



## ACCEPTANCE AND BARRIER OF ELECTRONIC HEALTH RECORDS IN A TERTIARY HOSPITAL IN NIGERIA

Mary Aina Ogbonna<sup>1i</sup>,  
Oluwatoyin Mary Oluwafemi<sup>2</sup>,  
Phebean Opeyemi Ojo<sup>3</sup>

Department of Health Information Management,  
College of Health Sciences and Technology,  
Ijero, Ekiti State,  
Nigeria

### Abstract:

**Purpose:** This study assesses the performance, determine the barriers and effects of electronic health records on the staff of Obafemi Awolowo Teaching Hospital, Ile-Ife, Osun State, Nigeria. **Method/Approach:** This study was designed to explore the experiences of staff that practised a computerized or electronic health record in Obafemi Awolowo Teaching Hospital, Osun State, Nigeria (OAUTH). This study utilized a quantitative method. The study sample includes 10 respondents from the intensive care unit, 40 respondents from the health information department, 25 respondents from nurses and 25 respondents from the medical doctors of the hospital. The respondents were purposively selected and the instrument (questionnaire) was administered using the random sampling technique. **Findings/results:** This study showed that there is a high performance (80%) of EHR in the hospital. Most respondents (65%) opined that EHR is easy to use. The assessment of the respondents about the ability of EHR to reduce medical error revealed that about 75% said EHR will reduce medical error. In addition to this, about 80% of the respondents said EHR is important in the transmission of patient prescription. The barrier to the implementation of electronic health record includes an inadequate computer (50%), lack of uniform hospital standard (55%), start-up financial costs (60%) and training and productivity loss. **Recommendation:** The hospital management, federal and state government and non-governmental organizations should work together to remove all barrier to the implementation of electronic health records through the provision of computer systems, finance, stable electricity supply, man-power training and employment of adequate staff.

**Keywords:** barriers and effects of electronic health, tertiary hospital in Nigeria

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<sup>i</sup> Correspondence: email [maryogbonna056@gmail.com](mailto:maryogbonna056@gmail.com)

## 1. Introduction

There had been many reported challenges to the acceptance and use of electronic health records in Nigeria and across the nations (Holden & Karsh, 2010). In a tertiary hospital such as the Obafemi Awolowo Teaching hospital, it has become very important to assess staff perception, use and acceptance of EHR technology. More so, that most studies available had focused attention on nurses, doctors or health information manager's perception of the use of EHR but this present study draws its participants from nurses, doctors and health information professionals.

Some obstacles to the acceptance and use of HER could be temporary and visible immediately after the adaptation phase that follows implementation while other challenges may come after prolonged use of the facility hence the need to examine the acceptance of EHR in this hospital (Carayon, Hundt & Wetterneck et al., 2010). A study on ICU nurses' acceptance and perceptions about electronic health records revealed that usability and usefulness increase in years after the application of. More so that usability and the usefulness were predictors of EHR acceptance (Carayon et al., 2011). Another study among health information managers revealed that electronic health records will increase job performance among the respondents as they indicated the willingness to learn and use EHR (Wilkins, 2009).

## 2. Literature review

Electronic records management is a subdivision of Information and Communication Technology (ICT), which involves the sophisticated automated method of management of official records in organisations (Ile & Ojowhoh, 2020). Electronic records management system was said by the management of automated and non-electronic records using computer hardware and software (Duranti, 2010). Electronic records system involves "*the manufacture, usage, preservation, protection and disposal of automatedly established records for business and evidence-based activities*" (Marutha, 2011).

Hence business owners tend to consider the use of electronic records management because of developments in automated office procedures. To denial people of unauthorised usage, modification, theft, or physical destruction to automated data, electronic management protection practices are important to limit user licence to computer systems to achieving control over the information stored on automated records (Ile & Ojowhoh, 2020).

Electronic Health Record continued to gain wide acceptance in Nigeria after the federal government declared it a key measure to facilitate effective and timeless patient management in 2001 (Adeleke, Erinle, Ndana, Anamah, Ogundele & Aliyu, 2014). Electronic health record (EHR) otherwise known as an electronic medical record (EMR), refers to the "*systematized collection of patient and population electronically-stored health information in a digital format*" (Gunter & Terry, 2005). An individual health record refers to the electronic record of a person's health information that is in conformation with

national standards and guidelines but is under the control of the individual (HealthIT.gov, 2019; Menachemi & Collum, 2011).

The pooled set of information can be transmitted through different hospital settings with network-connected, enterprise-wide information systems or other information networks and exchanges. The information collected is made up of an array of sociodemographics, health history, drug and allergies, vaccination status, results of laboratory test, radiogram, vital signs, billing information (Hamilton et al., 2014; Lupton, 2014), genetic testing results, sexual orientation, psychological details, accumulated hospital visitations records, radiology reports, allergies etc. (Esther, Jantan, Abiodun, Arshad, Dada & Emmanuel, 2020).

Researchers observed that the effective application of EHR is a drive for considerable improvement in the patient management system (Middleton et al., 2013; Rothman et al., 2012; Weston & Roberts, 2013). Electronic Health systems were made to accurately and consistently store data on the state of health of patients for some time. It removes the bottleneck associated with paper documentation and ensures the accuracy and legibility of data. It eliminates the risk of data duplication as there is only one amendable file, that is the file is more likely to be up-to-date and reduces the risk of loss associated with paperwork. Because the information in a single file, EHR is more accurate when extrapolating health data for possible examining the trends and long-term variations in a patient (Qureshi et al., 2015; Rothman et al., 2012; Victoroff, 2014).

Electronic health records increase the value of, and improves access to health data, enhance healthcare effectiveness and value and boosts health communication policies and research (Middleton et al., 2013). It smoothens information management among health administrators (Berges et al., 201; Janus et al., 2008). It also helps to minimize medical inaccuracies through prompt alerts and reminders (Sinha, 2010).

HIT evolution has improved the sharing and real-time access to the patient health information on point-of-care (Sinha, 2010) and it is facilitating healthcare delivery reform and reshaping the work of healthcare professionals (Kloss, 2013). A systematic review revealed that scholars had different views about EHR (Chaudhry, Wang, Wu, Maglione, Mojica, Roth et al., 2006). Scholars in the field of health information management opined that "*EHR as a container holding information about the patient, and a tool for aggregating clinical data for secondary uses*" (Estiri et al., 2018; Ofek et al., 2012; Tiwari et al., 2018). Conversely, other researchers view EHR as a contextualised artefact within a socio-technical system (Or, Dohan & Tan, 2014), whereas computer scientists in computer supported cooperative work (CSCW) view EHR as a tool supporting particular work (Piras & Zanutto, 2010).

Despite the benefits and promises of HITs, other studies have reported challenges of the technology. For instance, studies have shown that its implementations could not go without significant risks to patients and providers (Wachter, 2006). Cases of fatal insulin overdose as a result of a mix-up in the bar-coded wristbands (McDonald, 2006), dehumanization as providers focused computer screens in place of their critically ill-

patients, incorrect medications chosen from computerized pick lists, and most awful, escalation of paediatric mortality after computerized system (Adeleke et al., 2014).

As an aspect of the broad eHealth concept, the benefits of Electronic Health Record (EHR) system still evade Nigeria and other developing nations. The World Health Organization revealed that one of the obstacles facing the Nigerian healthcare system is insufficient electronic health records system for monitoring, evaluation and analysis of health indicators (Levingston, 2012; World Health Organization, 2012). A functional, appropriately designed electronic health record management system is capable of filling this gap. This is despite that the world was expected to have a steady increase in the number of electronic health records system being implemented coupled with the expected intensity of use at healthcare settings (Berner, Detmer & Simborg, 2005). As observed, electronic health records had not taken its rightful place in Nigeria and other developing nations as most healthcare centres still operates the manual health records documentation.

Information technology is important in driving sustainable and vital healthcare management system which is attained with the numerous health management systems which Electronic Health Record system is an important aspect. In Nigeria, electronic health record has not gained full recognition and implementation it deserves because of various challenges which include *“poor coordination among stakeholders, ad hoc, piecemeal basis implementation by foreign software developers and applications designed to solve specific problems among others”* (Bello, Faruk, Oloyode & Popoola, 2016).

As electronic medical record becomes more popular, this raises many security threats against the systems. Common security vulnerabilities, such as weak authentication, cross-site scripting, SQL injection, and cross-site request forgery had been identified in the electronic medical record systems (Adamu, Hamzah & Rosli, 2020). These challenges are capable of hindering the attainment of the health constituent of the sustainable development goals for Nigeria as well as the Vision 20:2020 (Bello et al., 2016).

### **3. Objectives of the study**

- 1) assess the performance of electronic health records in Obafemi Awolowo Teaching Hospital, Ile-Ife, Osun State;
- 2) determine the barriers of electronic health records utilization in Obafemi Awolowo Teaching Hospital, Ile-Ife, Osun State;
- 3) Effects of electronic health records on the staff of Obafemi Awolowo Teaching Hospital, Ile-Ife, Osun State.

### **4. Method**

This study was designed to explore the experiences of staff that practised a computerized or electronic health record in Obafemi Awolowo Teaching Hospital, Osun State, Nigeria (OAUTH). This study utilized a quantitative method. The study sample includes 10

respondents from the intensive care unit, 40 respondents from the health information department, 25 respondents from nurses and 25 respondents from the medical doctors of the hospital. The respondents were purposively selected and the instrument (questionnaire) was administered using the random sampling technique. All the instrument administered were retrieved making 100% return rate. The instrument contained four sections; section "A" contained sociodemographic characteristic of the respondents, section "B" was on questions that measured the effectiveness of electronic health records in the hospital, section "C" relates the mental demand of using electronic health records and section "D" was on barriers to the implementation of EHR in the hospital.

#### 4.1 Analysis

The data generated were analyzed with the Statistical Package for Social Sciences (SPSS) version 21. The results were presented in simple percentages.

**Table 1:** Sociodemographic characteristics of the respondents

Socio-demographic characteristics	Frequency	Percentage (%)
<b>Age</b>		
21-30 years	35	35
31-40 years	45	45
41-50 years	20	20
<b>Sex</b>		
Male	65	65
Female	35	35
<b>Department</b>		
Health information	35	35
Cardiac ICU	20	20
Pediatric ICU	15	15
Neonatal	30	30
<b>Typical shift hours</b>		
8 hours	40	40
12 hours	50	50
<b>Others</b>		
<b>Typical work time</b>		
Day	40	40
Evening	35	35
Night	25	25
<b>Work time during the week</b>		
Weekdays	45	45
Weekends	20	20
Both	35	35

Table 1 shows the sociodemographic characteristics of respondents at the Obafemi Awolowo Teaching hospital, Ile-Ife, Osun state. The distribution of the age category revealed the highest (45%) age was among those age 31 to 40 years compared to those age 41 to 50 years (20%). There were more male (65%) than female (35%) in this study. There

were more (35%) respondents from health information department, neonatal department (30%), cardiac ICU (20%) than pediatric ICU (15%). The analysis of the number of hours of work showed that most of the respondents (50%) work 12 hours a day compared to 8 hours (40%). Most of the respondents (45%) work during the day time, 20% worked at the weekend while 35% work on both weekdays and weekends.

**Table 2:** Respondents assessment of the performance of electronic health records

Assessment of HER	Respondent 100	Percentage of 100
<b>Performance</b>		
Low	20	20
High	80	80
<b>Acceptance of HER</b>		
Easy	65	65
Difficult	5	5
Satisfying	30	30
<b>Use in clinical documentation</b>		
Yes	70	70
No	30	30
<b>Reduction in medical error</b>		
Low	25	25
High	75	75
<b>Transmission of prescription using HER</b>		
Yes	85	85
No	15	15

Table 2 revealed the assessment of the performance of electronic health record in the tertiary care centre. It was observed from this study that most (80%) of the respondents said there is a high performance of EHR in the hospital. Almost of the respondents (65%) opined that EHR is easy to use, 30% said it was satisfying using it as (5%) opined it was difficult to use. The assessment of the respondents about the ability of EHR to reduce medical error revealed that about 75% said EHR will reduce medical error. In addition to this, about 80% of the respondents said EHR is important in the transmission of patient prescription.

**Table 3:** Importance of electronic health records in meeting organizational goals

Importance of EHR	Critically important (%)	Important (%)	Neutral (%)	Low importance (%)	Not important (%)	Total
Clinical quality	67(67)	16 (16)	10 (10)	7 (7)	0	100
Patient services	60 (60)	14 (14)	4 (4)	18 (18)	4 (4)	100
Operation services	79 (79)	13 (13)	0	8	0	100

Table 3 is revealed the importance of electronic health records to the tertiary healthcare facility. Respondents observed that EHR was critical to clinical quality (67%) patient service (60%) and operation services (79%).

**Table 4:** Barriers to electronic health records utilization

The barrier to EHR utilization	Not a barrier	Minor barrier	Major barrier	Total
Computer skill	15	35	50	100
Lack of uniform hospital standard	30	55	15	100
Start-up financial costs	35	60	5	100
Training and productivity loss	25	40	35	100

Table 4 showed the barriers to the effectiveness of electronic health records utilization in the teaching hospital. It was revealed that about 50% said computer skill was a major barrier as against (15%) who said it was not a barrier. Most of the respondents (55%) observed that lack of uniform hospital standard start-up financial costs (60%) and training and productivity loss were a barrier to the effectiveness of electronic health record utilization in the hospital.

**Table 5:** Respondents perception of the mental activity required to perform electronic health records

Mental activity	Respondent (100)	Percentage (%)
<b>Mental demand</b>		
Thinking	25	25
Deciding	20	20
Calculating	20	20
Remembering	15	15
Looking	5	5
Searching	15	15
<b>Frustration level</b>		
Insecure	10	10
Discouraged	25	25
Irritated	15	15
Stressed	30	30
Annoyed	20	20

Table 5 is the analysis of the mental activities required to perform effective EHR to be thinking (25%), deciding and calculating (20%) remembering and searching (15%) and looking 5%. The experience of the level of frustration includes stressed (30%), discouragement (25%) annoyance (20%), irritation (15%) and insecurity (10%).

## 5. Discussion

In this study, there were more male respondents than female, those who were age 31 to 40 years were more than the other age categories. More so, there were more respondents from the health information department of the hospital than other departments. The assessment of the electronic health records revealed a positive high-performance level in the hospital. The hospital staff had a wide acceptance of electronic health information management system patient care. A study in concordance with this present study established that sex, occupational category and the full deployment of health information

systems in hospitals had no significant association with employee's perspective toward electronic health records while factors such as age and experience of workers had a significant association on the implementation of EHR (Shahbahrami, Moayed, Rezaie & Hafezi, 2016). This implies that the more the age of an employee and work experiences, the more the opinions improved implementation of EHR. Since the staff skills are increased, using the established EHR in healthcare and learning the different services and abilities of the system would greatly help develop their perceptions about the system (Shahbahrami et al., 2016).

Equally, a great percentage of the participants make use of electronic health in clinical documentation. The opinion on whether electronic health records can reduce medical diagnostic error showed a positive high belief that EHR is capable of reducing medical error. Hence the majority of the participants in this study believed EHR can be very effective in patients' prescription transmission. Corroborating this study is a study on the acceptance of EHR among nursing students, positive attitude toward using EHR was considered the most influential factor on students' acceptance of EHR (Kowitlawakul, Chan, Pulcini & Wang, 2015).

In a similar study, it was evident that respondents that had adopted EHR components felt that EHRs would be beneficial in their work. Findings indicated that EHRs would enable them to accomplish tasks more quickly as well as improve their job performance. The health information managers surveyed felt EHRs would make it easier to do their job and would also increase their productivity (Wilkins, 2009). This is consistent with (Wilkins, 2009) which revealed that health information managers were determined to learn and use an EHR in performing their duties.

However, there were several challenges to the performance and utilization of electronic health records in the hospital. Findings revealed that inadequate computer skills and training and productivity loss were major barriers to the full implementation of EHR. The lack of uniform hospital standard and start-up financial costs were itemized as a minor barrier to the application of electronic health records. There was also a gap in ease of use of EHR between those that had adopted EHRs and those that had not. Health information managers felt EHRs would be clear and comprehensible and easy to use. It was revealed that learning EHR and becoming skilled with an EHR could be easy (Wilkins, 2009).

In the same vein, a systematic review identified various factors such as finance, high start-up costs, uncertainty over return on investment, physician and /or staff lack of computer skills, lack of technical training and support, the complexity of the system, lack of customization, lack of reliability, time, interconnectivity/standardization and lack of computer/hardware as major impediments to the implementation of electronic health records (Boonstra & Broekhuis, 2010)

The use of the computer system continuously over a long period had been said to impact negatively on the mental health of the individual concern. This study revealed that the major mental health demand for continuous exposure of the computer system was thinking and stress, annoyance and discouragement.



## 6. Recommendations

This study recommends that the present performance of EHR implementation is commendable and should be sustained with incremental efforts to improve it through education, training, raising awareness. The hospital management, federal and state government and non-governmental organizations should work together to remove all barrier to the implementation of electronic health records through the provision of computer systems, finance, stable electricity supply, man-power training and employment of adequate staff. More so, there should be adequate training for the staff on stress management and the use of personal protective equipment to minimize the health implications associated with constant exposure to the computer system.

### Conflict of interest

We declare no conflict of interest.

### About author

**Mary Aina Ogbonna**, lecturer, School of Health Information and Computer Science, College of Health Sciences and Technology, Ijero-Ekiti, Nigeria.

**Oluwatoyin Mary Oluwafemi**, lecturer, School of Health Information and Computer Science, College of Health Sciences and Technology, Ijero-Ekiti, Nigeria.

**Phebean Opeyemi Ojo**, lecturer, School of Health Information and Computer Science, College of Health Sciences and Technology, Ijero-Ekiti, Nigeria.

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