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The Role of Electronic Health Record in The Effective And Efficient Health Record Keeping at St. Lukes Hospital, Anua Akwa Ibom State

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Abstract

This investigative study, titled "The Role of Electronic Health Records (EHR) in Effective and Efficient Record Keeping at St. Luke's Hospital, Anua, Akwa Ibom State," aims to assess the impact of electronic health records on the hospital's record-keeping processes, focusing on their effectiveness and efficiency in preserving health records. EHR is a systematic collection of patient electronically stored information in a digital format. The problem under investigation were inadequate training for staff on the use of EHR systems, inadequate funding from the management to maintain and create room for smooth running of the EHR system, threats to confidentiality of patient health information can occur and lead to loss of information in using EHR system. The objectives of this study was to create an overview on the benefit of using EHR in record keeping and patient care management at St. Luke's Hospital, find out the developmental process towards the implementation of EHR in the hospital, access the current challenges of the health system in the use of EHR, examine the ways of maintaining the EHR system. Some related literature were reviewed. Data were collected using self-administered questionnaires to 110 staff members and 96 responses were retrieved for the analysis. Data was analyzed with simple frequencies and percentages chi square was used for the analysis. Findings revealed that inadequate Electronic Health equipment, inadequate IT personnel and epileptic power supply are the major issues in the smooth preservation of EHR. Despite the issues, benefits of EHR such as improved accuracy, faster access to patient information and enhanced care coordination were recognized. The study provided recommendations for hospital management, government and policy making to enhance EHR adoption and utilization, invest in adequate EHR equipment and ensure a reliable power supply to support the seamless operation of the EHR system.

Keywords: Electronic health record, Efficient health record keeping, Electronic health equipment, Patient care management, EHR systems.

1 | Introduction

An Electronic Health Records (EHR) is an electronic version of patients' medical history that is maintained by the provider overtime and may include all of the key administrative clinical data relevant to the patients care under a particular provider including demographics, progress note, problems, medications, vital signs,

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past medical histories, immunization, laboratory data and radiology reports [1]. The EHR automates access to information and has the potential to streamline the clinicians work flow. The EHR also has the ability to support other care related activities directly or indirectly through various interfaces including evidence-based decision support, quality management and outcome reporting [2]. EHR is the next step in the continued progress of health that can strength the relationship between patients and clinicians. The data and timeliness and availability of it will enable providers to make better decisions and provide better care. The EHR can improve patient care by reducing the incidents of medical errors by improving the accuracy and clarity of medical records making the health information available, reduce delays in treatments and patients well informed to take better decisions, reducing medical errors by improving the accuracy and clarity of medical records [3].

2| Benefits and Challenges of Electronic Health Record Systems

The computer-based EHR has been shown by several studies to be an essential technology tool for health care modernizing the management of medical information and contributing to high-quality patient care and efficient patient management [4]. The functions of EHR include patient billing, electronic ordering of investigations and receiving investigation results, electronic prescribing, recording of clinical information and in some circumstances, decision support software [5]. From the patient's perspective, the benefits of EHR include: improved diagnosis and treatment, significantly fewer errors found within personal health records and faster care and decision making responses from assigned medical professionals [6]. From the viewpoint of doctors and health practitioners there are numerous other advantages of implementing EHR: the ability to quickly transfer patient data from one department to the next is a huge asset; the space saving benefit of a digital records environment; the ability to ultimately increase the number of patients served per day for enhanced patient workflow and increased productivity; improved results management and patient care with a reduction in errors within your medical practice; reduced operational costs such as transcription services and overtime labour expenses; customizable and scalable EHR that can grow with your practice; advanced e-prescribing and clinical documentation capabilities and; an improved bottom line of the healthcare practice, enhanced through the ability to more accurately and support for clinical research [7].

Electronic records also help communities and systems by compiling data for use in disease surveillance and outcome evaluation. EHRs enhance the accessibility and efficiency of retrieving pertinent patient data and increase the provision of comprehensive, collaborative care [8]. Critics believe the use of templates discourages nurses and other providers from fully documenting the narrative during patient interactions. Electronic records help staff avoid mistakes and improve the quality of patient care. Electronic records offer nurses evidence-based care reminders as they work with patients at the bedside. This provides patients with the most current and proven treatments to improve care. The EHR also helps avoid mistakes by alerting nurses of potential errors as they care for patients. The EHR helps connect and align patient-centered care into information that is distilled and used for good decision making towards improving quality and patient safety [9]. The use of EHRs has been associated with many financial effects to physician practices which can be central to the decision to adopt EHRs. These benefits include net overhead cost savings, increased revenue and positive Return on Investment (ROI). Overhead costs may be reduced through lower administrative costs (e.g. chart pulls and filing, transcriptions, phone calls, photocopying charts, faxing medical information), reduced storage costs, and reduced costs from increased provider and staff efficiency.

Physicians may be able to increase their revenue from billings through enhanced charge capture and reduced billing errors. For example, physicians can enter charges in real time and are provided with drop down menus which enable more accurate billing. EHRs can provide a positive ROI for practices if the cumulative sum of reduced overhead costs and/or increased billing revenues is greater than the costs associated with EHR investment and implementation [10]. Evidences in the international literature suggests that EHRs are associated with a positive ROI. In a Canadian study, most practices were found to recoup their investments in an average of 10 months, with a range from 1 to 37 months. 14 of 17 primary care clinics in the study had a positive ROI [11]. In addition to economic benefits, EHRs contribute significantly to the improvement of

the quality of care [12]. Primary care constitutes a pivotal specialty in the clinical management of patients within a healthcare system. The use of an EHR in primary care is of paramount importance for the effective and timely management of patients [13].

Despite their benefits, EHR present a number of challenges [14]. pointed out that they are costly and need a substantial amount of finance in order to set up. Another disadvantage of EHR is that they are technical in nature; and demand training before they can be used. In addition, they lack standardized terminology and system architecture which render it hard to implement. Some of the challenges of using EHR are security related. Security lapses might compromise the privacy and confidentiality of Health Records [15, 16]. Stated that system designers must consider how individually identifiable patient information will be protected and also meet regulatory requirements before using EHR. Technological compliance solutions are some of the measures that have been adopted to safeguard EHR. One such technological compliance solution is data encryption, whereby Internet Transfer Protocols are managed, in order to limit access to records. In this case, the activities concerning EHR are tracked to identify who received disclosed data. Another way of safeguarding EHR is through the use of biometrics (e.g. fingerprint ID recognition) to secure access to computers on networks and information storage devices [17, 18].

One of the basic challenges of manual record is the insufficient space for the increasing number of health records. With concern to physical space for storage of paper health records a challenge many institutions will keep battling with [19]. Hospitals producing hundreds to thousands of records each day means that after a given period of time the records accumulate huge volumes of paper records. This may bring about difficulty in locating some records and also insufficient space to carry all the records before they are disposed. This becomes the major challenge for paper records. Unlike paper, loss of electronic records is guaranteed unless actively managed. Paper can be ignored for 100 years, and when it is opened the information is perfectly readable. If the state ignores electronic records for 10 years, the fragility of the media and technological obsolescence will make access difficult. The longer one waits to manage these records, the less likely the data will be recoverable [20]. The records of an organization, such as the hospital, constitute the corporate memory which supplement human memory and serve as guides for effective planning and decision making. Records are invaluable to the teaching hospital. Thus, in order to take advantage of past experiences, accurate records and good records keeping are the bedrock of planning for the future existence of the hospital. However, health records need proper management through proper storage areas, controlled access and adequate preservation measures to improve efficiency, safety and quality of care Marutha [21].

The role of EHR in the effective and efficient health record keeping at St. Luke's hospital, Anua as factored in the above literature and beyond are highlighted below:

- I. Insufficient Technological Setups
- II. Practical Skills
- III. Shortage of technological innovations
- IV. Lack of Regulation/Strategy
- V. Insufficient Funding
- VI. Computer literacy

Insufficient funding

Digital projects are expensive. Digitization of records requires enormous funding due to frequent hardware and software upgrades, and increasing cost of subscription to electronic databases, this makes them to be easily by information seekers globally [22].

Computer literacy

Due to inadequate skills in information technology in Africa, many traditional librarians, record keepers and archivists are conservatives and are not computer literate. Because of generational gaps between the new and

old professionals, computers are perceived as a threat to their status as experts [23]. Thus, they find it difficult to cope or measure up with the requirements of the electronic/digital age, and are at the same time 'too reluctant to jettison the old practices for new one [24]. Successful application of information handling technologies in developing countries requires an ability to overcome staff and personal resistance to such innovation.

Practical skills

One of the biggest challenges to preservation and conservation of hospital records in developing countries is educating the record keepers in hospital community on the best ways to handle hospital records. This challenge is exacerbated by the fact that preservation of records is not at the centre of most medical science curricula. There are few places or nowhere, for example in Nigeria where one can receive formal specialized education in preservation and maintenance of archives and records. Added to this is the fact that inadequate technical expertise is prevalent in many African countries [25]. Also, there is shortage of personnel/human capital. Those few librarians that possess basic knowledge in computer science and its applications work in archives and record units, hence the consequent frequent break down of ICT facilities and disruption of services in digitized record units. In many African countries, human resources with appropriate skills, competences and attitude are not readily available to initiate, implement and sustain digitization project, and most African states are still lagging behind in technological and telecommunications infrastructure [26].

Insufficient technological setups

Frequent power outage constitute serious bottleneck to digitization in Africa. This has the effects in damaging digital/ ICT equipment and where there is a standby electric generator, the cost of running them is prohibitive [27]. Added to this is the harsh environment of Sub-Saharan Africa which is not always friendly with technology equipment. Most countries in Africa do not have adequate and reliable supply of electricity which consequently makes it impossible to maintain a conducive and sustainable technological environment suitable for digitization project in the continent [28]. Again, telecommunications infrastructures in most African countries are either lacking or poorly developed, and few African states have modern digital and packet switching telecommunications facilities needed for data transmission.

Insufficient technological innovations

The continuous changes in computer hardware and software have caused a lot of technological innovations gap which is a threat to digitization and record preservation in Africa [29]. It causes the loss of the means to access to information in digital form. Technological innovation gap is caused by continuous upgrade of operating system, programming language application and storage media.

Inadequate regulation/strategy

Legislators in Africa are neither aware of, nor conversant with the requirements of digital preservation and for that reason; they either ignore or inadequately cover digital preservation issues [30]. The Internet links is also a challenge to digitization because of copyright legislation. The copyrights of software needed to access digital files, and the right to copy for preservation has not been adequately articulated in most national legislation, and if permission for digitization cannot be obtained, digitization of such materials should not proceed.

3 | Research Methodology

3.1 | Study Area

The study is set out to investigate the role of EHR in the effective and efficient health record keeping at St. Luke's hospital, Anua, Uyo, Akwa Ibom State. It is centered on the EHR and current challenges facing staff of health information management in all the departments at St. Luke's hospital, Anua, Uyo, Akwa Ibom State. The hospital is a tertiary health institution which is concerned with giving possible solutions to all health

related issues. They build and maintain the patient relationship. However, health information professionals in the above named institution plays a vital role in managing patient health records and welfare electronically. Their role in ensuring adequate safety practices, adequate treatment and time management in the discharge of information through HER system influences the rate of patient recovery process thus, cannot be overemphasised. The study is limited to staff of health information managers St. Luke's hospital, Anua, Uyo, Akwa Ibom State. The facility is located at Anua offot, along Nwaniba road, Uyo, Akwa Ibom State.

3.2 | Population of the Study

In this study, the target population was 110 Health Information employees on permanent, contract and temporary terms at the St. Luke's hospital, Anua, Uyo, Akwa Ibom State. A high percentage of the population of the organization would need to be familiar with both the paper and electronic method of records as they were users. The study target was 96 personnel and this represents 87.27 % of the total target population which comprises of the staff members of St. Luke's Hospital. The population included Health Information Management officers (12), Doctors (19), Nurses (24), Pharmacy Staff (8), OPD secretaries (4), front desk personnel (9), Billing staff (8), and laboratory Technicians (12).

3.3 | Research Design

This comprises the collection of data that will provide an account or description of individuals, groups or situations. Instruments used to obtain data in descriptive studies include questionnaires, interviews (closed questions), and observation (checklists, etc.). Survey research includes gathering quantitative and/or qualitative data from participants typically using a questionnaire or interview. The survey was designed to gather information on the current role of EHR in the effective and efficient health record keeping at St. Luke's hospital, Anua, Uyo, Akwa Ibom State. The questionnaire was divided into sections to cover various aspects of health record management, including record keeping practices, access to health records, data security, and staff training. The questions were designed to rouse detailed responses from participants to provide a comprehensive understanding of the problems associated with the use of EHR faced by the hospital in managing health records.

3.4 | Sampling Technique

The sampling frame was acquired from the hospital health information department head who gave a copy of the current staff establishment working under the records unit at the St. Luke's hospital, Anua, Uyo, Akwa Ibom State. The survey targeted healthcare professionals working at St. Luke's hospital, Anua, Uyo, who are directly involved in the management of health records. A random sampling method was used to select participants from different units within the hospital, including medical records officers, nurses and administrative staff. The sample size was determined based on the number of healthcare professionals involved in health record management of the hospital.

3.5 | Method of Data Analysis

The responses from the questionnaire were analyzed using qualitative research methods to identify key issues and challenges of EHR faced by the hospital in managing health records. The data were coded and categorized to identify common themes and patterns. The findings were presented in a descriptive form and were statistically presented in percentage and chi-square statistical tool was used to test the hypotheses at 0.05 level of significance.

Formula for Chi-Square (X^2).

$$X^2 = \sum(O_i - E_i)^2$$

E_i

Where

O_1 = Observed frequency

E_1 = Expected frequency

X^2 = Chi-Square

To obtain the $E = \frac{CT \times ET}{ET}$

Where CT = Column Total,

ET = Expected Values

Level of Significance = 0.05

Decision Rule of acceptance or rejection

When the calculated chi-square (X^2) value is greater or equals to the critical table value rejects the null hypothesis and accept alternative hypothesis. If the tabulated X^2 value is greater than the calculated value, accept the null hypothesis and reject the alternative hypothesis.

4 | Results and Discussion

This section analyzed the data obtained from the respondents through the questionnaires. The discussion on the findings was carried out to enhance understanding. Simple percentage and chi-square were used to analyze the data. One hundred and ten questionnaires were administered and ninety six was recovered at 87.27% rate of recovery. The analysis of respondents' socio demographic characteristics is presented in the following tables.

Table 1. Distribution and collection of questionnaire (field survey).

Number of distributed	110	100%
Number of retrieved	96	87.27%
Number of non-retrieved	14	12.73%

From the analysis on the table above, it was revealed that 110 (100%) questionnaire were distributed, and 100 (87.27%) were recovered. The lost percentage was 20 (12.73%).

Table 2. Gender distribution of respondents.

Variables	Number of Respondents	Percentage
Male	32	33.33%
Female	64	66.67%
Total	96	100%

From the analysis on the table above, it was revealed that 31 (33.33%) of the respondent were male while the female respondents were also 65 (66.67%).

Table 3. Age distribution of respondents.

Variable	Number of Respondents	Percentage
20-30	25	26.042%
31-40	36	37.5%
41-50	23	23.958%
51 and above	12	12.5%
Total	96	100%

From the analysis *Table 3*, it was revealed that 25 (26.042%) of the respondent were between the ages of 20 to 30 years of age, 36 (37.5%) of the respondent were between the ages of 31 to 40 years of age, 23 (23.958%) of the respondent were between the ages of 41 to 50 years of age while 12 (12.5%) of the respondents were between the ages of 51 and above.

Table 4. Marital status of respondents.

Variable	Number of Respondents	Percentage
Single	38	39.583%
Married	41	42.708%
Divorced	7	7.292%
Widowed	10	10.417%
Total	96	100%

From the analysis on *Table 4*, it was revealed that 38 (39.583%) of the respondent were single, 41(42.708%) of the respondent were married, 9 (9.375%) of the respondent were divorced while 12 (12%) of the respondents were widowed.

Table 5. Educational qualification of respondents.

Variable	Number of Respondents	Percentage
ND	15	15.625%
HND	29	30.21%
BSc	44	45.833%
MSc/PhD	8	8.333%
Total	96	100%

From the analysis on *Table 5*, it was discovered that 15 (15.625%) of the respondent had National Diploma as their highest qualifications, 29 (30.21%) of the respondent had Higher National Diploma as their highest qualifications, 44 (45.833%) of the respondent had Bachelor of Science Degree as their highest qualifications while 8 (8.333%) of the respondents had either a Master's degree or a PhD as their highest qualifications.

Table 6. Department of the respondents.

Variable	Number of Respondents	Percentage
Doctors	19	19.792%
Health information officers	12	12.5%
Nurses	24	25%
Pharmacy	8	8.333%
Lab. technicians	12	12.5%
Front desk personnel	9	9.375%
Billing staff	8	8.333%
OPD secretaries	4	4.167%
Total	96	100%

From the analysis on *Table 6*, it was observed that 19 (19.792%) of the respondent were Doctors, 12 (12.5 %) of the respondent were Health Information officers, 24 (25%) of the respondent were nurses, 8 (8.333%) of the respondents were Pharmacists, 12 (12.5%) were Laboratory Technologist, 9 (9.37%) were Front Desk Personnel, Billing staff were 8 (8.333%) and 4 (4.167%) were OPD secretaries who made up the total number of respondents.

Table 7. Years of work experience of respondents.

Variable	Number of Respondents	Percentage
1 - 5 years	23	23.958%
6 - 10 years	27	28.125%
11 - 15 years	17	17.708%
16 - 20 years	15	15.625%
21 - 25 years	8	8.333%
26 and above	6	6.25%
Total	96	100%

From the analysis on *Table 7*, it was deduced that 23 (23.958%) of the respondent had between 1 to 5 years work experience at the chosen medical centre, 27 (28.125%) of the respondent had between 6 to 10 years work experience at the medical centre, 17 (17.708%) of the respondent had between 11 to 15 years work experience at the medical centre, 15 (15.625%) of the respondents had between 16 to 20 years work experience

at the St. Luke’s hospital, Anua, Uyo, 8 (8.333%) of the respondent were had between 21 to 25 years of work experience at the St. Luke’s hospital, Anua, Uyo, while 6 (6.25%) had worked for over 26 years.

4.1 | Findings from Research Questions

The data collected from the field were first presented in a tabular form and later analyzed using percentage technique to present the depiction of the respondents view on the subject matter as shown in *Tables 8 to 11*. Research Question 1: What are the benefits of using EHR in record keeping and patient care management at St. Luke’s hospital, Anua, Uyo?

Table 8. Benefits of using EHR in record keeping.

S/N	ITEMS	YES (%)	NO (%)
1	Improved accuracy in patient records	78 (81.25%)	18 (18.75%)
2	Faster access to patient information	89 (92.71%)	7 (7.29%)
3	Enhanced patient care coordination	83 (86.46%)	13 (13.54%)
4	Reduction in paperwork	87 (90.63%)	9 (9.37%)
5	Improved data analysis for decision-making	74 (77.08%)	22 (22.92%)

Analysis of responses to Research Question 1 reveals the perceived benefits of using EHR in record keeping and patient care management at St. Luke’s hospital, Anua, Uyo. Improved accuracy in patient records had a positive response of 78 (81.25%) and the negative response from the questionnaire was 18 (18.75%). It should be noted that EHR systems facilitate the recording and retrieval of patient data in a structured and standardized format, reducing the risk of errors and improving the overall accuracy and completeness of patient records. Faster access to patient information was reported by 89 (92.71%) of respondents, while 7 (7.25%) of the total respondents were negative. Electronic access to patient information enables healthcare providers to retrieve relevant data promptly, enhancing clinical decision-making and reducing delays in patient care delivery. Enhanced patient care coordination was cited positively by 83 (86.46%) of respondents and 13 (13.58%) of the respondent were negative about it.

EHR systems facilitate communication and information sharing among healthcare professionals involved in patient care, promoting collaboration and ensuring continuity of care across different healthcare settings. Reduction in paperwork was identified positively as a significant advantage by 87 (90.63%) of the respondents and negatively by 9 (9.37%). EHR systems streamline administrative processes by digitizing patient records and eliminating the need for manual documentation, thereby reducing paperwork burden and freeing up time for healthcare providers to focus on patient care. Improved data analysis for decision-making was reported with a yes by 74 (77.08%) of respondents and a no by 22 (22.92%) underscoring the value of EHR systems in generating actionable insights from healthcare data.

Research Question 2: What is the developmental progress towards the implementation of EHR in tertiary hospitals in Nigeria?

Table 9. Implementation of electronic health records in tertiary hospitals.

S/N	ITEMS	YES (%)	NO (%)
1	Government policies supporting EHR implementation	74(77.08%)	22(22.92%)
2	Availability of funding for EHR projects	58(60.42%)	38(39.58%)
3	Training programs for healthcare staff on EHR usage	79(82.29%)	17(17.71%)
4	Collaboration with technology providers	66(68.75%)	30(31.25%)
5	Public awareness and acceptance of EHR	67(69.79%)	29(30.21%)

Table 9 provides insights into the progress towards the implementation of EHR in tertiary hospitals in Nigeria. Government policies supporting EHR implementation were reported positively by 74 (77.08%) of respondents while 22 (22.92%) were skeptical about it, indicating a favorable regulatory environment. The availability of funding for EHR projects was cited positively by 58 (60.42%) of respondents as a factor contributing to implementation progress while 38 (39.58%) had different opinion. Training programs for healthcare staff on EHR usage were reported positive by 79 (82.29%) of respondents while 17 (17.71%) had

other views which indicates effort to build capacity and improve digital literacy among healthcare professionals. Collaboration with technology providers was cited by 66 (68.75%) of the respondents as a strategy towards EHR implementation. Public awareness and acceptance of EHR were reported positively by 67 (69.79%) of respondents, suggesting ongoing efforts to educate and engage the public on the benefits of digital health technologies.

Research Question 3: What are the current challenges facing staff of health information management in the use of EHR in St. Luke's hospital, Anua?

Table 10. Current challenges facing staff of health information management in the use of electronic health records.

S/N	ITEMS	YES (%)	NO (%)
1	Inadequate electronic health equipment	38(39.58%)	58(60.42%)
2	Inadequate IT personnel/expertise within the organization	30(31.25%)	66(68.75%)
3	Inadequate power supply to run the system	56(58.33%)	40(41.67%)
4	Resistance from staff	21(21.87%)	75 (78.13%)
5	System failure/technical difficulties while using the EHR system during working hours	31(32.29%)	65(67.71%)

The analysis of the responses to Research Question 3 in *Table 10* reveals several challenges facing the staff of health information management in the use of EHR at St. Luke's hospital, Anua. Inadequate electronic health equipment emerged as a prominent issue, with 38 (39.58%) of the respondents while 58 (60.42%) were of different opinion, indicating its prevalence. This shortage of hardware or devices may hinder the smooth operation of the EHR system, impacting staff productivity and patient care. Similarly, a considerable number of respondents 30 (31.25%) identified inadequate IT personnel or expertise within the organization as a challenge and 66 (68.75%) responded negatively. This shortage of skilled IT professionals could compromise the effective implementation and maintenance of the EHR system, emphasizing the importance of having a proficient IT support team. The analysis also revealed concerns regarding inadequate power supply, with 56 (58.33%) of respondents citing it as a challenge. Frequent power outages or unstable electricity supply may disrupt the functioning of the EHR system, leading to downtime and potential data loss. Ensuring a reliable power source is crucial for the uninterrupted operation of EHR in the hospital. Resistance from staff was reported by 21 (21.87%) of respondents, indicating reluctance or opposition to the adoption of EHR. Furthermore, system failures or technical difficulties during working hours were identified as a challenge by 31 (32.29%) of respondents. This indicates that the EHR system may be prone to malfunctions or glitches, disrupting workflow and causing delays in patient care. Ensuring the reliability and stability of the EHR system is paramount for maintaining efficient healthcare services in the hospital.

Research Question 4: What are the confidentiality problems towards the storage and maintenance of EHR in St. Luke's hospital, Anua?

Table 11. Confidentiality problems towards the storage and maintenance of electronic health records.

S/N	ITEMS	YES (%)	NO (%)
1	Unauthorized access to patient records	65(67.71%)	31(32.29%)
2	Data breaches/hacks	58(60.42%)	38(39.58%)
3	Insufficient data encryption measures	32(33.33%)	64(66.67%)
4	Poor password management practices	31(32.29%)	65(67.71%)
5	Lack of staff training on data privacy	50(52.08%)	46(47.92%)

Analysis of responses to Research Question 4 reveals various security threats and confidentiality problems towards the storage and maintenance of EHR in St. Luke's hospital, Anua. Unauthorized access to patient records emerged as a significant concern, with 65 (67.71%) of respondents indicating its prevalence. Unauthorized access poses a serious threat to patient privacy and confidentiality, highlighting the need for robust access control measures to restrict access to sensitive health information. Similarly, data breaches and hacks were reported by 58 (60.42%) of respondents, indicating vulnerabilities in the hospital's EHR system. Data breaches can result in the unauthorized disclosure or manipulation of patient information, potentially

leading to legal and ethical implications. Strengthening cybersecurity measures is essential for preventing and mitigating the risk of data breaches. Insufficient data encryption measures were identified as a challenge by 32 (33.33%) of respondents. Encryption plays a crucial role in safeguarding patient data during transmission and storage, and the absence of adequate encryption measures may expose sensitive information to unauthorized access or interception. Poor password management practices were reported by 31 (32.29%) of respondents, indicating weaknesses in password security protocols. Weak or easily guessable passwords can compromise the security of EHR systems, emphasizing the importance of implementing strong password policies and regular password audits. Lack of staff training on data privacy was cited by 50 (52.08%) of respondents as a challenge. Staff members play a critical role in ensuring the security and confidentiality of patient information, and comprehensive training on data privacy policies and procedures is essential for promoting a culture of compliance and awareness.

4.3 | Research Hypothesis

This section will test the hypothesis formulated in this study using the data obtained from the respondents on the questionnaire. The 96 questionnaire obtained from the respondents were used as base for the work.

Hypothesis 1.

H₀: There is no significant benefits of using EHR in St. Luke’s hospital, Anua, Uyo.

H₁: There is significant benefits of using EHR in St. Luke’s hospital, Anua, Uyo.

Table 12. Observed (O) and Expected (E) frequency table in relation to question 1.

Variables	Yes	(E)	No	(E)	Total
Male	26	(29)	6	(8)	32
Female	52	(49)	12	(10)	64
Total	78	(78)	18	(18)	96

*Source: Questionnaire

The data used in this hypothesis was randomly picked from the pool of items 1-5 from *Table 8*. It represents item 1 from that table which is: Improved accuracy in patient records as one of the benefits of using EHR in record keeping and patient care management at St. Luke’s hospital, Anua, Uyo.

To obtain the E = $\frac{CT \times ET}{ET}$

Where CT = Column Total,

ET = Expected Values

$$(C - 1) (R - 1)$$

$$(2 - 1) (2 - 1)$$

$$1 \quad 1$$

Level of Significance = 0.05 = 3.84

$$\frac{(26 - 29)^2}{29} + \frac{(6 - 8)^2}{8} + \frac{(52 - 49)^2}{49} + \frac{(12 - 10)^2}{10}$$

$$= 0.31 + 0.5 + 0.18 + 0.4$$

= 1.39 as the calculated value

3.84 is the table value

Decision Rule of acceptance or rejection

If X^2 calculated is greater than X^2 tabulated, reject the null hypothesis, but if X^2 calculated is less than X^2 tabulated accept H_0 . When the calculated chi-square (X^2) value is greater or equals to critical table value, reject the null hypothesis and accept alternative hypothesis. If the tabulated X^2 value is greater than the calculated value, accept the null hypothesis and reject the alternative hypothesis. In this case, since the calculated value 1.39 is less than the table value 3.84, the H_0 is therefore accepted and H_1 rejected. This implies that, there is no significant benefits of using EHR at St. Luke's hospital, Anua, Uyo.

Hypotheses 2.

H_0 : There is no significant relationship on developmental process toward the implementation of EHR at St. Luke's hospital, Anua, Uyo.

H_1 : There is significant relationship on developmental process toward the implementation of EHR at St. Luke's hospital, Anua, Uyo.

Table 13. Observed (O) and Expected (E) frequency table in relation to question 1.

Variables	Yes	(E)	No	(E)	Total
Male	21	(24)	11	(8)	32
Female	37	(34)	27	(30)	64
Total	58	(58)	38	(38)	96

*Source: Questionnaire

The data used in this hypothesis was randomly picked from the pool of item 1-5 from *Table 9*. It represents item 2 from that table which is: Availability of funding for EHR projects as one of the developmental progress towards the implementation of EHR in tertiary hospitals in Nigeria.

To obtain the $E = \frac{CT \times ET}{ET}$

Where CT = Column Total,

ET = Expected Values

$$(C - 1) (R - 1)$$

$$(2 - 1) (2 - 1)$$

$$1 \quad 1$$

Level of Significance = 0.05 = 3.84

$$\frac{(21 - 24)^2}{24} + \frac{(11 - 8)^2}{8} + \frac{(37 - 34)^2}{34} + \frac{(27 - 30)^2}{30}$$

$$= 0.38 + 1.13 + 0.26 + 0.3$$

$$= 2.07 \text{ as the calculated value.}$$

3.84 is the table value

Decision Rule of acceptance or rejection

If X^2 calculated is greater than X^2 tabulated, reject the null hypothesis, but if X^2 calculated is less than X^2 tabulated accept H_0 . When the calculated chi-square (X^2) value is greater or equals to critical table value, reject the null hypothesis and accept alternative hypothesis. If the tabulated X^2 value is greater than the calculated value, accept the null hypothesis and reject the alternative hypothesis. In this case, since the calculated value 2.07 is less than the table value 3.84, the H_0 is therefore accepted and H_1 rejected. This implies that, there is no significant relationship on developmental process toward the implementation of EHR at St. Luke's hospital, Anua, Uyo.

Hypotheses 3.

H₀: There is no significant challenges facing the health system in the use of EHR in St. Luke’s hospital, Anua, Uyo.

H_i: There is significant challenges facing the health system in the use of EHR in St. Luke’s hospital, Anua, Uyo.

Question 3: What are the security threats and confidentiality problems towards the storage and maintenance of patient EHR in St. Luke’s hospital, Anua, Uyo.

Table 14. Observed (O) and Expected (E) frequency table in relation to question 3.

Variables	Yes	(E)	No	(E)	Total
Male	21	(25)	11	(7)	32
Female	35	(31)	29	(33)	64
Total	56	(56)	40	(40)	96

*Source: Questionnaire

The data used in this hypothesis was randomly picked from the pool of items 1-5 from *Table 10*. It represents item 3 from that table which is: Inadequate power supply to run the system as one of the security threats and confidentiality problems towards the storage and maintenance of patient EHR in St. Luke’s hospital, Anua, Uyo.

To obtain the $E = \frac{CT \times ET}{ET}$

Where CT = Column Total,

ET = Expected Values

$$(C - 1) (E - 1)$$

$$(2 - 1) (2 - 1)$$

$$1 \quad 1$$

Level of Significance = 0.05 = 3.84

$$\frac{(21 - 25)^2}{25} + \frac{(11 - 7)^2}{7} + \frac{(35 - 31)^2}{31} + \frac{(29 - 33)^2}{33}$$

$$= 0.64 + 2.29 + 0.52 + 0.48$$

= 3.93 as the calculated value.

3.84 is the table value

Decision Rule of acceptance or rejection

If X² calculated is greater X² tabulated, reject the null hypothesis, but if X² calculated is less than X² tabulated accept H₀. When the calculated chi-square (X²) value is greater or equals to critical table value, reject the null hypothesis and accept alternative hypothesis. If the tabulated X² value is greater than the calculated value, accept the null hypothesis and reject the alternative hypothesis.

In this case, since the calculated value 3.93 is greater than the table value 3.84, the H₀ is therefore rejected and H_i accepted. This implies that, there is significant challenges facing the health system in the use of EHR in St. Luke’s hospital, Anua, Uyo.

Hypotheses 4.

H₀: There is no significant relationship in the way of maintaining EHR in St. Luke’s hospital, Anua, Uyo.

H_i: There is significant relationship in the way of maintaining EHR in St. Luke’s hospital, Anua, Uyo.

Question 4: What are the current challenges facing staff of health information management in the use of EHR in St. Luke's hospital, Anua, Uyo?

Table 15. Observed (O) and Expected (E) frequency table in relation to question 4.

Variables	Yes	(E)	No	(E)	Total
Male	17	(20)	15	(12)	32
Female	33	(30)	31	(34)	64
Total	50	(50)	46	(46)	96

*Source: Questionnaire

The data used in this hypothesis was randomly picked from the pool of items 1-5 from *Table 11*. It represents item 5 from that table which is: Lack of staff training on data privacy as one of the current challenges facing staff of health information management in the use of EHR in St. Luke's hospital, Anua, Uyo.

To obtain the $E = \frac{CT \times ET}{ET}$

Where CT = Column Total,

ET = Expected Values

(C - 1) (R - 1)

(2 - 1) (2 - 1)

1 1

Level of Significance = 0.05 = 3.84

$$\frac{(17 - 20)^2}{20} + \frac{(15 - 12)^2}{12} + \frac{(33 - 30)^2}{30} + \frac{(31 - 34)^2}{34}$$

$$= 0.45 + 0.75 + 0.3 + 0.26$$

$$= 1.76 \text{ as the calculated value.}$$

3.84 is the table value

Decision Rule of acceptance or rejection

If X^2 calculated is greater X^2 tabulated, reject the null hypothesis, but if X^2 calculated is less than X^2 tabulated accept H_0 . When the calculated chi-square (X^2) value is greater or equals to critical table value, reject the null hypothesis and accept alternative hypothesis. If the tabulated X^2 value is greater than the calculated value, accept the null hypothesis and reject the alternative hypothesis.

In this case, since the calculated value 1.76 is greater than the table value 3.84, the H_0 is therefore accepted and H_1 rejected. This implies that, there is no significant relationship in the way of maintaining EHR in St. Luke's hospital, Anua, Uyo.

5 | Summary of Findings

It was observed through the respondents that participated in the research EHR and current challenges facing staff of St. Luke's hospital, Anua, Uyo from the questionnaire and interview conducted showed that many of the staff knows how to use EHR system in registration and documentation of patient records but lack of adequate computer system was a bane. The staff believed that EHR is more useful, more beneficial and accurate than paper base collection of patient data and the records are also more reliable for statistical purposes. Concerns raised by the staff is that of confidentiality in patients record which was not adequately maintained and funding for the procurement of computer system not provided as at when due, re-training of staff on the use of EHR not often organized, staff sometimes experience system/technical failure while using EHR system and most importantly that EHR system do not often reduce patient waiting time in the hospital, because the computer system in use are not enough. Another major challenge faced by the staff were epileptic

power supply and network failure, errors during documentation of patient data into EHR system, inadequate funding and maintenance cost of EHR systems. There are other threats such as virus attack on the system which can result in loss of patient data and more. It is therefore recommended that EHR should be adequately funded and good computer system provided and also training should be provided for the staff for smooth efficient and effective running of the system to serve its unique purpose for increased output and productivity.

6 | Conclusion

The study concluded that while EHR system offers significant benefits such as improved accuracy, faster access to information, enhanced care coordination and reduced paperwork, there are substantial challenges that needs to be addressed. Inadequate equipment, inadequate skilled IT personnel and power supply issued are major hurdles. Furthermore, security threats like unauthorized access and data breaches pose significant risk. The progress in EHR implementation is supported by favourable government policies, availability of funding and ongoing training programs. However, public awareness and acceptance still require attention. The hypothesis testing indicated no significant relationship between the benefits and challenges of EHR, nor between the challenges and implementation, suggesting that these aspects operate somewhat independently within the context of the studied population.

7 | Recommendations

Base on the study, the following recommendations were made:

- I. The hospital management should invest in adequate Electronic Health equipment and ensure a reliable power supply to support the seamless operation of EHR system.
- II. The management should conduct awareness programs and provide incentives to encourage staff to embrace EHR systems. Involve staff in planning and implementing process to increase buy-in.
- III. Government and policy makers should continue to develop supportive government policies and secure funding to sustain and expand EHR implementation initiatives.
- IV. Public health educators should increase public awareness and education on the benefits of EHR to foster acceptance and trust in digital health records.
- V. The management should plan on ways to fund and train staff of health Information Management on effective and efficient use of EHR system.

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