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Artificial Intelligence and Medical Practice in Nigeria

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Abstract

This study examined the intersection between artificial intelligence and medical practice in Nigeria with specific focus on the extent to which artificial intelligence is currently integrated into medical diagnosis, treatment, and healthcare delivery systems. The study further focused on the perceived benefits and challenges of adopting artificial intelligence among healthcare professionals and institutions and the impact of artificial intelligence on the quality, efficiency, and accessibility of medical services in Nigerian healthcare facilities. The study adopted theory of technological determinism as its theoretical orientation and relied on secondary data. The study found that AI technologies are increasingly becoming part of the medical ecosystem in Nigeria, although the level of integration remains modest and uneven across different regions and healthcare sectors. The study also found that AI integration in healthcare practices has benefits as well as challenges and that AI has enhanced diagnostic accuracy and treatment precision in Nigerian hospitals. The study concludes that AI technologies have made moderate but steady inroads into medical practices in Nigeria, particularly in the areas of diagnostics, treatment planning, and healthcare delivery systems. The study recommends comprehensive capacity building, strengthening healthcare infrastructure and promoting context-specific research, innovation, and public-private partnerships as ways to improve medical practices through the integration of AI in healthcare.

Keywords: Artificial Intelligence, medical practices, medical diagnosis

Introduction

Medical practice, defined as the structured application of scientific knowledge in diagnosing, treating, and preventing diseases, continues to face significant global challenges despite technological progress, thereby constituting a persistent public health concern. Empirical studies such as those of Hennrich, Ritz and Hofmann (2024) and Wenderott, Krups and Weigl (2026) showed that

healthcare systems worldwide are burdened by inefficiencies such as diagnostic errors, workforce shortages, and administrative overload, which undermine quality care delivery. In Europe, particularly in Germany and the United Kingdom, healthcare systems are advanced yet strained by increasing patient demand and operational complexity, prompting gradual integration of AI tools to enhance workflow efficiency, although gaps between development and real-world implementation persist (Wenderott, Krups & Weigl, 2026).

Artificial intelligence (AI) has emerged as a transformative solution capable of addressing these systemic inefficiencies by improving diagnostic accuracy, optimizing treatment decisions, and enhancing healthcare management, yet its integration into medical practice remains uneven and complex. Empirical investigations by Wang, Wei and Xue (2024) demonstrated that AI can significantly improve clinical outcomes; for example, experimental evidence shows that AI-assisted decision-making reduced medical overtreatment by up to 62% and improved diagnostic accuracy by between 17% and 37%. However, despite such benefits, studies consistently identify barriers including ethical concerns, lack of trust, data privacy issues, and limited technical capacity, particularly in low- and middle-income countries (Botha, Segbedzi & Dumahasi, 2024; Scipion, Manchester, Federman Wang & Arias, 2025). In Africa, including Kenya, South Africa, and Nigeria, Nyoro, Kamau and Gikandi (2025) noted that AI adoption remains at an emerging stage due to infrastructural and regulatory limitations, although it is increasingly viewed as a viable tool for bridging healthcare access gaps and improving service delivery. Consequently, while efforts to integrate AI into healthcare systems are ongoing globally, significant disparities in adoption, implementation, and outcomes persist, underscoring the necessity for context-specific empirical research. Therefore, this study on artificial intelligence and medical practices becomes timely and essential to critically examine its effectiveness, identify contextual challenges, and generate evidence-based strategies for optimizing its use in improving healthcare delivery across both developed and developing regions.

Literature Review: Concepts of Artificial Intelligence and Medical Practices

Artificial Intelligence

Artificial intelligence (AI) refers to the simulation of human intelligence processes by machines, particularly computer systems, to perform tasks such as learning, reasoning, problem-solving, perception, and decision-making. It encompasses subfields such as machine learning, natural language processing, and computer vision, which enable systems to analyse large datasets and generate predictive or adaptive outcomes with minimal human intervention. Chui, Hazan, Roberts, Singla, Smaje, Sukharevsky and Yee (2023) observed a study by McKinsey Global Institute which found that approximately 50% of organizations worldwide reported adopting at least one form of AI in their operations by 2022, reflecting a significant increase from previous years.

Similarly, Brynjolfsson and McElheran (2024) observed that firms implementing AI-driven processes experienced productivity gains ranging from 10% to 20%, underscoring AI's transformative potential in improving efficiency and decision-making across industries.

The conceptual foundation of AI is rooted in its ability to mimic cognitive functions through algorithms trained on data, allowing systems to identify patterns, automate processes, and improve performance over time. A large-scale experimental study by Jumper, Evans and Pritzel (2021) demonstrated that AI models achieved near-experimental accuracy in protein structure prediction, marking a major scientific breakthrough. In addition, Davenport, Guha, Grewal and Bressgott (2020) found that organizations utilizing AI for data analytics reported a 44% improvement in decision quality and faster response times compared to non-AI users. Despite its transformative capabilities, AI is characterized by significant ethical, technical, and social considerations that shape its conceptual understanding and application. The survey by Jobin, Ienca and Vayena (2019) identified over 80 global AI ethics frameworks, reflecting growing recognition of the need for governance and regulation. Furthermore, Acemoglu and Restrepo (2020) suggested that while AI can enhance productivity, it may also contribute to job displacement in certain sectors, indicating a dual impact on labour markets. Consequently, the concept of artificial intelligence extends beyond technical definitions to include its socio-economic implications, ethical dimensions, and policy considerations, highlighting the need for continuous empirical inquiry into its development and responsible use.

Medical Practice

Medical practice refers to the organised application of medical knowledge, clinical skills, and healthcare systems in the prevention, diagnosis, treatment, and management of diseases to improve patient outcomes and overall public health. It encompasses a wide range of activities including clinical consultations, surgical procedures, medication administration, and preventive care, all guided by established professional standards and evidence-based protocols. However, despite these standards, medical practice globally is confronted with significant challenges, particularly in ensuring patient safety and quality care. For instance, studies by Slawomirski, Auraaen and Klazinga (2020) and WHO (2023) showed that in high-income countries, approximately 1 in 10 patients is harmed during hospital care, indicating systemic inefficiencies in healthcare delivery. This highlights that medical practice is not only a clinical activity but also a complex system influenced by organizational structures, human factors, and technological integration.

The dynamics of medical practice are further illustrated by the prevalence of medical errors and adverse events, which remain critical indicators of healthcare quality worldwide. Empirical evidence by Sun *et al.* (2025) and Rodziewicz, Houseman, Vaqar and Hipskind (2024) revealed that medical errors, defined as failures in planned actions or the use of incorrect procedures

are among the leading causes of morbidity and mortality globally. In the United States alone, studies by Rodziewicz *et al.* (2024) estimated that over 200,000 deaths annually are associated with preventable medical errors, while approximately 400,000 hospitalized patients experience preventable harm each year. Similarly, global estimates indicate that about 134 million adverse events occur annually in low and middle-income countries, contributing to roughly 2.6 million deaths (WHO, 2023). These challenges are exacerbated by increasing complexity in healthcare delivery, including the rise of chronic diseases, aging populations, and the integration of advanced medical technologies, all of which demand higher levels of coordination, expertise, and system efficiency (Aldardeir, Abdullah & Jones, 2025). Consequently, medical practice is increasingly viewed as a multidisciplinary and system-oriented process that requires continuous improvement and adaptation.

Theoretical Framework

The study is anchored on technological determinism theory. Technological determinism is a theoretical perspective which posits that technological innovation is the primary driver of social change, shaping human behaviour, institutional structures, and cultural values in a largely unidirectional manner (McLuhan, 1964; Smith & Marx, 1994). The main tenets of technological determinism revolve around the idea that technology develops autonomously and exerts a deterministic influence on society, often independent of human intentions or social contexts. It assumes that technological change follows a linear progression and inevitably produces corresponding changes in social institutions, economic systems, and cultural practices. According to this perspective, new technologies redefine how people think, interact, and organize their lives, often leading to structural transformations in key sectors such as education, governance, and healthcare (Chandler, 1995). The theory also emphasizes that societies that adopt advanced technologies tend to experience accelerated development, while those that lag behind risk stagnation. In this sense, technological determinism underscores the primacy of innovation as the engine of societal progress, suggesting that human agency plays a secondary role in shaping outcomes.

In relation to artificial intelligence and medical practices in Nigeria, technological determinism provides a useful lens for understanding how the introduction and diffusion of AI technologies can transform healthcare delivery systems. The increasing adoption of AI-driven tools such as diagnostic algorithms, telemedicine platforms, and electronic health records suggests that technology is beginning to reshape clinical decision-making, patient management, and healthcare accessibility in Nigeria. From a deterministic standpoint, the integration of AI into medical practice is expected to enhance efficiency, reduce diagnostic errors, and address challenges such as workforce shortages and limited access to healthcare services, particularly in rural areas. This implies that as AI technologies become more embedded within Nigeria's healthcare system, they will inevitably redefine professional roles, improve

service delivery, and influence health outcomes, regardless of existing structural constraints.

However, technological determinism has been criticized for its overly simplistic and reductionist assumptions, particularly its tendency to ignore the role of human agency, social context, and institutional frameworks in shaping technological outcomes. Critics argue that technology does not operate in a vacuum but is influenced by economic conditions, political decisions, cultural values, and regulatory environments, which determine how it is developed, adopted, and utilised (Williams & Edge, 1996). In the Nigerian context, factors such as inadequate infrastructure, limited funding, low digital literacy, and weak policy frameworks may hinder the effective integration of AI into medical practice, thereby challenging the deterministic assumption of inevitable technological impact. Consequently, while technological determinism helps explain the transformative potential of AI in healthcare, it must be applied alongside other perspectives that account for contextual realities. Therefore, this study adopts technological determinism as a guiding framework to examine how AI technologies can influence medical practices in Nigeria, while also recognizing the importance of socio-economic and institutional factors in shaping their outcomes.

Application of Technological determinism Theory to Artificial Intelligence and Medical Practices

The application of technological determinism theory to the study of artificial intelligence (AI) and medical practices in Nigeria can be understood through the assumption that technological innovations such as AI inherently shape healthcare structures, professional practices, and patient outcomes. A cross-sectional study among 200 Nigerian psychiatrists and trainees by Abiodun, Ajiboye, Salihu, Akinsulore, Obayi and Salihu (2025) found that 86.5% acknowledged AI's usefulness in psychiatric practice, with applications in diagnostic assistance (54%), patient monitoring (60%), and outcome prediction (59%), demonstrating how technology is actively restructuring clinical processes and decision-making patterns.

Furthermore, technological determinism explains how the diffusion of AI influences the attitudes, skills, and readiness of healthcare professionals, thereby shaping the evolution of medical practice. The study by David-Olawade, Wada, Adeniji, Aderupoko and Olawade (2025) revealed that despite limited exposure, there is strong optimism about AI's transformative role; for example, a study of 551 healthcare students in Nigeria showed that 90.8% believed AI would improve healthcare workflow efficiency, while 84.4% expressed willingness to adopt AI technologies, even though 92% demonstrated low actual knowledge of AI concepts. This suggests that the perceived inevitability of technological advancement is already influencing professional orientation and expectations within the healthcare sector. In line with technological determinism, such patterns imply that as AI systems become more accessible and embedded in healthcare infrastructure, they will

inevitably redefine training, clinical competence, and healthcare delivery models in Nigeria, regardless of current knowledge gaps or institutional limitations.

However, while technological determinism highlights the transformative capacity of AI, its application to the Nigerian healthcare context also reveals important limitations that must be critically considered. The studies by Odu, Akinyooye and Aransi (2025) and Abiodun *et al.* (2025) indicated that AI adoption remains uneven due to structural constraints such as inadequate infrastructure, limited technical expertise, and ethical concerns surrounding data security and patient privacy. Consequently, this study adopts technological determinism to examine how AI is shaping medical practices, while also interrogating the extent to which structural constraints influence its effective integration and outcomes in the Nigerian healthcare system.

Methods

The paper is an opinion paper that adopted a systematic literature review-based method. The method is adopted by the researcher because it affords the researcher to collect and review the related previous literature from various online sources. With the aid of digital platform, the researcher collected secondary information to generate knowledge on this topic. The position paper followed a qualitative narrative design method. The researcher visited different online sites to collect the previous literature and analyse the influence of influence of artificial intelligence on medical practices in Nigeria.

Inclusion

The output of literatures on this study titled “artificial intelligence and medical practices in Nigeria” presents an in-depth study and result that can infer conclusion on the subject matter under study. The literature used in this study includes secondary sources such as online publications, conference papers and journal articles sorted from reputable journals.

Exclusion

Also, the literature review excludes information from sources that are more than five (5) years which is in line with APA 7th edition referencing style.

Ethical Issues Ascribed to the Use of AI and Inherent Abuses

The application of Artificial Intelligence (AI) in medical practice in Nigeria presents significant ethical concerns that require careful consideration. One major issue is the protection of patients' privacy and confidentiality, as AI systems often rely on large volumes of personal health data for diagnosis, treatment recommendations, and predictive analysis. Inadequate data protection mechanisms may expose sensitive medical information to unauthorised access, breaches, or misuse. Furthermore, concerns regarding informed consent arise when patients are unaware of how their health information is collected, processed, stored, or shared by AI-powered systems.

Ethical medical practice therefore demands transparency, accountability, and compliance with data protection regulations to safeguard patients' rights and maintain public trust in healthcare institutions.

In addition, AI technologies are susceptible to inherent abuses and biases that may negatively affect healthcare outcomes. Algorithms trained on incomplete or unrepresentative datasets may produce discriminatory results, leading to unequal access to quality healthcare services among different population groups. There is also the risk of overreliance on AI-generated decisions by healthcare professionals, which could diminish human judgement and professional responsibility in clinical practice. Malicious actors may further exploit AI systems through cyberattacks, manipulation of medical records, or the generation of false diagnoses, thereby endangering patient safety. Consequently, robust ethical guidelines, regulatory oversight, and continuous human supervision are essential to ensure that AI applications in Nigeria's healthcare sector are used responsibly, fairly, and for the benefit of all patients.

Results and Discussions

Artificial intelligence (AI) has increasingly influenced medical practices in Nigeria by transforming diagnostic processes, clinical decision-making, and healthcare delivery systems, albeit at an emerging stage. Evidence from the studies demonstrates that AI tools are already being integrated into routine medical workflows, particularly for diagnostic support and data analysis. For instance, a cross-sectional study of 415 healthcare professionals in Lagos State by Chima-Oduko, Maduafokwa, Abdulraheem, Roberts and Obua (2025) found that 86.5% reported using AI tools, with 51.3% applying them directly to professional duties such as diagnostic assistance and clinical decision support, despite only 19.8% having formal AI training. This indicates that AI is significantly reshaping medical practice by enhancing efficiency and enabling faster, data-driven clinical judgments.

Beyond diagnostics, AI has also influenced medical practices in Nigeria through improvements in public health interventions, patient engagement, and disease management. Authors have highlighted the role of AI in optimizing healthcare delivery at the population level; for example, Kehinde, Abdul, Afolabi, Vir, Namblard, Mukhopadhyay and Adereni (2023) stated that an AI-driven intervention known as ADVISER was deployed in Oyo State to improve child vaccination uptake, successfully reaching over 13,000 families and enhancing the allocation of healthcare resources. Additionally, emerging applications such as AI-powered mental health tools and chatbots are addressing critical gaps in healthcare access, particularly in underserved areas where there is a severe shortage of professionals. Evidence indicates that such tools are increasingly used for mental health support, providing accessible and cost-effective services in a country with limited psychiatric resources, thereby extending the reach of healthcare services beyond traditional clinical settings. These developments demonstrate that AI is not only improving clinical

efficiency but also expanding the scope and accessibility of medical practice in Nigeria.

Furthermore, the study found that AI has influenced the knowledge, attitudes, and competencies of healthcare professionals, thereby reshaping the human dimension of medical practice. Empirical findings further support this finding as they reveal a growing awareness and positive perception of AI among Nigerian medical professionals; for instance, a national survey by Ojedokun *et al.* (2024) reported that approximately 75% of respondents demonstrated favourable attitudes toward AI integration in healthcare, recognizing its potential to enhance diagnosis, treatment planning, and medical record management. Similarly, studies conducted in South-East Nigeria by Umah, Adekalu, Anumaka, Ezeagwu, Shamsudeen, Owoeye and Osijirin (2025) indicated increasing awareness and utilization of AI tools among diverse healthcare workers, including doctors, nurses, and laboratory scientists, although levels of technical expertise remain uneven. This suggests that AI is gradually influencing professional training, skill acquisition, and clinical practice orientation, fostering a transition toward digitally competent healthcare systems. However, the study also established that despite these positive influences, the integration of AI into medical practice in Nigeria is constrained by significant structural, ethical, and operational challenges, which shape its overall impact.

The discourse above shows that artificial intelligence has exerted a multifaceted influence on medical practices in Nigeria by enhancing diagnostic accuracy, improving healthcare delivery, expanding access to services, and reshaping professional competencies, while simultaneously exposing critical gaps in infrastructure, governance, and ethical regulation. However, the uneven pace of adoption and persistent contextual challenges highlight the need for sustained investment, policy reforms, and empirical research to fully harness its potential.

Findings

The major findings from the foregoing discourse reveal that artificial intelligence (AI) is progressively reshaping medical practices in Nigeria, particularly in the areas of diagnostics, clinical decision-making, and healthcare delivery efficiency. The Chima-Oduko *et al.* (2025) support this finding as it found that 86.5% of healthcare professionals reported using AI tools, with over half applying them in clinical tasks such as diagnosis and treatment support. Similarly, Abiodun *et al.* (2025) observed that 86.5% of mental health practitioners acknowledged the usefulness of AI in psychiatric care, with significant proportions utilizing it for patient monitoring and outcome prediction. These findings suggest that AI is no longer a peripheral innovation but an emerging core component of medical practice, influencing how healthcare services are delivered and how clinical decisions are made across different specializations in Nigeria.

Another key finding in the study is the growing positive perception and readiness for AI adoption among healthcare professionals and trainees, which underscores its perceived inevitability and transformative potential within the healthcare system. The studies by David-Olawade *et al.* (2025) and Ojedokun *et al.* (2024) corroborate this finding as they showed that about 75% of Nigerian healthcare workers hold favourable attitudes toward AI integration, while 90.8% of healthcare students believe AI will improve workflow efficiency and service delivery. However, this optimism is juxtaposed with significant knowledge and skill gaps, as over 90% of respondents in some studies reported limited understanding of AI concepts, indicating a mismatch between enthusiasm and technical capacity. This highlights a critical transitional phase in Nigeria's healthcare system where AI adoption is driven more by perceived benefits and global trends than by adequate preparedness, thereby emphasizing the need for structured training, policy frameworks, and capacity building initiatives.

Furthermore, the findings revealed that while AI holds substantial promise for improving healthcare access and outcomes, its integration into medical practice in Nigeria is constrained by systemic and contextual challenges. In tandem with the above finding, the studies by Odu *et al.* (2025) and Olubena *et al.* (2025) lend credence to this finding as they consistently identified barriers such as inadequate infrastructure, data privacy concerns, lack of regulatory frameworks, and limited technical expertise as significant impediments to effective implementation. These findings underscore that the impact of AI on medical practices is not solely determined by technological availability but is mediated by socio-economic and institutional factors. Consequently, while AI is gradually transforming healthcare delivery in Nigeria, its full potential can only be realized through deliberate efforts to address these structural limitations and ensure sustainable integration.

Conclusion

In conclusion, the discourse above demonstrates that artificial intelligence is progressively transforming medical practices in Nigeria by enhancing diagnostic accuracy, improving clinical decision-making, expanding healthcare access, and reshaping professional competencies, thereby aligning with the propositions of technological determinism which emphasize the transformative power of technology in shaping societal systems. Empirical evidence consistently shows a growing level of awareness, acceptance, and utilization of AI among healthcare professionals despite notable gaps in technical knowledge and training, while its applications in areas such as diagnostics, mental health support, and public health interventions highlight its practical relevance in addressing longstanding healthcare challenges. However, the findings also reveal that the impact of AI is significantly constrained by structural issues including inadequate infrastructure, weak regulatory frameworks, data privacy concerns, and limited institutional capacity, which moderate its effectiveness and challenge the deterministic assumption of inevitable technological

progress. Therefore, while AI holds substantial promise for revolutionizing medical practice in Nigeria, its successful integration depends on deliberate policy actions, investment in capacity building, and the development of context-specific strategies to ensure that technological advancements translate into sustainable improvements in healthcare delivery and outcomes.

Recommendations

The following recommendations are proffered based on the discourse above:

- i. Firstly, there is a critical need for comprehensive capacity building through the integration of artificial intelligence (AI) education and training into medical and health-related curricula as well as continuous professional development programmes for practicing healthcare workers in Nigeria. This should include structured modules on AI fundamentals, clinical applications, data ethics, and practical usage to bridge the existing knowledge gap between high awareness and low technical competence, thereby enabling healthcare professionals to effectively and safely utilize AI tools in diagnosis, treatment, and patient management.
- ii. Secondly, the government and relevant stakeholders should invest significantly in strengthening healthcare infrastructure and establishing robust regulatory and policy frameworks to support the sustainable adoption of AI in medical practice.
- iii. Lastly, there is a need to promote context-specific research, innovation, and public-private partnerships aimed at developing and scaling AI solutions tailored to Nigeria's healthcare challenges.

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