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ASSESSMENT OF THE PRACTICES AND CHALLENGES OF DISEASE CLASSIFICATION AND CLINICAL CODING IN SELECTED HEALTH FACILITIES IN BAYELSA STATE

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ABSTRACT

Disease classification and clinical coding are essential components of health information management, converting clinical diagnoses and procedures into standardized alphanumeric codes for healthcare planning, epidemiological surveillance, reimbursement, and research. This study assessed the practices and challenges of disease classification and clinical coding in selected health facilities in Bayelsa State, Nigeria. A descriptive cross-sectional survey design was adopted, involving all 66 Health Information Management personnel in Niger Delta University Teaching Hospital and Diete Koki Memorial Hospital. Data were collected using a structured questionnaire and analyzed using descriptive statistics. Findings revealed that 92.4% of respondents were aware of the International Classification of Diseases, Tenth Revision (ICD-10), but only 36.4% had received formal training in clinical coding. The majority (89.4%) relied on manual, paper-based coding systems, while electronic coding tools were minimally utilized. Poor clinical documentation, particularly incomplete discharge summaries, was identified as the most severe challenge (Mean = 4.6). Other major constraints included inadequate number of trained coders (Mean = 4.5), heavy workload (Mean = 4.4), absence of electronic coding systems (87.9%), erratic power supply, insufficient equipment, and poor internet connectivity. The study concludes that despite high awareness of ICD-10, clinical coding practices in the study facilities are hindered by inadequate training, weak infrastructure, and poor documentation systems. These limitations negatively affect data quality, health planning, and disease surveillance. The study recommends continuous professional training, improved clinical documentation practices, recruitment of skilled coders, and adoption of electronic health record systems to enhance the efficiency and accuracy of disease classification and clinical coding in Bayelsa State health facilities.

Keywords: Clinical coding, Disease classification, ICD-10, Health Information Management, Bayelsa State, Electronic health records.

1 INTRODUCTION

Disease classification and clinical coding are indispensable components of contemporary healthcare delivery and health information management systems. Clinical coding involves the systematic translation of diagnoses, diseases, procedures, and healthcare interventions into standardized alphanumeric codes using internationally recognized classification systems such as the International Classification of Diseases (ICD). These coded data serve multiple purposes, including health statistics generation, epidemiological surveillance, hospital management, reimbursement systems, and health policy formulation. The World Health Organization emphasizes that the ICD system provides a global standard for reporting diseases and health conditions, thereby enabling comparability of health data across countries and health systems (World Health Organization, 2019, p. 14).

Beyond statistical reporting, clinical coding significantly enhances healthcare quality and institutional efficiency. Accurate coding ensures proper documentation, retrieval, and continuity of patient information, which supports clinical decision-making, insurance claims processing, and health services evaluation. It also strengthens disease surveillance systems, supports resource allocation, and contributes to evidence-based health planning and medical research.

The International Classification of Diseases, Tenth Revision (ICD-10), remains the most widely used disease classification system globally. In Nigeria, ICD-10 was officially introduced by the Federal Ministry of Health in 1994 to standardize morbidity and mortality reporting across healthcare institutions. Since its adoption, many Nigerian health facilities have integrated ICD-10 into routine health information management practices. Adeleke et al. (2015, p. 42) reported that approximately 88.2% of hospitals in Nigeria had adopted ICD-10 coding systems, reflecting significant progress in standardization efforts. Despite this progress, the effectiveness of clinical coding practices continues to be constrained by several systemic challenges.

Empirical studies have consistently identified key barriers to effective clinical coding in Nigeria, including poor clinical documentation, shortage of trained clinical coders, inadequate ICT infrastructure, limited funding, and lack of continuous professional development. For instance, findings from University College Hospital, Ibadan, revealed that many coding personnel are Health Information Management professionals without formal clinical coding training, relying largely on informal or on-the-job learning (Oweghoro & Oluwole, 2025). Similarly, incomplete and inconsistent clinical documentation by physicians has been shown to contribute significantly to coding errors and data inconsistencies. Adeleke et al. (2015, p. 42) further reported systemic issues such as absence of automation (34.5%), shortage of coders (74.4%), and poor documentation practices (91.6%) as major national challenges.

Infrastructural constraints such as unstable electricity supply, limited access to computers, and poor internet connectivity also hinder the implementation of electronic coding systems, particularly in developing countries. Many health facilities continue to rely on manual, paper-based systems, which increase the risk of coding errors and reduce efficiency in data retrieval and reporting. In Lagos State, Olagundoye et al. (2021) reported that coding accuracy improved from 78.7% to 91.3% following the introduction of an electronic diagnostic terminology tool, demonstrating the value of digital solutions in enhancing coding performance.

Furthermore, global transitions toward ICD-11 have exposed additional capacity gaps in low- and middle-income countries, particularly regarding training, system readiness, and technological infrastructure. Tavakkoli et al. (2025) observed that countries such as Ecuador and Trinidad and Tobago face challenges including inconsistent ICD usage, shortage of trained coders, and continued dependence on manual systems, highlighting a broader global readiness gap.

In Bayelsa State, healthcare delivery has expanded through the establishment of tertiary and secondary health institutions aimed at improving access to quality care in the Niger Delta region. The Niger Delta University Teaching Hospital serves as a major tertiary referral and training institution, while Diete Koki Memorial Hospital provides secondary healthcare services to residents of Yenagoa and surrounding communities. Despite their importance, there is limited empirical evidence on how disease classification and clinical coding are practiced within these facilities and the challenges affecting their effectiveness.

Most existing Nigerian studies on clinical coding have focused on other geopolitical zones, particularly the southwest and northern regions, leaving a significant research gap in the Niger Delta region. This study therefore seeks to fill this gap by examining the practices and challenges of disease classification and clinical coding among Health Information Management personnel in selected health facilities in Bayelsa State. The findings are expected to provide evidence-based insights for policymakers, hospital administrators, and health information professionals to strengthen coding systems and improve the overall quality of health data management in the region.

2 LITERATURE REVIEW

2.1 Role of Health Information Management Personnel in Clinical Coding

Health Information Management (HIM) professionals are central to the effective functioning of modern healthcare information systems. Their responsibilities include the collection, classification, coding, storage, retrieval, and protection of health data. A core aspect of this role is the translation of clinical diagnoses and procedures into standardized alphanumeric codes using the International Classification of Diseases (ICD) system. Through this process, HIM professionals ensure that health information is accurate, consistent, secure, and usable for clinical decision-making, health planning, reimbursement, and research purposes (Health Records Officers Registration Board of Nigeria, 2026; Ogun Health Information Managers, 2026).

Globally, HIM professionals are increasingly positioned as key actors in health data governance and digital transformation. Clinical coding has evolved from a purely manual administrative task into a critical component of health system interoperability and digital health analytics. The integration of digital tools and artificial intelligence (AI) is gradually reshaping coding practices by improving efficiency and reducing human error. Campbell and Giadresco (2020, p. 7) emphasize that computer-assisted coding systems are becoming integral to modern health information systems, enhancing both speed and accuracy of data processing. Similarly, Mousavi Baigi et al. (2025) note that AI-driven ICD coding systems can automate common diagnostic codes effectively, although challenges remain in handling rare and complex clinical conditions.

In Nigeria, HIM professionals remain the primary custodians of clinical coding activities across healthcare institutions. Adeleke et al. (2015, p. 42) report that over 90% of hospitals rely on HIM personnel for ICD coding, underscoring their central role in health data management. However, despite this dependence, the capacity of HIM professionals is uneven across institutions, with tertiary hospitals generally better structured than secondary facilities.

Evidence suggests that the effectiveness of HIM personnel is often constrained by inadequate training and limited professional specialization in clinical coding. Oweghoro and Oluwole (2025) found that many coders in Nigerian teaching hospitals lack formal certification in coding systems and rely heavily on on-the-job training, resulting in inconsistencies in coding practices. Similarly, Adamu et al. (2026) identified shortages of ICD manuals, weak ICT infrastructure, and insufficient continuous professional development as major barriers affecting HIM performance in secondary healthcare facilities.

Workforce-related challenges further compound these issues. Hamza, Aliyu, and Yahqub (2025) highlight that poor remuneration, inadequate staffing, and limited access to training opportunities significantly affect job performance and efficiency among HIM professionals. Collectively, these constraints reduce the overall effectiveness of clinical coding systems in Nigeria and highlight the need for stronger institutional support and professional development structures.

2.2 Accuracy of Clinical Coding and Its Determinants

Clinical coding accuracy refers to the degree to which assigned codes accurately reflect documented diagnoses, procedures, and clinical conditions in patient records. It is a critical determinant of health system performance, influencing clinical care, health statistics, insurance claims, and policy development (World Health Organization, 2019, p. 27). Inaccurate coding can distort disease patterns, compromise reimbursement systems, and undermine evidence-based decision-making.

A central determinant of coding accuracy is the quality of clinical documentation. Across studies, poor documentation consistently emerges as the most significant factor affecting coding performance. Rahmawati and Handayani (2023) emphasize that completeness, clarity, and the use of standardized medical terminology are essential for accurate coding. Similarly, Oweghoro and Oluwole (2025) report that missing discharge summaries and incomplete patient records significantly hinder coding accuracy in Nigerian hospitals.

Empirical evidence further demonstrates the strong relationship between documentation quality and coding outcomes. Azzahra and Supriyantoro (2024) found that complete clinical documentation can improve coding accuracy by more than tenfold compared to incomplete records. This highlights documentation as not merely an administrative process but a critical clinical quality determinant.

Coder competence is another important factor influencing accuracy. Coders with formal training and continuous professional education consistently demonstrate higher accuracy levels than those relying solely on experience. However, Farzandipour et al. (2009) caution that even trained coders may struggle with ambiguous or poorly structured documentation, indicating that coding accuracy is a shared responsibility between clinicians and HIM professionals.

Technological adoption also plays a significant role in improving coding performance. Olagundoye et al. (2021) demonstrate that the introduction of electronic diagnostic tools in Lagos State hospitals improved coding accuracy from 78.7% to 91.3%. Similarly, Mwogosi, & Mambile, (2026) argue that electronic health records improve documentation quality, reduce information loss, and enhance coding efficiency across healthcare settings.

Recent innovations in digital learning further support coding accuracy improvement. Ogbonna and Wokocha (2025) found that mobile-based gamified learning tools significantly enhanced ICD-11 coding skills among HIM professionals in resource-limited environments, suggesting that continuous digital training can bridge existing competency gaps.

Overall, evidence indicates that coding accuracy is influenced by an interconnected system of documentation quality, coder competence, and technological infrastructure rather than a single isolated factor.

2.3 Challenges of Clinical Coding in Nigeria

Clinical coding in Nigeria is constrained by interrelated structural, human resource, technological, and financial challenges that collectively reduce system efficiency and data quality.

Adeleke et al. (2015, p. 42) provide a national overview of these challenges, identifying poor documentation (91.6%), shortage of trained coders (74.4%), weak political support (48.1%), and lack of automation (34.5%) as major systemic constraints. These findings suggest that coding inefficiencies are deeply embedded in broader health system weaknesses rather than isolated operational issues.

Human resource limitations remain particularly critical. Across Nigerian hospitals, shortages of trained coders lead to excessive workload, burnout, and delays in data processing. Hamza et al. (2025) further emphasize that inadequate staffing, poor remuneration, and limited continuing education opportunities significantly undermine coding performance. In response, Oweghoro and Oluwole (2025) recommend the formal recognition of clinical coding as a specialized HIM discipline supported by structured training and continuous professional development.

Technological constraints also significantly hinder coding efficiency. Many health facilities continue to depend on paper-based systems due to inadequate ICT infrastructure and limited digital literacy among staff. Okediran and Oluwole (2025) report that gaps in health information technology skills among HIM professionals contribute to fragmented and inefficient data management systems. In addition, infrastructural instability—particularly poor electricity supply and weak internet connectivity—further limits the adoption of electronic coding systems, especially in underserved regions such as the Niger Delta.

Financial limitations further exacerbate these challenges. Insufficient funding restricts investment in training, infrastructure, and digital health systems. Hamza et al. (2025) identify inadequate financial support as a major barrier to improving coding quality and sustaining HIM development programs in Nigeria.

Finally, the global transition from ICD-10 to ICD-11 introduces additional complexity. Tavakkoli et al. (2025) note that countries undergoing this transition face challenges in governance, workforce readiness, infrastructure, and data standardization. Similarly, Prater et al. (2025) highlight interoperability and historical data continuity issues associated with ICD-11 implementation. García-Saisó et al. (2025) further emphasize that successful adoption requires coordinated policy frameworks, adequate funding, technological preparedness, and structured training systems.

In conclusion, the literature suggests that clinical coding challenges in Nigeria are systemic, interconnected, and deeply rooted in structural health system limitations rather than isolated technical problems.

2.4 OBJECTIVES OF THE STUDY

2.4.1 General Objective

The general objective of this study was to assess the practices and challenges of disease classification and clinical coding in selected public health facilities in Bayelsa State, Nigeria.

2.4.2 Specific Objectives

The study specifically aimed to:

- determine the level of awareness, knowledge, and utilization of the International Classification of Diseases, Tenth Revision (ICD-10) among Health Information Management personnel in the selected health facilities;
- examine the existing disease classification and clinical coding practices in the selected facilities;

- identify the key institutional, technological, and human resource challenges affecting effective clinical coding practices; and
- recommend evidence-based strategies for improving the efficiency, accuracy, and sustainability of disease classification and clinical coding systems in the selected facilities.

2.5 Research Questions

The study was guided by the following research questions:

- What is the level of awareness, knowledge, and utilization of ICD-10 among Health Information Management personnel in the selected health facilities?
- What disease classification and clinical coding practices are currently used in the selected facilities?
- What institutional, technological, and human resource challenges affect clinical coding practices in the selected health facilities?
- What strategies can be adopted to improve disease classification and clinical coding practices in these institutions?

2.6 Significance of the Study

This study provides empirical evidence on disease classification and clinical coding practices in selected health facilities in Bayelsa State, thereby contributing to improvements in Health Information Management systems in Nigeria.

For Health Information Management personnel, the study identifies gaps in ICD-10 utilization and highlights the need for continuous professional training and capacity development to improve coding accuracy and consistency.

For hospital administrators and policymakers, the findings provide insight into operational, infrastructural, and human resource constraints affecting clinical coding practices, thereby supporting evidence-based decision-making and health system strengthening.

For government health agencies, the study offers relevant evidence to support digital health reforms, including the implementation of electronic health records, improved clinical documentation systems, and strengthening of national health information systems.

For researchers and students, the study serves as a reference material for future studies in clinical coding, disease classification, and health informatics in Nigeria and other developing settings.

2.7 Scope of the Study

This study focused on the assessment of disease classification and clinical coding practices in selected public health facilities in Bayelsa State, Nigeria. It was limited to Health Information Management personnel working in the medical records, coding, and disease classification units of Niger Delta University Teaching Hospital and Diete Koki Memorial Hospital.

The study specifically examined ICD-10 awareness and utilization, current coding practices, challenges affecting coding processes, and strategies for improving clinical coding effectiveness.

It excluded other categories of healthcare workers because clinical coding is primarily the responsibility of Health Information Management personnel. Private health facilities and institutions outside Bayelsa State were not included in order to maintain focus and comparability within public healthcare settings.

3 METHODS

3.1 Study Design and Setting

This study adopted a descriptive cross-sectional survey design. This design was considered appropriate because it allows for the collection of data at a single point in time to describe existing conditions and relationships among variables without manipulation (Creswell & Creswell, 2018, p. 147).

The study was conducted in two public health facilities in Bayelsa State:

Niger Delta University Teaching Hospital (NDUTH), Okolobiri: A tertiary health institution established in 2007, serving as a major referral and training centre in the Niger Delta region.

Diete Koki Memorial Hospital, Yenagoa: A secondary healthcare facility providing general medical, surgical, obstetric, and emergency services to residents of Yenagoa and surrounding communities. These facilities were selected to provide a balanced representation of tertiary and secondary healthcare levels within the state.

3.2 Study Population and Sampling Technique

The study population comprised all Health Information Management personnel working in the selected health facilities, totaling 66 respondents (NDUTH = 41; Diete Koki Memorial Hospital = 25).

A total enumeration sampling technique was adopted due to the small and accessible population size, ensuring that all eligible respondents were included in the study (Polit & Beck, 2021, p. 312).

3.2.1 Inclusion Criteria

- Registered Health Information Management personnel
- Staff involved in clinical coding or disease classification
- Willingness to participate

3.2.2 Exclusion Criteria

- Staff on prolonged leave during data collection
- Non-HIM personnel not involved in coding activities

3.3 Instrument for Data Collection

Data were collected using a structured self-administered questionnaire developed from relevant literature and study objectives.

The questionnaire consisted of five sections:

- Section A: Socio-demographic characteristics
- Section B: Awareness and utilization of ICD-10
- Section C: Clinical coding practices
- Section D: Challenges affecting coding practices
- Section E: Strategies for improvement

The instrument contained mainly close-ended questions using Likert-scale and multiple-choice formats.

Content validity was ensured through expert review by specialists in Health Information Management and research methodology. A pilot test was conducted in a comparable facility outside the study area, and internal consistency was assessed using Cronbach's Alpha, which indicated acceptable reliability (≥ 0.70).

3.4 Procedure for Data Collection

Ethical approval and administrative permissions were obtained before data collection. Questionnaires were personally administered to respondents with the assistance of departmental coordinators.

Participants were informed of the purpose of the study and assured of confidentiality. They were given adequate time to respond, and completed questionnaires were retrieved promptly to ensure a high response rate.

3.5 Method of Data Analysis

Data were coded and analyzed using SPSS version 26. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarize the data.

This analytical approach was adopted because the study is descriptive in nature and aims to present the current status of clinical coding practices rather than test hypotheses or establish causality.

Findings were presented using tables and narrative interpretation for clarity.

3.6 Ethical Considerations

Ethical approval was obtained from the relevant Health Research Ethics Committees of the participating institutions. Administrative permission was also granted by hospital management and heads of Health Information Management departments.

Participation was voluntary, and informed consent was obtained from all respondents. Participants were assured of their right to withdraw at any time without penalty.

Confidentiality and anonymity were strictly maintained, and no personal identifiers were collected. All data were used solely for academic purposes in accordance with the Declaration of Helsinki (World Medical Association, 2013, p. 2194).

4 RESULTS

4.1 Demographic Characteristics of Respondents

All 66 Health Information Management personnel distributed questionnaires across the two study facilities completed and returned them, yielding a 100% response rate. The demographic profile of respondents is presented in Table 1.

Table 1: Demographic Characteristics of Respondents

Characteristic	NDUTH (n=41)	Diete Koki (n=25)	Total (N=66)
Age (years)			
20–29	8 (19.5%)	12 (48.0%)	20 (30.3%)
30–39	22 (53.7%)	9 (36.0%)	31 (47.0%)
40–49	9 (22.0%)	3 (12.0%)	12 (18.2%)
50+	2 (4.9%)	1 (4.0%)	3 (4.5%)
Sex			
Male	15 (36.6%)	8 (32.0%)	23 (34.8%)
Female	26 (63.4%)	17 (68.0%)	43 (65.2%)
Educational Qualification			
Diploma	6 (14.6%)	14 (56.0%)	20 (30.3%)
HND/Bachelor's Degree	30 (73.2%)	9 (36.0%)	39 (59.1%)
Master's Degree	5 (12.2%)	2 (8.0%)	7 (10.6%)
Years of Experience			
<2 years	4 (9.8%)	8 (32.0%)	12 (18.2%)
2–5 years	12 (29.3%)	10 (40.0%)	22 (33.3%)
6–10 years	15 (36.6%)	5 (20.0%)	20 (30.3%)
>10 years	10 (24.4%)	2 (8.0%)	12 (18.2%)

The findings show that most respondents (47.0%) were aged 30–39 years, while females constituted the majority (65.2%). Educational qualification differed across facilities, with NDUTH having more degree holders (73.2%), whereas Diete Koki had a higher proportion of diploma holders (56.0%). Overall, more than half of the respondents (63.6%) had at least six years of professional experience in Health Information Management.

4.2 Awareness and Utilization of ICD-10

Table 2 presents findings on awareness and use of ICD-10 among respondents.

Table 2: Awareness and Utilization of ICD-10

Variable	NDUTH (n=41)	Diete Koki (n=25)	Total (N=66)
Awareness of ICD-10			
Yes	39 (95.1%)	22 (88.0%)	61 (92.4%)
No	2 (4.9%)	3 (12.0%)	5 (7.6%)
Formal ICD-10 Training			
Yes	18 (43.9%)	6 (24.0%)	24 (36.4%)
No	23 (56.1%)	19 (76.0%)	42 (63.6%)
Frequency of ICD-10 Use			
Daily	24 (58.5%)	10 (40.0%)	34 (51.5%)
Several times weekly	12 (29.3%)	8 (32.0%)	20 (30.3%)
Weekly	3 (7.3%)	5 (20.0%)	8 (12.1%)
Rarely	2 (4.9%)	2 (8.0%)	4 (6.1%)

Although awareness of ICD-10 was very high (92.4%), formal training was limited, with only 36.4% of respondents reporting any structured training. The majority of respondents indicated routine use of ICD-10 in daily coding activities, though training gaps remain evident across both facilities.

4.3 Clinical Coding Practices

Findings on current clinical coding practices are presented in Table 3.

Table 3: Clinical Coding Practices

Practice Variable	NDUTH (n=41)	Diete Koki (n=25)	Total (N=66)
Coding Method			
Manual (paper-based)	35 (85.4%)	24 (96.0%)	59 (89.4%)
Electronic/computer-assisted	6 (14.6%)	1 (4.0%)	7 (10.6%)
Coding System Used			
ICD-10 only	27 (65.9%)	15 (60.0%)	42 (63.6%)
ICD-10 + local system	14 (34.1%)	10 (40.0%)	24 (36.4%)
Availability of Guidelines			
Up-to-date	15 (36.6%)	6 (24.0%)	21 (31.8%)
Outdated	18 (43.9%)	12 (48.0%)	30 (45.5%)
None available	8 (19.5%)	7 (28.0%)	15 (22.7%)
Discharge Summary Availability			
Always	10 (24.4%)	3 (12.0%)	13 (19.7%)
Often	15 (36.6%)	9 (36.0%)	24 (36.4%)
Sometimes	12 (29.3%)	10 (40.0%)	22 (33.3%)
Rarely/Never	4 (9.8%)	3 (12.0%)	7 (10.6%)

The findings reveal that clinical coding is predominantly manual (89.4%), with limited adoption of electronic systems (10.6%). In addition, less than one-third of respondents reported access to up-to-date coding guidelines, and only a minority consistently received complete discharge summaries prior to coding.

4.4 Challenges Affecting Clinical Coding

Table 4 presents the major challenges reported by respondents.

Table 4: Challenges Affecting Clinical Coding

Challenge	NDUTH	Diete Koki	Total (%)	Mean Score
Poor/incomplete clinical documentation	38 (92.7%)	24 (96.0%)	93.9%	4.6
Inadequate number of trained coders	37 (90.2%)	22 (88.0%)	89.4%	4.5
Heavy workload	35 (85.4%)	20 (80.0%)	83.3%	4.4
Absence of electronic systems	34 (82.9%)	24 (96.0%)	87.9%	4.4
Erratic power supply	33 (80.5%)	23 (92.0%)	84.8%	4.3
Insufficient equipment	31 (75.6%)	22 (88.0%)	80.3%	4.2
Lack of training opportunities	30 (73.2%)	21 (84.0%)	77.3%	4.1
Poor remuneration	29 (70.7%)	18 (72.0%)	71.2%	4.0
Lack of coding policies	27 (65.9%)	16 (64.0%)	65.2%	3.9
Poor internet connectivity	24 (58.5%)	20 (80.0%)	66.7%	3.8

(Scale: 1 = Not a challenge, 5 = Extremely severe challenge)

Poor or incomplete clinical documentation emerged as the most severe challenge (93.9%, mean = 4.6), followed by shortage of trained coders and lack of electronic systems. These findings indicate that both human resource and infrastructural limitations significantly affect coding effectiveness.

4.5 Comparative Analysis of Facilities

Table 5 highlights key differences between the two study facilities.

Table 5: Comparison between Facilities

Indicator	NDUTH	Diete Koki	Difference
Formal coding training	43.9%	24.0%	+19.9%
Electronic coding system availability	14.6%	4.0%	+10.6%
Up-to-date guidelines	36.6%	24.0%	+12.6%
Regular quality checks	29.3%	12.0%	+17.3%
Consistent discharge summaries	24.4%	12.0%	+12.4%
Staff with >10 years experience	24.4%	8.0%	+16.4%

Overall, NDUTH demonstrated relatively better infrastructure, training exposure, and quality assurance mechanisms compared to Diete Koki Memorial Hospital. However, both facilities exhibited significant gaps in electronic coding systems, documentation quality, and continuous professional development.

5 DISCUSSION

This study assessed the practices and challenges of disease classification and clinical coding in two public health facilities in Bayelsa State. The findings reveal a persistent gap between high awareness of ICD-10 among Health Information Management (HIM) personnel and the actual capacity to effectively implement standardized clinical coding practices. This gap is largely driven by deficiencies in formal training, weak documentation practices, inadequate infrastructure, and human resource constraints.

The high level of awareness of ICD-10 (92.4%) reflects its widespread institutional presence within Nigerian healthcare facilities and aligns with national evidence on its adoption (Adeleke et al., 2015, p. 42). However, awareness alone does not guarantee competence in clinical coding. The relatively low proportion of respondents with formal ICD-10 training (36.4%) indicates a critical skills gap that undermines coding accuracy and consistency. This suggests that coding practice in the study settings is largely experience-based rather than competency-based, increasing the likelihood of variation and errors. This observation aligns with Oweghoro and Oluwole (2025), who noted that clinical coding in many Nigerian hospitals is often performed without structured certification, relying instead on informal workplace learning.

The predominance of manual, paper-based coding systems (89.4%) reflects a low level of digital integration within the studied facilities. This indicates that coding processes remain labor-intensive, fragmented, and highly dependent on manual interpretation of clinical records. Such systems are prone to inefficiencies, delays, and human error. This finding is consistent with Adeleke et al. (2015, p. 42), who reported limited automation in Nigerian hospitals, and Okediran and Oluwole (2025), who linked this to inadequate health informatics competencies among HIM personnel. In contrast, evidence from digital health systems shows that electronic coding tools improve accuracy, efficiency, and standardization (Campbell & Giadresco, 2020), highlighting a significant implementation gap.

Poor clinical documentation emerged as the most severe challenge (93.9%). This indicates that coding inefficiencies are strongly influenced by upstream clinical documentation practices rather than coding activities alone. Incomplete discharge summaries, poor handwriting, and inconsistent use of medical terminology significantly hinder accurate code assignment. This finding aligns with Adeleke et al. (2015, p. 42) and Hamza et al. (2025), who identified documentation deficiencies as a persistent national challenge. It also reflects a systemic disconnect between clinical care processes and health information management requirements.

The shortage of trained coders (89.4%) and high workload (83.3%) further demonstrate significant human resource limitations. These constraints increase pressure on available staff, reduce attention to detail, and contribute to delayed and potentially inaccurate coding outputs. Similar workforce challenges have been reported in other Nigerian studies (Hamza et al., 2025), indicating that this is a widespread systemic issue.

Infrastructural and technological limitations—including absence of electronic systems (87.9%), unstable electricity supply (84.8%), inadequate equipment (80.3%), and poor internet connectivity (66.7%)—further constrain effective coding practice. These deficiencies highlight weak health system infrastructure that limits the transition from manual to digital coding systems. Comparable findings have been reported by Adamu et al. (2026), who emphasized that inadequate ICT infrastructure remains a major barrier to effective clinical coding in Nigeria.

Comparatively, Niger Delta University Teaching Hospital (NDUTH) demonstrated better performance than Diete Koki Memorial Hospital in training exposure, supervision, and technological readiness. This difference is likely due to NDUTH's status as a tertiary institution with greater access to skilled personnel and institutional resources. However, the presence of similar challenges in both facilities suggests that the problems are largely systemic rather than facility-specific.

Overall, the combined effect of poor documentation, inadequate training, workforce shortages, and weak infrastructure significantly compromises the quality of health data generated in both facilities. This has serious implications for disease surveillance, health planning, and resource allocation. As emphasized by the World Health Organization (2019), accurate health information is essential for effective health system performance and decision-making.

A key strength of this study is the complete inclusion of all HIM personnel in both facilities, eliminating sampling bias and enhancing representativeness. However, limitations include reliance on self-reported data, the cross-sectional design, and the absence of objective validation of coding accuracy through record audits.

6 CONCLUSION

This study examined disease classification and clinical coding practices in Niger Delta University Teaching Hospital and Diete Koki Memorial Hospital in Bayelsa State. The findings reveal a significant disparity between high awareness of ICD-10 and effective implementation of clinical coding standards.

The most critical challenge identified is poor clinical documentation, particularly incomplete or missing discharge summaries, which directly affects coding accuracy and completeness. Other major constraints include inadequate formal training, shortage of skilled personnel, excessive workload, reliance on manual systems, and weak technological infrastructure.

Although NDUTH demonstrates relatively better performance due to its tertiary status, both facilities face similar systemic constraints, indicating that the challenges are structural rather than institutional. Consequently, the quality and reliability of coded health data in Bayelsa State remain suboptimal.

The study concludes that without coordinated interventions targeting documentation practices, workforce capacity, and health information infrastructure, the effectiveness of disease classification and clinical coding will remain limited, thereby undermining health system planning, surveillance, and evidence-based decision-making.

Recommendations

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

- Hospital management should enforce standardized documentation protocols, with mandatory and timely completion of discharge summaries before coding. Regular audits and accountability mechanisms should be instituted, as documentation quality is central to coding accuracy.
- Health Information Management personnel should undergo formal, continuous, and competency-based training in ICD-10 coding. Clinical coding should be recognized as a specialized skill requiring certification and periodic refresher training.
- Additional qualified HIM personnel should be recruited to reduce workload pressure and improve coding efficiency. Appropriate staffing ratios should be established to minimize burnout and coding errors.
- Health facilities should progressively transition from manual to electronic coding systems through the implementation of electronic health records (EHRs) and computer-assisted coding tools. Evidence shows that digital systems significantly improve accuracy and efficiency (Olagundoye et al., 2021).
- Government and health authorities should invest in stable electricity supply, ICT infrastructure, and internet connectivity to support digital health systems. In addition, a standardized state-level clinical coding policy should be developed to harmonize practices and support gradual alignment with ICD-11 global standards (World Health Organization, 2022).

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

Disclosure of conflict of interest

The authors declare no conflicts of interest regarding this manuscript.

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