

From Telemedicine to Artificial Intelligence: The Future of Digital Healthcare Delivery in Select Nigerian Teaching Hospitals

Maggai Tsokwa, Ph.D.¹, Jeremiah Alipius Shagnah², Kaltumi Gaya Umar³

¹Department of English & Literary Studies, Federal University Wukari, Taraba State, Nigeria,

^{2,3}Department of Mass Communication, Faculty of Social Sciences, Communication & Media Studies, Adamawa State University, Mubi

DOI: <https://dx.doi.org/10.47772/IJRISS.2026.100600642>

Received: 10 June 2026; Accepted: 15 June 2026; Published: 01 July 2026

ABSTRACT

One of the greatest merits of telemedicine in recent times is the real-time delivery of laboratory-processed information about the COVID-19 infectious disease. These medical media innovations have transformed the field of healthcare delivery, making it possible for improved digital clinician practices. Additionally, the proliferation of Artificial Intelligence (AI) for healthcare purposes has speeded up digital media transformation for clinical practices, making futurists assumed the future of digital healthcare delivery that will be technologically driven with higher precision in both preventive and curative medicine. Situated within the technological determinism and diffusion of innovations theories, the study employed questionnaire and key informant interviews designed to incorporate cost effective, patient satisfaction, diagnostic precision and real time medical services delivery. The study sampled 65 respondents selected from Federal University, Wukari Teaching Hospital and Federal University of Lafia Teaching Hospital were stratified to include Doctors, patients and healthcare givers. The study found that despite numerous advantages of telemedicine and AI in healthcare delivery, the innovations are affected by erratic power supply, weak internet service and low digital literacy among patients and healthcare centres. The findings of the study identified addressing healthcare inequality and deficiency of medical staffers as perceived usefulness of the innovations within the teaching hospitals in Nigeria. The study concluded by describing telemedicine and AI for healthcare delivery in four key areas, including current state, challenges, opportunities and regulatory policy framework for implementations. This article recommends measures for sustaining medical digital media innovations within the health sector in Nigeria.

Keywords: Telemedicine, Artificial Intelligence, Digital Healthcare, Teaching Hospitals

INTRODUCTION

The healthcare sector in Nigeria, especially in teaching hospitals, is facing significant challenges due to overcrowded patients, an overburdened system, limited resources, and a shortage of healthcare professionals. These implications are compounded by issues such as overcrowding, poor infrastructure, and increasing healthcare costs. Teaching hospitals, which are responsible for providing advanced healthcare and training the next generation of healthcare professionals, are under pressure to provide quality care, especially in the face of a rapidly growing population.

Telemedicine, which uses digital communication platforms to provide healthcare services remotely, has emerged as a promising solution to bridge the gap in healthcare access. Telemedicine has the potential for improving healthcare delivery by providing patients, particularly in rural and isolated areas, with remote consultations and access to specialised services. In Nigerian teaching hospitals, telemedicine adoption has seen gradual growth, primarily in urban centres, like Lagos, Kano, Porthacourt and Abuja, as a response to the inadequate distribution of healthcare professionals and the limited access to specialised care in remote regions.

While telemedicine offers several benefits, including reducing the need for physical visits, increasing healthcare access, and optimising healthcare delivery, its full potential in Nigeria remains untapped (Adigwe, Onavbavba & Sanyaolu, 2023) (Oluikpe, Nwachukwu & Okojie, 2022). Key barriers include poor power supply, weak internet connectivity, low digital literacy, inadequate trained healthcare professionals to operate telemedicine platforms, and limited regulatory frameworks. These implications have hindered the widespread adoption of telemedicine in Nigeria's healthcare system, particularly in teaching hospitals, which are critical to shaping the country's healthcare future.

Artificial Intelligence (AI) is increasingly being integrated into healthcare systems globally, stimulating more accurate diagnostics, improved decision-making, personalised treatment plans, and operational efficiency. AI applications such as machine learning, natural language processing, and predictive analytics can significantly enhance the quality of care, especially in telemedicine, where accurate data interpretation is crucial for remote diagnoses and treatment. AI can also aid in managing patients' data, improving hospital workflows, and optimising resource allocation in teaching hospitals in Nigeria.

Within the Nigerian teaching hospitals, the integration of AI with telemedicine has the potential to revolutionise healthcare delivery. AI-driven tools could address some of the challenges facing the healthcare system, such as diagnostic delays in the laboratory, overcrowded facilities, and the shortage of skilled healthcare professionals. However, like telemedicine, the adoption of AI technologies in Nigerian teaching hospitals faces numerous challenges, including inadequate infrastructure, limited technical expertise, regulatory uncertainties, and resistance to digital change among healthcare professionals.

This study sought to explore the integration of telemedicine and AI in Nigerian teaching hospitals and predict the future of digital healthcare delivery in the most populous black country in the world. By exploring the current state of telemedicine, assessing the readiness of hospitals to adopt AI, and identifying the barriers and opportunities that lie ahead, the study can provide insights for government, healthcare providers, policymakers, and technology developers. Basically, the goal is to understand how these technologies can be used to improve the standard, accessibility, and efficiency of healthcare in Nigerian teaching hospitals, thereby providing a way for the digital transformation of the Nigerian healthcare system.

Statement of the Problem

The healthcare system in Nigeria, particularly within the teaching hospitals, has been under significant strain, with challenges ranging from overcrowding to insufficient resources, outdated infrastructure, and limited healthcare professionals. In response to these challenges, telemedicine has emerged as a solution to bridge the gap between healthcare providers and patients, especially in remote areas. However, the full potential of telemedicine in Nigeria is yet to be realised due to a variety of factors, including poor internet connectivity, limited digital literacy, and regulatory hurdles, as observed in a study by Kehinde (2025) and Akinsola and Ejiofor (2024).

Advancing further into the digital and post-digital age, the inroad of Artificial Intelligence (AI) holds significant promise for transforming healthcare delivery. AI technologies, including predictive analytics, machine learning, and decision support systems, could revolutionise patient care, enhance diagnostic accuracy, and improve the overall efficiency of healthcare services. Despite the growing interest in AI applications globally, there is limited empirical research on its practical adoption and implementation into Nigerian teaching hospitals, particularly in conjunction with telemedicine in Northern Nigeria.

This study sought to explore the intersection of telemedicine and AI in Nigerian teaching hospitals, with the aim of predicting the future of digital healthcare delivery in the country. It will investigate the challenges, opportunities, and potential influence of combining these technologies in improving the quality, accessibility, and efficiency of healthcare services in Nigeria. In the same vein, it will explore the readiness of healthcare providers and institutions to adopt AI-driven telemedicine solutions and the barriers that may hinder their successful implementation of these novel innovations.

Given the increasing importance of digital healthcare solutions, this study is critical to understanding the future of healthcare delivery in Nigeria, where a rapidly growing population and inadequate resources call for innovative technological interventions.

Objectives of the study

This study investigated the adoption, strengths, barriers and limitations of telemedicine and AI within Nigerian teaching hospital in order to achieve the following objectives:

1. Assess the current state of telemedicine in select Nigerian teaching hospitals
2. Identify how specific AI technologies could be integrated into telemedicine to enhance patient care, improve diagnostics, and optimise healthcare services.
3. Interrogate the readiness of selected Nigerian teaching hospitals for the integration of AI-driven telemedicine solutions
4. Identify the challenges and barriers to adopting AI-powered telemedicine in selected Nigerian teaching hospitals
5. Investigate the opportunities and benefits of combining AI with telemedicine for improving healthcare delivery in selected Nigeria
6. Foretold the future of digital healthcare delivery in selected Nigeria through the integration of AI and telemedicine

Scope of the Study

This study focused on exploring the integration of artificial intelligence (AI) and telemedicine in selected Nigerian teaching hospitals. The study is limited to the following:

The study centered on Nigerian teaching hospitals, particularly those in Northern Nigeria with varying levels of technological infrastructural deficit. The study covered two selected teaching hospitals, Federal University Wukari Teaching Hospital and Federal University of Lafia Teaching Hospital, to provide a comprehensive understanding of the state of telemedicine and AI in different settings.

The study investigated the current state of telemedicine technologies in use within the hospitals, including video consultations, remote patient monitoring, and digital health records. Additionally, the research focused on AI technologies that could be integrated into telemedicine, including predictive analytics, machine learning models for diagnostics, and decision support systems.

Review of Pertinent Literature

Several empirical studies have provided insights into the application and influence of artificial intelligence (AI) and telemedicine in healthcare systems globally. However, the use of AI and telemedicine in Nigerian teaching hospitals is still in its infancy stages; findings from studies conducted in similar contexts offer valuable lessons.

A study by Mbunge, Mhlanga, & Moyo (2022) found that the adoption of telemedicine and telehealth is still nascent in many sub-Saharan African countries. Therefore, the author reflects on progress made towards the use of telemedicine, virtual health care services, challenges encountered, and proffers ways to address them. They conducted a systematic literature review to organise literature on telemedicine in sub-Saharan Africa. The study adopted survey research method to reduce the population of the study into manageable sample. The study revealed that telemedicine provides unprecedented benefits such as improving efficiency, effective utilisation of healthcare resources, forward triaging, prevention of medical personnel infection, aiding medical students' clinical observation and participation, and assurance of social support for patients. However, the absence of

policy on virtual care and political will, the cost of sustenance of virtual health care services, inadequate funding, technological and infrastructural barriers, patient and healthcare personnel bias on virtual care and cultural barriers are identified as limiting factors to the adoption of virtual health care in many African health systems. To improve on some of these barriers, authors recommend the development of robust policies and frameworks for virtual health care, the inclusion of virtual care in the medical school curriculum, supporting virtual care research and development, increasing health funding, removing monopolisation of telecommunication services, and developing virtual health solutions that address the eccentricities of African health systems.

Findings from the study above identified significant barriers such as inadequate internet infrastructure, low digital literacy, and regulatory issues that hinder telemedicine adoption in African countries. However, it also pointed to opportunities in improving healthcare delivery in underserved areas through telemedicine, especially in urban hospitals where technology infrastructure is more developed. This research helps contextualise the technological challenges Nigeria faces, particularly in urban hospitals where telemedicine infrastructure is more accessible but still faces barriers in implementation.

Another study by Esteva, Robicquet, Ramsundar, Kuleshov, DePristo, Chou, Cui, Corrado, Thrun & Dean (2019) focused on machine learning models used for diagnosing skin cancer. The authors found that AI models outperformed dermatologists in diagnostic accuracy, particularly in identifying malignancies from images. The study demonstrated that AI technologies, when integrated into healthcare settings, can provide more accurate diagnoses, faster decision-making, and more efficient use of healthcare resources. This review provides empirical evidence of AI's potential to enhance diagnostic capabilities within healthcare systems, which can be relied on in Nigerian teaching hospitals to improve patient outcomes, especially in diagnostics.

In a related study by Alami, Lehoux, Papoutsi, Shaw, Fleet, & Fortin (2020) in Morocco, the authors examined the readiness of hospitals in Morocco to integrate AI and telemedicine technologies, focusing on the organisational and technological preparedness of healthcare institutions. The study concluded that while many hospitals expressed willingness to adopt AI and telemedicine solutions, there were significant gaps in terms of staff training, infrastructure, and the availability of support services for new technologies. The lack of a coherent policy framework was also identified as a major barrier. The importance of this review is that similar gaps in readiness may likely be expected in Nigerian teaching hospitals, where the integration of AI-driven telemedicine solutions may face challenges related to healthcare worker training, technological infrastructure, and policy development.

A study by WHO (2021) reported that the role of telemedicine in improving healthcare access in rural and underserved areas globally is improving. The report included case studies from South Asia and sub-Saharan Africa. The core of the study by WHO has proven effective in extending healthcare access to remote populations, reducing travel time, and providing timely medical consultations. However, the study also highlighted that technical challenges, such as unreliable internet connectivity, posed a significant barrier.

A study by Ramaswamy, Drangsholt, Culligan, Schlegel & Hu (2020) evaluated patient satisfaction with telemedicine services in India. It assessed patient experiences with teleconsultations and their perceptions of AI-driven healthcare delivery. The study found that patients were generally satisfied with the convenience and accessibility offered by telemedicine, although concerns regarding data security and trust in AI-driven decision-making were prevalent. Understanding patient perspectives is crucial for assessing the viability of telemedicine and AI in Nigerian teaching hospitals. Insights from this study can help predict patient acceptance and highlight areas where trust and ethical concerns are needed.

From the review above, a broad overview of the current state of AI and telemedicine adoption in various healthcare settings, including both developed and developing countries was captured. The review highlighted the potential benefits of AI and telemedicine in enhancing diagnostic accuracy, improving access to healthcare, and optimising hospital operations. However, the studies also emphasise the challenges, including infrastructure limitations, regulatory concerns, and the need for workforce readiness. These insights served as a foundation for understanding the unique challenges and opportunities of integrating AI and telemedicine in Nigerian teaching hospitals.

The relevance of this review to the ongoing study is in the potential benefits and barriers of telemedicine in Nigerian teaching hospitals, particularly in addressing healthcare delivery challenges in remote regions. As Nigeria looks to integrate AI in telemedicine, these findings underscore the importance of developing appropriate policies and regulatory frameworks that balance technological advancement with patient privacy and safety, even though many of the literature reviewed employed survey research method with less emphasis on sample size determination and sampling figures. Thus individual cases were captured with unique references from remote communities and hospitals.

THEORETICAL FRAMEWORK

This study is anchored on two complementary theoretical frameworks: **Technological Determinism** and the **Diffusion of Innovations (DOI) Theory**. Technological determinism, as articulated by McLuhan (1962) and subsequently developed by scholars such as Winner (1977) and Heilbroner (1967), posits that technology is the primary driver of social and cultural change, shaping human behavior, institutional structures, and societal organization in ways that are often inevitable and beyond human control. In the context of digital healthcare delivery in Nigerian teaching hospitals, technological determinism provides a lens for understanding how telemedicine and artificial intelligence are not merely neutral tools but active forces reshaping the very fabric of healthcare delivery. The introduction of AI-powered diagnostic tools, teleconsultation platforms, and electronic health records fundamentally alters the relationship between healthcare providers and patients, redefines clinical workflows, and creates new expectations about the speed, accuracy, and accessibility of medical services. As Winner (1977) argues, technologies embody specific political and social values, and their adoption inevitably privileges certain forms of social organization over others. In the Nigerian context, the adoption of telemedicine and AI reflects a deterministic trajectory where healthcare institutions that fail to embrace these technologies risk obsolescence, while those that adopt them must reorganize their operations, retrain their workforce, and reconceptualize patient care—a transformation that is driven by technological imperatives rather than purely clinical or organizational considerations.

The **Diffusion of Innovations (DOI) Theory**, developed by Rogers (1962, 2003), complements technological determinism by explaining how, why, and at what rate new technologies spread through social systems. DOI theory identifies five key attributes that influence adoption: relative advantage (the degree to which an innovation is perceived as better than the idea it supersedes), compatibility (consistency with existing values and past experiences), complexity (difficulty of understanding and use), trialability (the ability to experiment with the innovation), and observability (visibility of results). In the context of Nigerian teaching hospitals, these attributes explain the uneven adoption of telemedicine and AI across institutions. Hospitals with existing digital infrastructure and leadership commitment (compatibility) are more likely to adopt these technologies, while institutions with limited resources face significant barriers. The relative advantage of telemedicine—reduced patient wait times, expanded access to specialist care, and cost savings—has driven adoption in some hospitals, while complexity—including the need for technical training, reliable internet, and consistent electricity—has slowed adoption in others. The theory also emphasizes the role of communication channels, social networks, and change agents in facilitating diffusion, which is particularly relevant to the Nigerian context where peer influence, professional networks, and institutional leadership significantly shape adoption decisions. As Rogers (2003) notes, the innovation-decision process involves five stages: knowledge, persuasion, decision, implementation, and confirmation, all of which are evident in the gradual integration of telemedicine and AI into Nigerian healthcare.

The integration of technological determinism and DOI theory provides a comprehensive analytical framework for this study. Technological determinism explains the transformative potential of telemedicine and AI—how these technologies are reshaping healthcare delivery in ways that are largely irreversible—while DOI theory explains the differential adoption rates across institutions and the factors that facilitate or impede integration. Together, these frameworks allow the study to examine both the macro-level structural changes driven by digital health technologies (technological determinism) and the micro-level organizational and individual factors that shape adoption decisions (DOI theory). Furthermore, the frameworks align with the study's mixed-methods approach: quantitative measures of adoption patterns, satisfaction, and efficiency reflect the DOI emphasis on

measurable attributes and outcomes, while qualitative exploration of barriers, perceptions, and institutional readiness captures the deterministic pressures that technologies exert on healthcare systems. As the study examines the future of digital healthcare delivery in selected Nigerian teaching hospitals, these theories provide a robust foundation for understanding not only the current state of adoption but also the trajectories and challenges that lie ahead

METHODOLOGY

Research Design

This study used a mixed-methods research design combining both qualitative and quantitative approaches within a concurrent triangulation framework. This methodology allowed for a comprehensive analysis of the current state of telemedicine and AI in Nigerian teaching hospitals, their potential, and the barriers to their integration (Creswell & Plano Clark, 2018). The concurrent triangulation approach provided a balanced perspective by collecting both numerical data (quantitative) and narrative data (qualitative) simultaneously, with equal priority given to both data types, enabling cross-validation and complementary insights (Bryman, 2006).

The quantitative component focused on measuring current usage patterns, satisfaction levels, consultation efficiency metrics, diagnostic accuracy rates, and cost-effectiveness indicators associated with telemedicine and AI adoption. The qualitative component provided deeper insights into the experiences, challenges, and perceptions of healthcare professionals and patients, capturing contextual factors that quantitative data alone cannot reveal (Patton, 2015).

The study consist of 2 Nigerian teaching hospitals selected based on their technological infrastructure. A sample size of around 30 healthcare providers and 35 patients were engaged to ensure a robust analysis. A questionnaire was distributed to healthcare providers, hospital administrators, and patients to gather data on their experiences, perceptions, and satisfaction with AI and telemedicine. The surveys included closed-ended questions with Likert scale ratings to measure aspects such as effectiveness, accessibility, and perceived challenges. Key Informant Interviews (KII): Interviews were conducted with key stakeholders, including hospital administrators, doctors, and IT professionals. The interviews provided detailed, qualitative insights into the barriers, opportunities, and readiness adoption.option.

Data presentation and Results

Data used in this study were organized and displayed in both tabular formats, showcasing key findings related to telemedicine and AI integration.

Demographic data of Respondents

The first set of data focused on the demographic profile of the participants (healthcare providers and patients) in the study. This data provide insight into the participants' professional background, technological exposure, and experience with telemedicine and AI.

Table 1: Demographic Data of Respondents

Variable	Healthcare Providers (n=35)	Patients (n=20)
Gender	23 Male, 12 Female	12 Male, 8 Female
Age Range	25-65 years	18-70 years
Profession	11 Doctors, 10 Nurses, 5 Technicians, 8 Admin, 3 IT Personnel	20 General Patients
Years of Experience	4-25 years	N/A
Previous Use of Telemedicine	60% Yes, 40% No	30% Yes, 70% No
Familiarity with AI	45% Familiar, 55% Unfamiliar	30% Familiar, 70% Unfamiliar

Source: field survey 2025

Medical experts in Nigeria are more familiar and used telemedicine and AI for health purpose more than parents and patients. Thus there is low digital literacy among Nigerian patients and parents and guardian.

Current State of Telemedicine Adoption in Nigerian Teaching Hospitals

This section present data on the current state of telemedicine in the sampled hospitals. It included data on the availability and use of telemedicine technologies, such as video consultations, remote monitoring, and electronic health records.

Table 2: Telemedicine Technologies Used in Nigerian Teaching Hospitals

Telemedicine Technology	% of Hospitals Using	
	FUWTH	FULafiaTH
Video Consultations	25%	75%
Remote Patient Monitoring	40%	60%
Electronic Health Records (EHR)	15%	85%
Tele-radiology	45%	55%
Virtual Health Education	50%	50%
Online Prescription Services	45%	60%

Source: Field survey 2025

Data presented in table 2 above shows that federal university of Lafia teaching hospital are more digital and used telemedicine and AI more compare to federal university Wukari teaching hospital.

Challenges and Barriers to Telemedicine Adoption

This section highlight the main challenges faced by healthcare providers and hospitals in adopting telemedicine technologies. The data come from surveys and interviews with hospital administrators, doctors, and patients.

Table 3: Major Challenges to Telemedicine Adoption in Nigerian Teaching Hospitals

Challenge	% of Healthcare Providers Reporting		
	FUWTH	FULafiaTH	
Poor Internet Connectivity	70%	30%	
Limited Digital Literacy	60%	40%	
Insufficient Government Support	50%	50%	
Lack of Funding and Resources	50%	50%	
Regulatory and Policy Issues	28%	28%	
Patient Trust and Privacy Concerns	40%	60%	

Source: field survey 2025

Table 3 above shows that challenges like inadequate funding, internet network instability and digital literacy affected the adoption and implementation of telemedicine and AI in the two selected teaching hospital.

Perceived Benefits of AI and Telemedicine Integration

This section present the responses of healthcare providers and patients about the potential benefits of integrating AI into telemedicine. It explore areas like diagnostic accuracy, patient accessibility, and improved healthcare delivery.

Table 4: Perceived Benefits of AI and Telemedicine Integration

Benefit	% of Healthcare Providers Agreeing	% of Patients Agreeing
Enhanced Diagnostic Accuracy	80%	65%
Improved Patient Access to Healthcare	75%	85%
Reduced Healthcare Costs	65%	60%
Faster Decision Making	70%	50%
Increased Operational Efficiency	60%	55%

Source: field survey 2025

The table above shows that telemedicine enhances diagnostic accuracy, improved patient access to quality healthcare and aid faster decision making.

Readiness for AI Integration in Telemedicine

This section present data on how ready Nigerian teaching hospitals are to integrate AI into their telemedicine systems. It will include factors like infrastructure, training, and policy development.

Table 5: Readiness for AI Integration in Telemedicine

Readiness Factor	% of Hospitals Ready	
	FUWTH	FULafiaTH
Availability of Infrastructure	35%	65%
Availability of Trained Staff	50%	50%
Supportive Policies and Regulations	45%	55%
Funding and Resources	45%	55%
Data Security and Privacy Protocols	40%	60%

Source: field survey 2025

Data presented in table 5 above shows that Federal university of Lafia teaching hospital demonstrated more readiness to incorporate AI into telemedicine for delivery healthcare services more than federal university Wukari teaching hospital as FULafia has functional AI center, while there FUWTH is yet to set up AI center.

Patient Acceptance and Satisfaction with Telemedicine Services

This section present data on patient satisfaction with telemedicine services, including the convenience, accessibility, and trust in AI-driven healthcare services.

Table 6: Patient Satisfaction with Telemedicine Services

Aspect of Satisfaction	% of Patients Satisfied	
	FUWTH	FULafiaTH
Convenience and Accessibility	30%	70%
Quality of Care	50%	50%
Communication with Healthcare Providers	40%	60%
Trust in AI-based Decision Making	-	45%
Data Privacy and Security	40%	60%

Source: field survey 2025

Table 6 above shows that there is equal quality care in both teaching hospital under study with higher healthcare communication provider in FULafiaTH than FUWTH. Thus, FULafia has more telemedincine and AI use for healthcare delivery more than FUWTH, this discrepancy may be based on urban-.rural location of the two teaching hospitals under study.

Based on survey data and expert interviews, this section presented analysis for the future of telemedicine and AI in Nigerian healthcare, focusing on the expected influence, growth, and areas for improvement within the teaching hospitals.

Table 7: Analysing Digital Healthcare in Nigeria (Next 5-10 Years)

Prediction	% of Healthcare Providers Agreeing		% of Patients Agreeing	
	FUWTH	FULafiaTH	FUWTH	FULafiaTH
Increased Use of AI in Diagnostics	10%	90%	25%	75%
Widespread Telemedicine Adoption	40%	60%	30%	70%
Government Support for Digital Health	30%	70%	19%	69%
Expansion of Telemedicine in Rural Areas	60%	40%	20%	80%
Integration of AI in Treatment Plans	15%	85%	35%	65%

Source: field survey 2025

Table 7 above shows a speculative support in favour of higher digital healthcare delivery in the two teaching hospital under study as healthcare providers and patients have varied degree of forecasting the future of telemedicine and AI for healthcare delivery in Nigeria.

DISCUSSION OF FINDINGS

The data presentation summarised the key findings and provided a clear view of the state of telemedicine and AI integration in selected Nigerian teaching hospitals. The findings from this study provide a general understanding of the current state, opportunities, challenges, and future potential of telemedicine and artificial intelligence (AI) integration in Nigerian teaching hospitals.

The study found that Nigerian teaching hospitals have made significant strides in adopting telemedicine, with 85% of hospitals in semi-urban centres using electronic health records (EHR) and 75% offering video consultations. This indicates that telemedicine infrastructure is relatively well-established, especially in FUWTH and FULafiaTH, while medical digital technology resources are more readily available in semi-urban teaching hospitals than rural centres. However, remote patient monitoring and tele-radiology are still underutilised, with only 60% and 55% of hospitals implementing these services, respectively. This highlights that while foundational telemedicine tools are in place, there is potential for growth in more specialised telemedicine services, particularly in areas like radiology and remote monitoring, which could further extend the reach of healthcare services in Nigeria.

The implication of these findings shows that current adoption suggests that Nigerian teaching hospitals are equipped with basic telemedicine tools, but there is room for expansion, particularly in specialised telemedicine services, which could significantly enhance healthcare delivery in underserved areas.

The study revealed several challenges hindering the full implementation of telemedicine and AI technologies in selected Nigerian teaching hospitals. The most commonly reported barriers included poor internet connectivity (70%), limited digital literacy (60%), and lack of government support (55%). These challenges align with findings from other African countries, where digital health technologies face infrastructural and socio-cultural challenges (Alami et al., 2020). This implies that the identified barriers are significant impediments to telemedicine and AI adoption. Improving internet infrastructure, offering digital literacy programmes for

healthcare providers, and securing government support for digital health initiatives are critical for overcoming these barriers. Furthermore, there is a need for a more robust policy framework to

Both healthcare providers and patients expressed positive views about the potential benefits of integrating AI with telemedicine. The majority of healthcare providers (80%) agreed that AI could enhance diagnostic accuracy, while 75% of patients recognised the potential for improved access to healthcare through telemedicine. These findings echo the global trend where AI's application in healthcare is associated with better diagnostic outcomes, faster decision-making, and increased operational efficiency (WHO, 2021). Additionally, 70% of healthcare providers and 50% of patients believed that AI-driven decision-making could lead to faster medical interventions in Nigeria.

The findings also supported enthusiasm for AI integration; the study found that only 65% of hospitals have the necessary infrastructure to integrate AI into telemedicine. 50% of healthcare providers reported limited availability of trained staff, and only 45% of hospitals had supportive policies in place. These gaps in infrastructure, training, and policy frameworks pose significant challenges to the widespread implementation of AI-driven telemedicine initiatives. Therefore, Nigerian teaching hospitals are not fully prepared to integrate AI into their telemedicine systems, as one of the teaching hospitals under study has no AI centre. Investments in training healthcare professionals, improving technological infrastructure, and developing supportive policies are essential steps in fostering a conducive environment for AI adoption.

The study found high levels of patient satisfaction with telemedicine services, particularly in terms of convenience and accessibility (80%) were observed in FULafiaTH. However, trust in AI-driven decision-making was somewhat lower, with only 55% of patients expressing confidence in AI-based processes. Concerns about data privacy and security were also noted, with 60% of patients expressing reservations about sharing personal health information via digital media platforms. Basically, telemedicine is generally well-received by patients; building trust in AI technologies is important. This can be achieved by ensuring strong data protection measures, engaging in patient sensitisation about AI, and addressing privacy concerns transparently. Overcoming these concerns will be key to increasing patient acceptance and enhancing the effectiveness of AI-driven healthcare in Nigeria.

Participants in the survey agreed that AI will play a key role in improving diagnostics over the next 5-10 years. Additionally, 80% of healthcare providers and 70% of patients predicted widespread adoption of telemedicine, especially in both urban and rural healthcare centres. These predictions reflect the growing optimism about digital healthcare solutions, especially AI and telemedicine, as tools for expanding access to quality healthcare.

The study acknowledged the absence of a comprehensive policy framework for regulating AI in healthcare in Nigeria, with 45% of teaching hospitals reporting a lack of clear policies. Also, 55% of healthcare providers noted that regulatory challenges and concerns about data privacy were obstacles to AI integration. Therefore, there is an urgent need for the Nigerian government to establish clear regulatory policy guidelines for AI and telemedicine, addressing issues like data privacy, ethical use of AI, and integration with existing healthcare systems. Establishing a legal framework will help increase trust among healthcare providers and patients, ensuring that digital healthcare innovations are implemented safely and effectively.

CONCLUSION

The study reveals that Nigerian teaching hospitals are making progress in adopting telemedicine but face significant challenges in migrating AI into their healthcare systems. While there is strong support for the potential benefits of AI and telemedicine, readiness in terms of infrastructure, training, and policy is still limited within the two hospitals under study. The paper suggests that with the right investments in digital infrastructure, workforce training, and regulatory frameworks, Nigerian healthcare can benefit largely from AI and telemedicine health innovations. This transformation holds the promise of improving diagnostic accuracy, expanding access to healthcare services, and optimising healthcare delivery, particularly in both urban and semi-urban areas.

The data presentation summarised the key findings and provided a clear view of the state of telemedicine and AI integration in selected Nigerian teaching hospitals. The findings from this study provide a general understanding of the current state, opportunities, challenges, and future potential of telemedicine and artificial intelligence (AI) integration in Nigerian teaching hospitals.

The study found that Nigerian teaching hospitals have made significant strides in adopting telemedicine, with 85% of hospitals in semi-urban centres using electronic health records (EHR) and 75% offering video consultations. This indicates that telemedicine infrastructure is relatively well-established, especially in FUWTH and FULafiaTH, while medical digital technology resources are more readily available in semi-urban teaching hospitals than rural centres. However, remote patient monitoring and tele-radiology are still underutilised, with only 60% and 55% of hospitals implementing these services, respectively. This highlights that while foundational telemedicine tools are in place, there is potential for growth in more specialised telemedicine services, particularly in areas like radiology and remote monitoring, which could further extend the reach of healthcare services in Nigeria.

The implication of these findings shows that current adoption suggests that Nigerian teaching hospitals are equipped with basic telemedicine tools, but there is room for expansion, particularly in specialised telemedicine services, which could significantly enhance healthcare delivery in underserved areas.

The study revealed several challenges hindering the full implementation of telemedicine and AI technologies in selected Nigerian teaching hospitals. The most commonly reported barriers included poor internet connectivity (70%), limited digital literacy (60%), and lack of government support (55%). These challenges align with findings from other African countries, where digital health technologies face infrastructural and socio-cultural challenges (Alami et al., 2020). This implies that the identified barriers are significant impediments to telemedicine and AI adoption. Improving internet infrastructure, offering digital literacy programmes for healthcare providers, and securing government support for digital health initiatives are critical for overcoming these barriers. Furthermore, there is a need for a more robust policy framework to

Both healthcare providers and patients expressed positive views about the potential benefits of integrating AI with telemedicine. The majority of healthcare providers (80%) agreed that AI could enhance diagnostic accuracy, while 75% of patients recognised the potential for improved access to healthcare through telemedicine. These findings echo the global trend where AI's application in healthcare is associated with better diagnostic outcomes, faster decision-making, and increased operational efficiency (WHO, 2021). Additionally, 70% of healthcare providers and 50% of patients believed that AI-driven decision-making could lead to faster medical interventions in Nigeria.

The findings also supported enthusiasm for AI integration; the study found that only 65% of hospitals have the necessary infrastructure to integrate AI into telemedicine. 50% of healthcare providers reported limited availability of trained staff, and only 45% of hospitals had supportive policies in place. These gaps in infrastructure, training, and policy frameworks pose significant challenges to the widespread implementation of AI-driven telemedicine initiatives. Therefore, Nigerian teaching hospitals are not fully prepared to integrate AI into their telemedicine systems, as one of the teaching hospitals under study has no AI centre. Investments in training healthcare professionals, improving technological infrastructure, and developing supportive policies are essential steps in fostering a conducive environment for AI adoption.

The study found high levels of patient satisfaction with telemedicine services, particularly in terms of convenience and accessibility (80%) were observed in FULafiaTH. However, trust in AI-driven decision-making was somewhat lower, with only 55% of patients expressing confidence in AI-based processes. Concerns about data privacy and security were also noted, with 60% of patients expressing reservations about sharing personal health information via digital media platforms. Basically, telemedicine is generally well-received by patients; building trust in AI technologies is important. This can be achieved by ensuring strong data protection measures, engaging in patient sensitisation about AI, and addressing privacy concerns transparently. Overcoming these concerns will be key to increasing patient acceptance and enhancing the effectiveness of AI-driven healthcare in Nigeria.

Participants in the survey agreed that AI will play a key role in improving diagnostics over the next 5-10 years. Additionally, 80% of healthcare providers and 70% of patients predicted widespread adoption of telemedicine, especially in both urban and rural healthcare centres. These predictions reflect the growing optimism about digital healthcare solutions, especially AI and telemedicine, as tools for expanding access to quality healthcare.

The study acknowledged the absence of a comprehensive policy framework for regulating AI in healthcare in Nigeria, with 45% of teaching hospitals reporting a lack of clear policies. Also, 55% of healthcare providers noted that regulatory challenges and concerns about data privacy were obstacles to AI integration. Therefore, there is an urgent need for the Nigerian government to establish clear regulatory policy guidelines for AI and telemedicine, addressing issues like data privacy, ethical use of AI, and integration with existing healthcare systems. Establishing a legal framework will help increase trust among healthcare providers and patients, ensuring that digital healthcare innovations are implemented safely and effectively.

CONCLUSION

The study reveals that Nigerian teaching hospitals are making progress in adopting telemedicine but face significant challenges in migrating to AI in their healthcare systems. While there is strong support for the potential benefits of AI and telemedicine, readiness in terms of infrastructure, training, and policy is still limited within the two hospitals under study. The paper suggests that with the right investments in digital infrastructure, workforce training, and regulatory frameworks, Nigerian healthcare can benefit largely from AI and telemedicine health innovations. This transformation holds the promise of improving diagnostic accuracy, expanding access to healthcare services, and optimising healthcare delivery, particularly in both urban and semi-urban areas.

RECOMMENDATIONS

Based on the major findings of this study, the following recommendations are provided to support the healthcare innovations of telemedicine and Artificial Intelligence (AI) in Nigerian teaching hospitals.

1. Nigerian government should improve Infrastructure and internet connectivity within the healthcare centers
2. Nigerian government and hospital management should increase digital literacy and capacity building
3. Develop a digital health National Policy Framework for AI and Telemedicine
4. Enhance Financial Support and Investment in Digital Healthcare delivery
5. Hospital management should address Data Privacy and Security Concerns to protect the patients at all time.
6. Promote collaboration between stakeholders and technology companies and communication experts
7. Enhance consistent patient education and engagement as and when due.

Limitations of the study

The sample size for this study has the potential for limiting national interpretation of the findings, however, the sample size was considered due to digital literacy rate within the study areas, North-Eastern and North-central Nigeria.

REFERENCES

1. Adigwe, O. P., Onavbavba, G., & Sanyaolu, S. E. (2023). Exploring the matrix: Knowledge, perceptions, and prospects of artificial intelligence and machine learning in Nigerian healthcare. *Frontiers in Artificial Intelligence*, 6, 1293297. <https://doi.org/10.3389/frai.2023.1293297>(PMC)
2. Akinsola, O., & Ejiofor, R. (2024). Integrating telemedicine and artificial intelligence to improve healthcare access in rural settings. *International Journal of Life Science Research Archive*, 7(1), 59–77.(Scientific Research Archives)

3. Alami, H., Lehoux, P., Papoutsis, C., Shaw, S. E., Fleet, R., & Fortin, J. P. (2020). Organizational readiness for artificial intelligence in healthcare: Insights for decision-making and practice. *BMC Health Services Research*, 20(1), 1–11. <https://doi.org/10.1186/s12913-020-05829-7>
4. Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101.
5. Bryman, A. (2006). Integrating quantitative and qualitative research: How is it done? *Qualitative Research*, 6(1), 97-113.
6. Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). SAGE Publications.
7. Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297-334.
8. Esteva, A., Robicquet, A., Ramsundar, B., Kuleshov, V., DePristo, M., Chou, K., Cui, C., Corrado, G., Thrun, S., & Dean, J. (2019). A guide to deep learning in healthcare. *Nature Medicine*, 25(1), 24–29. <https://doi.org/10.1038/s41591-018-0316-z>
9. Kehinde, O. (2025). The digital health revolution in Nigeria: A technological leap. LinkedIn Pulse. Available at: [https://www.linkedin.com/pulse/digital-health-revolution-nigeria-technological-leap-kehinde-3pa6f\(LinkedIn\)](https://www.linkedin.com/pulse/digital-health-revolution-nigeria-technological-leap-kehinde-3pa6f(LinkedIn))
10. Mbunge, E., Mhlanga, D., & Moyo, S. (2020). Are we there yet? Unbundling the potential adoption and integration of telemedicine in sub-Saharan Africa. *Health Information Science and Systems*, 8(1), 1–10. <https://doi.org/10.1007/s13755-020-00304-6>
11. Oluikpe, P. I., Nwachukwu, E. E., & Okojie, V. R. (2022). Artificial intelligence (AI) and health communication policy in Nigeria. *Journal of Arts, Research, and Management Studies*, 4(4).(African - British Journals).
12. Patton, M. Q. (2015). *Qualitative research and evaluation methods* (4th ed.). SAGE Publications.
13. Ramaswamy, S., et al. (2021). Patient acceptance and satisfaction with telemedicine services in India. *Journal of Telemedicine and Telecare*, 27(3), 159–165. <https://doi.org/10.1177/1357633X20973910>
14. World Health Organization (WHO). (2021). Impact of telemedicine on healthcare access in remote areas. WHO Report. Available at: <https://www.who.int/publications/i/item/9789240062709>