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ICT skills and electronic health records management practices by health information management personnel in teaching hospitals in South-South, Nigeria

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Abstract
The study is an analysis of ICT skills among health information management (HIM) staff, the level of ICT application in electronic health electronic records (EHRs) management, and the correlation between ICT competence and EHR management practices. An approach that incorporated descriptive research design in a mixed methods were taken. The population included 376 HIM staff in eight teaching hospitals in the South-South geopolitical region in Nigeria. All the personnel were targeted using the census technique. The heads of departments were used to gather data using a structured questionnaire and an in-depth interview guide. The internal consistency reliability of the instrument provided a Cronbach's alpha of 0.85 which was acceptable. Descriptive and inferential statistics such as frequency distribution table, mean, standard deviation and Pearson's Product-Moment Correlation Coefficient (PPMC) were used to analyse quantitative data and thematic analysis was used to analyse qualitative responses. It was found that ICT skills among the HIM personnel were moderate to high, especially in simple digital tasks like word processing, data entry, document formatting and electronic file management; that the most common and common usage of the ICT tools were core EHR functions such as patient billing, admission and discharge documentation, record tracking and data retrieval with mean scores of above the benchmark of 2.50 out of a four-point scale, meaning their regular usage. Nevertheless, more ICT-related activities, including patient indexing, database administration, virus protection, password protection, and systematic deletion of non-active records, had rather lower degree of usage, indicating deficiency in the domain-specific ICT skills. Inferential analysis also showed that there is a significant positive correlation between ICT skills and effective practices of electronic health records management ($p < 0.05$) among the HIM personnel. The study concluded that ICT capacity building among health information managers is necessary in enhancing efficiency, security, and sustainability of electronic health records systems in teaching hospitals in Nigeria. The study recommended a long-term investment in ICT infrastructure, ongoing professional growth, and institutional policies that would promote the management of digital health information.

Keywords: Information and communication technology skills, electronic health records management practices, health information management personnel, teaching hospitals, Nigeria

Introduction

Over the last few years, the healthcare systems in different parts of the world have increasingly adopted the use of electronic health records (EHRs) as a way of enhancing the accuracy, accessibility, and continuity of health information to ensure patients are better cared about and the health care operations become effective. EHRs are electronic databases that contain all the patient information such as diagnoses, treatment history, lab results, and other demographic information, which will enable healthcare providers to access crucial information within a short time span and make more informed clinical decisions (Sibiya, Akinyemi & Oladimeji, 2023).

The shift towards the use of paper-based systems to electronic ones has been identified as a breakthrough move in the present-day healthcare management due to the increased level of data security, less error rates and effective inter-departmental coordination. Nevertheless, the success of the EHR systems is strongly tied to the ability of the healthcare staff to effectively utilise them. With a developing setting, the low level of information and communication technology

(ICT) of healthcare personnel may impede the exploitation of electronic records systems (Hlaing Min Oo et al., 2021). An example is a study carried out in a tertiary hospital in Nigeria: the researchers noted that most healthcare workers were fluent in the simplest computer programs, i. e. word processors and email, but they had very limited knowledge in more complex programs, i. e. spreadsheets and database management skills, which are critical in efficient interaction with EHR systems (Sibiya et al., 2023). This underscores an endemic skills gap that may undermine the quality of record keeping, jeopardize the quality of data and decrease the productivity of implementing digital health records.

Following the world experiences, it has been established that ineffective ICT literacy and users with low training levels may hinder the implementation and effectiveness of electronic health systems, which can reduce their efforts to enhance healthcare delivery (Frontiers in Digital Health, 2025). In most environments, users complain of technical difficulties, lack of training, and support in institutions as the obstacles to successful EHR use. The same tendencies are observed in terms of the role of health information management (HIM) staff that is at the core of health data management and structuring. Their ICT level is also a direct indicator of their ability to handle electronic health records, maintain the accuracy of data and promote quality healthcare provision. Although the benefits of EHR are widely recognised, including the enhanced communication among professionals and the enhanced decision support, their implementation is not even, especially in low resource settings where the teaching hospitals might struggle to fulfill infrastructure requirements and differentiate between staff levels of digital competence (Sibiya et al., 2023). This fact highlights the necessity of specific research on the connection between ICT skills and EHR management practices- particularly among the representatives of HIM staff that is a key participant in health data governance and service provision. Hence, this paper examines the roles of the ICT competencies of health information management staff in their practice regarding the management of the electronic health records in the teaching hospitals of South-South region, Nigeria.

Statement of the problem

Electronic health records (EHRs) adoption has been recognised as one of the most effective strategies of enhancing patient care, management, and efficiency in healthcare institutions. Nevertheless, the current situation in the South-South region of Nigeria is that most teaching hospitals still struggle to successfully implement and use the EHR systems despite large investments in digital health technologies. The major obstacle is the lack of ICT competence in the personnel of health information management, and such personnel are expected to ensure proper entry, maintenance, and retrieval of patient data. The lack of sufficient digital literacy and technical skills can make the HIM staff not navigate the intricate EHR systems and make mistakes, slow down the process, and leave several records incomplete, all of which will undermine the process of healthcare delivery and decision-making. In addition, the lack of training, institutional facilitation, and inconsistency in ICT infrastructure worsen the situation, providing a skills-technology gap that prevents the complete realisation of EHR utilisation in these hospitals. A large number of HIM workers have fundamental skills of using computers but with no skills in the higher-level capabilities of database management, data analysis and interoperability systems, which are key to competent records management.

The identified gap does not only influence the quality and accuracy of electronic health records but also constrains the possibility of making decisions based on the data, conducting research, and planning policies. These issues are important in ensuring that EHR systems deliver their desired outcomes in enhancing patient outcomes and fortifying healthcare systems in the area.

Research questions

The study addresses the following research questions:

1. What are the practices of health information management personnel in managing electronic health records?
2. What is the level of ICT skills of health information management personnel in teaching hospitals in South-South Nigeria?
3. What is the relationship between ICT skills and EHR management practices among health information management personnel?
4. What challenges do health information management personnel face in using ICT for electronic health records management?
5. What strategies can be implemented to enhance ICT skills and improve EHR management practices in teaching hospitals?

Literature review

Electronic health records (EHRs) refer to computer systems, which are created to systematize, store, and retrieve information on the health of patients in a manner that enhances accuracy, efficiency, and accessibility as opposed to the paper-based records. EHRs have gained international recognition as essential instruments of enhancing the quality of care, minimising medical errors, and coordinated care in the last ten years (Finnegan and Mountford, 2025). The adoption of EHR does not only involve a technological upgrade but also involves organisational reorganisation, training, workflow adjustment to make meaningful use (Bashir et al., 2024). Lack of infrastructural and human resource capacities tend to be the leading factors hindering the adoption of EHR in low- and middle-income countries (LMICs). Indicatively, research conducted

by Hassan et al. (2025) in Somali public hospitals showed that although healthcare practitioners knew how to operate simple computer applications, lack of proper software, low-quality internet accessed, and lack of technical assistance posed an impediment to effective use of EHR. On an equal note, a study in Ghana done by Owusu-Antwi and Mensah (2024) found that the advantages of EHR systems such as having better access to data and providing patient monitoring were limited by the problem of low digital literacy and lack of institutional support. This evidence points to the importance of human factors and technical capability as the determinant of the success of digital health systems as much as infrastructure is.

The success of EHR systems is based on the ICT competencies of medical workers to a considerable degree. Sibiya, Akinyemi, and Oladimeji (2023) studied tertiary hospitals in Nigeria and identified that although the health information management (HIM) personnel were competent in the basic computer processes, they were not skilled in the database management and data analytics, and system-specific software that could be used to manage the EHR. This knowledge gap causes lack of consistency in record-keeping, errors in data entry and inability to retrieve crucial information about patients. Moreover, Hlaing Min Oo, Zin, and Htet (2021) emphasized that one of the problems

that impede the full use of EHR by the HIM staff is the lack of professional development opportunities and ICT training. These restrictions highlight that a persistent skills-technology mismatch exists that the digital infrastructure is not necessarily better used to achieve improved record management practices. The findings of other African settings confirm that better ICT skills directly enhance EHR usage and quality of data (Mensah and Adjei, 2022).

Studies continuously reveal that institutional support, training, and user engagement are also essential factors that help to achieve successful EHR adoption, besides the availability of the technologies. In Indonesia, Prasetyo et al. (2025) discovered that the EHR practice was better in hospitals with well-organised training courses and favorable working flows, yet facilities with scanty ICT support experienced difficulties with hybrid systems, where paperwork was implemented alongside electronic documentation. This shows that ICT skills development should be incorporated into the larger implementation plans in order to maximise the EHR advantages. Around the world, including in the high-income countries, the effectiveness of the digital record systems is decreased by the lack of user training and the absence of change management. As an illustration, the NHS of the UK has stated that it struggles to make the most out of EHR because training was fragmented and inconsistent in terms of adoption (Smith and Davies, 2023). All these insights point to the fact that the process of filling the ICT skills gaps by continuous capacity-building, favorable policies, and the user-centered design is crucial to attaining better healthcare services and efficient electronic record management.

Theoretical framework

The Technology Acceptance Model (TAM), which was developed by Davis (1989) offers a solid framework of working out the factors that contribute to the adoption and successful usage of technology, especially within the organisational context. According to TAM, the attitude of a person towards the use of a technology is determined by two core constructs, including Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), which in turn are the predictors of actual usage behaviour (Davis, 1989; Venkatesh and Bala, 2008). Perceived Usefulness demonstrates how much an individual thinks that utilising a specific system improves job performance whereas Perceived Ease of Use shows how much a person thinks that the use of a system will not be accompanied by hard work. According to the model, when users feel that a system is beneficial and user friendly, they will strive to embrace it and make good use of it. The topicality of the TAM to the present research is that it is concerned with personal levels of perception and ability to work with technologies, which is consistent with the primary research topic, which is to investigate the connection between ICT skills and EHR management practices. Health Information Management (HIM) employees with high ICT competencies have higher chances of seeing EHR systems as user-friendly and helpful to their work, which positively affects their practice of record-keeping.

Empirical research confirms this relation, such as Alhassan et al. (2022) reported that the ICT proficiency of healthcare workers had a significant influence on the successful use of EHR systems in Ghanaian hospitals mediated by the perceived ease of use and perceived usefulness. On the same note, research conducted by Omotayo and Adebayo (2023) within the tertiary hospitals of Nigeria has shown that ICT training of

staff improved perceived system usability, which subsequently improved electronic record management practices. Using TAM, the proposed study conceptualises ICT skills as a precondition, which impact both perceptions of ease of use and usefulness of EHR systems, which in turn have an impact on the real management practices. The model also gives an outline to analyse the obstacles like insufficient training, inadequate infrastructure or insufficient digital literacy that could be restricting successful implementation of EHRs in systems where they are already available. As such, TAM does not only clarify why HIM staff can or cannot utilise EHR systems effectively, but also informs the use of highly specific interventions, including specific ICT training programs and user-friendly system designs, to enhance digital record management in teaching hospitals.

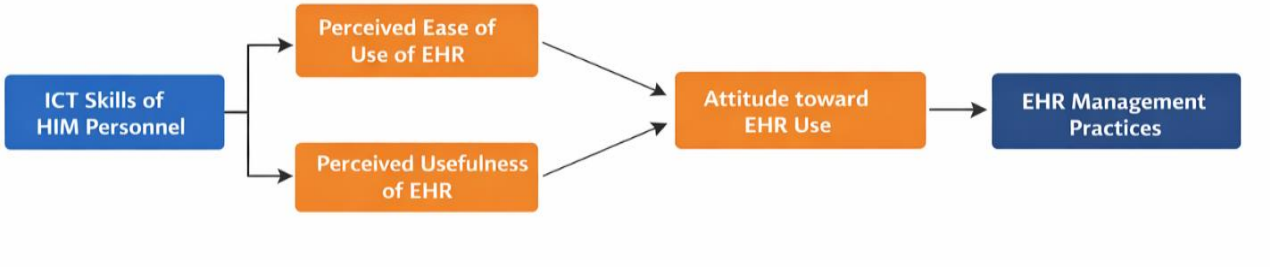


Figure 1: Conceptual Model adapted from Technology Acceptance Model (TAM)
Source: Self-constructed conceptual model

Methods

The research design used in this study was a descriptive research design in an integrated mixed-method approach, which comprised of quantitative and qualitative methods of data collection. The mixed-methods model allowed the researcher to find out data on a high number of people using structured questionnaires and also obtain data representing the depth of thoughts using interviews. The sample population consisted of 376 personnel of health information management in eight teaching hospitals in South-South geopolitical zone of Nigeria. There are six states which make up the South-South zone. These are Akwa Ibom, Bayelsa, Cross River, Delta, Edo, and Rivers. Census was used to be able to cover all 376 HIM personnel in these teaching hospitals. A structured questionnaire and an in-depth interview guide were considered to be the main sources of data collection. The heads of departments (HODs) were interviewed through the interview guide to provide detailed information on the same. Both the instruments were certified by professionals in the Department of Library, Archival, and Information Studies, Faculty of Education, University of Ibadan. A pilot was done where 30 questionnaires were given to HIM staff at Nnamdi Azikiwe University Teaching Hospital (NAUTH), Nnewi, Abia State and they did not participate in the actual study. Cronbach's alpha was used to check the reliability of the questionnaire. The total reliability coefficient of questionnaire was 0.85, and the coefficients of each section were as follows: B (EHR management practices): 0.85. Section C (ICT skills held by HIM personnel): 0.97. All these values exceed the acceptable level of 0.70 that shows sufficient reliability of the study (Nunnally, 1978). Qualitative and quantitative methods of data analysis were used. The analysis of quantitative data involved descriptive and inferential statistics

statistics such as frequency distribution table, mean, standard deviation and Pearson's Product-Moment Correlation Coefficient (PPMC with the help of the SPSS version 20 software. The demographic features of the respondents were summarized using simple percentages, and answers to research question 1–4 were provided using frequencies, percentage, mean and standard deviations. The answers to research question 5 were discussed thematically based on what was gathered in the interviews with heads of departments.

Table 1: Questionnaire administration and return rate

Name of Institution	Distribution	Returns (%)
Delta State University Teaching Hospital (DELSUTH), Delta State	17	17(100.0%)
Irrua Specialist Teaching Hospital (ISTH), Edo State	32	30(93.8%)
Niger Delta University Teaching Hospital (NDUTH) Bayelsa State	15	15(100.0%)
Rivers State University Teaching Hospital (RSUTH) Rivers State	42	40(95.2%)
University of Benin Teaching Hospital (UBTH) Edo State	60	57(95.0%)
University of Calabar Teaching Hospital (UCTH) Cross River State	66	63(95.5%)
University of Port Harcourt Teaching Hospital (UPTH) Rivers State	76	72(94.7%)
University of Uyo Teaching Hospital (UUTH) Akwa-Ibom State	68	64(94.1%)
Total	376	358(95.2%)

Results

Research question one: What are the practices of health information management personnel in managing electronic health records?

Table 2 revealed that health records generation indicated that health information management (HIM) staff often perform some critical management activities on patients. Billing of patient treatment ($\bar{x}$ = 3.40), creating of admission and discharge summaries ($\bar{x}$ = 3.39), and tracking of patient records (x = 3.28) were activities which were uniformly carried out across the teaching hospitals that were studied. On the other hand, such operations as generation of the daily attendance of patients ($\bar{x}$ = 2.15) and development of the patient master name index ($\bar{x}$ = 2.33) were not carried out as consistently, which means that the EHR functionalities were not fully used to manage patients. In terms of maintenance and usage of health records, the study identified that personnel activities are usually involved in maintenance of patient records ($\bar{x}$ = 3.35), guaranteeing prompt retrieval of information about patients ($\bar{x}$ = 3.01), and ensuring privacy and confidentiality ($\bar{x}$ = 2.97). Nonetheless, the security measures related to patient records protection against virus attacks ($\bar{x}$ =1.94) and password protection of records ($\bar{x}$= 2.3) were poorly done. These results indicate that in certain hospitals stable digital security is weak, which is why more effective IT protocols should be implemented to ensure patient data safety.

Regarding the record retention, HIM staff indicate the semi-active state of records ($\bar{x}$ = 2.74) on a regular basis and seldom assess or delete inactive health records ($\bar{x}$ = 2.35-2.41). It means that there is also a lack of systematic record retention and lifecycle management, which may result in the formation of unnecessary/old records and influence the quality of information in general. Concerning the disposal practices, the results indicate that more commonly used were disposal to archives ($\bar{x}$ = 2.68) as well as reappraisal of records to ascertain usefulness ($\bar{x}$= 2.58) compared to deletion of non-archival records ($\bar{x}$ = 2.16). The general grand mean of 2.71 indicates that EHR management practices of the HIM staff are

not outstanding, and areas that need improvement include records retention and disposal policies. The quantitative results were reinforced by qualitative data of interviews.

Table 2: Electronic health records management practices among HIM personnel in teaching hospitals (n = 376)

S/N	Electronic health records management practices	SA	A	D	SD	Mean ($\bar{x}$)	Std. Dev
Health records creation							
1	Document and register new/old patients	107	200	26	25	3.09	0.80
2	Create patient identification number	119	208	31	0	3.25	0.60
3	Book patient appointment	127	180	49	2	3.21	0.69
4	Create patient master name index	61	115	63	119	2.33	1.11
5	Generate patient daily attendance	39	118	59	142	2.15	1.07
6	Report medical statistical data	53	143	77	85	2.46	1.01
7	Generate disease & operation codes	47	157	85	69	2.51	0.95
8	Create patient referral letter	51	129	82	96	2.38	1.03
9	Generate daily ward return	91	113	54	100	2.54	1.15
10	Generate laboratory investigation reports	80	152	62	64	2.69	1.01
11	Generate admission & discharge summary	172	154	32	0	3.39	0.65
12	Perform billing of patient treatment	170	165	18	5	3.40	0.65
13	Track patient records	174	128	40	16	3.28	0.84
Weighted mean				2.82	0.89		
Maintenance & use of health records							
14	Preserve patient health records	175	146	25	12	3.35	0.76
15	Protect patient records via password	66	101	65	126	2.30	1.13
16	Maintain patient folder & subfolder against virus	40	75	68	175	1.94	1.07
17	Preserve privacy/confidentiality with security codes	109	158	63	28	2.97	0.89
18	Speedy retrieval of patient records	84	214	40	20	3.01	0.76
19	Data sharing among healthcare providers	78	206	56	18	2.96	0.76
20	Protect records from unauthorized access	78	195	55	30	2.90	0.84
21	Perform classification for easy retrieval	107	69	92	90	2.54	1.16
22	Manage patient portal	86	72	134	66	2.50	0.05
23	Maintain access control to records	97	142	86	33	2.85	0.93
Weighted mean						2.73	0.94
Retention							
24	Appraise records to determine status	53	111	124	70	2.41	0.97
25	Determine active use of health records	64	101	98	95	2.37	0.06
26	Determine semi-active status	104	120	72	62	2.74	0.06
27	Determine inactive records to be disposed	36	108	160	54	2.35	0.86
Weighted mean						2.47	0.99
Disposal							
28	Reappraisal of records to determine usefulness	85	97	115	61	2.58	0.03
29	Disposal of inactive records to archives	95	108	102	53	2.68	0.02
30	Deletion of non-archival health records	35	113	86	124	2.16	0.01
Weighted mean						2.47	1.02
Grand mean						2.71	0.93

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

According to the respondents, their institutions have adopted EHRs which include Health in Box, Smart Card, Koko, Elephant Healthcare and Rapid Medics.

Some hospitals, including Irrua Specialist Teaching Hospital, have completely digitalised their operations, whereas in others, still, a hybrid system is in place as a result of the network being unstable or due to technical failures. Moreover, the use of fundamental EHR operations is very common, but advanced features such as billing, coding, and indexing are not exploited in a number of hospitals. The results indicate that basic EHR practices have been quite embraced but little is done on the overall implementation of advanced features. This illustrates a necessity of specific ICT training, an improvement of infrastructure and enforcement of policies to maximise EHR management among HIM staff in South-South Nigeria teaching hospitals.

Research question two: What is the level of ICT skills of health information management personnel in teaching hospitals in South-South Nigeria?

Table 3: ICT skills possessed by HIM personnel in teaching hospitals in South-South Nigeria

S/N	ICT Skill Items	VTM	TM	OTM	N	$\bar{x}$	Std Dev
Word processing skills							
1	Have computer typing speed	92	161	55	50	2.82	0.97
2	Edit word document (copy, cut, paste)	34	148	122	54	2.45	0.86
3	Formatting document (bold, italics, underline, font type/size)	100	144	60	54	2.81	1.01
4	Justify and centralise document	202	120	24	12	3.43	0.76
5	Create page layout (margins, paper type/size)	196	134	16	12	3.44	0.73
6	Manipulate Save/Save As and file retrieval	198	115	27	18	3.38	0.83
7	Zip files/folders	22	101	95	140	2.01	0.96
8	Troubleshooting	51	81	99	127	2.16	1.06
9	Print documents	74	129	100	55	2.62	0.98
Weighted mean						**2.79**	**0.91**
Spreadsheets & data analysis							
10	Entry of data in rows & columns	141	196	0	21	3.28	0.74
11	Use formulas in spreadsheet	167	143	21	27	3.26	0.87
12	Sort data in spreadsheet	64	91	81	122	2.27	0.11
13	Use formulas to solve problems	69	105	72	112	2.37	0.12
14	Design charts/graphs for data analysis	79	135	64	80	2.59	0.06
15	Create database using computer	32	98	70	158	2.01	0.04
16	Use graphic design tools for data	92	161	55	50	2.82	0.97
17	Report statistical compilation of data	34	148	122	54	2.45	0.86
Weighted mean						**2.63**	**0.97**
Presentation skills (MS PowerPoint)							
18	Understand computer programming language	100	144	61	53	2.81	0.01
19	Create PowerPoint slides	202	120	24	12	3.43	0.76
20	Modify colours of text/background/line	196	134	16	12	3.44	0.73
21	Operate slideshow, timing, animations	198	115	27	18	3.38	0.83
22	Deliver/receive lectures via PowerPoint	22	101	95	140	2.01	0.96
23	Use PowerPoint for teleconferencing	51	81	99	127	2.16	0.06
24	Use different search engines to retrieve files	74	129	100	55	2.62	0.98
25	Share documents during presentation	141	196	0	21	3.28	0.74
Weighted mean						2.89	0.88
Internet use & search skills							
26	Access internet via website address	167	143	21	27	3.26	0.87
27	Use search engines to find info	64	91	81	122	2.27	0.11
28	Use social media effectively	69	105	72	112	2.37	0.12
29	Use cloud computing (Google Drive, Dropbox)	79	135	64	80	2.59	0.06

30	Use email effectively	32	98	70	158	2.01	0.04
31	Download files from internet	92	161	55	50	2.82	0.97
32	Attach documents/files on email	34	148	122	54	2.45	0.86
33	Work in networked environment	100	144	60	54	2.81	0.01
34	Troubleshoot computer/internet problems	201	120	25	12	3.42	0.77
Weighted mean						**2.67**	**0.98**
Communication skills							
35	Connect computers to networks	196	134	16	12	3.44	0.73
36	Operate communication tools (mobile devices)	198	115	27	18	3.38	0.83
37	Create, manipulate, transfer, use information	22	101	95	140	2.01	0.96
38	Share electronic materials in a team	51	81	99	127	2.16	0.06
39	Express self in computing environment	74	129	100	55	2.62	0.98
40	Operate radio, telephone, satellite systems	141	196	0	21	3.28	0.74
41	Create text and communicate messages via email	167	143	21	27	3.26	0.87
42	Participate in online discussion via Zoom	64	91	81	122	2.27	1.11
43	Use internet for teleconferencing	69	105	72	112	2.37	1.12
44	Retrieve information on the web	79	135	64	80	2.59	1.06
Weighted mean						2.74	0.95
Digitization skills							
45	Use digital technology devices	32	98	70	158	2.01	1.04
46	Send digital information to people	92	161	55	50	2.82	0.97
47	Project electronic slides	34	148	122	54	2.45	0.86
48	Scan and upload documents/files	100	144	60	54	2.81	1.01
49	Edit scanned documents/images	202	120	24	12	3.43	0.76
50	Convert Word files to PDF	196	134	16	12	3.44	0.73
Weighted mean						**2.83**	**0.90**
How they learn ICT							
51	Formal training by producers/vendors	198	115	27	18	3.38	0.83
52	Assistance of friends/colleagues	22	101	95	140	2.01	0.96
53	Self-effort	51	81	99	127	2.16	1.06
54	Instruction manuals provided by producers	74	129	100	55	2.62	0.98
55	Knowledge acquired at seminars/conferences	141	196	0	21	3.28	0.74
56	Taught by fellow HIM personnel	167	143	21	27	3.26	0.87
Weighted	Mean					2.79	0.91
Grand	Mean					2.76	0.93

Key**:** VTM = Very True of Me (4), TM = True of Me (3), OTM = Occasionally True of Me (2), N = Never (1)

Table 3 includes ICT skills of the health information management (HIM) staff of teaching hospitals in South-South Nigeria. The results show that the HIM staff have a high ICT skill level in different fields. In word processing, employees were found to be competent in justification and centralisation of documents (x = 3.43; SD = 0.76), page layout (x = 3.44; SD = 0.73), manipulating save and save-as commands and accessing files (x = 3.38; SD = 0.83). But, the development of skills like file/folder zipping ($\bar{x}$ =2.01; SD=0.96), and troubleshooting ($\bar{x}$ =2.16; SD=1.06) were found to be less developed, and thus it can be concluded that they might need additional training. Word processing skills Weighted mean was 2.79 (sd=0.91), which indicated that proficiency was mostly high. In data analysis and spreadsheets, HIM staff performed well in data entry ($\bar{x}$= 3.28, SD = 0.74) and spreadsheet formula usage ($\bar{x}$= 3.26, SD = 0.87), but poorly in the creation of databases ($\bar{x}$= 2.01, SD = 0.04) and data sorting ($\bar{x}$= 2.27, SD = 0.11), which gave a weighted average of 2.63 (SD 0.97 To the presentation skills using MS PowerPoint, the personnel scored highly in creating slides ($\bar{x}$= 3.43; SD

= 0.76), changing colours and backgrounds ($\bar{x}$= 3.44; SD = 0.73), and running slideshows ($\bar{x}$ = 3.38; SD = 0.83), whose weighted mean is 2.89 (SD = 0.88), which makes it the most predominant ICT skills domain.

In the internet use and search skills, the HIM personnel proved to be competent in using websites (x = 3.26; SD = 0.87), and troubleshoot computer and internet issues (x = 3.42; SD = 0.77), whereas the use of email (x = 2.01; SD = 0.04) and search engines (x = 2.27; SD = 0.11) were not used as consistently as internet search and troubleshooting. High levels of proficiency were noticed in the communication skills, relating to connecting computers with networks ($\bar{x}$= 3.44; SD = 0.73), using mobile communication tools ($\bar{x}$= 3.38; SD = 0.83), and sending/receiving emails ($\bar{x}$= 3.26; SD = 0.87), and collaborative skills, including sharing of electronic materials ($\bar{x}$= 2.16; SD = 0.06), were relatively low. Communication skills weighted mean was 2.74 (SD = 0.95). In the digitization skills dimension, the personnel showed good skills in converting Word files to PDF ($\bar{x}$ = 3.44; SDT = 0.73), and editing of scanned documents/images ($\bar{x}$ = 3.43; SDT = 0.76), and low skills in using digital devices to transfer information ($\bar{x}$ = 2.01; SDT = 1.04), and the weighted mean was 2.83 (SD = 0.90). Last but not least (concerning acquisition of ICT skills), the most commonly used ways included formal training by producers/vendors ($\bar{x}$ = 3.38; SD.= 0.83), seminars/conferences ($\bar{x}$ 3.28; SD = 0.74), and mentoring by their colleagues ($\bar{x}$ 3.26; SD = 0.87), whereas self-effort and friends were not very popular, so the weighted average score is 2.79 (SD = 0.91 On the whole, the grand mean of 2.76 (SD=0.93), exceeding the criterion mean of 2.50 suggests that HIM staff in the teaching hospitals in South-South Nigeria has high ICT skills.

These results were supported by the interview responses which pointed into personnel competence in word processing, spreadsheet processing, presentation, internet navigation, communication and digitization. Interviewees affirmed their capacities to accomplish tasks like editing and formatting documents, developing and working with spread sheets, creating and presenting presentations, accessing and retrieving information online and scanning and converting files electronically. Nevertheless, some weaknesses are identified, especially in troubleshooting, database creation, zipping files, and collaboration in digital communication, which implies that specific training can be used to increase ICT proficiency.

Table 4: Relationship between ICT skills and EHR management practices among the HIM personnel

EHR management dimension	ICT Skills ($\bar{x}$)	EHR Practices ($\bar{x}$)	Pearson's r	Sig. (2-tailed)	Interpretation
Health Records Creation	2.79	2.82	0.68	0.000	Strong Positive
Maintenance & Use of Records	2.79	2.73	0.61	0.000	Moderate Positive
Retention of Records	2.79	2.47	0.54	0.001	Moderate Positive
Disposal of Records	2.79	2.47	0.49	0.002	Moderate Positive
Overall EHR Management	2.79	2.71	0.63	0.000	Strong Positive

Key**:**

- $\bar{x}$ = Mean score of respondents
- Pearson's r = correlation coefficient (strength and direction of relationship)
- Sig. = significance value ($p < 0.05$ indicates significant relationship)

Research question three: What is the relationship between ICT skills and EHR management practices among health information management personnel?

Table 4 analysis indicates that ICT skills and EHR management practices have a positive and significant relationship among HIM personnel in teaching hospitals in South-South Nigeria. In particular, the development of health records showed the most significant correlation with ICT skills ($r = 0.68$, $p = 0.000$), and it means that employees who are more skilled in ICT are more likely to be fully involved in patient registration, billing, tracking, and producing admission/discharge summaries. Records maintenance and use also demonstrated a moderate positive association with ICT skills ($r = 0.61$, $p = 0.000$), which indicates that those staff with more competence in ICT skills are better able to maintain records and maintain confidentiality and retrieve patient information effectively. Likewise, the correlation with retention ($r = 0.54$, $p = 0.001$) and disposal ($r = 0.49$, $p = 0.002$) practices was moderate, which indicates that the ICT skills assist in the accurate appraisal of records, their archiving, and disposal. In general, the aggregated EHR management practices analysis has provided a good positive correlation with the ICT skills ($r = 0.63$, $p = 0.000$), which proves that ICT competence is a substantial facilitator of effective EHR practices. This observation was confirmed through interviews, with personnel that had high skills in ICT claiming to use EHR software to the full or nearly full extent and similar skill gaps to underuse the advanced features such as database creation, reporting, and teleconferencing. This highlights the importance of specific ICT training, capacity building, and infrastructure assistance to maximise the management of EHR in teaching hospitals.

Research question four: What challenges do health information management personnel face in using ict for electronic health records management?

Table 5: Challenges faced by HIM personnel in using ICT for EHR management

S/N	Challenges	SA	A	D	SD	$\bar{x}$	Std. Dev	Interpretation
1	Network instability and internet outages	150	172	32	22	3.33	0.78	High
2	Insufficient ICT training and capacity building	143	165	40	28	3.23	0.81	High
3	Limited access to updated EHR software	130	158	55	33	3.06	0.91	Moderate
4	Technical glitches and software downtime	125	160	60	31	3.01	0.92	Moderate
5	Lack of ICT policy enforcement in hospitals	110	140	80	46	2.78	0.99	Moderate
6	Resistance to change from paper-based systems	95	135	90	56	2.63	1.04	Moderate
7	Inadequate hardware (computers, servers)	102	128	95	51	2.67	1.03	Moderate
Grand mean						2.92	0.91	High

Key: SA = Strongly Agree, A = Agree, D = Disagree, SD = Strongly Disagree

The results in Table 5 give us the significant issues that HIM staff encounter when leveraging the usage of ICT to manage EHR in teaching hospitals in South-South Nigeria. The most notable issues are network instability and internet outages ($x = 3.33$, $SD = 0.78$) and inadequate ICT training and capacity building ($x = 3.23$, $SD = 0.81$), which means that both infrastructure constraints and skillset gaps are the major obstacles to the successful use of EHR systems. The areas of moderate difficulties

included the lack of access to the updated EHR software ($\overline{x}$ = 3.06), technical problems and software failures ($\overline{x}$ = 3.01), the absence of policy enforcement by ICT ($\overline{x}$ = 2.78), and the unwillingness to change to paper-based systems ($\overline{x}$ = 2.63). Also poorly maintained hardware, including computers and servers (x 0 = 2.67) continues to restrict full use and application of electronic health records. These quantitative results were supported by the interviews, as the respondents reported that network instability can frequently interfere with data entry and retrieval, whereas insufficient training makes staff levels less confident in their skills with advanced EHR features. Partially provided EHR software were also reported in some hospitals and some modules were not fully used as some had no knowledge or technical support. It was identified that there was resistance to change over to the use of paper--based systems, especially in long serving employees which has influence on standardization and consistency of electronic recordkeeping. The mean (2.92) is large, which means that the issues are significant, and the development of a strong ICT infrastructure, ongoing professional education, efficient policy implementation, and change management plans are the only solutions that can assist HIM staff in the optimal EHR management.

Research question five: What strategies can be implemented to enhance ICT skills and improve EHR management practices in teaching hospitals?

Table 6: Strategies to Enhance ICT Skills and Improve EHR management Practices

S/N	Strategy	SA	A	D	SD	$\overline{x}$	Std. Dev
1	Regular ICT training and capacity-building workshops	180	160	20	16	3.51	0.65
2	Provision of reliable ICT infrastructure (computers, servers, internet)	172	155	30	19	3.42	0.71
3	Adoption of updated and standardized EHR software	160	148	40	28	3.30	0.78
4	Implementation of ICT policies and governance frameworks	145	160	50	21	3.23	0.79
5	Continuous technical support and helpdesk services	138	152	55	31	3.15	0.82
6	Incentivizing staff to adopt and fully utilise EHR features	120	145	60	51	2.97	0.90
7	Encouraging peer-learning and mentorship among HIM personnel	130	138	70	38	3.00	0.88
Grand mean						3.22	0.78

Key: SA = Strongly Agree, A = Agree, D = Disagree, SD = Strongly Disagree

Table 6. presents the strategies recommended to enhance ICT skills and improve EHR management practices among HIM personnel in teaching hospitals across South-South Nigeria. The data show that regular ICT training and capacity-building workshops ($\overline{x}$ = 3.51, SD = 0.65) were considered the most effective strategy, highlighting the critical role of continuous professional development in equipping personnel with the skills required to fully utilise EHR systems. Other high-impact strategies include the provision of reliable ICT infrastructure such as computers, servers, and stable internet connectivity ($\overline{x}$ = 3.42), the adoption of updated and standardized EHR software ($\overline{x}$ = 3.30), and the implementation of ICT policies and governance frameworks ($\overline{x}$ = 3.23). The availability of continuous technical support ($\overline{x}$ = 3.15) also emerged as crucial to address operational glitches and ensure smooth EHR management. Moderate strategies highlighted by respondents included incentivizing staff to adopt and fully utilise EHR features ($\overline{x}$ = 2.97) and encouraging peer-learning and mentorship among HIM personnel ($\overline{x}$ = 3.00), which can foster collaborative skill development and

knowledge sharing. Interviews reinforced these findings, with participants emphasizing the need for structured training programs, mentorship opportunities, and reliable infrastructure. Respondents noted that hospitals with regular training sessions and dedicated technical support reported higher usage of advanced EHR features and improved record management practices. Incentive systems and policy enforcement were also suggested to motivate staff to transition fully from hybrid to fully electronic record systems. The grand mean of 3.22 indicates a generally high level of agreement among respondents regarding the importance of these strategies, demonstrating that targeted interventions in ICT skill development, infrastructure provision, software standardization, and policy enforcement are essential to optimise EHR management practices in teaching hospitals.

Discussion

The study revealed that the HIM staff in the teaching hospitals in South South Nigeria have active involvement in the core EHR management practices, including patient registration, billing, documentation of admission and discharge summaries, patient record tracking. Such practices show a steady adoption of EHR systems to complete key administrative and clinical activities. Nevertheless, not all the extended features of the EHR systems were exploited, such as the development of the master name index and daily attendance, implying partial use of the functionalities in the system. Moreover, it is possible to note that staff members were very diligent in keeping and retrieving the records of patients, but there were gaps in digital security methods, including password protection and virus protection. Altogether, the results indicate that the EHR systems are broadly used, but the full potentials are not always exploited in all hospitals. The results can be supported with the international research which revealed the similar patterns of EHR usage where basic features are more frequently used in comparison with advanced ones. Indicatively, the gaps in user training and familiarity in the United Kingdom meant that among the many basic EHR capabilities (e.g., documentation, scheduling, billing) in use in the National Health Service, advanced analytics and customised reporting tools were not even used (Smith and Davies 2023). Such a trend is also reflected in the South South Nigerian where employees are basing their operations on minimal functionality of EHRs leaving some of the more sophisticated system functionalities unexploited. The researchers noted that even though the HIM staff members show a regular use of the systems to store and retrieve the records, digital security measures like passwords and antivirus are poorly implemented, which confirms the necessity to use more effective strategies to protect electronic data. Therefore, this study affirms that although the adoption of EHR is gaining ground in Nigeria, there is a challenge on further use of advanced and security-soriented practices.

The study showed that there is a positive and statistically significant correlation between the degree of ICT skills of HIM staff and their practices in EHR management. Staff members in HIM were better equipped digitally, which led them to undertake EHR related activities in a more regular and efficient manner, such as patient registration, electronic record writing and data retrieval. The relationship indicates that the skills of ICT are key facilitators of meaningful use of the EHR system because the more the personnel is digitally fluent, the more he or she will be able to navigate and utilise EHR software. The presented finding is in line with the Tehnology Acceptance Model (TAM) framework and available empirical studies. According to Davis (1989),

when people find technology easy to use and helpful, they would adopt and effectively use technology; these perceptions are directly related to the level of ICT skills in the person using the technology. Equally, Hlaing Min Oo, Zin, and Htet (2021) established that Myanmar healthcare professionals with a higher ICT literacy level were much more ready to read and use electronic medical record systems, which implies that digital competence can alleviate resistance to technological change and promote its use. In a research aiming at investigating the tertiary healthcare context in Nigeria, Sibiya, Akinyemi, and Oladimeji (2023) noted that those, who had solid ICT skills, could work with EHR systems to generate documentation and reporting data, which supports the claim that digital skills directly affect the quality of information management. In totality, these studies, along with the current research, highlight that ICT skills are central in defining either the level or efficiency of EHR utilisation, especially in settings whereby digital health records are in the development stages.

The study discovered that HIM workers tend to have a high degree of ICT skills especially in word processing, presentation and digitization. Staff members can conduct basic electronic duties, such as document preparation, formatting, information input, and management of digital files, which are the basic aspects of EHR activities. Nevertheless, practices in more developed fields, like the spreadsheet analysis or the database development, as well as intricate internet-based features, were not so popular. The results indicate that though simple ICT skills are robust as among HIM staff, there is a necessity of ongoing professionalism in order to increase advanced digital skills that are becoming important in effective EHR management. Other studies in similar health contexts support this pattern. Adjei and Attah (2021) discovered that healthcare information professionals in the Nigerian hospitals were better equipped in simple ICT activities (e.g., document creation and formatting), although less proficient in sophisticated analytical abilities (e.g., sorting data and manipulating a database). Similarly, Chibuzor, Mbamalu, and Okwuoma (2022) also revealed that nurses and other allied health workers are usually well-equipped with the initial digital skills, but whose ICT higher-order skills are restrictive in terms of complex data analysis and troubleshooting. The same quantitative findings were reflected in the interview insights in the current study because HIM personnel indicated confidence in typing, formatting, data entry, and conversion of digital files but indicated difficulty in creating databases and complicated data operations. This tendency indicates that the overall ICT proficiency of the HIM staff is quite high, but additional capacity building in areas like spreadsheet analytics, database design, and advanced internet search strategies, i.e., competencies that are becoming core to streamlined EHR management and health information analysis, is required.

The study has uncovered that Health Information Management staffs experience various difficulties when utilising ICT in management of electronic health records. Such challenges as network instability, software malfunctions, and insufficient access to more advanced EHR features, and insufficient ICT infrastructure can be listed as key ones. The staff also complained about issues regarding the lack of technical assistance, occasional training options, and the inability to incorporate EHR systems within the departments. These limitations prevent the complete use of the EHR capabilities including advanced billing, coding, and analytics thus lowering

productivity in health information management. These results are supported by similar results in other health care settings. Mensah and Adjei (2022) discovered that healthcare professionals in Ghana hospitals were faced with network and software constraints that made the use of EHR systems ineffective. On the same note, Sibiya, Akinyemi, and Oladimeji (2023) indicated that the Nigerian hospital staff experienced technical and infrastructural obstacles that limited the implementation and maximum utilisation of digital health technology. The same challenges were also supported through responses in the interviews in the present study of which the basic EHR functions are regularly used, but the advanced modules are frequently not fully utilised due to the lack of connectivity, software, and/or system instability to achieve operational efficiency.

The study has discovered a number of techniques which can be adopted to stimulate ICT proficiencies and to transform the practice of electronic health records management, among the staff of the HIM. The main measures will be the ongoing professional growth programs, organised training sessions, software training led by the vendor, peer mentoring, and implementation of uniform EHR protocols within the departments of the hospital. Also, the investment in consistent ICT infrastructure, good internet connectivity, and role in offering technical support were mentioned as the primary issues in enhancing the use of EHR. These approaches are evidenced by other contexts. As Adjei and Attah (2021) underscored, specific training and professional growth have a great impact on ICT competency and EHR application among health information professionals. In a similar manner, Chibuzor, Mbamalu, and Okwuoma (2022) found that some of the most appropriate drivers were mentorship, practical workshops, and institutional support to improve digital skills and the use of health information systems. Such findings were supports by interview insights in the current research where HIM personnel recommended frequent training, refresher courses, and vendor-oriented training to make the most of the advanced EHR features. These findings indicate that skill-building programs, infrastructural investments, and system-wide policies need to be combined in order to achieve the maximum of ICT competence and the development of effective use of electronic health records in teaching hospitals.

Conclusion

The paper has determined that the health information management staff in South-South Nigerian teaching hospitals have an average to high degree of involvement in Electronic Health Records (EHR) management practices. Staff members are especially competent in the primary activities like patient records, billing, and discharge summary and patient record tracking. Similarly, the research found that the HIM personnel tend to have high ICT skills particularly word processing, presentation and digitization that form the backbone of the successful EHR operations. Nevertheless, more advanced ICT skills, including spreadsheet analytics, database creation and complex internet-based functionality are less common. The research also noted that there are some barriers to effective EHR management such as lack of training, network failures, technical hiccups, and incomprehensive use of EHR software capabilities. The insights gained during the interviews have helped to confirm that although other hospitals have completely adopted EHR systems, some others have a hybrid system and this restricts the effectiveness and full benefits of EHR. In general, the results suggest that the baseline

ICT skills and EHR practices are impressive, but the advanced digital skills should be further developed, infrastructure should be improved, and regular professional development initiatives should be implemented to streamline EHR management levels among the HIM employees.

Based on the findings, it is recommended that:

1. Conduct regular trainings and workshops on higher ICT skills, such as database management, spreadsheet analytics, advanced internet search methods, etc., to enforce EHR-related competencies.
2. The teaching hospitals are recommended to invest in stable network connectivity, sound hardware, and all-inclusive EHR software that allows full use of its features in both inpatient and outpatient units.
3. Establish and implement institutional policies upon which EHR use and data security, data retention and data disposal is conducted (so that there is uniformity in managing records).
4. Bring hospitals to maximise all the functionality of the existed EHR systems, such as the coding, billing, reporting, and patient interaction capabilities, to become more efficient and less dependent on manual work.
5. Creating mentorship programs that would allow having experienced HIM staff to introduce the less-experienced personnel to complex ICT applications and best practices in EHR management.
6. Undertake a regular evaluation of EHR adoption and ICT skills application to detect the deficiencies to take corrective action to improve the overall efficiency and accuracy in health information management.

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