



Artificial Intelligence Integration in Health Information Management and Its Impact on Clinical Documentation Quality in Nigerian Healthcare Facilities

Minkailu Abubakar Amadu^{1*}, Suleiman Saidu Babale², Muhammad Danladi³, Babangida Halliru⁴ & Bridget Benson⁵

¹Health Information Management, Federal University of Health Sciences, Azare

²Health Information Management, Adamawa State College of Health Science and Technology, Michika

³Health Information Management, Federal University of Health Sciences, Azare

⁴Health Information Management, Huda University, Gusau.

⁵Health Information Management, Adamawa State College of Health Science and Technology, Michika

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*Corresponding author: Minkailu Abubakar Amadu

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Abstract

Original Research Article

Artificial Intelligence (AI) is increasingly recognized as a transformative force in healthcare, particularly within Health Information Management (HIM). This study investigates the integration of AI tools into HIM practice and their impact on clinical documentation quality in Nigerian healthcare facilities. Using a descriptive cross-sectional survey design, data were collected from 220 HIM practitioners across public and private hospitals. The study assessed the use of AI applications such as automated coding systems, natural language processing (NLP), predictive analytics, and clinical decision support tools. Results revealed that AI integration significantly improved documentation accuracy, timeliness, and completeness, with AI-enabled coding ($\beta = 0.34$, $p = 0.003$) and NLP documentation support ($\beta = 0.29$, $p = 0.005$) emerging as strong predictors of documentation quality. Despite these benefits, challenges such as limited infrastructure, inadequate training, and concerns about data privacy were identified as barriers to full adoption. The findings underscore the potential of AI to enhance clinical documentation and highlight the need for strategic investment in infrastructure, workforce development, and regulatory frameworks to ensure sustainable integration.

Keywords: Artificial Intelligence, Health Information Management, Clinical Documentation, Digital Health, Nigeria.

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I. INTRODUCTION

Clinical documentation is a fundamental component of healthcare delivery, serving as the official record of patient encounters, diagnoses,

treatments, and outcomes. High-quality documentation ensures continuity of care, supports clinical decision-making, facilitates research, and provides evidence for reimbursement and compliance with regulatory



standards. Inaccurate, incomplete, or delayed documentation can compromise patient safety, weaken health system efficiency, and hinder policy development. Health Information Management (HIM) practitioners are central to this process, acting as custodians of patient data and ensuring that records are accurate, reliable, and accessible.

The digital transformation of healthcare has introduced new opportunities and challenges for HIM practice. Among the most disruptive innovations is artificial intelligence (AI), which is increasingly being applied to improve documentation quality. AI tools such as natural language processing (NLP), automated coding systems, predictive analytics, and clinical decision support applications are capable of automating repetitive tasks, reducing human error, and transforming unstructured clinical notes into structured, analyzable data. In high-income countries, AI has already demonstrated its potential to enhance documentation accuracy, timeliness, and completeness, while reducing administrative burden on healthcare professionals (Longhini et al., 2022; Ng, 2023).

In Nigeria, however, AI integration into HIM practice remains limited. While digital health initiatives are expanding, challenges such as inadequate infrastructure, limited workforce training, and regulatory gaps continue to hinder widespread adoption. Previous studies on digital literacy and HIM practice in Nigeria (Taiwo & Uwaifo, 2024; Otuuchi et al., 2025) highlight growing awareness of digital transformation but reveal significant barriers to advanced technology use. These constraints raise critical questions about the feasibility and impact of AI integration on clinical documentation quality in resource-constrained settings.

The importance of this inquiry is underscored by Nigeria's broader healthcare challenges, including high patient volumes, limited human resources, and the need for efficient data management to support evidence-based decision-making. By examining the experiences of HIM practitioners with AI tools, this study provides empirical evidence on how AI

integration affects documentation quality in Nigerian healthcare facilities.

The study is guided by the following objectives:

- i. To assess the extent of AI integration into HIM practice in Nigerian healthcare facilities.
- ii. To evaluate the impact of AI tools on clinical documentation quality, focusing on accuracy, timeliness, and completeness.
- iii. To identify challenges and barriers to AI adoption in HIM practice.
- iv. To propose strategies for strengthening AI integration and improving documentation quality in Nigeria.

By addressing these objectives, the study contributes to the global discourse on digital health transformation while offering context-specific insights for policymakers, healthcare institutions, and professional bodies in Nigeria. Ultimately, it positions HIM practitioners as key drivers of innovation, ensuring that clinical documentation evolves to meet the demands of the digital era.

II. LITERATURE REVIEW

Artificial Intelligence (AI) has emerged as a transformative force in healthcare, particularly in the domain of Health Information Management (HIM). Globally, AI applications such as natural language processing (NLP), automated coding systems, and predictive analytics have been shown to improve clinical documentation quality by enhancing accuracy, timeliness, and completeness (Longhini, Rossetini, & Palese, 2022). These tools reduce human error, streamline workflows, and support compliance with international standards such as ICD coding and HL7 interoperability frameworks.

In high-income countries, AI integration into HIM practice is well documented. Ng (2023) highlights the role of digital literacy and AI in improving efficiency and reducing administrative burden in clinical documentation. Similarly, Digital Health Canada (2023) emphasizes that AI competencies are now considered core requirements for HIM professionals, particularly in areas of data governance, analytics, and compliance. El Hag et al. (2025) further note that HIM practitioners are increasingly recognized as informatics

specialists, responsible for leveraging AI tools to support clinical decision-making and ensure data integrity.

Clinical documentation quality is typically assessed through indicators such as accuracy, timeliness, and completeness. Studies have shown that AI-enabled coding systems improve accuracy by reducing variability in diagnostic and procedural coding (Venkatesh & Davis, 2000). NLP tools, on the other hand, enhance completeness by extracting structured data from unstructured clinical notes, thereby ensuring that critical patient information is captured. These findings align with the principles of the Technology Acceptance Model (TAM), which suggests that perceived usefulness and ease of use are key determinants of technology adoption in healthcare.

In Nigeria, research on digital literacy and HIM practice has primarily focused on basic digital competencies rather than advanced AI applications. Taiwo and Uwaifo (2024) reported that undergraduates in Nigerian universities demonstrate moderate digital literacy but face challenges related to infrastructure and access. Otuuchi, Adeniyi, and Akindaisi (2025) similarly found that self-efficacy in digital literacy is limited by inadequate training and uneven resource distribution. These findings suggest that while awareness of digital transformation is growing, the adoption of AI tools in HIM practice remains constrained by systemic barriers.

The integration of AI into clinical documentation raises ethical and regulatory concerns, particularly in resource-constrained settings. The World Medical Association's Declaration of Helsinki (2013) underscores the importance of safeguarding patient rights in medical research and practice. In Nigeria, the National Health Research Ethics Committee (NHREC) provides oversight, but specific guidelines for AI use in HIM are still evolving. UNESCO (2024) emphasizes the need for human-centered approaches to digital transformation, highlighting equity, inclusivity, and data privacy as critical considerations.

While global literature demonstrates the benefits of AI in HIM, there is limited empirical evidence from Nigeria on how AI integration impacts

clinical documentation quality. Most studies focus on digital literacy and general informatics competencies rather than specific AI applications. This gap underscores the need for research that examines the practical experiences of Nigerian HIM practitioners, evaluates the effectiveness of AI tools in local contexts, and identifies strategies for overcoming infrastructural and regulatory challenges.

III. METHODOLOGY

Study Design: A descriptive cross-sectional survey design was employed to assess AI integration in HIM practice and its impact on clinical documentation quality.

Study Setting: The study was conducted in selected public and private hospitals across Nigeria where HIM practitioners are actively engaged in clinical documentation and digital health systems.

Study Population: The population consisted of HIM practitioners working in hospitals and health training institutions. Inclusion criteria required participants to have at least one year of experience in clinical documentation.

Sample Size and Sampling Technique: A sample size of 220 HIM practitioners was determined using stratified random sampling to ensure representation across public and private facilities.

Data Collection Instruments: Data were collected using a structured questionnaire designed to capture AI integration and documentation quality. The instrument included sections on demographic information, types of AI tools used (e.g., NLP, automated coding, decision support), perceived impact on documentation quality (accuracy, timeliness, completeness), and challenges encountered. Responses were measured using a five-point Likert scale. The questionnaire was pre-tested to ensure clarity and reliability.

Data Analysis: Data were analyzed using SPSS version 25. Descriptive statistics summarized demographic characteristics and AI usage patterns. Multiple regression analysis was

conducted to identify predictors of documentation quality improvement.

Ethical Considerations: Ethical approval was obtained from an accredited Health Research Ethics Committee in Nigeria. Participation was voluntary, and informed consent was obtained from all respondents. Confidentiality was maintained by anonymizing responses and securely storing data. The study adhered to the principles of respect for persons, beneficence,

and justice, consistent with the Declaration of Helsinki (World Medical Association, 2013).

IV. RESULTS

Demographics: Out of 220 respondents, 60% were male and 40% female. Public hospitals accounted for 55% of participants, private hospitals 35%, and training institutions 10%.

Table 1: Demographic Characteristics of Respondents

Variable	Frequency	Percentage (%)
Gender: Male	132	60
Gender: Female	88	40
Institution: Public Hosp.	121	55
Institution: Private Hosp.	77	35
Institution: Training Inst.	22	10

AI Tools in Use: The most commonly used AI tools were automated coding systems (68%), NLP-based documentation support (54%), and clinical decision support applications (42%).

Table 2: AI Tools Reported by HIM Practitioners

AI Tool	Frequency	Percentage (%)
Automated Coding Systems	150	68
NLP Documentation Support	119	54
Clinical Decision Support	92	42
Predictive Analytics	65	30
AI-enabled Audit Tools	48	22

Impact on Documentation Quality: Respondents reported improvements in accuracy (mean = 4.2, SD = 0.6), timeliness (mean = 4.0, SD = 0.7), and completeness (mean = 3.8, SD = 0.8).

Table 3: Documentation Quality Indicators

Indicator	Mean	SD
Accuracy	4.2	0.6
Timeliness	4.0	0.7
Completeness	3.8	0.8

Regression Analysis: Regression analysis identified AI-enabled coding ($\beta = 0.34$, $p = 0.003$) and NLP documentation support ($\beta = 0.29$, $p = 0.005$) as strong predictors of improved documentation quality.

Table 4: Regression Analysis of Predictors of Documentation Quality

Predictor Variable	Beta (β)	p-value
AI-enabled Coding	0.34	0.003
NLP Documentation Support	0.29	0.005
Clinical Decision Support	0.21	0.018
Predictive Analytics	0.17	0.027
Limited Infrastructure	-0.25	0.009

V. DISCUSSION

The results of this study provide compelling evidence that artificial intelligence (AI) integration into Health Information Management (HIM) practice significantly enhances clinical documentation quality in Nigerian healthcare facilities. The improvements observed in accuracy, timeliness, and completeness of documentation reflect the transformative potential of AI tools such as automated coding systems and natural language processing (NLP). These findings are consistent with global research, which has shown that AI reduces human error, streamlines documentation processes, and supports compliance with international standards (Longhini et al., 2022; Ng, 2023).

The regression analysis identified AI-enabled coding and NLP documentation support as the strongest predictors of improved documentation

quality. This suggests that AI tools directly address long-standing challenges in clinical documentation, such as inconsistent coding practices and incomplete patient records. By automating repetitive tasks and extracting structured data from unstructured notes, AI reduces variability and enhances the reliability of health records. These outcomes align with El Hag et al. (2025), who emphasized the evolving role of HIM practitioners as data stewards in AI-driven environments.

The study also revealed that AI integration improves timeliness in documentation. Automated coding systems accelerate the assignment of diagnostic and procedural codes, while NLP tools facilitate real-time documentation support. This efficiency not only reduces administrative burden but also allows HIM practitioners to focus on higher-order tasks such as compliance monitoring and analytics

consulting. Similar findings have been reported in high-income countries, where AI adoption has led to faster turnaround times and improved workflow efficiency (Digital Health Canada, 2023).

Despite these benefits, the study highlights persistent challenges that hinder full AI integration in Nigeria. Limited infrastructure, inadequate training, and concerns about data privacy were identified as significant barriers. These findings echo earlier studies on digital literacy in Nigerian higher education, which pointed to infrastructure deficits and uneven access to digital tools as major obstacles (Taiwo & Uwaifo, 2024; Otuuchi et al., 2025). Without adequate investment in secure servers, interoperable systems, and workforce training, the potential of AI to revolutionize documentation will remain underutilized.

The integration of AI into clinical documentation raises important ethical and regulatory questions. Concerns about patient data privacy, algorithmic bias, and accountability must be addressed to maintain trust in AI-enabled systems. The World Medical Association's Declaration of Helsinki (2013) emphasizes the importance of safeguarding human subjects in medical research, and these principles extend to the use of AI in healthcare. Nigerian regulatory bodies such as the HRORBN and NHREC must therefore establish clear guidelines for ethical AI use, ensuring that patient rights are protected while innovation is encouraged.

The findings underscore the evolving role of HIM practitioners in the digital era. As AI tools become more integrated into healthcare systems, HIM professionals must transition from traditional record-keeping to advanced roles in informatics, compliance, and analytics. This shift requires continuous professional development and collaboration with IT specialists, clinicians, and policymakers. By embracing AI, HIM practitioners can position themselves as leaders in digital health transformation, contributing to safer, more efficient, and patient-centered care.

At the national level, AI integration aligns with Nigeria's broader digital health agenda and global trends in health informatics.

Strengthening AI adoption in HIM practice will not only improve documentation quality but also enhance the overall efficiency of the healthcare system. Globally, these findings contribute to the growing body of evidence that AI is a critical enabler of healthcare modernization, particularly in resource-constrained settings.

VI. CONCLUSION

This study has demonstrated that the integration of artificial intelligence (AI) into Health Information Management (HIM) practice has a measurable and positive impact on clinical documentation quality in Nigerian healthcare facilities. Specifically, AI-enabled coding systems and natural language processing (NLP) tools were found to significantly improve documentation accuracy, timeliness, and completeness, thereby strengthening the reliability of patient records and supporting better clinical decision-making. These findings confirm that AI can serve as a transformative force in HIM, enabling practitioners to move beyond traditional record-keeping roles toward more advanced responsibilities in data stewardship, compliance, and informatics support.

At the same time, the study highlights persistent challenges that must be addressed to fully realize the benefits of AI integration. Limited infrastructure, inadequate training, and concerns about data privacy remain barriers to widespread adoption. Without strategic investment in digital infrastructure and workforce development, the potential of AI to revolutionize clinical documentation will remain underutilized. Moreover, ethical considerations around patient data security and responsible AI use must be prioritized to maintain trust in digital health systems.

The implications of these findings extend beyond individual healthcare facilities. At the national level, AI integration into HIM practice aligns with Nigeria's broader digital health transformation agenda and global trends in health informatics. By equipping HIM practitioners with the necessary competencies and resources, Nigeria can strengthen its healthcare system, improve patient outcomes,

and position itself as a leader in digital health innovation across Africa.

In conclusion, while AI integration is not without its challenges, its potential to enhance clinical documentation quality is undeniable. The path forward requires a balanced approach that combines technological investment, professional training, regulatory oversight, and ethical safeguards. If these elements are addressed, HIM practitioners in Nigeria will be well-positioned to harness AI as a powerful tool for improving healthcare delivery in the digital era.

VII. RECOMMENDATIONS

1. Curriculum Integration: Health Information Management training programs should incorporate comprehensive modules on artificial intelligence and health informatics. This includes practical exposure to AI tools such as natural language processing (NLP), automated coding systems, and predictive analytics. Embedding these competencies into undergraduate and postgraduate curricula will ensure that future HIM practitioners graduate with the skills necessary to thrive in AI-driven healthcare environments.

2. Continuous Professional Development (CPD): Professional associations and regulatory bodies should establish structured CPD programs focusing on AI applications in clinical documentation. Regular workshops, seminars, and certification courses will help practitioners stay updated on emerging technologies. CPD should emphasize hands-on training with AI tools, case studies from Nigerian healthcare facilities, and global best practices to bridge the gap between theory and practice.

3. Infrastructure Investment: Healthcare institutions must prioritize investment in digital infrastructure to support AI integration. This includes upgrading electronic health record (EHR) systems, ensuring interoperability, and deploying secure servers capable of handling AI applications. Adequate infrastructure will enable HIM practitioners to fully utilize AI tools, thereby improving documentation accuracy, timeliness, and completeness.

4. National Competency Frameworks: Regulatory bodies such as the Health Records Officers Registration Board of Nigeria (HRORBN) should collaborate with the National Health Research Ethics Committee (NHREC) to develop standardized AI competency frameworks. These frameworks would define the minimum digital and AI skills required for HIM practice, guide professional development, and ensure consistency across healthcare institutions nationwide.

5. Cybersecurity and Ethical Guidelines: With AI integration comes heightened risks related to data privacy and security. National and institutional policies should establish clear ethical guidelines for AI use in clinical documentation. Training programs must emphasize cybersecurity awareness, data protection protocols, and ethical considerations to safeguard patient information and maintain public trust in AI-enabled systems.

6. Strengthening Collaboration: HIM practitioners should actively collaborate with IT professionals, clinicians, and policymakers to ensure effective AI implementation. Interdisciplinary collaboration will facilitate smoother integration of AI tools into clinical workflows, align documentation practices with patient care needs, and foster innovation in health informatics.

7. Pilot Projects and Research: Nigerian healthcare institutions should initiate pilot projects to test AI applications in clinical documentation. These projects will provide evidence on the effectiveness, challenges, and scalability of AI tools in local contexts. Findings from such pilots can inform national policies and guide broader adoption strategies.

8. Government Support and Policy Alignment: The Nigerian government should provide funding, incentives, and policy support for AI adoption in healthcare. Aligning AI integration with national health strategies will accelerate digital transformation, improve documentation quality, and enhance overall healthcare delivery.

VIII. IMPLICATIONS FOR POLICY AND PRACTICE

The integration of artificial intelligence (AI) into Health Information Management (HIM) practice carries significant implications for both policy and practice in Nigeria. The findings of this study demonstrate that AI tools, particularly automated coding systems and natural language processing (NLP) can substantially improve clinical documentation quality. However, realizing these benefits requires coordinated action across multiple levels of the healthcare system.

At the national policy level, regulatory bodies such as the Health Records Officers Registration Board of Nigeria (HRORBN) and the National Health Research Ethics Committee (NHREC) must establish clear frameworks for AI adoption in HIM practice. These frameworks should define minimum competency standards, ethical guidelines, and data governance protocols to ensure that AI use is safe, equitable, and aligned with patient rights. Policymakers should also integrate AI into Nigeria's broader digital health strategy, positioning HIM practitioners as central actors in the country's healthcare modernization agenda.

Government support is critical to overcoming infrastructural and financial barriers. Policies that provide funding incentives, tax breaks, or grants for hospitals adopting AI technologies could accelerate integration. Additionally, national investment in broadband connectivity, secure servers, and interoperable electronic health record (EHR) systems will create the enabling environment necessary for AI to thrive.

At the institutional level, healthcare facilities must prioritize investment in AI-enabled documentation systems and workforce training. Hospitals should adopt a phased approach, beginning with pilot projects to test AI applications in clinical documentation before scaling up. Institutional policies should emphasize cybersecurity safeguards, ensuring that patient data is protected against breaches and misuse. Furthermore, hospitals must foster interdisciplinary collaboration between HIM practitioners, IT specialists, clinicians, and administrators to ensure that AI tools are effectively integrated into clinical workflows.

For HIM practitioners, the study underscores the need for continuous professional development and lifelong learning. Practitioners must acquire competencies in AI applications, data analytics, and informatics to remain relevant in the digital era. Professional associations should provide certification programs and training workshops tailored to AI use in documentation. By embracing these opportunities, HIM practitioners can transition from traditional record-keeping roles to advanced positions in compliance monitoring, informatics consulting, and data stewardship.

At the health system level, AI integration into HIM practice has the potential to improve patient outcomes, strengthen data quality for research and policy, and enhance efficiency across healthcare delivery. Reliable documentation supports evidence-based decision-making, facilitates accurate disease surveillance, and improves resource allocation. In the long term, widespread AI adoption could position Nigeria as a leader in digital health innovation within Africa, contributing to global efforts to modernize healthcare systems.

IX. LIMITATIONS

Although this study provides valuable insights into the integration of artificial intelligence (AI) in Health Information Management (HIM) and its impact on clinical documentation quality in Nigerian healthcare facilities, certain limitations must be acknowledged. The scope of data collection was restricted to selected public and private hospitals, which may not fully capture the diversity of healthcare facilities across Nigeria, particularly smaller clinics and rural health centers where infrastructural challenges are often more severe. In addition, the reliance on self-reported data through structured questionnaires introduces the possibility of bias, as respondents may have over- or under-estimated the effectiveness of AI tools. The cross-sectional design of the study also presents a limitation, as it provides only a snapshot of AI integration at a single point in time without accounting for how documentation quality might evolve with sustained use or practitioner adaptation. Furthermore, the study focused primarily on a limited set of AI

applications—automated coding systems, NLP tools, predictive analytics, and decision support applications—while excluding other emerging technologies such as generative AI for clinical note drafting or advanced audit systems. Finally, the findings are influenced by Nigeria’s current infrastructural and regulatory environment, meaning that results may differ in contexts with stronger digital infrastructure or more established AI governance frameworks.

X. FUTURE RESEARCH

Future research should build on these findings by adopting longitudinal designs that track the long-term impact of AI integration on documentation quality, practitioner adaptation, and patient outcomes. Comparative studies across different regions of Nigeria, or between Nigeria and other African countries, would provide broader insights into contextual factors influencing AI adoption. Experimental designs, such as controlled trials or pilot projects testing specific AI tools in clinical workflows, could yield stronger causal evidence of their effectiveness. Researchers should also explore newer AI applications, including generative AI for drafting clinical notes, advanced audit systems, and AI-driven interoperability solutions, to assess their potential contributions to HIM practice. Equally important is the need to investigate the ethical, legal, and policy dimensions of AI integration, focusing on issues such as data privacy, algorithmic bias, and accountability frameworks tailored to Nigeria’s healthcare system. Finally, future studies should expand beyond documentation quality to examine patient-centered outcomes, such as safety, satisfaction, and overall healthcare delivery, thereby providing a more holistic understanding of AI’s role in transforming health information management.

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