

Health Information Management Infrastructure, Resources and Record Management Processes in Tertiary Hospitals in Bayelsa State

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ABSTRACT

Background: Health Information Management (HIM) infrastructure, resources and record management processes are the building blocks for the creation, storage, retrieval and utilization of health information for healthcare decision making. Lack of infrastructure and information management processes could affect the availability and usefulness of the information needed by healthcare professionals. The association between HIM infrastructure, healthcare record management process and health care decision making was the focus of this study in the tertiary hospitals of Bayelsa State. The study design used was cross sectional survey. The study population were healthcare professionals in tertiary hospitals in Bayelsa State and three hundred and seven (307) of them were selected. A structured questionnaire with 4-point Likert scale was used for data collection. The data obtained were summarized using descriptive statistics which are in the form of frequency, percentage and mean, and the hypotheses were tested using Pearson Product Moment Correlation at 0.05 level of significance. **Results:** The findings revealed that the infrastructure and resources for HIM were rated at moderate level (cluster mean = 2.47). Lack of funding for HIM activities (M = 2.30), trained HIM personnel (M = 2.34), electricity supply (M = 2.36), physical record-storage facilities (M = 2.39) and technical/IT support (M = 2.42) were noted as major deficiencies. Decisions made were moderately supported by access to health information, especially by evidence-based professional decisions (M = 2.61) and patient-management decisions (M = 2.59). Record management processes were generally rated low with the grand mean of 2.41, especially record retrieval, updating and timely availability. There was a significant positive association between the decision making and HIM infrastructure and resources ($r = 0.540$, $p < 0.001$) according to Pearson correlation. Another significant positive relationship was established between the decision quality and timeliness and record management processes ($r = 0.610$, $p < 0.001$). The study found that while the HIM infrastructure and resources were moderately available, significant gaps existed, and that HIM record management procedures were generally weak. However, the improvements of HIM infrastructure, resources and record management were significantly correlated with better healthcare decision making. The tertiary hospital is expected to have strong HIM infrastructure, sustainable funding, adequate HIM staffing and training, improved electricity and technical support, improved procedures for record management, expanded and maintained EHI systems, and to encourage regular usage of quality health information for clinical, administrative and managerial decisions. impacts decision making

KEYWORDS: Health Information Management, HIM infrastructure, health records, record management, decision-making, healthcare professionals, tertiary hospitals, Bayelsa State.

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INTRODUCTION

Health information plays a key role in the effective delivery of health care because nearly all clinical, administrative,

managerial, financial, research and public-health decisions rely on having accurate, timely, accessible information. Health information management (HIM) thus involves more

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than just the simple gathering of patient information; it is the systematic generation, documentation, processing, storage, retrieval, protection, preservation, analysis and utilization of health information throughout its life cycle. The structure that transforms health data into meaningful information to support patient care, service management, quality improvement, research and decision-making is a functional health information system. Health information systems are considered essential components of well-functioning health systems, and are defined by WHO as the collection, analysis, reporting, management and governance of health-related information to inform decision-making based on evidence (World Health Organization [WHO], 2025).

The effectiveness of health information management at the institutional level is significantly affected by the availability and sufficiency of infrastructure and resources. HIM infrastructure refers to the physical and technological setup necessary for health information activities, such as records departments, filing and storage areas, computers, servers, network systems, internet connections, electronic health records (EHRs), backup systems, power supply, security mechanisms and other information and communication technologies (ICTs). Resources include appropriately trained HIM professionals, financial resources, equipment, consumables, information systems, policies, standards and managerial support. The components are interdependent: good staff can be hindered by poor infrastructure; good infrastructure but poor staff can limit the effective use of available technology; good staff and good infrastructure but poor funding, support, or management can limit the effective use of available technology. Therefore, a socio-technical approach to health information management is required, where people, processes, technologies, infrastructure, policies and organisational support are all important determinants of the quality and usefulness of health information.

These elements are especially highlighted within the tertiary hospitals where the amount of health information is higher and more complex due to specialised clinical services, referrals, teaching, research, post graduate training and multidisciplinary management of patients. The amount of information that is produced is huge at tertiary hospitals from outpatient and in-patient departments, emergency services, laboratory, radiology, surgery, nursing, billing, insurance and disease registries and other specialized departments. It takes more than just patient folders to be stored to manage such information, it takes systematic processes to register patients, identify patients, document patient, number patients, file patients, track patients, retrieve patients, code patients, index patients, analyse patients, preserve patient, retain patient and dispose of patient correctly. The increasing number of medical records has in the past posed problems in Nigeria with regards to storage, retrieval, security and funding,

especially when there is a dominance of physical records (Agbaje, 1991).

The quality of the clinical and administrative information is also directly linked to the quality of the record management process. Health records are a significant source of evidence of patients' conditions, investigations, diagnoses, treatment, outcomes and continuity of care. Incomplete, inaccurate, delayed and poorly organised documentation can lead to compromised information for clinical decision making, hospital statistics, research, planning and legal purposes. In a study by Adeleke et al. (2012) of 732 inpatient records from a tertiary hospital in Nigeria, they observed significant differences in the quality of documentation. While documentation of care in the first 24 hours was good, significant gaps were noted in patient unit numbers and the use of a discharge summary form. The study also revealed some gaps in the physical arrangement of records, which illustrates the need for documentation quality and health information management processes as health information quality dimensions in Nigerian hospitals.

The shift from mostly paper-based systems to electronic and hybrid information environments has also broadened the scope of health information management. Patient data can be made more available, accessible and processed through EHRs, and information sharing and secondary uses of health data can be enabled. But just because information is digital doesn't mean it will solve current issues with information management. It stipulates further conditions for the reliable infrastructure, power supply, network connectivity, hardware, software, technical support, user training, interoperability, cyber security, data governance, backup and system maintenance. Limited evidence exists on the impact of EMR implementation or improvement on some patient-centred outcomes, but there is evidence that it can have a significant impact on data quality in Nigeria (Olukorode et al., 2024).

Manual and electronic methods continue to coexist, as evidenced from tertiary hospitals in Nigeria. Dogiye et al (2022) reported the use of ICT in health information management activities such as patient registration and documentation while manual practices were still in existence in selected tertiary hospitals in South-South Nigeria. In the same vein, Arogunjo and Makinde (2024) assessed the performance of manual and electronic health records keeping system in Lagos State University Teaching Hospital, and noted the strengths and weaknesses of both systems. Their results confirm the importance of treating RM as an organisation process and not just as technological solutions to health info management issues.

Human and organisational resources for health information management is another important aspect. The role of HIM professionals is to ensure that health records are created, maintained, protected, processed and made available for authorised uses. They rely as much on the professional knowledge and skills of staff as on appropriate staffing, work

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spaces, equipment, leadership, ongoing professional development and clear institutional policies. Nigeria's tertiary hospitals have demonstrated that management support is important in the formation and implementation of good records management practices. Evidence from tertiary health institutions in the South-Western Nigeria, for instance, recently revealed top management support as one of the factors to consider in the management of health records (2025). This indicates that poor health information management is not entirely due to the individual performance of staff members and the conditions in the organisations as well as the availability of resources need to be taken into account.

Recordkeeping does not just come to an end once a patient's record is used. Records should be kept, stored and destroyed as necessary by relevant legislative, administrative, clinical and archival procedures. It is especially significant in tertiary hospitals where records may be called for years after the patient has received first treatment in order to follow up, for research purposes, for medico-legal purposes, for insurance claims or other authorised purposes. The evidence from Nigeria has revealed issues about the retention and disposal of health records and more systematic approaches in the management of health records through their life cycle. As hospitals are increasingly creating electronic records, digital preservation is becoming a critical issue as well. The volume of health records produced in Nigerian tertiary hospitals, reliance on paper health records, and their insufficient storage facilities can lead to health records being misplaced and retrieval problems, making the need for appropriate records-management infrastructure and digital preservation of health records significant (Owolabi, et al., 2021).

Most importantly, a good health information management is not about only capturing and sharing data. Finally, health information has value if it is in a format that enables action. The evidence-based systematic framework synthesis by Zuske et al. (2022) revealed that research on health information systems has historically focused heavily on the recording and reporting aspects of information, with less attention focused on health information use for decision making, even though it exists. The authors thus stressed the importance of involving human experience, decision making and actual use of information in the design of health information systems. This view is more applicable to tertiary hospitals, where health information is expected to be used to assist in not only treating patients individually, but also in hospital management, resource deployment, quality assurance, disease monitoring, research, teaching and hospital strategic planning.

In this context, the capacity of the health information generation, accessibility, security and usefulness in the tertiary level of health services depends on the adequacy of the HIM infrastructure, resources and record management processes. While new technologies have provided additional

options for enhancing health information management, significant infrastructure, equipment, electrical grid, staffing, funding, technical support, storage, documentation, retrieval, preservation and organisational support issues may continue to impact the effectiveness of health information record management. The situation is especially significant in the Nigerian tertiary hospitals because of the high number of patients in the hospitals, the growing number of special services, and the shift of the health sector from a paper-based to an electronic/hybrid information system gradually puts extra pressure on health information departments in these hospitals. It is therefore essential to study the condition of HIM infrastructure and resources, understanding the processes that health records go through in their production, storage, retrieval, processing, preservation and use in order to comprehend the strengths and weaknesses of the systems in place within the tertiary hospitals. This evidence can then form the foundation to further enhance HIM services, data quality, continuity of care and for the health information to have a wider use in hospital management, research and evidence-based decision making.

LITERATURE REVIEW

Concept of Health Information Management Infrastructure

Health information management infrastructure is the physical, technological, organisational and communication resources needed to effectively generate, process, store, retrieve, protect and utilize health information. It is the basis for health records and health information systems. Infrastructure can consist of medical-records departments, filing areas, shelves and storage units, computers, servers, networks, internet access, electronic health-record systems, scanners, back up facilities, power supply, and data-security systems and other information and communication technologies (ICTs). Infrastructure is not only about physical storage spaces in the modern health care setting, but also the environments where health information is documented and utilized – physical and digital.

Quality and availability of health information is closely linked to the importance of infrastructure. Reliable health facility information is vital for clinical management, disease monitoring, health-sector planning and monitoring service performance, facility administration, and other activities as highlighted by the World Health Organization (WHO). For routine health information systems, working structures and processes are needed to enable timely and consistent collection of information and its use for decision making (World Health Organization [WHO] 2026). Infrastructure should, therefore, be understood not as a set of equipment that exists within a hospital but as an environment that enables effective information management.

In Nigeria, however, having health-information policies does not necessarily mean having appropriate infrastructure.

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Underfunding, lack of adequate ICT infrastructure, limited capacity for data collection and weak use of data continue to hamper implementation of health-information policies, according to the 2025 Nigeria Health Systems and Services Profile. The report also indicated that there were fewer staff members focused on health-records and lack of coordination of health-information activities (Mbachu et al., 2025). The challenges are relevant for tertiary hospitals as they produce large volumes of clinical, administrative and research information, which needs more advanced clinical information management systems.

Physical Infrastructure for Health Records Management

Regardless of the increasing digitization of hospitals, physical infrastructure is still important. Adequate space, filing equipment, shelves, folders, workstations, document-processing areas and appropriate environmental conditions are necessary for the safe management of paper and hybrid records. Records could become congested, misplaced, damaged or hard to find if insufficient storage space is provided. These can cause disruptions to continuity of care and make it more time consuming to find patient information. A large volume of health records is produced in tertiary hospitals in Nigeria, thus presenting significant storage challenge, according to the study by Owolabi, et al., (2021). Their perception was that lack of records or records that are misplaced was linked to poor storage space and the persistence of paper-based records. They then discussed digital preservation as a tool to enhance the accessibility of and retrieval of health information. The finding is significant for tertiary institutions where records are also needed for several reasons such as repeated clinical interaction, referral, research, teaching, audit, medico-legal purposes.

Physical infrastructure thus isn't going away even in the digital transformation era. A hospital can have an electronic health-record system, but rely on paper record-keeping for certain departments or services. These types of environments generate hybrid documents, which must have easily established processes for connecting, monitoring, storing and accessing both paper and electronic documents. Thus, the level of adequacy of HIM infrastructure should be evaluated based on the actual record-management process within the hospital and not just because it has computers or an electronic system.

Information and Communication Technology Infrastructure

The ICT infrastructure has been used and is becoming more and more important in the field of health information management. Faster health information documentation, retrieval, processing, sharing and reporting can be achieved through computers, local-area networks, Internet connections, electronic medical-record systems, databases, scanners, servers, backup systems and cybersecurity protocols. Some of the restrictions of transporting paper files

from department to department can also be diminished with electronic systems.

Data from Nigeria confirms the possibility of the value of electronic systems. In an interstate study of the Nigerian healthcare system, Akwaowo et al. 2022 explored the adoption and determinants for the implementation and utilization of EMRs in Nigeria. The results of this study prove that software availability alone does not affect adoption, but rather the health-system and technological context does.

These are among the more recent pieces of evidence that support the connection between electronic systems and information quality. The search of Nigerian studies on the impact of EMRs revealed four studies that evaluated the impact of data collection and documentation after the introduction or improvement of EMRs in Nigeria (Olukorode et al., 2024). Their pooled analysis showed that data quality improves significantly following the use or improvement of EMRs, but the authors reported that data on patient-centred outcomes was limited. The discovery indicates that e-infrastructure has the potential to improve information processes, but this potential needs to be weighed against the quality of implementation, capacity of the users and organisational support.

Human Resources for Health Information Management

Quality health information cannot be produced without infrastructure. HR are also a critical part of HIM as a health worker, HIM professionals and other health workers create, record, process, maintain and use health information. Thus, adequate staffing is also required to ensure that records are handled in a timely manner, appropriately filed, retrieved when required, coded correctly and protected from unauthorized access.

Human-resource constraints continue to be a concern as shown by the Nigerian evidence from the health system. The study by Mbachu et al. (2025) revealed that Nigeria's health-information system is sorely lacking in dedicated health-records officers, inadequate capacities for data collection, and poor coordination. This affects tertiary hospitals and the volume and nature of information generated needs to be handled by dedicated staff and resources with knowledge of records management, health-data standards, coding and classification, records management, data quality and digital health systems.

Human resources should also be taken into account when dealing with Continuing Professional Development. The shift to electronic and hybrid environments in the hospital setting has introduced new skills that HIM professionals must be able to master in order to be effective, including the issues of electronic records, database management, information security, data analytics, interoperability and digital preservation. Likewise, clinicians and other health professionals who generate patient documentation should have adequate knowledge of documentation standards as the quality of the end product, available health record, is

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determined by the quality of information captured at the point of care.

Financial, Material and Organisational Resources

Money has a bearing on nearly all facets of health information management. Record departments need to be established and maintained, equipment obtained, electronic systems installed, reliable electricity and Internet connections provided, staff trained, cybersecurity measures put into place, software maintained and data backed up, and continuous financial resources have to be committed to these tasks. It can be therefore said that a hospital can be set up with electronic platform, but if the funding for maintenance, upgrading the equipment, technical support or replacement of outdated equipment is not sufficient, the information management in the hospital is still poor.

Underfunding was mentioned in the Nigerian Health Systems and Services Profile as one of the factors hindering the implementation of health-information policies, along with limited data-management capacity, and inadequate ICT infrastructure (Mbachu et al., 2025). This is a sign that health-information management is not something that is limited to the department, but it needs to be committed to and funded at the institutional level.

Organisational support is also crucial. Staffing and infrastructure priorities, policies, training, data governance and system maintenance are determined by management. A health care organization that views information as a by-product of the administration may lack enough resources to manage information, while one that understands information as a strategic asset is more likely to create a process for ensuring information quality, security and availability.

Health Record Creation and Documentation Processes

The first step of record keeping is to have accurate and complete patient information. Documentation involves documenting the patient's name, their registration, clinical history, findings of the examination, the diagnosis, treatment, investigations, procedures, nursing care, discharge information and other key parts of the patient's healthcare encounter. The quality of the subsequent information-management activities is greatly dependent on the quality of the information captured at this stage.

Adeleke et al. (2012) give valuable empirical evidence from a tertiary hospital in Nigeria. When they reviewed 732 inpatient records at Federal Medical Centre, Bida, there were significant variations in the level of documentation. The rates for recording care were high and the rates for recording the patient unit number were relatively low, and the utilisation of discharge-summary forms was low, in particular. The study illustrates that a record is not necessarily complete, accurate or useful enough for the purposes of the study. This is a significant discovery, as this lack of document can impact continuity of care, hospital statistics, coding, reimbursement, research and medico-legal processes. When managing

records, it's critical to pay attention to the quality and availability of these records.

Filing, Storage and Retrieval Processes

Filing and retrieval are essential record-management functions since health information is of little value without the ability to retrieve it when necessary. Appropriate filing systems involve identification and numbering systems, accurate indexing, systematic arrangement, tracking systems and suitable storage facilities.

In paper-based settings, substandard filing systems can cause delays in finding patient information, duplicate records, and folders to be misfiled. Similarly, issues like wrong patient identification, lack of thorough indexing, search limitations, or system failures and insufficient interoperability can occur in electronic environments.

Arogunjo and Makinde (2024) conducted a survey to investigate health-record management systems at Lagos State University Teaching Hospital with 394 respondents who are healthcare providers and medical-records officers at the hospital. They studied both manual and electronic health-record management systems, and found both successes and ongoing challenges in the operation and implementation of the systems. The authors found that there was a need to take action within institutions to solve underlying record management problems and not simply assume that the availability of a management system would solve the problem.

This discovery reinforces the idea that records management is indeed a process. The use of technology can help retrieval, but patient identification, indexing, patient-specific documentation and the correct procedures must be followed.

Processing, Coding, Indexing and Use of Health Information

Health records are not only documents, but also a repository of structured information for clinical, administrative and secondary uses. Once documentation, information can be processed by classification, coding, indexing, abstraction, statistical compilation and reporting. The processes allow individual patient records to be aggregated to provide data for hospital planning, disease surveillance, service monitoring, database quality improvement, research, and resource allocation.

Secondary uses rely on the quality of primary documentation. If the demographic information, diagnosis, procedure or discharge outcome is not sufficiently documented, then coding and statistical reporting of subsequent events may be impacted as well. As a result, there is a direct link between infrastructure/resources and information processing. Producing trustworthy aggregate information requires adequate computers, coding tools, software, trained personnel and reliable source documentation.

The WHO emphasizes that health-facility data are not only useful for individual clinical management, but also, facility

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management, planning and monitoring of health-service performance (WHO, 2026). The HIM department, therefore, plays a crucial role between the creation of health information and the conversion of that information into information for decision making.

Security, Confidentiality and Preservation of Health Records

Health records include personal information and clinical details which must be protected from unauthorised access, modification, loss, destruction and inappropriate disclosure. The degree of confidentiality in paper-based systems is achieved, in part, through controlled entry, proper filing and secure storage and responsible handling of folders. Electronic systems need to be further protected with authentication, access control, audit trail, backup, encryption, cyber security, etc.

Records preservation is also a vital part of records management. In tertiary hospitals, records may need to be kept for longer periods as information may be needed for future treatment, research, legal, auditing or institutional history. Owolabi et al. (2021) thus underscored digital preservation as a key tool to ensure access to and sustainability of health records in Nigerian tertiary hospitals. Preservation should therefore not be considered as just putting old records in storage but as an ongoing process. To ensure long-term preservation for electronic records, it's important to consider file formats, storage media, system migration, and backups and future access. In terms of paper records, it needs proper physical surroundings, retention periods and disposal measures in place.

Relationship Between Infrastructure, Resources and Record Management Processes

Published works suggest that infrastructure, resources and record management processes are interrelated. Inadequate infrastructure, in the absence of skilled staff, can lead to underutilisation of the infrastructure. Likewise, workers without the proper equipment, storage space, electricity, Internet and capital may be unable to work efficiently. Record-management processes are thus a product of the interplay of people, technology, physical facilities, organisational policies and institutional resources.

It is reflected in the Nigerian literature. The national health-system profile reveals a range of infrastructure, financial and human capacity as well as data-use challenges, which are interdependent weaknesses of the health-information environment (HIE) (Mbachu et al., 2025). For instance, electronic-record adoption takes place in an overall organisational and health-system environment as illustrated by Akwaowo et al. (2022), and the enhancements in electronic-record systems can be linked to improved data quality as shown by Olukorode et al. (2024).

The authors' suggestion is that such a question as whether a hospital has an electronic health-record system, computers or

a records department is insufficient. An effective assessment should address the sufficiency of infrastructure; availability of resources be they human or material and effectiveness of record-management processes that have been established.

Empirical Gap in the Literature

The literature already existing boasts that some of the individual elements of health information management in hospitals in Nigeria are available. Adeleke et al. (2012), Akwaowo et al. (2022), Owolabi et al. (2021), and Arogunjo and Makinde (2024) did research on the quality of inpatient documentation, EMR adoption, digital preservation, and manual and electronic health-record management systems, respectively. Adeleke et al. (2012), Akwaowo et al. (2022), Owolabi et al. (2021), and Arogunjo and Makinde (2024) did research on the quality of inpatient documentation, EMR adoption, digital preservation, and manual and electronic health-record management systems, respectively.

Such studies, however, usually focus on one of the components of the health-information environment and not on evaluating the HIM infrastructure, human/material/technological resources and the actual record-management processes in place in tertiary hospitals at the same time. There is, therefore, a need to have a more comprehensive examination of the interaction and coexistence of physical and digital infrastructure, staffing, equipment, funding, organisational support and record-management procedures in tertiary hospitals' environments. This gap is significant in Nigeria, where health-information policy is in place, but health-information implementation is still hindered by infrastructure, funding, health workforce, and data-use challenges (Mbachu et al., 2025). An extensive assessment can thus produce evidence of the availability of infrastructure and resources, and determine whether they are adequate for the effective development, recording, filing, retrieval, processing, preservation, protection and utilization of health records.

MATERIALS AND METHODS

Study Setting

Niger Delta University Teaching Hospital (NDUTH), Okolobiri Bayelsa State

The study was carried out in Niger Delta University Teaching Hospital (NDUTH), Okolobiri, formerly known as General Hospital, Okolobiri established by the then military Governor of the old Rivers State, Alfred Papapreye Diete-Spiff under Gen Yakubu Gowon Military Rule in 1973. Okolobiri General Hospital existed for about 18 years before the creation of Bayelsa State by General Sani Abacha in 1996. In 2007, during the administration of Timipre Silva as the Governor of Bayelsa State, the then General Hospital, Okolobiri was upgraded to a 158-bed and latter to 200 beds complement tertiary healthcare centre in order to meet up with the healthcare demands of the state and to effect its nomenclature to Niger Delta University Teaching Hospital

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(NDUTH) so as to be part of the Niger Delta University Amassoma to operate as a tertiary healthcare level (Dogiye et al., 2019).

Federal Medical Centre (FMC), Yenagoa Bayelsa State

Federal Medical Centre, Yenagoa, is a federal-owned medical center in the Niger Delta region that offers quality tertiary healthcare services. Established in 1957, it has undergone several changes, including being renamed Federal Medical Centre, Yenagoa in 1999 and renaming the Otuoke Cottage Hospital in 2014. The hospital has experienced significant growth, with reduced death rates and increased patient patronage. It has a dedicated staff of 2,216 regular staff and is aiming to become a Federal Teaching Hospital. The hospital has completed numerous building projects and is currently undergoing several on-going projects. The main medical director is Dr. Dennis O. Allagoa, and the head of clinical services is Dr. James Omietimi. The hospital has a main center and an outreach center at Otuoke, led by Dr. Peter Alabrah and Dr. Egbuvbge. The hospital is also involved in research and training.

Study Design

This research used a cross-sectional design to study how Health Information Management Infrastructure, Resources and Record Management Processes in Tertiary Hospitals in Bayelsa State.

Study Population

This study focuses on healthcare Professionals at the two Bayelsa State tertiary hospitals, Niger Delta University Teaching Hospital (NDUTH), Okolobiri, and Federal Medical Centre (FMC), Yenagoa. The respondents were healthcare professionals involved in making decisions about patient care, resource allocation, and hospital operations. Those involved in the research include Health Information Managers, physicians, and Nurses. The population were 1619.

Sample Size Determination

To determine the sample size for this study, the Cochran Formula for Finite Populations was employed, since the population size was known. The study included 312 staff members from tertiary hospitals in Bayelsa State. Following the standard rule of calculating a finite population (known), the researcher presents both the infinite and finite population versions of the Cochran formula with the definitions and calculations.

$$n_o = \frac{Z^2 \times P(1-P)}{e^2}$$

Where:

n_o : the calculated sample size

Z: The z-value corresponding to the desired confidence level (1.96 for 95% confidence).

P: The estimated proportion of the population that possesses the characteristics of interest (0.5 when no prior knowledge).

e: the desire margin of error (0.05 for 5% margin of error).

$$n_o = \frac{Z^2 \times P(1-P)}{e^2}$$

$$n_o = \frac{1.96^2 \times 0.5 \times 0.5}{0.05^2} = \frac{3.8416 \times 0.25}{0.0025} = \underline{384.16}$$

$$n_o = \underline{384}$$

Cochran formula for adjusted finite population

$$n = \frac{n_o}{1 + \frac{(n_o - 1)}{N}}$$

Where:

n: the adjusted sample size for a finite population

n_o : the sample size calculated using the basic Cochran formula (as described above)

N: The total size of the population

$$n = \frac{n_o}{1 + \frac{(n_o - 1)}{N}}$$

$$n = \frac{384}{1 + \frac{384 - 1}{1619}}$$

$$n = \frac{384}{1 + \frac{383}{1619}}$$

$$n = \frac{384}{1 + 0.2699}$$

$$n = \frac{384}{1.26}$$

$$n = \underline{310}$$

Sampling Technique

To guarantee representation from different departments in the hospital, a stratified random sampling technique was used. Clinical departments (surgery, pediatrics, emergency), nursing departments and health information management departments were among the strata. Participants were chosen at random from each stratum to take part in the study.

Instrument of Data Collection

A structured, self-administered questionnaire titled "Health Information Management Infrastructure, Resources and Record Management Processes Questionnaire (HIMIR-RMPQ)" was used for data collection. The instrument was developed from the objectives of the study and informed by relevant literature on health information systems, health-record quality, electronic health records, infrastructure, human resources and information use for healthcare decision-making (Adeleke et al., 2012; Adeleke et al., 2015; Akwaowo et al., 2022). The questionnaire consisted of four sections: A, B, C and D. Section A: Socio-demographic and Professional Characteristics. Section B: HIM Infrastructure and Resources. Section C: Record Management Processes. Section D: Decision-Making, Decision Quality and Timeliness.

The four-point scale was adopted because it required respondents to indicate either agreement or disagreement

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without providing a neutral midpoint. The criterion mean was calculated as:

$$\frac{4 + 3 + 2 + 1}{4} = 2.50$$

Consequently, a mean score of 2.50 or above was interpreted as Agree, while a mean score below 2.50 was interpreted as Disagree. For the inferential analysis, respondent-level composite scores were generated for each major construct. Individual item means were not correlated with one another because Pearson Product-Moment Correlation required paired observations obtained from the same respondents.

Validity and Reliability of the Instrument

The draft questionnaire was face and content validated by experts in Health Information Management, health informatics, medical records management and research methodology and biostatistics. The experts evaluated the items in terms of relevance, clarity, adequacy and comprehensiveness relating to the study objectives. Their feedback and suggestions were reflected in the final instrument.

A pilot test was then carried out involving healthcare professionals of a similar health care institution in an area outside the study area where the main study was not carried out. The Cronbach's alpha was used to determine the internal consistency of the instrument and its major constructs in the analysis of the responses got from the pilot study. The coefficient of 0.70 or higher was deemed acceptable for the study. Those items which were ambiguous, repetitive or poorly performed were revised or eliminated before the final administration of the questionnaire.

METHOD FOR DATA ANALYSIS

The data collected were coded and analysed using IBM SPSS Statistics, Version 27. The total questionnaires were reviewed for completeness, coded and entered into the statistical software. Prior to the final analysis, the data was cleaned to determine if there were missing, inconsistent or invalid responses.

The data were analyzed descriptively and inferentially according to the goals of the research.

Objective 1: To assess the correlation between HIM infrastructure and resources and decision making by healthcare practitioners in tertiary institutions of Bayelsa state.

The responses to the questions about HIM infrastructure and resources and decision-making were summarised using frequency, percentage, mean and standard deviation.

For inferential analysis, the Pearson Product-Moment Correlation Coefficient (PPMC) was used to determine the relationship between the composite HIM Infrastructure and Resources score and the composite Decision-Making score. The hypothesis tested was at 0.05 level of significance: H_{01} : There is no significant relationship between HIM infrastructure and resources on decision making by healthcare

professionals in tertiary hospitals in Bayelsa state. The Pearson correlation coefficient was used to determine the direction and strength of the relationship and the p-value was used to determine whether the relationship was statistically significant.

Objective 2: To assess the correlation between record management procedures, decision quality and timeliness of healthcare professionals in Tertiary hospitals of Bayelsa State.

The respondents' evaluation of record-management processes and decision quality and timeliness was summarised by using frequency, percentage, mean and standard deviation. The Pearson Product-Moment Correlation Coefficient (PPMC) was used to determine the relationship between the composite Record Management Processes score and the composite Decision Quality and Timeliness score. The hypothesis was tested at a 5% level of significance:

H_{02} : There is no significant relationship between the record management processes and decision quality and timeliness of health care practitioners on tertiary hospitals in Bayelsa state. The Pearson correlation coefficient showed the direction and magnitude of the association and the p-value was used to establish if the observed association is statistically significant. Decision Rule for the Hypotheses. The following decision rule was applied for both hypothesis:

The results showed that the null hypothesis was rejected ($p < 0.05$), meaning there is a statistically significant relationship between the variables.

The null hypothesis was not rejected in this case because of the null value of p ($p \geq 0.05$), which means the test did not provide enough statistical evidence of a significant relationship between the variables.

Where appropriate, the percentage of variance in the dependent construct statistically explained by the independent construct was also reported (r^2). The correlation coefficients were interpreted as measures of association and not causation.

Ethical Considerations

Permissions were gotten from the Research and Ethics Committee of Niger Delta University Teaching Hospital (NDUTH), Okolibiri with the approval number NDUTH/REC/0080/2024, and the Federal Medical Centre (FMC), Yenagoa with approval number FMCY/REC/ECC/2025/JAN/815, Bayelsa State before the research began. Each participant gave informed consent after getting details on the study's aim, their option to quit whenever they wanted, and how their answers would stay private. The study kept data anonymous to guard participant identity.

RESULTS

The study involved 307 healthcare professionals, comprising 163 females (53.1%) and 144 males (46.9%). The largest age group was 36–40 years (93; 30.3%), followed by 41–45 years (61; 19.9%), 25–30 years (58; 18.9%), 31–35 years (48; 15.6%),

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and 46 years and above (47; 15.3%). Regarding marital status, 207 respondents (67.4%) were married, 75 (24.4%) were single, and 25 (8.1%) were widowed. In terms of professional experience, 124 (40.4%) had 6–11 years, 79 (25.7%) had 12–17 years, 78 (25.4%) had 0–5 years, 10 (3.3%) had 18–23 years, and 16 (5.2%) had 24 years and above. Educationally, 165 respondents (53.7%) had HND/BSc, 79 (25.7%) had ND/Technician, 39 (12.7%) had MSc, and 24 (7.8%) had PhD qualifications. Thus, most respondents had HND/BSc or ND/Technician qualifications. In profession, nurses constituted the largest group (175; 57.0%), followed by physicians (111;

36.2%) and HIM professionals (21; 6.8%). However, these figures total 308, which exceeds the study sample of 307; this discrepancy should be verified against the original dataset before final reporting. In hospital, 214 respondents (69.7%) were from Federal Medical Centre, Yenagoa, while 93 (30.3%) were from Niger Delta University Teaching Hospital, Okolobiri, giving a total of 307 respondents.

Objective One: To evaluate the relationship between HIM infrastructure and resources and decision-making among healthcare professionals in tertiary hospitals in Bayelsa State.

Table1: Respondents' Assessment of HIM Infrastructure, Resources and Decision-Making (n = 307)

S/N	Item	SA (%)	n (%)	A (%)	n (%)	D (%)	n (%)	SD (%)	n (%)	Mean	Decision
HIM Infrastructure and Resources											
1	Computers and workstations were adequate for HIM activities.	45 (14.7)	110 (35.8)	115 (37.5)	37 (12.1)			2.53			Agree
2	Internet and network connectivity were reliable for HIM activities.	38 (12.4)	105 (34.2)	120 (39.1)	44 (14.3)			2.45			Disagree
3	Electronic health information systems/EHR facilities were available.	50 (16.3)	100 (32.6)	112 (36.5)	45 (14.7)			2.50			Agree
4	Electricity supply was adequate to support HIM activities.	32 (10.4)	98 (31.9)	125 (40.7)	52 (16.9)			2.36			Disagree
5	Data-storage facilities and servers were adequate.	40 (13.0)	108 (35.2)	117 (38.1)	42 (13.7)			2.48			Disagree
6	Adequate backup systems were available for health information.	42 (13.7)	112 (36.5)	110 (35.8)	43 (14.0)			2.50			Agree
7	Physical storage facilities for health records were adequate.	35 (11.4)	100 (32.6)	122 (39.7)	50 (16.3)			2.39			Disagree
8	Filing and record-retrieval equipment were adequate.	43 (14.0)	115 (37.5)	108 (35.2)	41 (13.4)			2.52			Agree
9	Sufficient trained HIM personnel were available.	30 (9.8)	96 (31.3)	128 (41.7)	53 (17.3)			2.34			Disagree
10	Adequate technical/IT support was available when needed.	36 (11.7)	104 (33.9)	119 (38.8)	48 (15.6)			2.42			Disagree
11	Funding for HIM activities were adequate.	28 (9.1)	92 (30.0)	130 (42.3)	57 (18.6)			2.30			Disagree
12	Data-security and confidentiality mechanisms were adequate.	47 (15.3)	119 (38.8)	105 (34.2)	36 (11.7)			2.58			Agree
Decision-Making											
13	HIM resources supported clinical decision-making.	45 (14.7)	118 (38.4)	110 (35.8)	34 (11.1)			2.57			Agree
14	HIM resources supported administrative decision-making.	40 (13.0)	115 (37.5)	116 (37.8)	36 (11.7)			2.52			Agree
15	Available health information supported patient-management decisions.	48 (15.6)	120 (39.1)	105 (34.2)	34 (11.1)			2.59			Agree
16	Available health information supported resource-allocation decisions.	35 (11.4)	108 (35.2)	122 (39.7)	42 (13.7)			2.44			Disagree
17	Health information supported planning and service improvement.	43 (14.0)	116 (37.8)	112 (36.5)	36 (11.7)			2.54			Agree
18	Health information supported monitoring of healthcare activities.	46 (15.0)	121 (39.4)	106 (34.5)	34 (11.1)			2.58			Agree
19	Health information supported evidence-based professional decisions.	50 (16.3)	119 (38.8)	105 (34.2)	33 (10.7)			2.61			Agree
Cluster Mean										2.47	Moderate

Note: SA = Strongly Agree; A = Agree; D = Disagree; SD = Strongly Disagree. Percentages were calculated using $n = 307$. Criterion mean = 2.50.

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The results of the respondents' perception of HIM infrastructure, resources and decision making of healthcare professionals in tertiary care facilities in Bayelsa State are presented in the table above. The results indicated moderate level of HIM infrastructure and resources, with substantial differences at a component level.

The highest mean scores for HIM infrastructure and resources were for data-security and confidentiality mechanisms ($M = 2.58$), adequacy of computers and workstations ($M = 2.53$), and filing and retrieval equipment ($M = 2.52$). Both the availability of electronic health information systems/EHR facilities and the availability of backup systems had a mean of 2.50, which was just at the criterion level of agreement.

The lowest mean score was obtained for the appropriateness of funding for HIM activities ($M = 2.30$) while the availability of enough trained HIM personnel ($M = 2.34$) and the appropriateness of electricity supply ($M = 2.36$) had second lowest mean scores. Physical records-storage facilities ($M = 2.39$), technical/IT support ($M = 2.42$), internet/network connectivity ($M = 2.45$), and data-storage/server facilities ($M = 2.48$), also had a mean score below the criterion mean of 2.50. These findings indicate, however, that while some basic HIM infrastructure was in place, respondents felt there were significant issues with funding, staffing, power supply, technical support and supporting infrastructure.

The most mean was found for the question of whether the information is used in making decisions based on evidence for the profession ($M = 2.61$), and the next highest mean was for the use of the information for decisions regarding patient management ($M = 2.59$). Another moderate positive assessment ($M = 2.54$) was made for planning and service improvement. The mean score for administrative decision making was 2.52, a score slightly higher than the criterion mean. The mean was, however, 2.44 for using available health information for resource allocation decisions, suggesting disagreement.

The overall cluster mean was at about 2.47, which was moderate, but lower than the criterion mean of 2.50. This indicated that HIM infrastructure and resources, along with their role in decision making, was in place to some extent but not completely across the tertiary hospitals.

Objective Two: To examine the relationship between record management processes and decision quality and timeliness among healthcare professionals in tertiary hospitals in Bayelsa State.

Response scale: SA = Strongly Agree (4), A = Agree (3), D = Disagree (2), SD = Strongly Disagree (1).

Decision rule: Mean ≥ 2.50 = High/Positive; Mean < 2.50 = Low/Negative.

Table 2: Respondents' Assessment of Record Management Processes, Decision Quality and Timeliness (n = 307)

S/N	Questionnaire Items	SA f (%)	A f (%)	D f (%)	SD f (%)	Total	Mean	Decision
1	Complete and accurate health records are maintained in my hospital.	45 (14.7)	100 (32.6)	112 (36.5)	50 (16.3)	307	2.46	Low
2	Patients' health records are updated promptly whenever new information is generated.	40 (13.0)	96 (31.3)	119 (38.8)	52 (16.9)	307	2.40	Low
3	Health records are properly classified, indexed and arranged for easy use.	48 (15.6)	103 (33.6)	105 (34.2)	51 (16.6)	307	2.48	Low
4	Patients' records can be retrieved promptly when required by healthcare professionals.	38 (12.4)	94 (30.6)	118 (38.4)	57 (18.6)	307	2.37	Low
5	Health records are securely stored and protected against loss, damage or unauthorized access.	44 (14.3)	92 (30.0)	115 (37.5)	56 (18.2)	307	2.40	Low
6	Information contained in health records is sufficiently available when healthcare professionals make decisions.	42 (13.7)	101 (32.9)	111 (36.2)	53 (17.3)	307	2.43	Low
7	Information obtained from health records supports timely decision-making by healthcare professionals.	39 (12.7)	98 (31.9)	116 (37.8)	54 (17.6)	307	2.40	Low
8	Complete health records contribute to accurate decisions about patient care and management.	46 (15.0)	103 (33.6)	109 (35.5)	49 (16.0)	307	2.48	Low
9	Delays in retrieving health records can delay healthcare professionals' decisions.	34 (11.1)	91 (29.6)	122 (39.7)	60 (19.5)	307	2.32	Low
10	Effective record management processes facilitate timely healthcare decisions.	40 (13.0)	105 (34.2)	112 (36.5)	50 (16.3)	307	2.44	Low
Grand Mean						307	2.41	Low

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As shown in the above table, the overall perception of the respondents towards the record management processes and its impact on decision quality and timely decision making was comparatively low. The overall mean of 2.41 was lower than the four-point Likert scale (2.50) showing low level of agreement with the positive statements.

The statement that health records are properly classified, indexed and arranged for easy use scored the highest mean of 2.48 followed closely by the statement that complete health records contribute to accurate decisions about patient care and management, with a mean of 2.48. This indicates that although respondents recognised the value of records being correctly organised and completed, these were not always robust in the hospitals.

The lowest mean was found to be for the statement that delays in getting health records can delay health care professionals' decisions, with a mean of 2.32. This was followed by the immediate retrieval of patients' records, the mean of which was 2.37. The results highlight specifically the retrieval and

accessibility of records as potential factors impacting on the timely nature of health care decision-making. Likewise, the prompt updating of patients' health records as new information is generated scored a mean of 2.40; and secure storage and protection of health records scored a mean of 2.40. This suggests that retrieval may not be the only weakness, but also in the routine updating and management of records.

Overall, this descriptive result indicated that the processes used for record management were not adequate to effectively support high quality and timely decision making by healthcare professionals. The results are thus used to investigate the question of whether the variance of record management processes is statistically related to decisions' quality and timeliness.

Hypothesis One

H₀₁: HIM infrastructure and resources have no significant relationship with decision-making among healthcare professionals in tertiary hospitals in Bayelsa State.

Table 3: Pearson Product Moment Correlation between HIM Infrastructure and Resources and Decision-Making (N = 307)

Variables	N	Mean	SD	Pearson r	Sig. (2-tailed)	Decision
HIM infrastructure and resources	307	2.74	0.61	0.540	0.000	Significant
Decision-making	307	2.86	0.57			

Note: Correlation is significant at the 0.01 level (2-tailed).

The table above shows the Pearson Product Moment Correlation between HIM infrastructure and resources and decision-making among healthcare professionals in tertiary hospitals in Bayelsa State. The result indicates a positive and moderately strong relationship between HIM infrastructure and resources and decision-making, with a correlation coefficient of $r = 0.540$.

The significance value of $p = 0.000$ is less than the 0.05 level of significance. This means that the observed relationship is statistically significant. In practical terms, the finding suggests that better availability and adequacy of HIM infrastructure and resources tend to be associated with better decision-making among healthcare professionals.

Since $p < 0.05$, the null hypothesis (H_{01}) is rejected. Therefore, there is a statistically significant relationship between HIM infrastructure and resources and decision-making among healthcare professionals in tertiary hospitals in Bayelsa State.

The coefficient of determination is approximately:

$$R^2 = (0.540)^2 = 0.292$$

Thus, approximately 29.2% of the variation associated with decision-making is statistically related to HIM infrastructure and resources, while the remaining variation may be associated with other factors not examined in this hypothesis.

Hypothesis Two

H₀₂: Record management processes have no significant relationship with decision quality and timeliness among healthcare professionals in tertiary hospitals in Bayelsa State.

Table 4: Pearson Product Moment Correlation between Record Management Processes and Decision Quality and Timeliness (N = 307)

Variables	N	Mean	SD	Pearson r	Sig. (2-tailed)	Decision
Record management processes	307	2.91	0.58	0.610	0.000	Significant
Decision quality and timeliness	307	2.88	0.56			

Note: Correlation is significant at the 0.01 level (2-tailed).

The above table shows that there is a positive and moderately strong relationship between the record management processes and decision quality and timeliness with a Pearson correlation coefficient of $r = 0.610$.

The significance value of $p = 0.000$ is < 0.05 so that it is accepted. The significance value of $p = 0.000$ is < 0.05 so it can

be accepted. This indicates that the relationship observed between record management processes and decision quality and timeliness is statistically significant.

The discovery suggests that the quality and timeliness of decision-making by healthcare professionals is linked to effective record management processes, such as the timely

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creation, organization, retrieval, storage and maintenance of health records.

So, the null hypothesis (H_{02}) is rejected as $p < 0.05$. The study therefore shows that there is a statistically significant relationship between record management processes and decision quality and timeliness of healthcare professionals in tertiary hospitals in Bayelsa State.

The coefficient of determination is equal to:

$$R^2 = (0.610)^2 = 0.372$$

This means that, for the majority of the variance in decision quality and timeliness, there is a statistical relationship with record management processes, while the rest of the variance may be due to other factors.

DISCUSSION OF FINDINGS

Objective One: HIM Infrastructure and Resources and Decision-Making

The overall assessment of HIM infrastructure and resources and contribution to decision-making was moderate with the cluster mean of 2.47 below the criterion mean of 2.50. While some were rated positively, deficiencies in funding, trained HIM personnel, electricity supply, physical record-storage facilities, technical/IT support, and internet connectivity and data-storage capacity were noted. Data-security and confidentiality mechanisms ($M = 2.58$), computers and workstations ($M = 2.53$), and filing and retrieval equipment ($M = 2.52$) on the other hand had relatively high scores.

The extremely low scores that were obtained for funding ($M = 2.30$) and trained HIM personnel ($M = 2.34$) indicate that there may be limitations on the effective working of HIM due to financial and human resource constraints. This aligns with the findings of Adeleke et al (2015) who cited the problems faced by HIM practitioners in Nigeria with regard to health information technology skills and training and the need to build a capacity of human resources in health information management for effective IT services. Likewise, Ojo (2013) identified organisational factors that were associated with the successful implementation of an electronic health information management system in Nigerian teaching hospitals including financial resources, user training, technical infrastructure, management support and user involvement.

Another infrastructure gap is the low score for electricity supply ($M = 2.36$). EHS systems need electricity to power up the servers, computers, networking, and other digital resources. The findings correspond with the results obtained by Owolabi et al. (2024) who listed some of the factors identified as challenges in the implementation of electronic medical records in Nigeria as insufficient funding, poor connectivity of networks, inadequate power supply, low level of technical knowledge and insufficient training.

The low rating of physical record storage facilities ($M = 2.39$) also indicates some weaknesses in the traditional records environment. According to Owolabi et al. (2021), large amount of paper archive is a challenge for storage and retrieval in

Nigerian tertiary health centres, digital archive for preservation can make health information more accessible and faster to retrieve.

Respondents' general consensus was that health information was useful to them in making evidence-based professional decisions ($M = 2.61$), patient-management decisions ($M = 2.59$), monitoring health care activities ($M = 2.58$), clinical decisions ($M = 2.57$), planning ($M = 2.54$), and service improvement ($M = 2.52$), and administrative decisions ($M = 2.52$). However, the use of health information for resource-allocation decisions was lower ($M = 2.44$). This indicates that the use of health information was more prevalent in-patient care and more likely for professional decisions than for other resource management decisions. Alwan et al. (2016) highlighted that health information systems should produce, analyse, and disseminate accurate and credible information for evidence-based decision-making, resource allocation, monitoring and evaluation.

The inferential finding provided further evidence of the relationship. There was a positive and statistically significant relationship between HIM infrastructure and resources and decision-making ($r = 0.540$, $p < 0.001$). This suggests that improved HIM infrastructure and resources were related to improved decision making by healthcare professionals. The result corroborates the study of Ojo & Popoola, (2015) which found significant positive relationships between TEFS and success of EHISM in teaching hospitals in Nigeria.

The shared variance between HIM infrastructure/resources and decision-making are around 29.2% as represented by the coefficient of determination ($r^2 = 0.292$). This is not to say that 29.2% of performance in decision-making is due to infrastructure, but only that the variation in infrastructure is statistically correlated with the performance in decision-making. There are other professional, organizational and contextual factors which might impact decision-making.

In all, the discovery implies that the correct HIM infrastructure and resources play a vital role in enabling the use of health information in health care decision-making. The moderate assessment suggests though that just having an infrastructure is not enough, if staffing, funding, technical support, training, reliable electricity and organizational commitment are not in place.

Objective Two: Record Management Processes and Decision Quality and Timeliness

For the second objective, the results revealed that overall, respondents found the record management process and their role in the effective decision-making process and timeliness to be low and were below the criterion mean of 2.50 with a grand mean of 2.41. The highest were for the proper classification of records, indexing and arrangement of records ($M = 2.48$) and contribution of complete records to accurate patient-care decisions ($M = 2.48$). Patient records were retrieved promptly ($M = 2.37$) and delays in retrieval and their impact on decision making was the lowest mean ($M = 2.32$).

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Results show that the record-management processes were not robust enough to ensure that the information was complete and current, readily available and timely. Having reliable records is important because healthcare professionals need them when making clinical and administrative decisions. Adeleke et al (2012) reported the inadequacies of inpatient records in a tertiary hospital in Nigeria concerning completeness and control of records and highlighted the need for proper documentation for patient care, continuity of care and administrative decision making.

In the same stride, Adebisi et al. (2018) identified low quality in healthcare documentation in the Antiretroviral records of a tertiary hospital in Nigeria, which could have an impact on continuity and quality of health care services, adding that incomplete documentation and inadequate protection of records could have an impact. The results of these studies corroborate the ratings of low levels of updating, accessibility, security and retrieval of health records found in the present study.

Low retrieval for prompt ($M = 2.37$) is significant as information that is not accessed when needed is not very useful for the instant decision-making process. Owolabi et al., (2021) noted its challenges in Nigeria tertiary hospitals which include storage and retrieval problems and proposed digital preservation as a solution to enhance access and retrieval time.

Another information quality area that is of concern is timely updating of records, which had a low rating ($M = 2.40$). Kebede et al. (2024) proposed five dimensions of data quality for health-information-systems: accuracy, completeness, timeliness, accessibility, consistency and reliability and security. Inadequacies in updating, accessibility and retrieval can, therefore, diminish the value of health records for timely and accurate decision making.

The inferential analysis also showed that the decision quality and timeliness were positively and significantly correlated with the record management processes ($r = 0.610$, $p < 0.001$). This suggests that the quality and timeliness of decision-making were related to improved record-management practices. The finding is consistent with Alwan et al. (2016) who highlighted that health information systems must generate and produce reliable and timely information to inform health-related decisions.

The coefficient of determination ($r^2 = 0.372$) shows about 37.2% variance shared between the record-management processes and the decision quality and timeliness. Again, as in the first hypothesis, this is a strong statistical correlation, but not proof of causality.

It is also worth noting that the descriptive assessment of the record-management processes is low ($M = 2.41$) despite a moderate positive correlation with decision quality and timeliness ($r = 0.610$). The results of these studies are not contradictory. The descriptive result suggests that in general, the respondents considered record-management procedures to be inadequate, while the correlation result suggests that in the range of the responses observed, the better the record-management, the better the decision quality and timeliness.

Overall, these results indicate that there are significant relationships between HIM infrastructure and resources, as well as between record management processes and healthcare decisions. Decision-making and decision quality and timeliness had a significant positive relationship with HIM infrastructure and resources ($r = 0.540$, $p < 0.001$) as well as record management processes ($r = 0.610$, $p < 0.001$).

The findings indicate that a successful decision-making process depends on the integrated environment of information which requires proper infrastructure, reliable electricity and connectivity, adequate HIM personnel and technical support, funding, secure environment of information, proper records, classification and storage, updating and retrieval and timely availability of information. This reflects the WHO view that health information systems must have the capacity to produce information to support evidence-based decision making, both technologically and in terms of human resources.

Special focus is therefore needed for the regions that scored low on the tertiary facilities in Bayelsa State particularly in areas of funding, trained HIM personnel, electricity, technical support, network connectivity, storage facilities and record retrieval among others. Improvements in these areas might enhance the access and accessibility of health information and the opportunities for timely and informed health care choices.

CONCLUSION

The study finally found that Health Information Management (HIM) infrastructure, resources and record management processes were key factors in making effective healthcare decisions in tertiary hospitals in Bayelsa State. Some HIM facilities and resources were available, however the overall quality of the facilities was moderate, with major gaps in funding, availability of trained HIM personnel, electricity supply, technical support, network connectivity, storage facilities and other supporting infrastructure. Likewise, the record management processes were generally low, especially as regards prompt record updating, record retrieval and storage and the availability of information when needed for decision-making.

Although the results were limited, the inferential results showed significant positive relationships between HIM infrastructure and resources, decision making ($r = 0.540$, $p < 0.001$), and between record management processes and decision quality and timeliness ($r = 0.610$, $p < 0.001$). These results suggest that the better the HIM environment, the higher the level of use of health information for clinical, administrative, managerial and professional decisions. The study, therefore, recommends the enhancement of health information infrastructure, human resource, and record management system to enhance the availability, accessibility, and usefulness of health information and in the final analysis, support timely and informed healthcare decision making in tertiary hospitals in Bayelsa State.

RECOMMENDATIONS

Given the results of the research, the following recommendations were made:

1. HIM infrastructure should be improved in the hospitals: Ensure proper provision of computers, work stations, servers, storage facilities, network connectivity and other necessary equipment for effective health information management.
2. Sufficient and sustainable financing of HIM activities: Hospital management and government authorities should assign dedicated resources for the purchase, maintenance, software development, security of data, record keeping and other activities of HIM.
3. Improve availability of qualified HIM professionals: Tertiary hospitals should recruit adequate health information management personnel and create regular opportunities for Continuing Professional Development (CPD) among them, especially in the areas of EHR, data quality, data analytics, information security and Digital Health Technologies.
4. Alternative power supply and technical support should be provided: Hospitals should have a good plan in place for electricity during events of disruption and ensure that ICT support is provided in time to minimise disruption to electronic information systems and other HIM activities.
5. Improve completeness, accessibility and timeliness of health information through strengthening record management processes: Hospitals should implement appropriate processes for the creation, documentation, classification, indexing, filing, storage, retrieval, updating, retention and disposal of records.
6. Electronic health information systems should be expanded and properly maintained: Hospital management should focus on using, maintaining, interoperating, training users, backing up, and continuously improving the EHR system, not just on the installation of a system.
7. Better data quality and security should be ensured: Data quality audits should be undertaken regularly to spot incomplete, inaccurate, inconsistent or out-of-date data; adequate access-control, security protocols, backups and cybersecurity should be observed.
8. Reliable Health information should be used regularly for decision-making in hospital: Hospital's management and health workers should routinely incorporate HIM data in clinical management, service planning, monitoring, evaluation, resource allocation and quality improvement.
9. Collaboration among HIM professionals and other healthcare professionals within hospital management should be strengthened to foster understanding of the importance of accurate and timely health information and more generally, a culture of data use in hospitals.

10. The institutionalization of periodic assessment of HIM performance should be established: Tertiary hospitals should routinely review infrastructure, staffing, record-management efficiency, data quality and information utilization to observe and measure the HIM performance gap and changes over time.

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CONFLICT OF INTEREST

The author declare that there was no conflict of interest in the conduct, analysis, or reporting of this study.

REFERENCES

- I. Adebisi, A. A., Adeleke, I. T., Abdulghaneey, O. O., & Abdulsalaam, A. (2018). Assessment of quality of healthcare data management in antiretroviral records at Federal Medical Centre, Bida in North-central Nigeria. *International Journal of Health Records & Information Management*, 1(1).
- II. Adeleke, I. T., Adekanye, A. O., Onawola, K. A., Okuku, A. G., Adefemi, S. A., Erinle, S. A., Shehu, A. A., Yahaya, O. E., Adebisi, A. A., James, J. A., Abdul-Ghaney, O. O., Ogundiran, L. M., Jibril, A. D., Atakere, M. E., Achinbee, M., Abodunrin, O. A., & Hassan, M. W. (2012). Data quality assessment in healthcare: A 365-day chart review of inpatients' health records at a Nigerian tertiary hospital. *Journal of the American Medical Informatics Association*, 19(6), 1039–1042. <https://doi.org/10.1136/amiajnl-2012-000823>
- III. Adeleke, I. T., Lawal, A. H., Adio, R. A., & Adebisi, A. A. (2015). Information technology skills and training needs of health information management professionals in Nigeria: A nationwide study. *Health Information Management Journal*, 44(1), 30–38.
- IV. Agbaje, A. A. (1991). Medical records in University College Hospital, Ibadan. *Information Development*, 7(1), 27–31. <https://doi.org/10.1177/026666699100700105>
- V. Akwaowo, C. D., Sabi, H. M., Ekpenyong, N., Isiguzo, C. M., Andem, N. F., Maduka, O., Dan, E., Umoh, E., Ekpun, V., & Uzoka, F.-M. (2022). Adoption of electronic medical records in developing countries—A multi-state study of the Nigerian healthcare system. *Frontiers in Digital Health*, 4, 1017231. <https://doi.org/10.3389/fdgth.2022.1017231>

Health Information Management Infrastructure, Resources and Record Management Processes in Tertiary Hospitals in Bayelsa State

- VI. Alwan, A., Ali, M., Aly, E., Badr, A., Doctor, H., Mandil, A., Rashidian, A., & Shideed, O. (2016). Strengthening national health information systems: Challenges and response. *Eastern Mediterranean Health Journal*, 22(11).
- VII. Arogunjo, R. O., & Makinde, O. B. (2024). Evaluation of health records management systems of Lagos State University Teaching Hospital, Nigeria. *Information Development*, 42(3), 1333–1351. <https://doi.org/10.1177/026666669241264754>
- VIII. Dogiye, E. L., Ayebanengimote, V., & Edeki, E. (2022). Application of ICT in health information management practices in selected tertiary hospitals in South-South States of Nigeria. *International Journal of Health Records & Information Management*.
- IX. Dogiye, E. L., Adeleke, I. T., Edeki, E., & Allison, M. (2019). Rate and predictors of hospital readmissions in Niger Delta University Teaching Hospital Okoloibiri, Bayelsa State, Nigeria. *International Journal of Health Records & Information Management*, 2(1), 14–18.
- X. Kebede, M. M., et al. (2024). Common data quality elements for health information systems: A systematic review. *BMC Medical Informatics and Decision Making*.
- XI. Mbachu, C., Ekwueme, C., Arize, I., & Ukor, N. (2025). Health information and information systems. In O. Onwujekwe, E. Etiaba, C. Ezenduka, N. Uguru, C. Okeke, E. Okechukwu, B. Uzochukwu, C. Mbachu, S. Batialack, & B. Kreling (Eds.), *Nigeria: Country Health Systems & Services Profile* (pp. 239–258). World Health Organization Regional Office for Africa.
- XII. Ojo, A. I. (2013). Organisational factors associated with electronic health information management systems success in two Nigerian teaching hospitals. *Journal of Health Informatics in Africa*, 1(1).
- XIII. Ojo, A. I., & Popoola, S. O. (2015). Some correlates of electronic health information management system success in Nigerian teaching hospitals. *Biomedical Informatics Insights*, 7, 1–9. <https://doi.org/10.4137/BII.S20229>
- XIV. Olukorode, O., Adedeji, O. J., Adetokun, A., & Abioye, A. I. (2024). Impact of electronic medical records on healthcare delivery in Nigeria: A review. *PLOS Digital Health*, 3. <https://doi.org/10.1371/journal.pdig.0000420>
- XV. Owolabi, R. O., Adeleke, I. T., Ahmed, H. H., & Aliyu, A. (2024). Organizational bottlenecks, health data management and electronic medical records adoption in Nigeria. *International Journal of Health Records & Information Management*, 7(1).
- XVI. Owolabi, R. O., Agboola, I. O., & Oguiyi, S. (2021). Digital preservation of health records in tertiary hospitals: Implications for health information management in Nigeria. *International Journal of Health Records & Information Management*, 4(1).
- XVII. World Health Organization. (2025). *Strategy for optimizing national routine health information systems: Strengthening routine health information systems to deliver primary health care and universal health coverage*. World Health Organization.
- XVIII. World Health Organization. (2026). *Health service data: Routine health information systems*. World Health Organization.
- XIX. Zuske, M.-K., Auer, C., Oliver, S., Eysers, J., & Bosch-Capblanch, X. (2022). Framework synthesis to inform the ideation and design of a paper-based health information system (PHISICC). *International Journal of Health Planning and Management*, 37(4), 1953–1972. <https://doi.org/10.1002/hpm.3487>