OPEN ACCESS
Global Journal of Research in Medical Sciences
ISSN: 2583-3960 (Online)
Volume 05 | Issue 06 | Nov.-Dec. | 2025
Journal homepage: https://gjrpublication.com/gjrms/
Research Article

ICD Use and Clinical Coding Skills Among Health Information Management Professionals: A Case Study of Specialist Hospital Sokoto State

*Dr. Abubakar Hamza[1], Sani Hassan Sauwa[2], Kayode Orimoloye[3]

[1,2,3] School of Health Information management, Usmanu Danfodiyo University Teaching Hospital Sokoto

DOI: 10.5281/zenodo.17854062 **Submission Date:** 25 Oct. 2025 | **Published Date:** 08 Dec. 2025

***Corresponding author:** *Dr. Abubakar Hamza*
School of Health Information management, Usmanu Danfodiyo University Teaching Hospital Sokoto

Abstract
This study investigated the use of the International Classification of Diseases (ICD) and clinical coding skills among Health Information Management (HIM) professionals in Specialist Hospital Sokoto. Using a descriptive survey design, data were collected from 120 respondents through structured questionnaires. Findings revealed that most HIM professionals use ICD-10 regularly and possess moderate to high coding skills. However, challenges such as inadequate training, lack of updated materials, and insufficient institutional support hinder optimal ICD use. The study recommends regular professional training, provision of updated coding resources, and strengthened institutional policies to enhance coding accuracy and health data quality.

Keywords: *ICD, Clinical Coding, Health Information Management, Data Quality, Specialist Hospital Sokoto*

Introduction
The International Classification of Diseases (ICD) is a globally recognized system developed by the World Health Organization for classifying diseases and related health conditions. Health Information Management professionals use ICD to ensure accurate and standardized health data recording, which is vital for health policy, research, and financing. Despite its importance, many Nigerian hospitals struggle with effective ICD implementation due to inadequate training, outdated resources, and weak institutional policies. This study explores ICD usage and coding skills among HIM professionals in Specialist Hospital Sokoto. Despite its global significance, the effective implementation of ICD remains a major challenge in many Nigerian hospitals. Factors such as inadequate training of HIM professionals, limited access to updated ICD manuals or digital tools, and weak institutional policies contribute to inconsistent and sometimes inaccurate clinical coding practices. These gaps can undermine the quality of health statistics, hinder efficient reimbursement processes, and impair data-driven health planning.

The World Health Organization (WHO) globally recognized the International Classification of Diseases (ICD) as a system developed by the for classifying diseases, health conditions, and related health problems. It is a critical tool for clinical documentation, statistical analysis, and decision-making in healthcare. ICD provides a standardized framework for the recording and reporting of diseases and health conditions, aiding health policymakers and administrators in developing effective health interventions.

In modern healthcare settings, Health Information Management (HIM) professionals play a vital role in ensuring that patient data is accurately coded according to ICD standards. These standards ensure consistency in medical record keeping, thereby enabling hospitals to evaluate patient care outcomes, manage resources effectively, and facilitate reimbursements through insurance systems. HIM professionals are tasked with a wide range of duties, including documentation analysis, code assignment, and audit support, all of which are dependent on accurate ICD usage.

Despite the global importance of ICD, its application in many Nigerian hospitals remains inconsistent. Challenges such as inadequate training, limited access to updated coding manuals, poor documentation practices, and lack of institutional support continue to hinder its effective use. In hospitals like Specialist Hospital Sokoto (SHS), these issues are particularly evident.

Additionally, documentation provided by medical personnel often lacks the specificity required for precise coding, resulting in data inaccuracies, claim rejections, and misinformed healthcare decisions. Furthermore, ICD usage is essential for disease surveillance, hospital quality management, and national health reporting. Without proper ICD implementation, it is nearly impossible to accurately track health trends, respond to epidemics, or design evidence-based health policies.

Therefore, strengthening ICD usage and clinical coding competencies among HIM professionals is essential. There is a need for continuous professional development, access to current coding guidelines, and implementation of standardized procedures.

This study focuses on understanding the level of ICD adoption, the coding skills of HIM professionals, and the barriers to effective coding practices in Specialist Hospital Sokoto.

Statement of the Problem

Although the International Classification of Diseases (ICD) provides a globally standardized framework for disease classification and health data reporting, many healthcare institutions in Nigeria continue to face challenges in its effective implementation. At Specialist Hospital Sokoto, Health Information Management (HIM) professionals encounter multiple obstacles that compromise the accuracy and consistency of clinical coding. These include incomplete or inconsistent clinical documentation, manual coding processes, absence of regular coding audits, and limited staffing capacity.

Furthermore, the lack of institutional policies governing ICD implementation and the slow transition to updated versions, such as ICD-11, exacerbate these challenges. Consequently, hospitals produce inaccurate or incomplete health data, leading to distorted morbidity and mortality statistics, inefficient resource allocation, and reduced reimbursement accuracy. The undervaluation of HIM professionals and insufficient investment in their continuous professional development further weaken the system's data quality and effectiveness.

There is, therefore, an urgent need to assess the current state of ICD utilization and clinical coding competencies among HIM professionals at Specialist Hospital Sokoto, identify the key barriers to effective implementation, and propose evidence-based strategies to enhance coding performance and data reliability.

Objectives of the Study

The main objective of this study is to examine the influence of ICD use and clinical coding skills among Health Information Management (HIM) professionals in Specialist Hospital Sokoto.
The specific objectives are to:

1. Determine the level, type, purpose, and frequency of ICD use among HIM professionals in Specialist Hospital Sokoto.
2. Assess the level of clinical coding skills among HIM professionals in the hospital.
3. Examine the awareness and adoption of ICD among HIM professionals.
4. Evaluate the clinical coding competencies and training backgrounds of the staff.

Conceptual Review

Concept of Clinical Coding in Healthcare

Clinical coding is the process of translating healthcare diagnoses, procedures, and services into standardized alphanumeric codes. It serves as a vital link between the clinical, administrative, financial, and research dimensions of healthcare. Coders interpret physicians' notes, laboratory results, imaging reports, and other clinical documents to assign accurate codes from recognized classification systems such as the International Classification of Diseases (ICD).

According to the World Health Organization (WHO, 2021), clinical coding is the foundation of health statistics because it enables the analysis of disease patterns, comparison of health outcomes, and continuity of care. Coding also supports healthcare financing through diagnosis-related group (DRG) systems, which determine hospital reimbursement. Inaccurate or incomplete coding can lead to underpayment, claim rejections, or distorted statistics, ultimately affecting the sustainability of health institutions.

In Nigeria, where resources are limited, the role of coding is even more critical for accurate disease surveillance and evidence- based decision-making. Health Information Management (HIM) professionals are central to this process because they possess medical, technical, and analytical skills required to ensure high-quality coded data. As noted by Adebayo (2020), the quality of health data is directly linked to the skill and competence of HIM personnel. Therefore, clinical coding is not merely a technical task but a professional practice that underpins data accuracy and quality healthcare delivery.

Conceptual Framework

This study adopts a hybrid model combining the Consolidated Framework for Implementation Research (CFIR) and the Donabedian Structure–Process–Outcome framework, in alignment with WHO's ICD-11 implementation guidelines.

- Structure (Context and Resources): Includes national policies, funding, ICT infrastructure, workforce capacity, and training materials.
- Process (Implementation Activities): Encompasses ICD planning, training, documentation workflows, dual coding, and quality assurance.
- Outcomes (System and Data Effects): Encompass data accuracy, completeness, timeliness, reimbursement performance, and surveillance outcomes.

According to this model, stronger structural support (e.g., policy and funding) enhances process quality (e.g., training and documentation), which in turn improves outcomes such as coding accuracy and data reliability. Feedback loops allow outcomes to inform system redesign and further investment.

Clinical Coding Skills in Health Information Management Practice

Clinical coding requires a blend of medical knowledge, technical expertise, and analytical ability. HIM professionals must understand anatomy, physiology, disease processes, and medical terminology to interpret clinical documentation accurately. They must also master classification systems like ICD-10/ICD-11 and Current Procedural Terminology (CPT).

Essential skills include attention to detail, problem-solving, computer literacy, and adherence to coding conventions. Ambiguous documentation often requires coders to use professional judgment or consult clinicians for clarification. Coding errors can distort hospital statistics, misrepresent disease prevalence, and affect reimbursement accuracy.

In Nigeria, the demand for digital health systems and electronic health records (EHRs) has made coding skills even more critical. As Ojo (2020) noted, modern coders must be proficient not only in manual coding but also in digital tools, data validation, and international reporting standards. Thus, ongoing professional development is vital for maintaining competence and aligning with global practices.

Core Coding Skill Domains:

1. Clinical Knowledge: Understanding of diseases, medical terminology, and treatments.
2. Classification Mastery: Application of ICD and CPT rules and conventions.
3. Documentation Interpretation: Abstracting relevant clinical information.
4. Coding Tools and Software Use: Utilizing EHR systems and WHO ICD tools.
5. Data Quality and Validation: Conducting audits and ensuring consistency.
6. Ethics and Confidentiality: Upholding data privacy and preventing misrepresentation.
7. Continuous Learning: Staying current with ICD updates and training.

Importance of Coding Skills:

- Ensures accurate reimbursement and efficient hospital billing.
- Supports health data quality, disease surveillance, and public health reporting.
- Contributes to research, policy-making, and legal compliance.

Overview of ICD Use in Healthcare Systems

The International Classification of Diseases (ICD), developed by the World Health Organization (WHO), provides a universal system for classifying diseases and health conditions. It facilitates standardized data recording, international comparability, and health system planning. ICD serves key purposes in healthcare, including clinical documentation, administration and financing, public health surveillance, and research.

Nigeria currently utilizes ICD-10, while the transition to ICD-11—which introduces digital integration and enhanced clinical specificity—is underway. Effective ICD implementation depends on adequate infrastructure, regular coder training, and consistent documentation quality.

Benefits of ICD Use:

- Promotes standardization and comparability of health data.
- Enhances health data accuracy and quality for national reporting.
- Improves hospital reimbursement and financial accountability.
- Facilitates evidence-based policy and resource allocation.

A structure–process–outcome model explains ICD's impact:

- Structure: Policies, infrastructure, and training resources.
- Process: Documentation, code assignment, and validation.
- Outcome: Standardized, accurate data for healthcare decision-making.

Theoretical Framework

This study is anchored on two theoretical perspectives: the Information Processing Theory and the Health Information Systems (HIS) Framework.

The Information Processing Theory explains how individuals and systems receive, process, and apply information. Within this context, ICD represents a structured tool for organizing and processing clinical data, while coding skills reflect the human ability to interpret and apply this information accurately.

The Health Information Systems (HIS) Framework focuses on how health data are collected, processed, analyzed, and used at institutional and national levels. It emphasizes data quality, accessibility, and utilization in decision-making and policy development. Together, these theories provide a conceptual foundation for understanding the relationship between ICD use, clinical coding skills, and overall healthcare quality and efficiency.

Empirical Review

Clinical Coding

Several empirical studies have explored the significance of clinical coding and the challenges associated with its practice. Osei (2019), in a study conducted in Ghana, found that hospitals with well-trained coders produced more accurate health statistics and received higher reimbursements from insurance schemes. Similarly, Ibrahim et al. (2021) reported that in Nigerian tertiary hospitals, coding accuracy was positively correlated with the level of professional training among Health Information Management (HIM) staff. These findings underscore that improved training and capacity building among coders directly enhance healthcare financing, data quality, and policy formulation.

Conversely, several studies have identified persistent barriers to accurate coding. Okafor (2020) highlighted poor clinical documentation as a major constraint in Nigerian hospitals, noting that incomplete or ambiguous physicians' notes hinder accurate code assignment and distort health data. In addition, the absence of necessary infrastructure—such as updated coding manuals, software, and regular training programs—further limits efficiency. Collectively, these constraints contribute to the suboptimal quality of health data generated in Nigeria when compared to international standards.

ICD Use and Clinical Coding Skills

The use of the International Classification of Diseases (ICD) in healthcare is inseparable from the clinical coding competencies of HIM professionals. While ICD provides a globally standardized framework for classifying diseases, its effectiveness depends on the coder's ability to apply it accurately and consistently. According to the World Health Organization (2022), ICD facilitates reliable health statistics, improves patient safety, and supports evidence-based decision-making; however, these benefits are achievable only when coders possess adequate training and skill in interpreting medical documentation.

In a study by Yakubu (2021) in Northern Nigeria, HIM professionals in specialist hospitals were found to face major challenges in ICD use due to inadequate exposure to ICD-10 guidelines and limited access to updated manuals. Although many coders understood the importance of ICD, their skills were often insufficient to handle complex medical cases, leading to underreporting and data inconsistencies. Similarly, Adebayo (2020) identified the lack of regular in-service training as a key factor limiting effective ICD application in Nigerian hospitals.

International experiences further illustrate the positive impact of strong coding skills. For instance, countries such as the United Kingdom and Australia have established structured training programs, certification standards, and continuous professional development systems for coders, which have led to the production of high-quality coded data and improved national health statistics. These examples demonstrate that sustained investment in coder training enhances data quality, operational efficiency, and policy relevance.

In summary, ICD use and clinical coding skills are mutually reinforcing. Without adequate skills, ICD systems remain underutilized, and without standardized ICD frameworks, coding lacks consistency and comparability. Strengthening the coding capacity of HIM professionals is, therefore, critical for the successful transition to ICD-11 and for improving health data quality, disease surveillance, and health system planning in Nigeria.

Summary of Empirical Review

Empirical evidence consistently affirms that clinical coding and ICD use are essential pillars of effective health information management. Studies from developed countries reveal that structured training, certification programs, and institutional support lead to higher data accuracy and better healthcare outcomes. Conversely, research in Nigeria exposes

persistent challenges, including inadequate training, outdated coding resources, poor documentation, and weak institutional policies.

These shortcomings hinder the full potential of ICD-based data systems in strengthening the Nigerian health sector. This study, therefore, seeks to bridge this knowledge and practice gap by examining the level of ICD use, coding skills, and the associated challenges among HIM professionals at Specialist Hospital, Sokoto.

Methodology

Research Design

This study adopted a descriptive survey research design. The design was considered appropriate for systematically collecting, analyzing, and interpreting primary data from respondents to describe the existing situation regarding ICD use and clinical coding skills among Health Information Management (HIM) professionals at Specialist Hospital, Sokoto.

Population of the Study

The population of this study comprised all Health Information Management professionals working at Specialist Hospital, Sokoto, totaling one hundred and twenty (120) staff members. These professionals include record officers, clinical coders, and other HIM personnel directly involved in health data management.

Instrument for Data Collection

The main instrument used for data collection was a structured questionnaire, which was partly adopted from previous related studies and partly developed by the researcher. The questionnaire was designed to elicit information on the respondents' demographic characteristics, ICD usage, clinical coding skills, and perceived challenges. A total of 120 copies of the questionnaire were distributed to the respond.

Results

Data Analysis

Section A: Personal and Professional Information

S/N	Variable	Category	Frequency	Percentage
1	**Gender**	Male	67	56%
		Female	36	30%
	Total		**103**	**86%**
2	**Age (Years)**	15–24	22	18%
		25–34	52	43%
		35–44	23	19%
		45 and above	6	5%
	Total		**103**	**86%**
3	**Educational Qualification**	Diploma	59	49%
		HND	31	26%
		B.Sc	13	11%
		M.Sc/Ph.D/Others	0	0%
	Total		**103**	**86%**
4	**Years of Experience in HIM**	0–10	36	30%
		11–20	46	38%
		21–30	17	14%
		31 and above	4	3%
	Total		**103**	**86%**
5	**Worked in Another Hospital Before**	Yes	53	44%
		No	50	42%
	Total		**103**	**86%**

Source: Researcher's compilation 2025

Most respondents (61%) were aware of ICD and used ICD-10 in their hospital. About 42% indicated they possessed a high level of coding skills, though only 37% had attended training workshops. Regular training and feedback were limited, while 47% of respondents identified challenges in ICD use. Approximately 55% agreed that clinical coding

improves decision-making and policy formulation, and 50% acknowledged that accurate coding impacts hospital revenue.

The demographic data reveal that most respondents were male (56%) while females accounted for 30%, indicating a gender imbalance that may warrant attention in recruitment. The majority of respondents (43%) were aged between 25–34 years, suggesting a relatively young and active workforce. Most respondents held Diploma (49%) or HND (26%) qualifications, while only 11% held Bachelor's degrees. In terms of work experience, 38% had between 11–20 years, showing moderate professional exposure. Additionally, 44% had previously worked in another hospital, implying exposure to diverse institutional practices.

Section B: ICD Use

Table B: Responses on ICD Use

Statement	SA	A	N	D	SD	Total
I am aware of the International Classification of Diseases (ICD).	34	40	13	8	8	103
I use ICD-10 in my hospital.	20	32	23	14	14	103
I use ICD-10 regularly in my daily duties.	14	25	22	27	15	103
I received formal training on the use of ICD.	25	30	15	22	11	103
I received annual training on ICD use.	10	32	17	27	17	103
I face challenges in using ICD.	23	33	10	20	17	103
I have access to updated ICD manuals or software.	13	29	9	29	23	103
I encounter difficulties selecting the correct ICD codes.	20	35	20	18	10	103
My hospital provides refresher or in-service ICD training.	13	24	23	25	18	103

Source: Researcher's compilation 2025

Findings indicate that 42% of respondents rated their coding skills as high, while 25% expressed low confidence. Approximately 50% were confident in coding complex cases, reflecting moderate competence. However, only 37% had attended workshops or seminars, suggesting limited access to professional development opportunities. A significant number (36%) reported not using Electronic Health Records (EHRs), implying a continued reliance on manual systems. Collaboration with physicians was inconsistent—38% agreed to doing so, while 35% disagreed, showing communication gaps that could affect coding accuracy. Overall, respondents strongly acknowledged that clinical coding skills are essential to effective HIM practice (49% agree, 27% disagree). This reinforces the need for structured training, EHR adoption, and improved interdisciplinary collaboration.

Effect on Health Information Management

Table C. Effects of ICD and Coding on HIM

Statement	SA	A	D	SD	Total
ICD use improves hospital data quality.	30	41	27	5	103
Coding skills aid decision-making and policy formulation.	25	41	26	11	103
Accurate coding impacts hospital revenue.	20	39	33	11	103
Management supports improved coding practices.	18	48	22	15	103
Job rotation and training improve ICD and coding skills.	21	37	30	15	103

Source: Researcher's compilation 2025

A majority (59%) agreed that ICD use enhances hospital data quality, while 27% disagreed. Similarly, 55% acknowledged that coding skills improve decision-making and policy formulation, supporting the idea that coding accuracy contributes to institutional effectiveness. Half of the respondents (50%) agreed that accurate coding positively affects hospital revenue, underlining its financial significance. Moreover, 55% agreed that hospital management supports improved coding practices, though 31% disagreed suggesting mixed institutional commitment. Finally, 48% of respondents supported job rotation and on-the-job training as effective means of improving ICD use and coding skills. This finding highlights the value of continuous professional learning and internal skill sharing in strengthening HIM practices.

Discussion

Findings show moderate ICD use and coding competence among HIM professionals in the hospital. Consistent with previous studies (Adebayo, 2020; Ibrahim et al., 2021), the study highlights inadequate training and limited access to ICD manuals as major barriers. Poor documentation and insufficient collaboration with clinicians further hinder accurate coding. These issues mirror national challenges in health information management and highlight the need for capacity building and digital health integration.

The results reveal that while awareness of ICD and clinical coding is relatively high, practical implementation and training opportunities remain inadequate. The lack of access to updated ICD manuals and software limits consistent application. Furthermore, reliance on manual coding and limited collaboration with clinicians hinder accuracy and efficiency. The findings align with Yakubu (2021) and Okafor (2020), who identified poor documentation and insufficient training as major barriers to effective ICD use in Nigerian hospitals. Similarly, the results corroborate Adebayo (2020), who emphasized the need for continuous professional development to improve coding accuracy and data reliability. Overall, the study underscores the critical role of institutional support, ICT adoption, and capacity-building initiatives in strengthening clinical coding practices and ensuring reliable health information management.

Summary

This study was cross-sectional descriptive research conducted among Health Information Management (HIM) professionals at Specialist Hospital, Sokoto, to assess the use of the International Classification of Diseases (ICD) and clinical coding skills. A structured questionnaire served as the main data collection instrument. Out of 120 questionnaires distributed, 103 were correctly completed and returned, representing a response rate of 86%. Data were analyzed using frequency counts and percentages, and results were presented in tables.

The findings revealed that most HIM professionals in Specialist Hospital, Sokoto, are aware of the ICD system and apply it in their daily operations. However, the study also found that while many possess moderate levels of clinical coding skills, there is a need for continuous capacity building through seminars, workshops, and conferences to improve competence. Additionally, the study identified challenges such as limited access to updated ICD manuals, inadequate training opportunities, and inconsistent use of electronic health records (EHRs).

Conclusion

The International Classification of Diseases (ICD), developed by the World Health Organization (WHO), serves as a global standard for classifying diseases and health-related conditions. It provides a common language that supports systematic recording, analysis, and comparison of health data across countries and time. ICD is crucial for epidemiological surveillance, health planning, and resource allocation, as well as for hospital reimbursement systems and insurance claims.

The practice of clinical coding requires a combination of medical knowledge, technical competence, and analytical skills. Health Information Management professionals must understand anatomy, physiology, disease processes, and medical terminologies to accurately interpret and code clinical documentation. They must also demonstrate proficiency in using classification systems such as ICD and Current Procedural Terminology (CPT), which require continuous training and professional development.

The findings of this study emphasize that, although HIM professionals in Specialist Hospital, Sokoto, have good awareness of ICD, their practical application and skill level require strengthening. Improved training, institutional support, and technological resources are essential for ensuring accurate, reliable, and efficient health information management.

Recommendations

Based on the findings of this study, the following recommendations are made:

1. Promote Gender Balance:
   The hospital management should consider recruiting more female Health Information Management professionals to ensure gender equity and inclusiveness in the workforce.
2. Encourage Educational Advancement:
   HIM professionals should be encouraged and supported to pursue higher education and professional certifications to deepen their knowledge and enhance their clinical coding competencies.
3. Support Continuous Professional Development:
   The management should sponsor HIM professionals to attend seminars, workshops, and conferences related to ICD usage and health information management to keep them updated with international best practices.
4. Integrate Electronic Health Records (EHRs):
   HIM professionals should be trained and equipped to effectively use EHR systems for coding and data management. This will enhance accuracy, efficiency, and data accessibility.

References

1. Ajayi, O. I. (2024). Assessing the effects of clinical coding audits in improving data quality in selected tertiary hospitals in Lagos State.
2. Adebayo, A. K., Bankole, F. A., & Adebayo, J. A. (2021). The impact and challenges of information and communication technology on health care delivery in Nigeria. Madonna University, Nigeria Faculty OF Law Law Journal, 6(2).
3. Atzmon, O., Crowther, M. E., Bei, B., & O'Connor, D. A. (2025). The use of implementation science theoretical approaches in hybrid effectiveness-implementation type 1 randomised trials of healthcare interventions: A scoping review. Implementation Science, 20(1), 23.
4. Olukemia, O. O., Adepoju, O. O., & Esan, O. (2024). Electronic health records (EHR) and staff competencies for quality service delivery in Nigeria. Journal of Healthcare in Developing Countries (JHCDC), 4(1), 31-38.
5. Ezechukwu, C. C. (2023). PANCONF 2023 Annual General Conference: 54th Annual General and Scientific Conference of the Paediatrics Association of Nigeria (PANCONF), 17th-21st January, 2023. Nigerian Journal of Paediatrics, 50(1), 13-92.
6. Ooi, E. C. W., Md Isa, Z., Abdul Manaf, M. R., Ahmad Fuad, A. S., Ahmad, A., Mustapa, M. N., ... & William Totu, C. (2024). Development and validation of the intention to use the ICD-11 questionnaire in the Malaysian medical records context. Plos one, 19(9), e0308403.
7. Ooi, E. C. W., Isa, Z. M., Manaf, M. R. A., Fuad, A. S. A., Ahmad, A., Mustapa, M. N., & Marzuki, N. M. (2024). Factors influencing the intention to use the ICD-11 among medical record officers (MROs) and assistant medical record officers (AMROs) in Ministry of Health, Malaysia. Scientific Reports, 14(1), 9926.
8. Ooi, E. C. W., Md Isa, Z., Abdul Manaf, M. R., Ahmad Fuad, A. S., Sidek, H. F., Mustapa, M. N., ... & Mohd Marzuki, N. (2025). From data collection to downstream data use: Malaysia's experience with ICD-11. Health Information Management Journal, 54(3), 325-332.
9. Egwudo, A. E., Jegede, A. O., Oyeniyi, T. A., Ezekwelu, N. J., Abdu-Aguye, S. N., Okwuraiwe, A. P., ... & Sobande, O. O. (2025). Integrating digital health technologies into the healthcare system: Challenges and opportunities in Nigeria. PLOS Digital Health, 4(7), e0000928.
10. Osakede, K. O., Igbokwe-Ibeto, C. J., & Nwalozie, I. C. (2023). Digital technology and primary healthcare administration in post coronaviruses (covid–19) era: a study of Ojo Local Government Area of Lagos State, Nigeria. Medical and Health Sciences European Journal, 7(5), 21-42.
11. Chika, E. U., Dike Ujunwa Precious, B., Ahuchaogu King-David, B., Gabriel Ezenri, B., Nneji Tobechukwu Okechukwu, B., Chidozie, C., & Madubugwu, R. (2024). Digital healthcare tools in Nigeria: strengthening public health and pandemic preparedness-insights from the COVID-19 crisis. Telehealth and Medicine Today, 9(1).
12. Ojo, A., Tolentino, H., & Yoon, S. (2021). Strengthening eHealth systems to support universal health coverage in sub-Saharan Africa. Online Journal of Public Health Informatics, 13(3).
13. Osamika, D., Adelusi, B. S., Kelvin-Agwu, M. T. C., Mustapha, A. Y., Forkuo, A. Y., & Ikhalea, N. (2025). *A systematic review of security, privacy, and compliance challenges in electronic health records: Current practices and future directions. World Scientific News, 205,* 1–26.
14. Odima, C. (2013). Texila international journal of public health.
15. Udensi, C. G., Akomolafe, O. O., & Adeyemi, C. (2025). Clinical Data Sharing and Integration Model for Precision Anticoagulation Therapy.
16. Balogun, J. A. (2021). Health professions in Nigeria: An interdisciplinary analysis. Springer Singapore.
17. Onofa, L., Odunleye, M., Kola, L., & Gureje, O. (2019). Reliability and clinical utility of ICD-11 diagnostic guidelines for severe mental disorders in Nigeria. Archives of medical research, 50(8), 535-542.
18. Nimoh, G. (2024). Mental health systems and policy in Ghana: a systematic review and meta-analyses.
19. Opoku, D., Stephani, V., Busse, R., & Quentin, W. A mixed-methods study to review non-communicable disease management in Ghana. *Mobile phone-based health interventions for improved management of non-communicable diseases in Sub-Saharan Africa: challenges and opportunities for Ghana*, *1001*, 45.
20. Christmals, C. D., & Aidam, K. (2020). Implementation of the National Health Insurance Scheme (NHIS) in Ghana: lessons for South Africa and low-and middle-income countries. Risk Management and Healthcare Policy, 1879-1904.
21. Osei-Gyamfi, P. (2022). Assessing the utilization of tax relief schemes by employees in the public sector (Doctoral dissertation, University of Education, Winneba).
22. Hong, Y., & Zeng, M. L. (2023). International classification of diseases (ICD). KO Knowledge Organization, 49(7), 496-528.
23. Almeida, M. S. C., Sousa Filho, L. F. D., Rabello, P. M., & Santiago, B. M. (2020). International Classification of Diseases–11th revision: from design to implementation. Revista de Saúde Pública, 54, 104.
24. Tanno, L. K., Chalmers, R., Jacob, R., Kostanjsek, N., Bierrenbach, A. L., Martin, B., ... & Demoly, P. (2020). Global implementation of the world health organization's International Classification of Diseases (ICD)-11: the allergic and hypersensitivity conditions model. Allergy, 75(9), 2206-2218.

25. Harrison, J. E., Weber, S., Jakob, R., & Chute, C. G. (2021). ICD-11: an international classification of diseases for the twenty-first century. BMC medical informatics and decision making, 21(Suppl 6), 206.
26. Barke, A., Korwisi, B., Jakob, R., Konstanjsek, N., Rief, W., & Treede, R. D. (2022). Classification of chronic pain for the International Classification of Diseases (ICD-11): results of the 2017 international World Health Organization field testing. Pain, 163(2), e310-e318.
27. Blencowe, H., Hug, L., Moller, A. B., You, D., & Moran, A. C. (2025). Definitions, terminology and standards for reporting of births and deaths in the perinatal period: International Classification of Diseases (ICD-11). International Journal of Gynecology & Obstetrics, 168(1), 1-9.

CITATION
Hamza, A., Sauwa, S. H., & Orimoloye, K. (2025). ICD Use and Clinical Coding Skills Among Health Information Management Professionals: A Case Study of Specialist Hospital Sokoto State. In Global Journal of Research in Medical Sciences (Vol. 5, Number 6, pp. 75–83).
https://doi.org/10.5281/zenodo.17854062