTION

Application of artificial intelligence (AI) in all areas of human endeavor, including nursing practice, offers an opportunity for faster, smarter, and cost-effective processes (Ahmad, 2024). O'Connor et al (2023) have noted that while AI is already in use in nursing, its application is limited. Rony et al (2023) have summarized some nascent uses of AI in nursing and in health care in general. Others, Ronquillo et al (2021) have led reflections on the priorities and opportunities for use of AI in nursing from an international collaboration perspective. Bolarinwa, O.A et al., (2024) have outlined how AI can be used to transform maternity services in Africa. It is important for nurses to be part of the discussion and be the advocates for use of AI. This paper explores readiness criteria for low-income countries to exploit the potential of artificial intelligence in nursing. (Kalanda, 2024).

2. EXAMPLES OF USE OF ARTIFICIAL INTELLIGENCE IN NURSING

There is limited data describing the extent of AI adoption in low-income healthcare systems including nursing, Njei et al. (2023). However, recently, a few actual and aspirational uses of AI in nursing have been documented such as studies on use of AI in cancer nursing (O'Connor, 2024).

Pailaha (2023) has documented impacts of AI. These include expanding access to high-quality medical care, improving provision of care and health records. These also include better collaboration, communication, and coordination between healthcare disciplines. Generative artificial intelligence tools summarize data into text for expedited information-gathering. They are gaining use in clinical work, helping nurse practitioners to improve productivity (Carroll, 2023).

AI has also been used to predict postpartum depression. Risk at delivery, based in age, has also been determined by use of AI (Chhetri & Shrestha, 2023). In recent studies, Jeong (2020) has also documented forecasts for chances of breast cancer both before and after menopause. In Africa, AI is being used to map and monitor malaria transmission, guiding targeted

interventions to high-risk areas (Minakshi et al., 2020, Jacob et al., 2021). These example, while being of benefit to the wider health care, can benefit the practice of nursing through interdisciplinary dialogue in health care settings.

2.1 Limitations of Artificial Intelligence

Halmilton et al (2023) have outlined several limitations for A. These include limited contextual understanding, lack of common-sense as can be obtained from a human brain, less memory capacity in comparison to human. In the absence of good data, AI has also limited ability generate new ideas. Others have also brought to the fore privacy concerns (De Gagne, 2023), copy right, bias and in appropriate use (Emenike & Emenike,2023).

2.2 Readiness Criteria for use of AI in Nursing

There is potential for applying AI in nursing practice in low-income settings. Application of AI in nursing in all settings, but particularly in low-income settings will be driven and optimized through (i) data governance frameworks and structures; (ii) intentionality; (iii) knowledge of what artificial intelligence is; (iv) investments data infrastructure; (v) data science skills; and (vi) risk management amongst others. In nursing and health care, WHO (2021) has issued six (6) key ethical principles for use of AI in health care. Rough (2024) has also recently highlighted patient safety concerns with AI generated reports.

Data Governance: AI will be used in low-income settings when there is intentionality in using AI for nursing practice. Establishing Data Governance Structures will be one of the risk mitigation measures that will need to be taken by low-income countries prior to using AI for nursing practices.

Knowledge gaps: AI can only appropriately be used if it is fully understood. There is a knowledge divide between experts in AI and nursing professionals. Bridging such a gap, through the later group reaching to the former will be the starting point for appropriately applying AI in the appropriate solution spaces including nursing.

Public data infrastructure¹: Artificial intelligence can be used for nursing practice only if the correct infrastructure is available. Inadequate data infrastructure is not conducive to using AI in nursing practice. Governments in low-income countries should progressively invest in data infrastructure if AI in nursing practice is to become a reality. Appropriate infrastructure is of utmost importance as a risk mitigation measure. Poor infrastructure would lead to abuse of data, privacy concerns, risking the central ethical considerations of nursing practice. Infrastructure investments should also take into consideration interoperability between healthcare information technology systems. This will require establishing interoperability standards, promoting data exchange protocols, standardizing data formats (Saheb et al., 2021). This will require collaboration between IT vendors, health care providers and regulatory bodies among other stakeholders (Linnen et al, 2019).

Data Scientists: To exploit AI for nursing practice, low-income countries need to invest in analysis skills in its data scientists and in nursing professionals with a grounding in data science. Low-income countries will need nationals with experience in using large amounts of data to model complex patterns if AI is to be used for nursing practice (Buluswar et al., 2018). University curricula would also need to be developed to educate both data scientists and nurse practitioners and academics to empower them to take national leadership in AI application in nursing.

Data sets for testing: O'Connor et al (2023), have suggested that there should be initiatives, where there should be digital data sets set up to support testing of AI technologies. This would mean that both public and private institutions begin to set to appropriate data to be used for testing.

Risk driven: AI has very well-known risks. As use of AI in nursing becomes prominent, risk mitigation measures need to be put in place. Low-income countries should invest, now, in risk governance frameworks and tools to manage AI driven nursing. Various ethical issues have been

identified as areas where risk management is imperative when using AI in any endeavor.

3. CONCLUSION

While there has been use of AI in nursing in developed nations, there is potential for exploiting AI to advance nursing in low-income settings. In addition to advancing scholarship and application, low-income countries need to prepare for risk informed adoption of AI in nursing.

This paper has identified data governance, knowledge gaps, public data infrastructure and skills amongst Data Scientists and nursing professionals as areas that need investment if the nursing practice is to benefit from AI. Academics have already started exploring and documenting areas where AI has been used and can be used in nursing practice. They need to be supported through government led investments.

Taking a readiness criteria approach will enable low income settings to jump the curve and benefit much quicker whenever AI is being universally applied in nursing. This approach will enable low-income settings to start now on estimating budgetary needs for an enabling environment for application of AI in nursing. It implies that governments (legislature, judiciary, executive) civil society and private sector, academia, independent practitioners start co-creating now of a "future" in which AI will be applied in nursing.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that no generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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¹ Data infrastructure refers to the various components—including hardware, software, networking, services, policies, and more—that enable data consumption, storage, and sharing. Having the right data infrastructure strategy is critical for organizations seeking to undertake data-driven digital transformation (Hewlett Packard Enterprise)

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