Chapter 6
Artificial Intelligence and Health in Africa: Opportunities, Challenges, and Ethical Considerations

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ABSTRACT

As the application of artificial intelligence (AI) expands across various fields of practice including health its deployment, regulation, acceptability, preparedness challenges, and ethical concerns in Africa requires a critical look. The chapter's primary objective is to provide a comprehensive understanding of how AI can positively affect health outcomes in Africa. The authors explored the potential for AI to transform and improve healthcare in low-resource areas like Africa and reviewed the current state of how AI algorithms can be used to improve diagnostics, treatment, and disease monitoring, as well as how AI can help with pandemic preparedness. The chapter also highlights the challenges and ethical considerations that need to be addressed when deploying AI in Africa. The chapter concludes that AI is poised to assist countries in improving the quality of health service delivery through innovation using telemedicine-assisted approaches and that there is a need to deploy new technologies and share lessons and experiences among countries on the African continent to help improve healthcare in Africa.

DOI: 10.4018/978-1-6684-9962-7.ch006

INTRODUCTION

Overview of AI Applications in African Healthcare

In Africa, where infectious and non-communicable diseases pose equal challenges, ensuring universal access to medications is paramount. However, numerous obstacles hinder access, including disease prevalence, limited pharmaceutical industry scale and costly raw materials, heavy reliance on foreign drug sources, weak supply chains, insufficient government investment, unfavorable manufacturing conditions, healthcare workforce shortages, inadequate health financing, infrastructure gaps, and limited investment in offshore initiatives (Adebisi et al., 2022).

Sub-Saharan Africa's healthcare systems confront a pressing crisis characterized by a severe shortage of healthcare personnel. In the face of this challenge, 57 nations grapple with a staggering deficit of 2.4 million doctors and nurses. This scarcity is compounded by the significant emigration of healthcare professionals, resulting in a stark imbalance, with only 2.3 healthcare workers per 1000 population in Africa compared to the Americas' 24.8 per 1000. Consequently, merely 1.3% of the world's healthcare workforce is left to address a substantial 25% of the global disease burden (Naicker et al., 2009).

This healthcare dilemma is further exacerbated by the continuous migration of medical experts from Africa to more affluent nations, intensifying the strain on already underfunded healthcare systems and hindering the delivery of even basic care standards. The relentless prevalence of diseases such as HIV/AIDS exacerbates this challenge, necessitating urgent measures to fortify the healthcare infrastructure. The global threat of emerging and re-emerging infectious diseases necessitates a robust pandemic preparedness approach. Artificial Intelligence (AI) emerges as a promising tool not only for pre-emptive action against such threats but also for understanding public behaviour and sentiments during epidemics. In a world characterized by interconnectedness, AI holds substantial potential to transform healthcare by enabling tailored interventions that save on treatment costs, improve access to health services, and foster individual health responsibility. (Ganasegeran & Abdulrahman, 2020).

Artificial Intelligence (AI) has the potential to revolutionize healthcare in Africa, addressing many of the unique challenges faced by the continent, such as a shortage of healthcare professionals, inadequate infrastructure, and a high burden of diseases. Here is an overview of AI applications in African healthcare:

Radiology automation: Mino Health AI Labs in Ghana is using deep learning and a convolutional neural network to automate radiology, improving the accuracy and efficiency of medical imaging analysis (Naicker et al., 2009; Owoyemi et al., 2020).

Diagnosis and treatment: AI mobile applications are being developed to diagnose birth asphyxia and malaria in rural areas of Africa (Adebisi et al., 2022; Owoyemi et al., 2020). AI-powered systems are providing faster and more accurate diagnoses, improving the quality of healthcare services in Africa (Kaur et al., 2023; Topol, 2019)

Data management: Proper digital infrastructure for storage of data from health facilities is essential for leveraging AI in healthcare. A strong data culture within health facilities that values data and makes tools and resources accessible to clinicians is also needed (Kaur et al., 2023; Naicker et al., 2009).

Supply chain management: AI can help manage supply chain processes, ensuring that healthcare facilities have precise medical supplies in stock, as demonstrated by Viebeg Technologies in Rwanda (Kaur et al., 2023; Topol, 2019).