

*Research paper*

# SWOT Analysis of Health Information Management Practice in Nigeria

<sup>1</sup>Omokanye S.A, <sup>2</sup>Wegbom A.I., <sup>3</sup>Adio R. and <sup>4</sup>Adebayo C.O

<sup>1</sup> School of Health Information Management, OAUTHC Ile-Ife, Nigeria

<sup>2</sup> Department Public Health Sciences, Rivers State University, Port Harcourt Nigeria

<sup>3</sup> Department of Health Information Management, National Hospital, Abuja, Nigeria

<sup>4</sup> School of Health Information Management UITH, Ilorin, Nigeria

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**Introduction and Objectives:** This study aimed to conduct a comprehensive SWOT analysis of existing health information management practices in Nigeria, focusing on both paper-based and electronic health records (EHRs) systems. The objectives were to assess the strengths and weaknesses of paper-based health records, explore the opportunities and threats of EHRs, and identify areas for improvement in health records management practices in Nigeria.

**Methods:** A survey research design was employed, and data were collected from healthcare professionals, healthcare administrators, health IT professionals, and healthcare researchers/academicians using an online Google Form questionnaire. Descriptive statistics and inferential statistics, specifically regression analysis, were used to analyze the data.

**Results:** The results showed that paper-based health records practice in Nigeria has both strengths and weaknesses. The strengths include portability, ease of use, and stability, while the weaknesses include poor filing, illegible handwriting, and inconvenience in accessing records. On the other hand, EHRs were perceived to offer opportunities for improved quality patient care, enhanced data security, and better interoperability, but also posed threats such as system failure, inadequate budgetary allocation, and insufficient training. The regression analysis revealed that the weakness of paper-based health records practice has a significant effect on its strength, and the threats of EHRs have a significant effect on the opportunities of EHRs.

**Conclusion:** In conclusion, the study found that health information management practices in Nigeria exhibit a certain degree of accuracy, despite the limitations of paper-based health records. However, EHRs demonstrate even higher levels of precision and accuracy compared to paper-based records, despite the potential challenges associated with their implementation. The study recommends that Nigeria consider adopting EHRs to enhance and improve the management of health records in the country.

**Recommendations:** Based on the findings of this study, several recommendations are proposed, including prioritizing adequate financial resources for EHRs adoption, establishing robust backup mechanisms, developing clear guidelines and policies for EHRs implementation, providing comprehensive training for healthcare professionals, and prioritizing robust security measures to protect EHRs from potential breaches and unauthorized access.

**Keywords:** SWOT analysis, health information management practices in Nigeria, focusing on both paper-based and electronic health records (EHRs) systems.

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## INTRODUCTION

Health Information Management (HIM) is a crucial practice that involves the acquisition, analysis, and protection of both digital and traditional medical information. This information is essential for delivering high-quality patient care, as stated by the American Health Information Management Association (AHIMA) and Nearterm (2018). During the delivery of various essential health services, health data is documented and recorded. These records are collected routinely or periodically and serve as valuable resources for planning and managing health services effectively and efficiently. This is important for ensuring the delivery of optimal healthcare, as emphasized by the World Health Organization (WHO) in 2012 and Nsiah (2022). In any healthcare institution, the practice of health record management is imperative to guarantee quality service delivery, as highlighted by Obotu (2018). The tasks involved in health information management require teamwork and collaboration. Fatiregun (cited in Omole, 2019) asserts that health records management is a coordinated effort involving people, equipment, data collection and processing methods. These elements work together to produce information that supports planning, decision-making, and overall management of the healthcare system. Furthermore, according to Olumide (cited in Omole, 2019), health records management practice encompasses a collection of personnel, procedures, and instruments organized to develop and utilize available facts, transforming them into valuable information that facilitates decision-making processes.

Health records management practices in Nigeria and some other African countries predominantly rely on manual methods. These methods involve the implementation of basic health records management systems, including numbering, tracing, filing, appointment scheduling, coding, and indexing. These systems are operational within the health records department, which consists of various sections such as registration, admission and discharge, coding and indexing, statistics, and library sections. Users of the information rely on manual processes to access the required information based on their needs and requests (Makata, 2015; Omole, 2019). To provide effective and efficient patient care, healthcare providers must have access to patients' information in the form of medical records. Health records play a vital role in helping hospitals achieve their missions and visions. The primary objective of health record management is to ensure the quality, accuracy, accessibility, authenticity, and security of information in both paper and electronic systems (The United States Department of Labor, 2013; Obotu, 2018).

Inadequate documentation and poor management of health records have a negative impact on the quality and effective utilization of health information, leading to adverse outcomes in healthcare delivery (Obimba, 2022). A study conducted by Asinor and Leung (2016) demonstrated that effective management of health records is crucial for improving healthcare services in less developed countries, such as Ghana (Alegbeleye n.d.). Similarly, Ondieke's (2017) study in Kenya revealed that records management practices encompass the creation/receipt, maintenance, use, and disposal of records. The study highlighted that the lack of effective and efficient records management practices hampers the ability of healthcare workers, including doctors, nurses, and pharmacists, to deliver timely and effective healthcare services in public health institutions. Another empirical study conducted by Danso in the Upper Denkyira West District of Ghana showcased the significant impact of improper records management practices on the responsiveness, effectiveness, and quality of healthcare service delivery (Ikonne, 2021). It is evident that health records management practices are integral to the healthcare system, and neglecting their proper functionality in any healthcare facility undermines the achievement of quality healthcare service delivery (Medical Protection Society [MPS], 2014, cited in Isaruk, 2021).

Continuous improvement in organizational processes is essential for achieving better performance and maintaining excellent quality of work (Noordin, 2011). To achieve this, it is important to identify and define all factors that influence the organization's functioning (Tarzic, 2010). One effective technique for assessing and evaluating these factors is through the use of SWOT analysis, which is an exploratory scientific approach (Arshad, 2017). Conducting a SWOT analysis is crucial in understanding the strengths, weaknesses, opportunities, and threats of Health Information Management Practice in Nigeria. By examining these factors, underlying issues can be identified and addressed (Adeniyi O, 2011). SWOT analysis aims to identify the internal strengths and weaknesses of the organization being studied, as well as the external opportunities and threats present in the environment. Strengths represent the internal capabilities and advantages that enable an organization to compete effectively. Weaknesses, on the other hand, are aspects that negatively impact the value of products or services in relation to customers or the competitive environment. Opportunities refer to favorable conditions that can be leveraged to achieve specific goals, while threats are external factors or events that can harm the organization's strategy. Once these factors are identified, strategies can be developed to capitalize on strengths, address weaknesses, exploit opportunities, and mitigate threats (Pereira, 2013). Internal factors can be identified through internal appraisals, while external factors require an assessment of the external environment. SWOT analysis takes into consideration both the internal and external environments of an organization, which are complex and interconnected (Pereira, 2013). The internal environment refers to factors that the organization can control and is directly influenced by the strategies formulated. On the other hand, the external environment is beyond the control of the organization and affects all organizations operating in the same market and area. The external

analysis considers factors such as the political, economic, cultural, social, technological, and competitive environment to identify opportunities and threats (Pereira, 2013).

In today's work environment, regardless of the type of organization, records play a crucial role in facilitating activities. Organizations heavily rely on the content and documentation of established structures and policies to enhance their functioning. However, it is not enough to simply have access to and retrieve stored records. The retrieved records need to be effectively utilized for their intended purposes, which is the ultimate goal of record management (Enakrire, 2020). The current health information management practice in Nigeria predominantly relies on paper-based systems and is primarily internal to healthcare organizations. However, there are opportunities external to healthcare organizations that can be harnessed to enhance the quality of patient care. These opportunities lie in the utilization of information technology devices such as electronic health records, electronic medical records, mHealth, eHealth, health informatics, and telemedicine. These technological advancements have been proven to improve the quality of healthcare data and patient outcomes in many developed nations. Despite the potential benefits, there are also identified threats associated with the adoption and implementation of these technological applications, which have contributed to a sense of reluctance in developing nations like Nigeria. These threats may include concerns about data security, privacy, lack of infrastructure, limited digital literacy, and financial constraints.

While healthcare professionals and administrative staff are aware of the weaknesses of paper-based records, such as illegible handwriting, incomplete data, and limited accessibility (Roukema, 2006), there are still significant strengths and advantages associated with paper-based records that are valued in healthcare settings. One of the main strengths of paper-based records is their portability and ease of use. Paper records can be easily carried and accessed by healthcare professionals at different locations within a healthcare facility. They do not require electricity or backup systems to be accessed, making them stable and reliable (Laerum, 2004). Flexibility is another advantage of paper-based records. They can be easily customized to fit the specific needs and workflows of healthcare professionals. This flexibility allows for quick and easy documentation of patient information during daily tasks (Ayatollahi, 2009). Another notable advantage is the accessibility of paper medical records. They do not require internet access or expensive software to record patient information. Healthcare providers can simply retrieve the relevant paper chart from a filing cabinet when they need to view a document (Pimsy © 2023). Some clinicians also find comfort in the tangibility of paper records. The ability to make quick handwritten notes and sketch diagrams on paper provides a sense of familiarity and ease for certain healthcare professionals (Pimsy © 2023).

On the other hand, the weaknesses of the health information management practice in relation to paper-based systems are significant. Many organizations and individuals do not give adequate attention to record-keeping, leading to irregular record filing and difficulties in retrieving necessary records. In some cases, records are not properly cared for and can deteriorate or even go missing due to exposure to the elements or theft. Manual systems for searching and retrieving records in hospitals can be time-consuming and inefficient (Yaya, 2015). The traditional paper-based clinical workflow also introduces a range of issues. Illegible handwriting, inconvenient access to records, potential errors in computational prescribing, inadequate patient handoffs, and drug administration errors are among the problems associated with paper records. These issues can result in medical errors, omissions, duplications, and ultimately, compromised quality of care and poor patient outcomes (Snyda, 2011; Ge, 2022). In modern healthcare, paper records lag behind due to the inefficiency of accessing, entering, and retrieving medical data. Paper charting can be inaccurate, illegible, incomplete, or repetitive, leading to delays and errors in patient care (Yu et al., 2013; Emmerich, 2023). The traditional paper system involves unnecessary steps and redundancies, such as patients having to repeatedly explain their symptoms to different healthcare professionals, reliance on handwritten notes that can be difficult to interpret, a reactive rather than proactive system where patients must self-diagnose and initiate care, delays in communication between physicians, and a lack of universal databases for cross-referencing patient information (Kumar, 2010). These inefficiencies can be significantly reduced with the introduction of electronic medical records (EMRs). Information technology, including electronic health records (EHRs), is seen as a crucial factor in improving healthcare quality and patient safety. EHRs are an essential component of IT systems that can address and mitigate the weaknesses of paper-based record keeping (Shahmoradi, 2017).

The opportunity for health information management practice in Nigeria lies in the application of information technology, particularly electronic health records (EHR) systems. Electronic health records provide significant advantages in diagnosing and managing illnesses. Physicians can access a wealth of information instantly, making it easier to diagnose complex or mysterious illnesses (Kumar, 2010). EHR systems are designed to accurately and consistently store patient health data over time, allowing for comprehensive and reliable health information (Ogbonna, 2020). By addressing population health information needs, electronic health records contribute to the development of health policies, informed decision-making, and the promotion of healthy lifestyles. They also facilitate improved communication, enhanced quality of care, reduced medical errors, and elimination of waste in healthcare processes (Shahmoradi, 2017). Another opportunity lies in the implementation of telemedicine, which involves the delivery of healthcare services using information and communication technologies. Telemedicine allows healthcare professionals to exchange valid

information for diagnosis, treatment, prevention, research, evaluation, and continuing education, particularly in situations where distance is a critical factor. Telemedicine has the potential to advance the health of individuals and communities by overcoming geographical barriers and improving access to healthcare services (Saxena, 2022).

The application of information technology, including electronic health records (EHR) systems, can indeed pose threats to health information management practice in Nigeria. When these applications or systems fail, they can become a vehicle for perpetuating erroneous information, leading to mistakes in diagnosis and increased costs (Fernandez, 2015). Insufficient electronic health records systems for monitoring, evaluation, and analysis of health indicators have been identified as one of the obstacles facing the Nigerian healthcare system by the World Health Organization (Levingston, 2012; World Health Organization, 2012) (Ogbonna, 2020). This lack of adequate systems hinders the effective management and analysis of health data, which can impact decision-making and overall healthcare quality. Another threat is the issue of data interoperability, which refers to the ability of different systems and applications to exchange and use data seamlessly. Inadequate data interoperability can lead to challenges in integrating and sharing health information across various healthcare settings, hindering the continuity and coordination of care (Diaz, 2020). Furthermore, public concerns about the privacy and confidentiality of patients' information can pose a threat to health information management practice. If individuals perceive that their personal health information is at risk of being compromised or misused, it can erode trust in electronic health record systems and deter their adoption and use.

The researcher has observed with keen interest the prevailing belief among Nigerians that it is necessary to migrate to electronic health records (EHR) systems, driven by the perceived weaknesses of paper-based health records practices and the apparent advantages of EHR systems. However, there has been limited consideration or evaluation of the potential strengths that paper-based records may possess over EHR systems. This lack of evaluation could be a contributing factor to the delay in migration. Furthermore, the researcher noted that while several studies have been conducted on the strengths, weaknesses, opportunities, and threats (SWOT) analysis of EHR systems, very few, if any, studies have been undertaken to analyze the strengths and advantages of paper-based health records practices in Nigeria. This knowledge gap prevents a comprehensive understanding of the potential benefits and challenges associated with both paper-based and electronic systems. Additionally, it raises questions as to why the success rate of migration to EHR systems in developing nations like Nigeria remains low or virtually nonexistent. To address this gap in knowledge, the present study aims to fill this void by conducting an analysis of the strengths and advantages of paper-based health records practices in Nigeria. The research seeks to explore whether paper-based records still offer certain strengths over EHR systems and to understand the reasons behind the limited success rate of migration. By conducting this analysis, the study aims to provide valuable insights into the current health information management landscape and offer a more balanced perspective on the potential benefits and challenges associated with different record-keeping approaches.

## Objectives of the study

The study aims to perform a comprehensive and in-depth SWOT analysis of existing health information management practice in both private and public healthcare organizations in Nigeria. The specific objectives are to:

1. Assess the Strengths of the existing paper-based health records management practice in Nigeria.
2. Evaluate weaknesses and the possible influential factors of the existing paper-based health records management practice in Nigeria.
3. Explore EHRs opportunities to improve the current health information management practice in Nigeria.
4. Identify and examine the possible threats that may lead to failure of the proposed EHRs system in Nigeria.

## Hypotheses

**Ho1:** The weakness of paper-based health records practice has no significant effect on its strength in Nigeria

**Ho2:** The threats of EHRs to health records practice has no significant effect on the opportunities of EHRs in Nigeria

## Methods

A survey research design was employed to gather information from various stakeholders, including healthcare professionals, healthcare administrators, health IT professionals, and healthcare researchers/academicians. Two sampling techniques, snowball sampling and convenience sampling, were utilized. Convenience sampling involved selecting participants based on their availability and willingness to participate, while snowball sampling involved existing

participants referring or recruiting other potential participants, creating a chain of referrals.

Data from the study participants were collected using an online Google Form questionnaire. The questionnaire consisted of five sections: Section A focused on the participants' demographic characteristics, Section B assessed the strengths of paper-based health records practice in Nigeria, Section C evaluated the weaknesses of paper-based health records practice in Nigeria, Section D explored the opportunities of electronic health records (EHRs) for health records practice in Nigeria, and Section E examined the threats of EHRs to health records practice in Nigeria.

Descriptive statistics, such as frequency distribution counts, percentages, mean, standard deviation and skewness of datasets were computed using IBM SPSS Statistics 20.0. Additionally, inferential statistics, specifically regression analysis and regression model, were employed to establish relationships between dependent and independent variables.

## Result and Discussion of Findings

### Section A: Socio-demographic Characteristics of the study Participants

**Table 1:** Socio-Demographical Characteristics

S/N	PARAMETERS	FREQUENCY	PERCENTAGE
	<b>Name of Healthcare Institution of the Participants</b>		
	<b>Osun State</b>		
	OAUTHC Ile-Ife	32	38.6
	UNIOSUNTH Osogbo	2	2.4
	General Hospital Osun	7	8.4
	PHC Osun	2	2.4
	<b>Ondo State</b>		
	UNIMEDTHC Ondo	2	2.4
	Adekunle Ajasin University Health Service	1	1.2
	FMC Owo	3	3.6
	HMB Akure	1	1.2
	CHT Clinic Ondo	1	1.2
	State Reference Hospital Akure	1	1.2
	<b>Lagos State</b>		
	National Orthopedic Hospital Igbobi	1	1.2
	General Hospital Ifakoljaye	4	4.8
	<b>Ogun State</b>		
	Babcock University Teaching Hospital	1	1.2
	Federal Neuropsychiatric Hospital Aro	1	1.2
	<b>Oyo State</b>		
	LAUTECH Teaching Hospital Ogbomoshu	3	3.6
	UCH Ibadan	1	1.2
	General Hospital	1	1.2
	<b>Kwara State</b>		
	UITH Ilorin	3	3.6
	<b>Niger State</b>		
	FMC Bida	3	3.6
	<b>Abuja</b>		
	MOH	1	1.2
	National Hospital	1	1.2
	Health Service Commission	2	2.4
	<b>Rivers State</b>		
	Specialist Hospital Port Harcourt	2	2.4
	HMB Port Harcourt	1	1.2
	<b>Akwa Ibom State</b>		
	University of Uyo Teaching Hospital	1	1.2
	PHC Akwa Ibom	3	3.6
	<b>Bayelsa State</b>		
	Federal University Otuoke Health Centre	1	1.2
	<b>Bauchi State</b>		
	Specialist Hospital	1	1.2

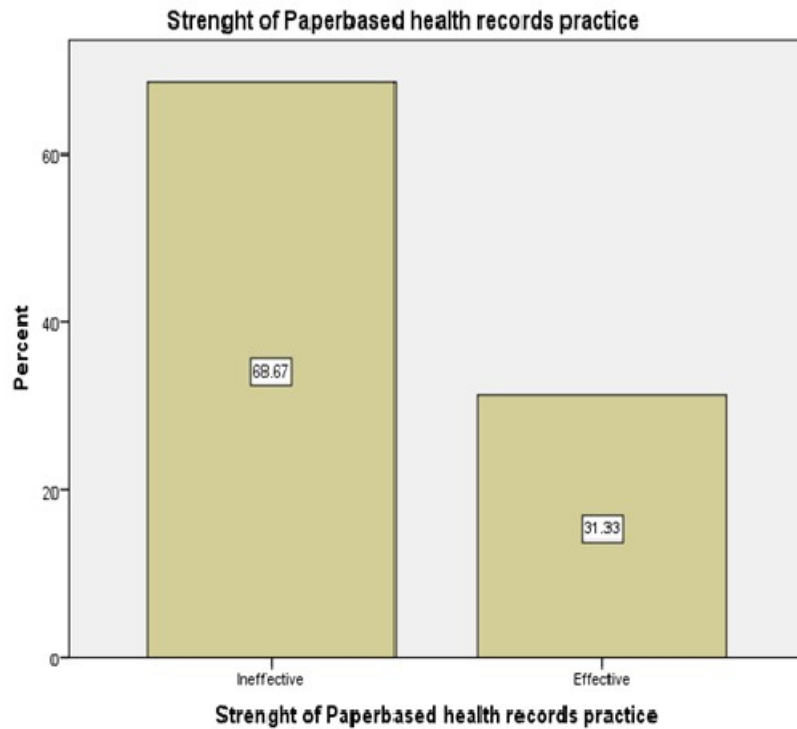
**Table 1: continues**

	<b>Category of Healthcare Institution</b>		
	Private	2	2.4
	Public/Government	81	97.6
	<b>Age Group</b>		
	18-25	1	1.2
	26-35	21	25.3
	36-45	31	37.3
	46-55	22	26.5
	56 and above	8	9.6
	Total	83	100.0
	<b>Gender</b>		
	Male	53	63.9
	Female	30	36.1
	Total	83	100.0
	<b>Occupation</b>		
	Administrator/Manager in Healthcare Organization	1	1.2
	Healthcare Professional (Doctor, Nurse, HIM e.t.c)	72	86.7
	Health IT Professional	3	3.6
	Health Researcher/Academician	7	8.4
	Total	83	100.0
	<b>Years of Experience in Healthcare Industry</b>		
	Less than 1 year	14	16.9
	1-5	17	20.5
	6-10	2	2.4
	More than 10 Years	50	60.2
	Total	83	100.0

In Table 1, the socio-demographic characteristics of the respondents in a study conducted in Nigeria are presented. The study included participants from various regions and states in Nigeria. The majority of respondents (38.6%) were from Osun State, specifically from the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC) in Ile-Ife. A significant majority of respondents (97.6%) were from public/government-owned healthcare institutions. The largest proportion (37.3%) fell within the age range of 36-45 years and the majority (63.9%) were identified as male. An overwhelming majority of respondents (86.7%) were healthcare professionals, specifically health information management professionals and the majority (60.2%) reported having more than 10 years of experience in the healthcare industry.

The significance of these variables lies in their potential influence on the study's findings and their implications for generalizability. The geographic distribution provides insights into the regional representation of the participants, while the healthcare institution type indicates a focus on the public healthcare sector. Age and gender distributions highlight the demographic composition of the sample. The emphasis on health information management professionals indicates their importance in the study, and the experience in healthcare reflects the expertise and knowledge of the participants. Understanding these variables helps interpret the findings and consider their applicability to broader populations or healthcare contexts in Nigeria.

## Section B: Assess the Strengths of the existing paper-based health records management practice in Nigeria.



**Figure 1.**

Figure 1 presents the assessment of the perceived strength of paper-based health records practice in healthcare institutions in Nigeria. The findings indicate that a significant majority (68.87%) of the study participants expressed the belief that paper-based health records practice in Nigeria is ineffective in ensuring quality patient care and fulfilling other secondary purposes. This finding suggests that a substantial proportion of the respondents hold a negative perception of the current paper-based health records system in Nigeria's healthcare institutions. They perceive it as lacking in effectiveness and potentially limiting the provision of high-quality care to patients. The dissatisfaction with the paper-based system may indicate a need for improvements or a shift towards more advanced and efficient electronic health record systems.

**Table 2**

Parameters Assessing the Strength of Paper-based Health Records Practice	Frequency	Percentage	Statistics
<b>General Perception</b>			Mean= 2.8434
Fair	20	24.1	Rel. Mean = 1.0028
Good	56	67.5	S.D= 0.5518
Excellent	7	8.4	Skewness= -0.071
<b>Operation Efficiency</b>			Mean= 2.0120
Inefficient	18	21.7	Rel. Mean = 0.9982
Moderately Efficient	49	59.0	S.D= 0.7241
Efficient	13	15.7	Skewness= 0.574
Highly Efficient	3	3.6	
<b>Security</b>			Mean= 1.7470
Low Security	34	41.0	Rel. Mean = 0.9973
Moderate Security	36	43.4	S.D= 0.7130
High Security	13	15.7	Skewness= 0.413

**Table 2. continues**

<b>Interoperability</b>			Mean= 1.6506
Low Interoperability	36	43.4	Rel. Mean = 1.0012
Moderate Interoperability	40	48.2	S.D= 0.6331
High Interoperability	7	8.4	Skewness= 0.443
<b>Training</b>			Mean= 1.3253
Ineffective	56	67.5	Rel. Mean = 0.9972
Effective	27	32.5	S.D= 0.4713
			Skewness= 0.760

Table 2 presents the parameters assessing the strength of paper-based health records practice in Nigeria. The given data reflects the perception and various attributes of paper-based records in different dimensions. The general perception of the strength of paper-based records is relatively positive (Rel. Mean = 1.0028) but slightly variable (SD = 0.5518). Operational efficiency (Mean = 2.0120), security (Mean = 1.7470), and interoperability (Mean = 1.6506) are all perceived negatively, with security (SD = 0.7130; Skewness 0.413) and interoperability (SD = 0.6331; Skewness 0.443) having similar patterns of moderate variability and positive skewness. Training (Mean = 1.3253) is perceived most negatively with the least variability (SD = 0.4713) in responses, indicating strong consensus on its negative impact. The relative means being close to 1 across all attributes suggest consistent perceptions relative to each other.

The findings of this study reveal that while paper-based health records in Nigeria are generally perceived positively, there are notable concerns regarding their effectiveness, particularly in training, interoperability, and security. The negative perception of training effectiveness highlights a gap in knowledge and skills among healthcare practitioners, suggesting that current training programs may not be adequately preparing staff for efficient record management. Additionally, the study shows that aspects such as operational efficiency, security, and interoperability are viewed negatively, with security and interoperability exhibiting moderate variability and positive skewness in responses. These findings emphasize the need for improvements in these areas to enhance the overall strength and effectiveness of paper-based health records. In contrast, previous studies have identified strengths in paper-based records, such as portability, ease of use, stability, flexibility (Laerum, 2004), compatibility with daily tasks (Ayatollahi, 2009), and accessibility and comfort (Pimsy, 2023), but the current findings highlight that these strengths alone may not suffice in addressing the operational limitations, underlining the importance of improving training, security, and interoperability in Nigeria's healthcare institutions.

### Section C: Evaluate weaknesses and the possible influential factors of the existing paper-based health records management practice in Nigeria.

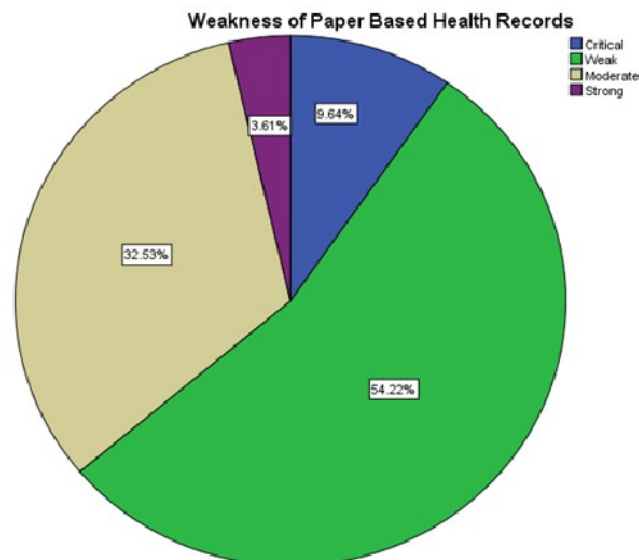
**Figure 2**

Figure 2 presents the assessment of the weakness of paper-based health records practice in healthcare institutions in Nigeria. The findings indicate that a majority (54.22%) of the study participants expressed the belief that paper-based



health records practice in Nigeria is weak in ensuring quality patient care and fulfilling other secondary purposes.

This finding suggests that a significant proportion of the respondents hold a negative perception of the current paper-based health records system in Nigeria's healthcare institutions. They perceive it as lacking in strength and effectiveness, potentially compromising the provision of high-quality care to patients. The assessment of weakness in the paper-based system may indicate a need for improvements or a transition towards more advanced and efficient electronic health record systems in order to address the identified concerns and enhance healthcare practices in Nigeria.

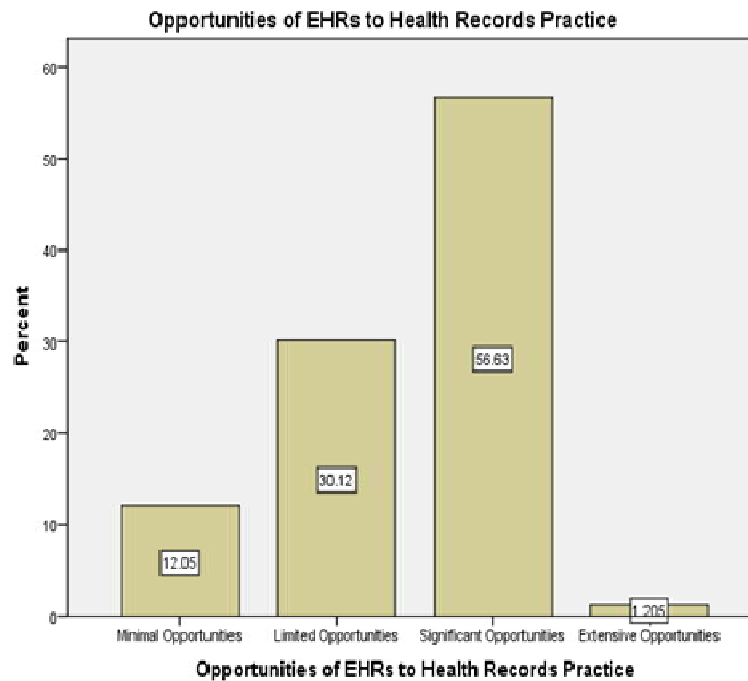
**Table 3**

<b>Parameters Assessing the Weaknesses of Paper-based Health Records Practice</b>	Frequency	Percentage	Statistics
<b>General Perception</b>			Mean=2.2651
Poor	13	15.7	Rel. Mean = 0.9973
Fair	41	49.4	S.D =0.8128
Good	23	27.7	Skewness=0.311
Excellent	6	7.2	
<b>Accessibility</b>			Mean=1.8072
Poorly Accessible	30	36.1	Rel. Mean = 1.0004
Fairly Accessible	39	47.0	S.D =0.7064
Reasonably Accessible	14	16.9	Skewness=0.293
<b>Data Integrity and Security</b>			Mean=1.7952
Low	29	34.9	Rel. Mean = 0.9988
Moderate	42	50.6	S.D =0.6764
High	12	14.5	Skewness=0.273
<b>Storage and Space</b>			Mean=2.0843
Insufficient	22	26.5	Rel. Mean = 1.0005
Limited	32	38.6	S.D =0.7841
Sufficient	29	34.9	Skewness= -0.150
<b>Cost and Resources Management</b>			Mean=1.9157
Inefficient	26	31.3	Rel. Mean = 0.9984
Adequate	38	45.8	S.D =0.7359
Efficient	19	22.9	Skewness=0.134
<b>Transition from Paper to EHRs</b>			Mean=1.6145
Unsuccessful	32	38.6	Rel. Mean = 1.0010
Successful	51	61.4	S.D =0.4897
			Skewness= -0.479

Table 3 provides the parameters assessing the weaknesses associated with paper-based health records practice in Nigeria. The provided data gives insights into the perceived weaknesses of paper-based records across several dimensions. The general perception has a moderate level of perceived weakness with significant variability (SD = 0.8128) and a slight positive skew (0.311). Accessibility (Mean = 1.8072), data integrity and security (Mean = 1.7952), and cost and resources management (1.9157) are perceived negatively but with moderate variability and slight positive skewness, suggesting generally low ratings with some higher ratings balancing them out. Storage and space is seen as a moderate weakness (Mean = 2.0843) with less variability (0.7841) and nearly symmetrical distribution (-0.150). Transition from Paper to EHRs has the most negative perception (Mean = 1.6145) with the least variability (SD = 0.4897) and a significant negative skew (-0.479), indicating a strong consensus on its difficulty or challenges.

The current findings align with previous research by highlighting weaknesses in paper-based health records, particularly in areas such as accessibility, data integrity and security, and the transition to electronic health records (EHRs). These aspects reflect concerns raised in earlier studies, such as Yaya (2015), who identified poor filing and records deterioration as key weaknesses, and Ge (2022), Yu (2013), and Emmerich (2023), who pointed to illegible handwriting and inconvenient access to records. However, the current study found that the transition to EHRs is perceived as a particularly difficult challenge, with strong consensus on its difficulty, which contrasts with the focus of previous studies on physical record management issues. Additionally, while previous studies emphasized problems like illegibility and deterioration, the current findings highlight the more systematic weaknesses related to operational aspects like cost, space, and resource management.

### Section D: Explore EHRs opportunities to improve the current health information management practice in Nigeria.



**Figure 3**

Figure 3 depicts the opportunities that electronic health records system (EHRs) presents to health records practice in healthcare institutions in Nigeria. The findings indicate that a majority (56.63%) of the study participants hold the belief that EHRs offer significant opportunities to enhance health records practice in Nigeria. These opportunities are seen as capable of ensuring improved quality patient care and fulfilling other secondary purposes.

This finding suggests that a substantial proportion of the respondents recognize the potential benefits of adopting EHRs in Nigerian healthcare institutions. They perceive EHRs as a valuable opportunity to enhance the quality of patient care and achieve various secondary objectives.

**Table 4**

Parameters Assessing the Opportunities of EHRs in HRM Practice	Frequency	Percentage	Statistics
General Perception			Mean=2.9880
Low	13	15.7	Rel. Mean = 0.9990
Moderate	13	15.7	S.D =1.1207
High	19	22.9	Skewness= -0.688
Very High	38	45.8	
Operational Efficiency			Mean=2.3373
Low	18	21.7	Rel. Mean = 0.9996
Moderate	20	24.1	S.D =0.8305
High	44	53.0	Skewness= -0.576
Very High	1	1.2	
Data Security and Privacy			Mean=2.9157
Low	9	10.8	Rel. Mean = 1.0002
Moderate	21	25.3	S.D =1.0384
High	21	25.3	Skewness= -0.431
Very High	32	38.6	

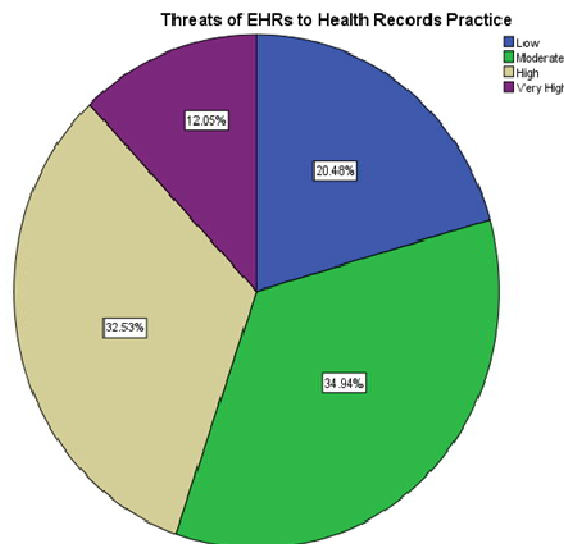
**Table 4.continues**

Interoperability and Integration			Mean=2.7349
Low	18	21.7	Rel. Mean = 1.0004
Moderate	17	20.5	S.D =1.1800
High	17	20.5	Skewness= -0.287
Very High	31	37.3	
Training and Adoption			Mean=2.4217
Low	11	13.3	Rel. Mean = 1.0016
Moderate	37	44.6	S.D =0.8851
High	24	28.9	Skewness=0.243
Very High	11	13.3	

Table 4 presents the parameters assessing the opportunities of electronic health records system (EHRs) to health records practice in Nigeria. The provided data reflects the perceived opportunities of Electronic Health Records (EHRs) across different dimensions. The general perception shows a very positive view (Mean = 2.9880) of EHR opportunities with significant variability (SD = 1.1207) and a strong negative skew (-0.688), indicating overall high ratings. Operational efficiency is perceived positively (Mean = 2.3373) with moderate variability (SD = 0.8305) and a negative skew (-0.576), showing favorable views but with some lower ratings. Data security and privacy is seen very positively (Mean = 2.9157) with considerable variability (SD = 1.0384) and a negative skew (-0.431), indicating generally high ratings with some lower responses. Interoperability and integration is also viewed very positively (Mean = 2.7349) but with the highest variability (SD = 1.1800), indicating diverse opinions but generally favorable views. Training and adoption is positively perceived (Mean = 2.4217) but with the smallest negative skew (0.243), indicating some respondents find this area challenging, but overall, it's seen as an opportunity.

The current findings align with previous studies in recognizing the significant opportunities that EHRs present for improving health records practice in Nigeria. Key areas of agreement include the enhancement of data security and interoperability, consistent with Ogbonna (2020), who identified accuracy and consistency in data storage as major benefits, and Shahmoradi (2017), who emphasized improved communication, quality of care, and reduced medical errors. Additionally, the positive perception of operational efficiency supports Kumar's (2010) identification of prompt diagnosis as a key opportunity. However, the present study notes more diverse opinions regarding training and adoption, with a relatively less favorable skew, which contrasts with the generally optimistic tone of earlier findings. Moreover, while Saxena (2022) highlighted telemedicine as a major potential of IT, this specific opportunity was not explicitly addressed in the current findings, indicating a divergence in focus. These findings underscore the importance of leveraging strengths like interoperability and security while addressing challenges in training and adoption to maximize the benefits of EHRs.

**Section E: Identify and examine the possible threats that may lead to failure of the proposed EHRs system in Nigeria.**



**Figure 4.**

Figure 4 illustrates the threats posed by electronic health records system (EHRs) to health records practice in healthcare institutions in Nigeria. The majority of study participants perceive EHRs to present threats ranging from moderate to high levels, with response rates of 32.53% and 34.94% respectively. This finding indicates that a significant proportion of the respondents express concerns about potential risks associated with the implementation and use of EHRs in Nigeria.

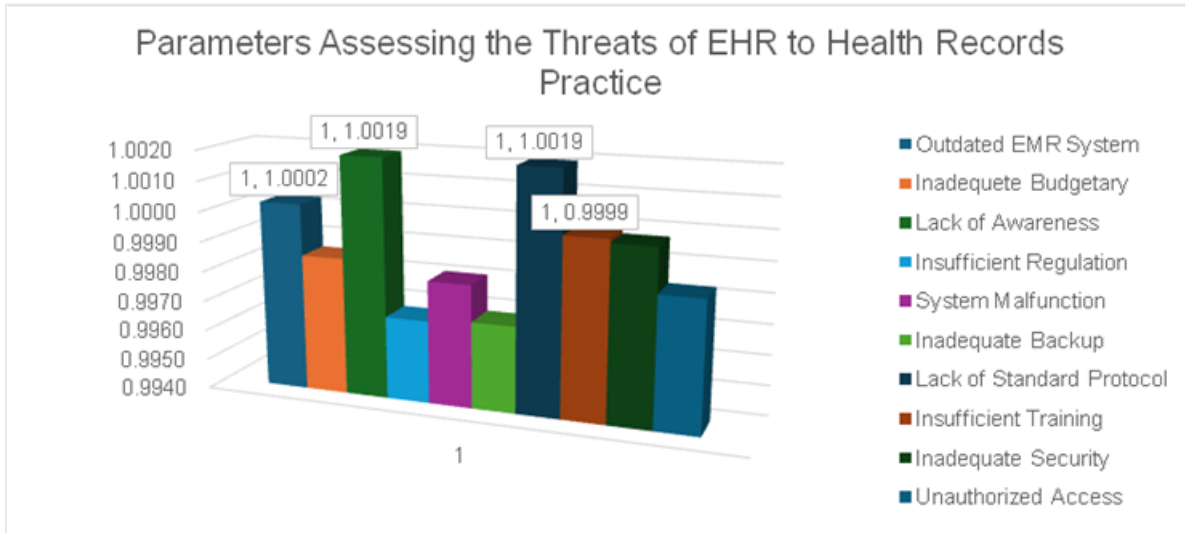


Figure 5

Figure 5 provides an overview of the parameters assessing the threats of electronic health records systems (EHRs) to health records practice in Nigeria. The relative means for all the listed threats are very close to 1, indicating that perceptions of these threats are quite balanced and consistent with each other. Lack of awareness (Rel. Mean 1.0019) and lack of standard protocol (Rel. Mean = 1.0019) are perceived slightly above average, suggesting they are seen as more critical threats that need addressing. Inadequate budgetary, insufficient regulation, system malfunction, inadequate backup, and unauthorized access are perceived slightly below average, indicating these threats are recognized but not seen as the most pressing issues. Outdated EMR system, insufficient training, and inadequate security are perceived as average threats, indicating a balanced view on their importance.

The current findings align with previous studies in recognizing various threats associated with EHRs in health records practice. Issues such as insufficient backup mechanisms, inadequate security measures, and lack of standard protocols, identified as key threats in this study, align with Fernandez (2015), who highlighted system failures as a major concern. Similarly, the findings regarding public fear of unauthorized access and privacy breaches resonate with Ogbonna (2020). However, while Diaz emphasized interoperability as the primary threat, this issue did not emerge as a significant concern in the current study, which instead highlighted lack of awareness and inadequate budgetary allocation as more pressing threats. These differences underline the need to address specific contextual challenges in Nigeria, including enhancing financial support, raising awareness, and developing robust standard protocols to mitigate EHR-related risks effectively.

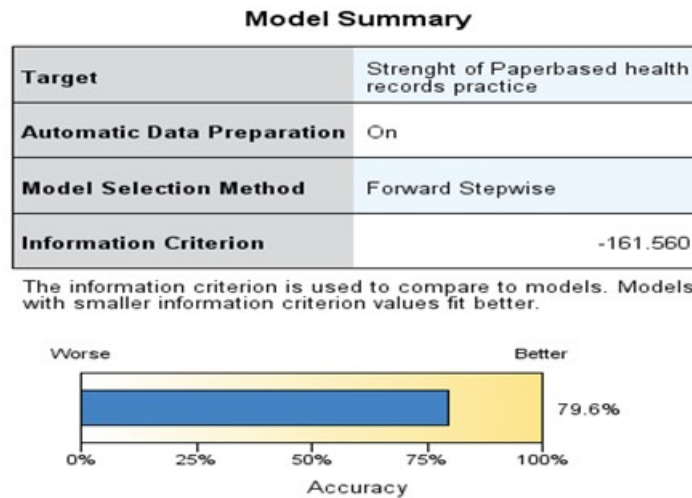
**Result of Hypotheses**

**Hypothesis 1:** The weakness of paper-based health records practice has no significant effect on its strength in Nigeria

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
	B	Beta		
1 (Constant)	1.837	.000	.17110.754	
Weakness of paper-based health Records practice	.207	.3082.911	.071	.005

a. Dependent Variable: Strength of paper-based health records practice  
**R=0.308, R<sup>2</sup>=0.095, Adjusted R<sup>2</sup>= 0.084, F=8.471, P < 0.05**

Table 5 presents the results of an analysis on the effect of the weakness of paper-based health records practice on its strength in Nigeria. The findings indicate that the weakness of paper-based health records practice has a significant effect on its strength ( $F=8.471$ ,  $P<0.05$ ). The results further reveal that an increase in the weakness of health records practice leads to a 0.207 unit increase in the strength of health records practice ( $B=1.837$ ,  $P<0.05$ ). The positive value of  $R=0.308$  for the model generated by the regression analysis indicates a positive effect. The model suggests that the weakness of paper-based health records practice accounts for a 9.5% increase in the variation observed in the strength of paper-based practice ( $\text{Adjusted } R^2= 0.095$ ).



**Figure 6**

Figure 6 presents a model representing the strength of paper-based records practices in Nigeria, considering the associated weaknesses. The analysis reveals that the level of accuracy of health records practice using paper-based medium is 79.6%. This finding indicates that, despite the identified weaknesses, paper-based health records practice in Nigeria demonstrates a relatively high level of accuracy. This suggests that healthcare practitioners are able to maintain a significant degree of precision and correctness in recording and documenting patient information using paper-based systems.

**Hypothesis 2:** The threats of EHRs to health records practice has no significant effect on the opportunities of EHRs in Nigeria

<b>Table 6The threats of EHRs to health records practice has no significant effect on the opportunities of EHRs in Nigeria</b>					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.472	.1808.195	.000		
Threats of EHRs to health Records practice	.422	.071	.5535.975	.000	

b. Dependent Variable: Opportunities of EHRs to health records practice

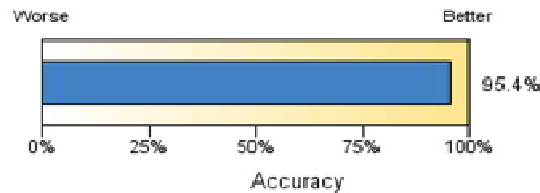
**R=0.553, R<sup>2</sup>=0.306, Adjusted R<sup>2</sup>= 0.297, F=35.700, P < 0.05**

Table 6 presents the results of an analysis on the effect of the threats of electronic health records (EHRs) to health records practice on the opportunities of EHRs system in Nigeria. The findings indicate that the threats of EHRs to health records practice have a significant effect on the opportunities of EHRs system ( $F=35.700$ ,  $P<0.05$ ). Furthermore, the results demonstrate that an increase in the threats of EHRs to health records practice leads to a 0.422 unit increase in the opportunities of EHRs to health records practice ( $B=1.472$ ,  $P<0.05$ ). The positive value of  $R=0.553$  for the model generated by the regression analysis indicates positive effects. The model suggests that the threats of EHRs to health records practice account for a 30.6% increase in the variation observed in the opportunities of EHRs practice ( $R^2= 0.306$ ).

**Model Summary**

<b>Target</b>	Opportunities of EHRs to Health Records Practice
<b>Automatic Data Preparation</b>	On
<b>Model Selection Method</b>	Forward Stepwise
<b>Information Criterion</b>	-219.497

The information criterion is used to compare to models. Models with smaller information criterion values fit better.



**Figure 7**

Figure 7 presents a model representing the opportunities of electronic health records systems (EHRs) to health records practices in Nigeria, taking into account the associated threats. The analysis reveals that the level of accuracy of health records practice using EHRs medium is 95.4%. This finding indicates that, despite the presence of potential threats, EHRs offer a significantly high level of accuracy in health records practices in Nigeria than what is obtainable with the paper-based health records practice. It suggests that EHRs have the potential to improve the precision and correctness of recording and documenting patient information, leading to more accurate and reliable health records.

**Hypothesis 3:** The Strength of Paper-based, the weakness of paper-based and the threats of EHRs to health records practice has no significant effect on the opportunities of EHRs in Nigeria

<b>Table 7 The Strength of paper-based, weakness of paper-based and threats of EHRs to health records practice has no significant effect on the opportunities of EHRs in Nigeria</b>							
Model Coefficients	Unstandardized Coefficients		Standardized Statistics		t	Collinearity	Sig.
	B	Std. Error	Beta				
1 (Constant)	1.082	.347	.116	0.003	.000		
Strength of Paper-based Health Records Practice	-0.017	.147	-.011	0.868	1.152	.906	
Weakness of Paper-based Health Records Practice	0.372	.125	.357	0.546	1.832	.004	
Threats of EHRs to health Records practice	.243	.093	.318	0.530	1.888	.011	

c. Dependent Variable: Opportunities of EHRs to health records practice  
**R=0.613, R<sup>2</sup>=0.376, Adjusted R<sup>2</sup>= 0.352, F=15.861, P < 0.001**

Table 7 presents the results of an analysis on the effect of the strength of paper-based, weakness of paper-based and the threats of electronic health records (EHRs) to health records practice on the opportunities of EHRs system in Nigeria. The findings indicate that the strength of paper-based health records has no significant effect on the

opportunities of EHRs system ( $p=0.906$ ). However, weakness of paper-based ( $p=0.004$ ) and threats of EHRs ( $p=0.011$ ) to health records practice have a significant effect on the opportunities of EHRs system ( $F=35.700$ ,  $P<0.001$ ). All tolerance (t) values are above 0.1, indicating that multicollinearity is not a problem in this model. All VIF (Variance Inflation Factor) are below 10, further suggesting that multicollinearity is not an issue.

Furthermore, the results demonstrate that an increase in the weakness of paper-based health record and the threats of EHRs to health records practice leads to 0.372 and 0.243 units increase respectively in the opportunities of EHRs to health records practice ( $B=1.082$ ,  $P<0.05$ ). The positive value of  $R=0.613$  for the model generated by the regression analysis indicates positive effects. The model suggests that the weakness of paper-based health records and the threats of EHRs to health records practice account for a 37.6% increase in the variation observed in the opportunities of EHRs practice ( $R^2= 0.376$ ). The adjusted  $R^2 = 0.352$  for the number of predictors in the model, providing a more accurate measure of the model's explanatory power.

## SUMMARY

The study's findings underscore the critical role of both paper-based and electronic health records (EHRs) systems in Nigerian healthcare. Despite the inherent weaknesses of paper-based health records, such as illegible handwriting and limited accessibility, the study reveals that these systems demonstrate a relatively high accuracy level (79.6%), attributable to the diligence of healthcare practitioners in ensuring data precision. However, these weaknesses positively correlate with the strength of health records practice, suggesting that efforts to address these limitations contribute to improving overall practices ( $R=0.308$ , Adjusted  $R^2=0.095$ ). Conversely, EHRs exhibit a significantly higher accuracy level (95.4%), reflecting their potential to enhance the precision and reliability of health data management. Interestingly, threats associated with EHRs, such as data security and infrastructure challenges, significantly influence the opportunities they present ( $R=0.553$ ,  $R^2=0.306$ ). The combined analysis highlights that weaknesses in paper-based systems and threats to EHRs significantly impact the opportunities for leveraging EHR systems in Nigeria (Adjusted  $R^2=0.352$ ). These findings align with the background emphasizing the importance of health information management in improving healthcare delivery, as highlighted by AHIMA (2018), WHO (2012), and other scholars, affirming the need for strategic interventions to balance strengths, mitigate weaknesses, and optimize opportunities in health records management practices.

## CONCLUSION

In conclusion, the study found that health information management practices in Nigeria exhibit a certain degree of accuracy, despite the limitations of paper-based health records. However, electronic health records (EHRs) demonstrate even higher levels of precision and accuracy compared to paper-based records, despite the potential challenges associated with their implementation. Based on these findings, it is recommended that Nigeria consider adopting EHRs to enhance and improve the management of health records in the country.

## RECOMMENDATIONS

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

1. The federal government of Nigeria should prioritize allocating sufficient funds to support the adoption and maintenance of electronic health records (EHRs) in the country. Adequate financial resources will be essential for successful implementation and long-term sustainability.
2. Healthcare professionals and relevant organizations should establish robust backup mechanisms to prevent data loss in the event of system failure. Regular data backups and contingency plans should be in place to ensure the integrity and availability of health records.
3. Healthcare administrators and regulatory authorities should collaborate to develop clear guidelines and policies for the safe and standardized implementation of EHRs. These guidelines should address data privacy, security protocols, interoperability standards, and data quality assurance to promote consistent and effective usage of EHRs across healthcare settings.
4. Healthcare professionals should receive comprehensive and ongoing training to facilitate the successful adoption and optimal utilization of EHR systems. Training programs should focus on both technical aspects of using EHRs and best practices for documenting, retrieving, and sharing patient information within the electronic system.

5. The government and healthcare administrators must prioritize the implementation of robust security measures to protect EHRs from potential breaches and unauthorized access. This includes implementing encryption protocols, access controls, user authentication mechanisms, and regular security audits to ensure the confidentiality and integrity of patient data.

By implementing these recommendations, Nigeria can foster a more efficient and accurate health records management system through the adoption of EHRs.

## LIMITATION

The findings of this study contend with the unwillingness and apathy of the study participants especially HIM professionals in responding to the online google form questionnaire as only eighty-three out of over a thousand of HIM professionals who belong to one WhatsApp group or the other respond to the questionnaire despite the fact that a space of two months was giving to participate in the study. Based on this, this study recommends a study to uncover the causes of HIM professional's apathy to research.

**Statement of Informed Consent:** Informed consent was obtained from all participating professionals, ensuring their voluntary participation. Strict measures were implemented to ensure strict anonymity.

**Authors' Contributions:** OSA conceived of the study, initiated its design, participated in data collection, data analysis and coordination and drafted the manuscript. WAI participated in the design, coordination and reviewed the final manuscript. AR participated in the coordination and reviewed the manuscript. ACO participated in the design, coordination and reviewed the manuscript.

## Compliance with ethical standards

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**Disclosure of conflict of interest** the authors wish to state categorically that there is no competing interest in this study.

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