

Healthcare Professionals' Perspectives on the Integration of Artificial Intelligence into Medical Practice in Nigeria: A Cross-Sectional Survey

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ABSTRACT

Background

Artificial Intelligence (AI) is increasingly being incorporated into healthcare systems worldwide, with applications spanning diagnosis, clinical decision-making, research, administrative support, and patient monitoring. Despite growing global interest, evidence regarding healthcare professionals' perceptions of AI within the Nigerian healthcare context remains limited.

Aim

To explore the perspectives of healthcare professionals in Nigeria regarding the integration of AI into medical practice, with particular emphasis on awareness, perceived applications, readiness for adoption, and barriers to implementation.

Methods

A cross-sectional online survey was conducted among 88 healthcare professionals practising in Nigeria between February and June 2025. The questionnaire collected information on socio-demographic characteristics, knowledge and awareness of AI, perceived applications, readiness for adoption, barriers to implementation, and predictors of AI use. Data were analysed using descriptive statistics and chi-square tests to identify factors associated with AI use.

Results

The mean age of respondents was 38.65 ± 6.27 years, and 59.1% were male. Awareness of AI was generally high, with 43.2% reporting that they were somewhat familiar with AI and 39.8% indicating that they were familiar with the concept. Image analysis (85.9%) and diagnosis (84.7%) were the most frequently recognised healthcare applications of AI. Most respondents believed that AI could improve medical practice in Nigeria. Perceived barriers to implementation included electricity challenges (64.7%), digital literacy limitations (63.5%), infrastructural constraints (58.8%), resistance to change (56.5%), and ethical concerns (50.6%). Predictors considered important for successful AI implementation included strong cybersecurity measures (71.8%), robust data governance policies (65.9%), training and upskilling opportunities (64.7%), and continuous monitoring of AI systems (62.4%). Age was the only factor significantly associated with AI use ($\chi^2 = 12.546$, $p = 0.028$).

Conclusion

Healthcare professionals in Nigeria demonstrate substantial awareness of AI and generally view its integration into medical practice positively. However, significant infrastructural, educational, ethical, and governance-related barriers remain. Effective implementation will require strategic investment in digital infrastructure, workforce development, regulatory frameworks, and data governance systems to ensure that AI can be deployed safely, responsibly, and effectively within the Nigerian healthcare system.

Keywords: Artificial Intelligence; healthcare professionals; medical practice; technology adoption; digital health; healthcare innovation; Nigeria; health informatics.

INTRODUCTION

Artificial Intelligence (AI) is increasingly reshaping healthcare delivery across clinical, administrative, and research settings. Rapid advances in machine learning, natural language processing, computer vision, and predictive analytics have expanded the use of AI in diagnostics, treatment planning, disease surveillance, workflow optimisation, and precision medicine (Jiang et al., 2017; Topol, 2019). Health systems in both high-income and low- and middle-income countries are now exploring how AI-driven technologies can strengthen service delivery, improve clinical efficiency, and support evidence-based decision-making.

Interest in AI within healthcare has grown substantially in recent years because of its potential to support earlier diagnosis, reduce medical errors, and improve access to specialist care. Studies have demonstrated promising applications in radiology, pathology, oncology, cardiovascular medicine, and population health management (Beam & Kohane, 2018; Esteva et al., 2019). AI-assisted systems have also shown potential in reducing clinician workload and improving turnaround time for routine clinical tasks, particularly in environments characterised by workforce shortages and overstretched healthcare systems (Topol, 2019).

Despite these developments, AI adoption in healthcare remains uneven across regions. Resource-constrained countries continue to face infrastructural, regulatory, financial, and ethical barriers that limit implementation. Nigeria presents a particularly important setting for examining these issues because the healthcare system continues to experience significant pressures related to workforce shortages, uneven distribution of specialist

services, inadequate digital infrastructure, and limited access to advanced healthcare technologies. Recent studies have suggested that AI may offer opportunities to strengthen healthcare delivery in such contexts, especially in diagnostic support, telemedicine, administrative efficiency, and disease prediction (Obiekwe et al., 2025; Olawade et al., 2025). However, successful implementation depends heavily on the perspectives and readiness of healthcare professionals who will ultimately interact with these technologies in clinical practice.

Healthcare professionals occupy a central position in the adoption and integration of AI within medical settings. Their perceptions influence acceptance, trust, implementation behaviour, and long-term sustainability of technological innovations. Concerns regarding patient safety, accountability, ethical governance, algorithmic bias, and data protection have become increasingly prominent in discussions surrounding AI integration into healthcare systems (WHO, 2021; Singh & Keche, 2025). Questions relating to transparency, explainability, informed consent, and medico-legal liability continue to generate debate among clinicians, policymakers, and health informatics researchers.

Recent Nigerian studies have reported cautious optimism regarding AI adoption among healthcare practitioners and medical trainees, although significant reservations remain concerning regulation, infrastructure, trust, and ethical oversight (Obiekwe et al., 2025; Olawade et al., 2025). Ethical oversight committees in Nigerian teaching hospitals have similarly highlighted gaps in AI governance, institutional preparedness, and technical capacity (Olawade et al., 2025). Data privacy and cybersecurity concerns appear particularly important within the Nigerian context because healthcare digitisation remains inconsistent across institutions and enforcement of data governance frameworks continues to

evolve.

The integration of AI into healthcare also raises broader professional concerns. Some clinicians remain apprehensive about potential overreliance on automated systems, erosion of clinical judgement, and possible displacement of certain professional roles. Research conducted across different healthcare settings has shown that trust in AI systems is closely associated with perceived reliability, interpretability, and alignment with clinical reasoning processes (Gerke et al., 2020). Concerns about bias and fairness are especially relevant in African populations where many AI algorithms are trained using datasets that may inadequately represent local demographic and epidemiological patterns.

Nigeria's healthcare environment presents a combination of opportunities and constraints for AI integration. Large patient populations, growing mobile technology penetration, and increasing digital health interest create favourable conditions for innovation. At the same time, inconsistent electricity supply, limited interoperability of electronic health records, inadequate funding, and shortages of AI-specific regulatory frameworks remain major obstacles (Ehirim, 2025; Olawade et al., 2025). Understanding how healthcare professionals perceive these realities is therefore important for informing future implementation strategies and policy development.

This paper examines the perspectives of healthcare professionals in Nigeria regarding the relevance of AI in medical practice. Particular attention is given to awareness levels, perceived benefits, and concerns surrounding AI adoption within clinical settings. Findings from this paper may contribute to ongoing discussions regarding responsible AI integration in Nigerian healthcare. They may help identify priority areas for education, governance, infrastructure development, and future policy planning.

METHODS

Study Design

This paper adopted a cross-sectional survey design to examine healthcare professionals' perspectives regarding the integration of AI into medical practice in Nigeria. Cross-sectional approaches are widely used in health technology perception studies because they permit rapid assessment of attitudes, awareness, and concerns within defined professional populations (Setia, 2016). The design was considered appropriate for this paper because the objective was to obtain a contemporary snapshot of healthcare professionals' views regarding AI adoption within the Nigerian healthcare system.

Study Setting and Population

The study was conducted among healthcare professionals practising in Nigeria in February 2025. Participants were drawn from different healthcare backgrounds and represented varying levels of professional experience. Inclusion of participants from diverse professional groups was important because AI integration into healthcare has implications across multiple areas of clinical practice, including diagnosis, patient management, administration, and decision-support systems.

Eligible participants included healthcare professionals currently practising within Nigeria who consented voluntarily to participate in the study. Participation was unrestricted by specialty, gender, or years of practice in order to capture a broad range of professional perspectives regarding AI in healthcare.

Sampling and Recruitment

A non-probability convenience sampling approach was used. Recruitment occurred through online distribution of the survey instrument. Online recruitment was considered suitable because of the growing reliance on digital communication among healthcare professionals and the increasing use of web-based survey methods in healthcare research (Andrade, 2020).

Participation was voluntary, and respondents completed the questionnaire anonymously. No financial incentives were provided. The study achieved responses from 12 healthcare professionals. Although the sample size was modest, the study was exploratory in nature and intended to provide preliminary insights into awareness, perceived benefits, and concerns regarding AI integration into medical practice in Nigeria.

Data Collection Instrument

Data were collected using a structured questionnaire developed specifically for this paper. The questionnaire contained items covering:

1. demographic characteristics,
2. familiarity with AI concepts,
3. perceived relevance of AI in medical practice,
4. potential benefits of AI adoption,
5. preferred areas of implementation,
6. and concerns relating to AI use in healthcare.

Questions included both categorical and perception-based items. The instrument was designed to capture participants' views regarding practical, ethical, and operational dimensions of AI implementation in healthcare settings.

Awareness of AI was assessed using self-reported familiarity

categories ranging from “very familiar” to “somewhat familiar” and “familiar”. Perceived benefits focused on whether participants believed AI could improve medical practice in Nigeria. Concerns explored issues such as data privacy, ethical implications, reliability, bias, regulatory compliance, interoperability, informed consent, and potential job displacement.

Data Collection Procedure

The questionnaire was distributed electronically using online survey methods. Respondents completed the survey remotely at their convenience. Online administration improved accessibility and reduced geographical limitations that may have restricted participation across different professional groups.

Confidentiality was maintained throughout the study process. No personally identifiable information was collected from participants. Participants were informed about the purpose of the study before completing the questionnaire.

Data Analysis

Data were analysed using descriptive statistical methods. Frequencies and percentages were calculated for categorical variables and presented in tables and charts where appropriate. Descriptive analysis was selected because the study aimed primarily to characterise healthcare professionals’ awareness, attitudes, and concerns regarding AI integration rather than establish causal relationships.

Findings were organised according to major thematic areas including familiarity with AI, perceived benefits, and concerns surrounding implementation. Presentation of

results followed standard reporting conventions for cross-sectional survey studies.

Ethical Considerations

Ethical approval was obtained from the Ethics Committee of FMC Asaba. Participation in the study was voluntary, and respondents provided informed consent prior to completing the survey. Confidentiality and anonymity were maintained throughout data collection and analysis. Respondents retained the right to discontinue participation at any stage without consequence.

Ethical considerations were particularly important because discussions surrounding AI in healthcare frequently involve sensitive issues such as data governance, privacy, patient safety, and professional accountability. Care was therefore taken to ensure responsible handling of participant responses and adherence to accepted principles of research ethics.

RESULTS

A total of 88 healthcare professionals participated in the study. The findings are presented across socio-demographic characteristics, knowledge and awareness of AI, perceived applications, barriers to implementation, and factors associated with AI use.

Socio-demographic Characteristics

Table 1 summarises the socio-demographic profile of respondents. The mean age was 38.65 ± 6.27 years. Male respondents constituted 59.1% of the sample. Most participants were married (72.7%), while the South-South geopolitical zone represented the largest regional group (39.8%). Part 2 Fellowship qualification accounted for the largest educational category (40.9%).

Table 1: Respondents’ Socio-demographic Characteristics

Variable	Value (N = 88)
Age (Mean $\pm$ SD)	38.65 $\pm$ 6.27
Male	52 (59.1%)
Female	36 (40.9%)
Married	64 (72.7%)
South-South	35 (39.8%)
Part 2 Fellowship	36 (40.9%)

Figure 1 shows a moderate predominance of male respondents within the study population.

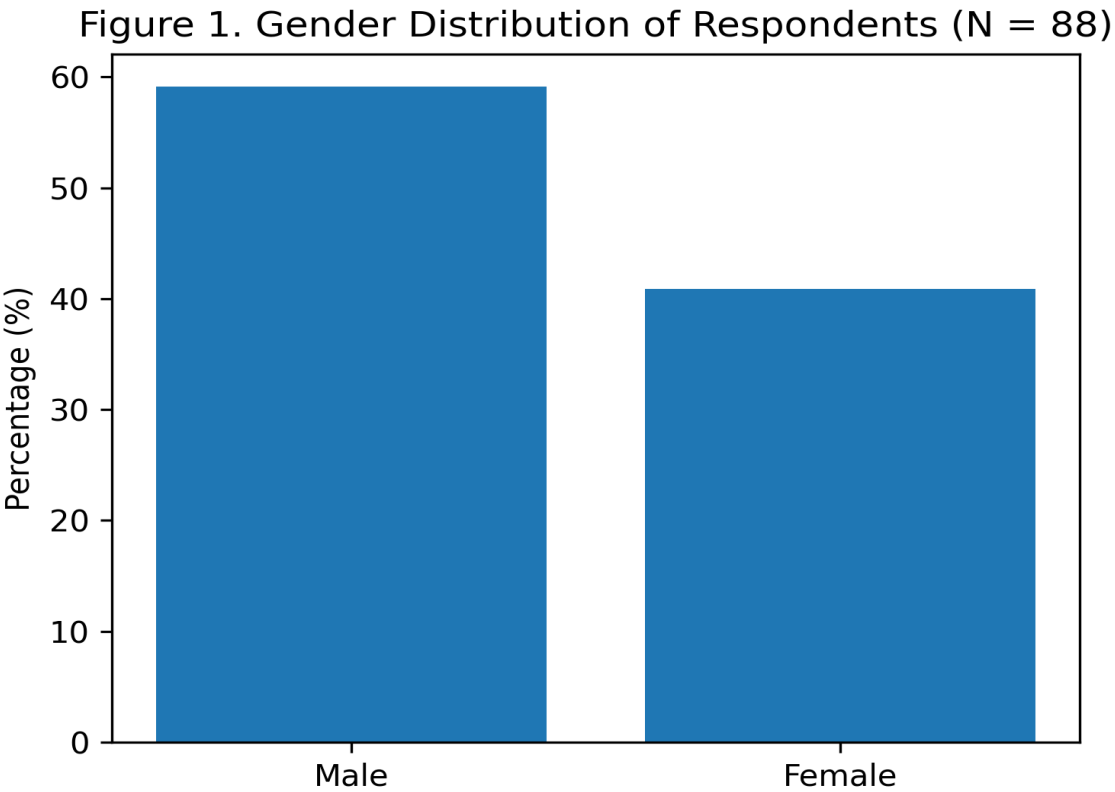


Figure 1: Gender Distribution of Respondents (N = 88)

Knowledge and Awareness of Artificial Intelligence

Awareness of AI was generally high among respondents. Most participants reported being somewhat familiar (43.2%) or familiar (39.8%) with AI concepts. Only 15.9% described themselves as very familiar with AI applications in healthcare (Table 2).

Table 2: Knowledge and Awareness of AI

Familiarity Level	n (%)
Not at all familiar	1.1%
Familiar	39.8%
Somewhat familiar	43.2%
Very familiar	15.9%

Figure 2 demonstrates that advanced familiarity with AI remained comparatively limited among respondents.

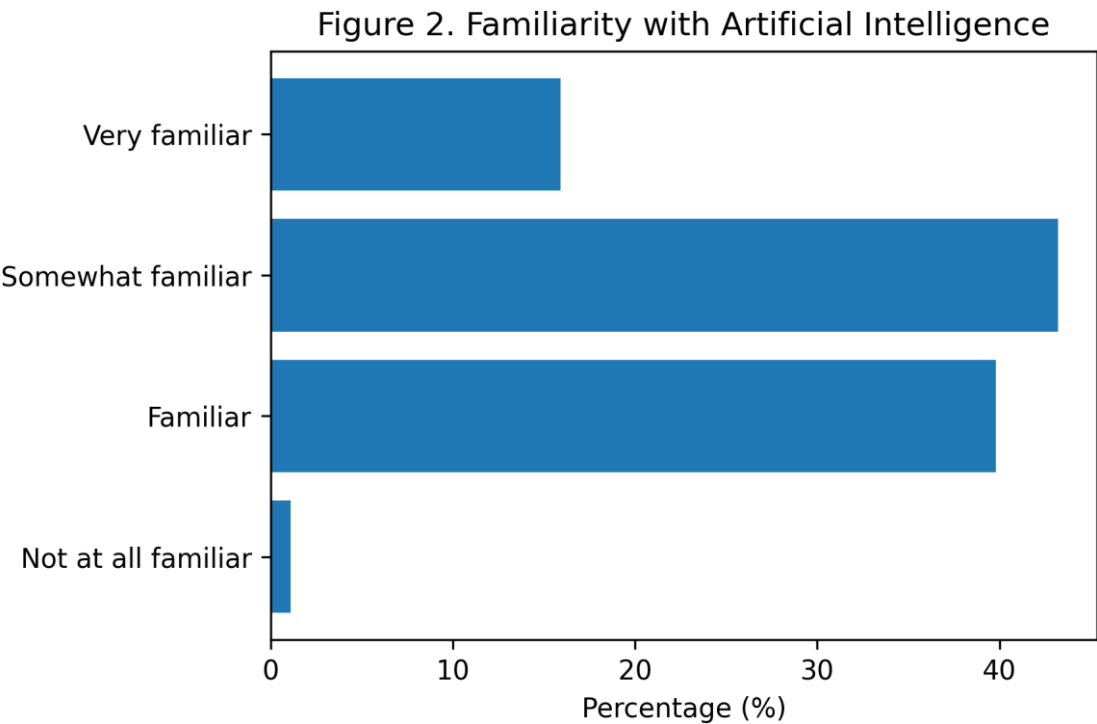


Figure 2: Familiarity with AI

Perceived Applications of Artificial Intelligence

Respondents identified multiple applications of AI in healthcare. Image analysis (85.9%) and diagnosis (84.7%) emerged as the most frequently recognised uses. Administrative support and information extraction also recorded high response frequencies (Table 3).

Table 3: Perceived Applications of AI

Application	Percentage (%)
Image Analysis	85.9
Diagnosis	84.7
Administrative Duties	75.3
Extract Information	72.9
Forecast Health Hazard	67.1
Robot-Assisted Surgery	67.1
Monitor Patients	65.9
Individualised Treatment	64.7
Drug Discovery	60.0
Mental Health Support	47.1
Virtual Assistants	9.4

Figure 3 illustrates the concentration of responses around clinically oriented applications of AI.

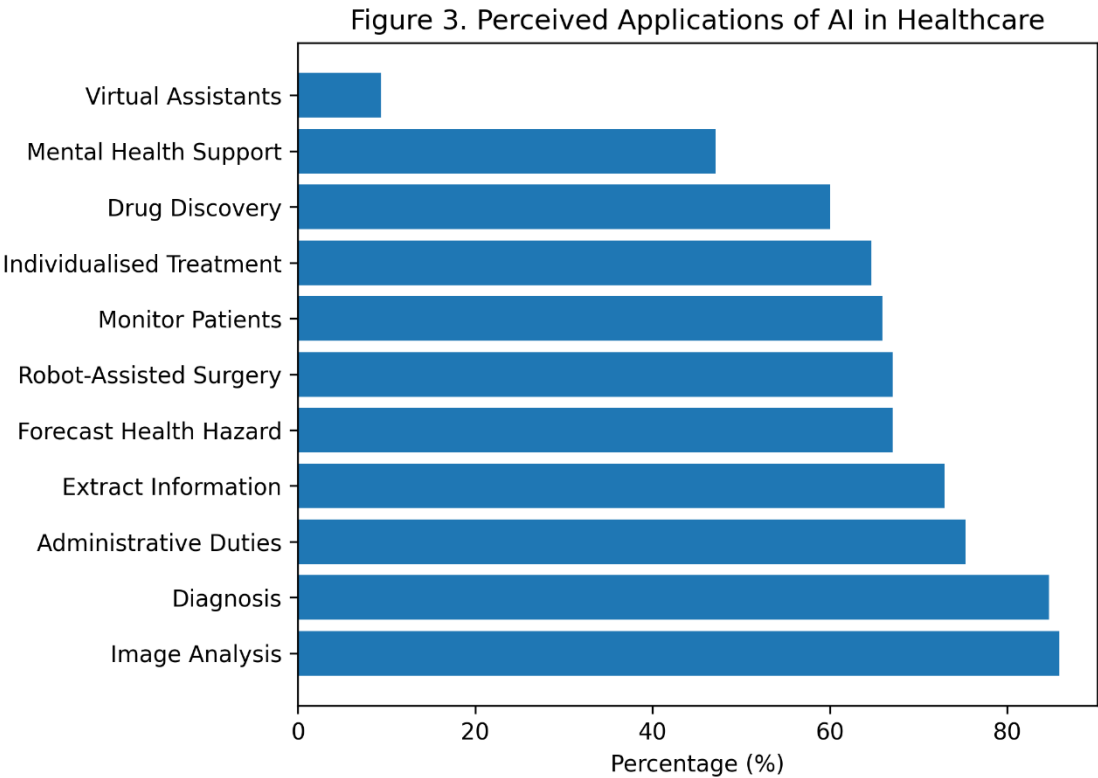


Figure 3: Perceived Applications of AI in Healthcare

Perceived Barriers to Artificial Intelligence Implementation

Infrastructure-related challenges emerged prominently among respondents. Electricity limitations (64.7%), digital literacy constraints (63.5%), and infrastructural barriers (58.8%) were the most commonly identified obstacles (Table 4).

Table 4: Perceived Barriers to AI Implementation

Barrier	Percentage (%)
Electricity	64.7
Digital literacy	63.5
Infrastructure	58.8
Resistance to change	56.5
Ethical Issues	50.6
Regulatory Issues	49.4
Access to data	44.7
Data privacy and Security	42.4
Access to device	38.8
Bias in Algorithms	31.8

Figure 4 highlights the predominance of structural and operational barriers over algorithmic concerns.

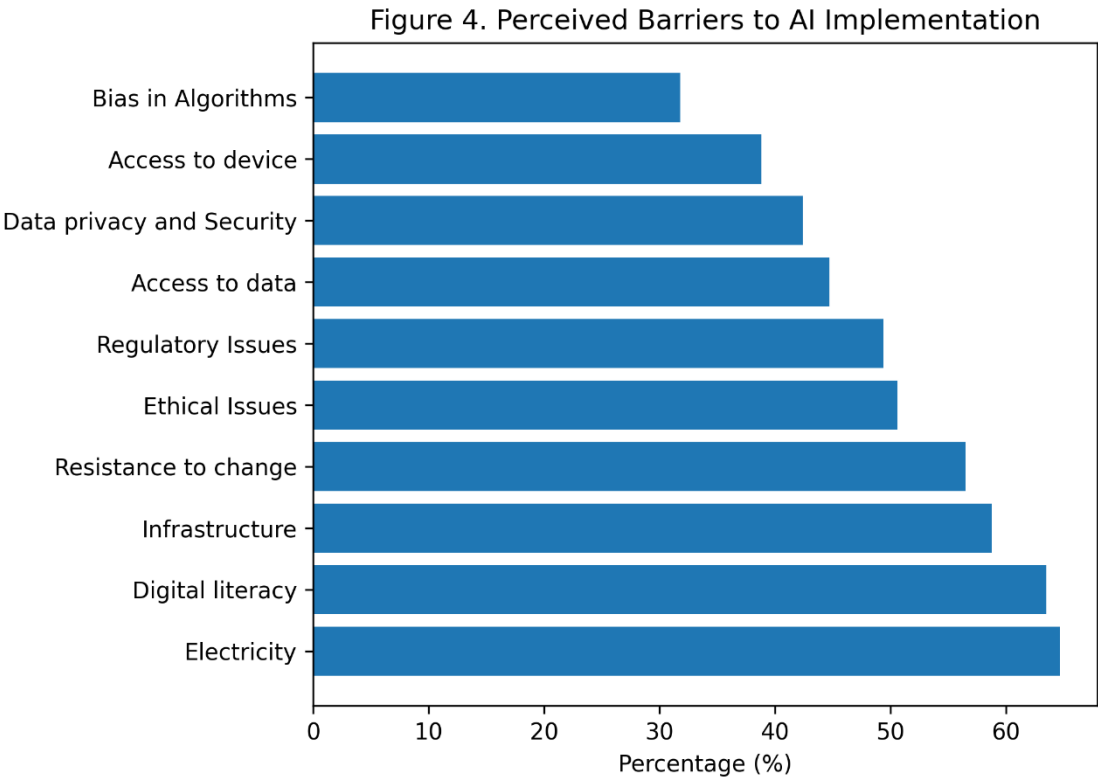


Figure 4: Perceived Barriers to AI Implementation

Factors Associated with Artificial Intelligence Use

Chi-square analysis identified age as the only factor significantly associated with AI use ($\chi^2 = 12.546$, $p = 0.028$). No statistically significant associations were observed for gender, geopolitical zone, marital status, educational level, years of experience, or level of AI familiarity (Table 5).

Table 5: Factors Associated with AI Use

Variable	χ^2	p-value	Interpretation
Gender	0.439	0.508	Not significant
Age	12.546	0.028*	Significant
Geopolitical Zone	3.173	0.673	Not significant
Marital Status	0.148	0.929	Not significant
Level of Education	3.492	0.322	Not significant
Years of Experience	6.466	0.263	Not significant
Knowledge of AI	3.382	0.336	Not significant

*Statistically significant at the 95% confidence level.

DISCUSSION

This paper examined healthcare professionals’ perspectives regarding the integration of AI into medical practice in Nigeria. The findings demonstrate substantial awareness of AI concepts, broad optimism regarding potential clinical applications, and persistent concerns

relating to infrastructure, ethics, governance, and implementation capacity. These results reflect the growing global interest in AI-driven healthcare innovation while also revealing the structural realities that shape technological adoption within low- and middle-income healthcare systems.

Awareness of AI among respondents was generally high, with

most participants reporting at least moderate familiarity with AI concepts. This finding aligns with recent studies indicating increasing exposure of healthcare professionals to AI technologies through clinical practice, digital platforms, and medical education (Mucci et al., 2023; Obiekwe et al., 2025). Rapid expansion of AI-related discussions within medicine has likely contributed to this growing familiarity. Increased visibility of AI-assisted diagnostics, predictive modelling, radiological interpretation, and automated clinical systems has also elevated professional awareness globally.

Despite this growing awareness, advanced familiarity remained comparatively limited within the present sample. Only a minority considered themselves very familiar with AI applications in healthcare. This pattern suggests that awareness does not necessarily translate into technical competence or operational understanding. Similar findings have been reported in studies conducted among physicians and medical trainees in other low-resource settings, where healthcare professionals often recognise the potential importance of AI while lacking formal training in its practical application (Pinto dos Santos et al., 2019). The findings therefore reinforce concerns regarding the preparedness of healthcare systems for large-scale AI integration without substantial investment in professional education and digital literacy.

Respondents identified diagnosis, image analysis, and administrative support as the most important applications of AI in healthcare. This reflects the strong association between AI and diagnostic enhancement within contemporary medical discourse. Advances in machine learning and computer vision have demonstrated substantial promise in radiology, pathology, dermatology, cardiology, and ophthalmology (Topol, 2019). High levels of recognition for image analysis and diagnostic support within this paper suggest that healthcare professionals in Nigeria are increasingly aware of these developments and perceive potential value in their local application.

Administrative functions also emerged prominently among perceived applications. This finding is important because healthcare systems in Nigeria continue to experience considerable administrative inefficiencies, workforce shortages, and documentation burdens. AI-assisted administrative systems may therefore be viewed not only as clinical tools but also as mechanisms for improving operational efficiency and reducing professional workload. Studies have shown that automation of repetitive administrative tasks may enhance workflow efficiency and reduce clinician burnout when implemented appropriately (Jiang et al., 2017).

The findings further demonstrate strong optimism regarding the role of AI in improving medical practice in

Nigeria. Such optimism likely reflects recognition of existing healthcare system challenges, including shortages of specialists, uneven distribution of services, and delays in diagnostic processes. Healthcare professionals may therefore perceive AI as a potential mechanism for strengthening healthcare access and supporting clinical decision-making in resource-constrained environments.

At the same time, respondents identified substantial barriers to implementation. Electricity limitations, digital literacy gaps, infrastructural weaknesses, and resistance to change emerged as prominent concerns. These findings are particularly significant within the Nigerian healthcare context, where inconsistent electricity supply and limited digital infrastructure continue to impede technological advancement across many healthcare institutions (Olawade et al., 2025). The prominence of infrastructural barriers in this paper suggests that successful AI implementation cannot be achieved through technological innovation alone. Sustainable integration requires parallel investment in healthcare infrastructure, digital systems, and institutional capacity development.

Ethical and governance-related concerns also featured prominently. Data privacy and security represented major concerns among respondents, reflecting growing international attention towards responsible AI governance in healthcare. AI systems frequently depend on large datasets containing sensitive patient information, creating substantial concerns regarding confidentiality, cybersecurity, consent, and accountability (World Health Organization, 2021). These concerns may be particularly pronounced in contexts where digital governance frameworks remain underdeveloped or inconsistently enforced.

Bias in AI algorithms was also identified as a concern, although less frequently than infrastructural barriers. This remains an important issue because many AI systems are trained using datasets derived predominantly from high-income populations. Limited representation of African populations within training datasets may reduce algorithmic accuracy and contribute to unequal healthcare outcomes. Research has demonstrated that algorithmic bias can reinforce existing inequalities when AI systems are implemented without adequate validation across diverse populations (Obermeyer et al., 2019). The findings therefore reinforce the importance of context-specific validation and inclusive dataset development in African healthcare settings.

Inferential analysis identified age as the only statistically significant factor associated with AI use. Younger healthcare professionals appeared more likely to report AI use compared with older participants. This finding is consistent with studies suggesting that younger clinicians may demonstrate greater openness towards digital technologies and innovation adoption because of increased exposure during training and professional development (Schnitzler & Bohnet-Joschko, 2025). No significant associations were observed for gender,

educational level, or years of experience, suggesting relatively broad acceptance of AI across professional subgroups within this sample.

This paper contributes important context-specific evidence regarding AI readiness within Nigerian healthcare practice. Existing research on AI adoption remains heavily concentrated in high-income settings, despite the unique implementation realities faced by low-resource healthcare systems. The present findings highlight the importance of balancing technological innovation with ethical governance, infrastructure development, workforce preparedness, and regulatory oversight.

Future implementation efforts should prioritise structured professional training, investment in digital infrastructure, and development of robust governance frameworks capable of addressing data security, accountability, transparency, and fairness. Effective collaboration between healthcare institutions, policymakers, technology developers, and regulatory agencies will likely be essential for sustainable AI integration within Nigerian healthcare settings.

CONCLUSION

This paper examined healthcare professionals' perspectives regarding the integration of AI into medical practice in Nigeria. The findings demonstrate that awareness of AI is increasingly present among Nigerian healthcare professionals, accompanied by strong optimism regarding its potential contribution to healthcare delivery. Most respondents believed that AI could improve medical practice, particularly in areas such as diagnosis, image analysis, research, and administrative support. These findings suggest growing recognition of AI as a potentially important component of future healthcare systems within resource-constrained settings.

At the same time, the results reveal important structural, ethical, and operational concerns that may influence the pace and sustainability of AI adoption in Nigeria. Electricity instability, infrastructural limitations, digital literacy gaps, and resistance to change emerged as prominent barriers. Concerns relating to data privacy, cybersecurity, algorithmic bias, and ethical governance further demonstrate that healthcare professionals are attentive not only to the opportunities associated with AI but also to the potential risks accompanying its implementation.

The findings highlight the importance of approaching AI integration within Nigerian healthcare through a balanced and context-sensitive framework. Technological advancement alone is unlikely to produce meaningful transformation without corresponding investment in

infrastructure, workforce development, governance systems, and regulatory oversight. Healthcare professionals must also be equipped with the knowledge and practical competencies necessary to interact confidently with AI-driven systems in clinical environments.

This paper contributes context-specific evidence to the growing body of research examining AI readiness within healthcare systems in low- and middle-income countries. Much of the existing evidence continues to originate from high-income settings, despite substantial differences in infrastructure, resource availability, and healthcare organisation. The present findings therefore provide important insight into the realities shaping AI adoption within Nigerian medical practice.

Future efforts should prioritise development of robust ethical frameworks, investment in digital infrastructure, strengthening of data governance systems, and incorporation of AI-related competencies into medical education and professional training programmes. Collaborative engagement involving policymakers, healthcare institutions, clinicians, technology developers, and regulatory agencies will likely play an important role in ensuring that AI implementation remains safe, equitable, clinically relevant, and responsive to local healthcare needs.

AUTHOR CONTRIBUTION

All authors played a substantive role in shaping this study and developing the manuscript. C.A.O. conceptualised the work and designed the overall study framework. Data analysis, interpretation of data and validation of findings were carried out collaboratively, with each author contributing to the discussions that informed the final results. K.O.O. and C.E.E. prepared the initial manuscript draft, covering the introduction, methods, results and discussion. Co-authors strengthened the analysis, offered detailed revisions and enhanced the clarity and coherence of the final document. Every author reviewed the complete manuscript, approved the final version and accepted responsibility for the integrity of the work.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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