

Barriers to Implementing Electronic Health Information Management in Patient Care

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Abstract

This project assessed the barriers to implementation of electronic health information in Ife Central Local Government Area of Osun State. The study was conducted among 170 members of staff through the administration of questionnaire survey. Descriptive statistics was used to analyze the data collected for the study. The finding thus showed that 98.8% of the respondents agreed and strongly agreed that electronic health information works at a very high speed, 98.2% others agreed and strongly agree that electronic health records provide patient with quick and easy access to their health information, regarding to the barriers to the use of electronic health records management, 96.4% of the respondent agreed and strongly agreed that network problem, and poor internet connection are the main barriers to implementation of electronic health information management. The findings revealed further that although electronic health records is not in used in the two hospitals, majority of the respondent preferred electronic health information management. The study concluded that adequate funding, adequate power supply, internet connectivity should be adopted as well as staff training.

Keywords: *Barriers, Electronic, Information, Health Information, Management, Patient Care*

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I. Background

The medical records, either paper-based or electronic is a communication tool that support clinical decision making, coordination of services, evaluation of the quality and efficacy of care, research, legal protection, education and accreditation and regulatory processes. It is the business record of the health care system, documented in the normal course of its activities. In the past, the medical record was a paper repository of information that was reviewed or used for clinical, research, administration and financial purpose. It was severely limited in terms of accessibility, available to only one user at a time. The paper-based record was updated manually, resulting in delays for record completion that lasted anywhere from 1 to 6 months or more. Most medical record departments were housed in institutions' basements because the weight of the paper precluded other locations. The physician was in control of the care and documentation processes and authorized the release of information. Patient rarely viewed their medical records. During the past era, access was controlled by doors, locks, identification cards and tedious sign-out procedures for authorized users. Unauthorized access to patient information triggered no alerts, nor was it known what information has been viewed. Today, the primary purpose of the documentation remains the same support of patient care. Clinical documentation is often scanned into an electronic system immediately and is typically completed by the time the patient is discharged. Record completion times must meet accrediting and regulatory requirements.

The electronic health records are interactive, and there are many stakeholders, reviewers, and users of the documentation. Because the government is increasingly involved with funding health care, agencies actively review documentation of care. The electronic health record (HER) can be viewed by many simultaneously and utilizes a host of information technology tools. Patient routinely review their electronic medical records and are keeping personal health records (PHR), which contain clinical documentation about their diagnoses (from the physician or health care website). In recent years, the health care organizations have aim to provide more customers-oriented services, to achieve this goal, the quality of care needs to be improved which in turn requires timely access to high-quality information. However, because of limitations of paper based records, the required data may not be available to the health care providers at the point of need. To resolve this problem, health information system has been in development for the past 30 years, and the ultimate goal is the adoption of electronic health records (EHRs). Electronic health records system is an information system that helps to collect individual's health information from birth to death so that it can be registered, certified and shared in different places by health care providers. The main goal of implementing electronic health records is improving the

quality of care by reducing medical errors, providing an effective means of communication, sharing information between health care providers and collecting health information for educational and research purpose.

Statement of the Problem

Several evidence-based have reviews concluded that some types of health information technology (IT), particularly electronic health records (EHRs) with advanced functionalities, have reduced medication errors and improved care processes, adherence to evidence-based guidelines, patient engagement, and patient satisfaction. Despite these potential benefits, health care providers were initially slow to adopt electronic health records. In 2008, approximately 1.5 percent of non-federal acute care hospitals reported having a comprehensive electronic health records system and 7.6 percent had a basic electronic health records system around the world. Similarly, approximately 17 percent of office-based physicians used an electronic health records that met the criteria of a basic system in 2008. However, this study seek to assess the barriers to implementation of electronic health information management with a view to contributing to existing literature on computerized records management systems for effective patient care.

Objectives of the Study

1. To assess the use of electronic health records keeping in patient care.
2. To investigate the barriers to effective use of electronic health records management in health care service.
3. To find of the influence of electronic health information management in selected hospitals.
4. Investigate the strategies adopted in the management of electronic health records system among the selected hospitals.

Research Questions

The following research questions were answered in the course of this study?

1. What is the level of utilization of electronic health records keeping in patient care?
2. What are the barriers to the use of electronic health records management in health service in selected Hospitals?
3. What are the influences of electronic health information management in selected hospitals?
4. What are the strategies adopted in the management of electronic health records system among the selected hospitals?

II. Review Of Related Literature

Overview of Electronic Health Records

With the many advances in information technology over the past 20 years, particularly in healthcare, a number of different forms of electronic health records (EHR) have been discussed, developed, and implemented. Some institutions/countries are currently planning the introduction of a nationwide electronic health record while others have actually implemented some form of EHR. However, the type and extent of electronic health records vary and what one country calls an EHR may not be the same as that developed in another country. Although work has been undertaken by institutions/countries on some form of a computerized patient healthcare information system, as yet not many hospitals have successfully introduced an electronic health record with clinical data entry at the point of care.

Although interest in automating the health record is generally high in both developed and developing countries unfortunately, in some cases, the introduction of an EHR system seems overwhelming and almost out of reach to many healthcare providers and administrators as well as medical record/ health information managers. Why is this so? The obstacles may not be available technology but technical support and the cost of changing to an electronic system coupled with insufficient healthcare funding. In many developing countries costs, available technology, lack of technical expertise and computer skills of staff, and lack of data processing facilities are in fact major issues which would need to be addressed before implementation is possible.

In addition to the above, resistance by some medical practitioners and health professionals generally to a change from manual to electronic documentation may be a problem in both developed and developing countries. Most health administrators and information managers are aware that it may take time to change or at least modify health practitioner behavior and attitudes. The reason for wanting to change to an electronic system is important. Many persons involved in healthcare today expect to move from a paper to a paperless environment. This is a major step and has only been successfully achieved in a few healthcare institutions to date. In Nigeria an electronic system has the potential contribute to enhance accuracy and quality of data recorded in a health record; Enhance healthcare practitioners' access to a patient's healthcare information enabling it to be shared by all for the present and continuing care of that patient; Improve the quality of care as a

result of having health information immediately available at all times for patient care; Improve the efficiency of the health record service and Contain healthcare costs

Component of Electronic Health Records Management

As documented in the literature, most commercial EHRs are designed to combine data from the large ancillary services, such as pharmacy, laboratory, and radiology, with various clinical care components (such as nursing plans, medication administration records [MAR], and physician orders). The number of integrated components and features involved in any given AMC is dependent upon the data structures and systems implemented by the technical teams. AMCs may have a number of ancillary system vendors that are not necessarily integrated into the EHR. The EHR, therefore, may import data from the ancillary systems via a custom interface or may provide interfaces that allow clinicians to access the silo systems through a portal. Key component of electronic health records system may include,

Administrative System Components: Registration, admissions, discharge, and transfer (RADT) data are key components of EHRs. These data include vital information for accurate patient identification and assessment, including, but not necessarily limited to, name, demographics, next of kin, employer information, chief complaint, patient disposition, etc. The registration portion of an EHR contains a unique patient identifier, usually consisting of a numeric or alphanumeric sequence that is unidentifiable outside the organization or institution in which it serves. RADT data allows an individual's health information to be aggregated for use in clinical analysis and research.

This unique patient identifier is the core of an EHR and links all clinical observations, tests, procedures, complaints, evaluations, and diagnoses to the patient. The identifier is sometimes referred to as the medical record number or master patient index (MPI). Advances in automated information systems have made it possible for organizations or institutions to use MPIs enterprise wide, called enterprise-wide master patient indices.

Laboratory System Components: Laboratory systems generally are standalone systems that are interfaced to electronic health records. Typically, there are laboratory information systems (LIS) that are used as hubs to integrate orders, results from laboratory instruments, schedules, billing, and other administrative information. Laboratory data is integrated entirely with the EHR only infrequently. Even when the LIS is made by the same vendor as the EHR, many machines and analyzers are used in the diagnostic laboratory process that are not easily integrated within the EHR. For example, the Cerner LIS interfaces with over 400 different laboratory instruments. Cerner, a major vendor of both LIS and EHR systems, reported that 60 percent of its LIS installations were standalone (not integrated with EHRs). Some EHRs are implemented in a federated model, which allows the user to access the LIS from a link within the EHR interface.

Radiology System Components: Radiology information systems (RIS) are used by radiology departments to tie together patient radiology data (e.g., orders, interpretations, patient identification information) and images. The typical RIS will include patient tracking, scheduling, results reporting, and image tracking functions. RIS systems are usually used in conjunction with picture archiving communications systems (PACS), which manage digital radiography studies. The RIS market is considered to be mature by industry analysts, with 80 percent market penetration by 2001. This means that most AMCs have RIS systems. However, it does not guarantee that the RIS systems are integrated with the EHRs.

Pharmacy System Components: Pharmacies are highly automated in AMCs and in other large hospitals as well. But, again, these are islands of automation, such as pharmacy robots for filling prescriptions or payer formularies that typically are not integrated with EHRs. Ondo, et al, report, in 2005, that "in inpatient settings, an average of 31 percent of all [electronic] pharmacy orders ... are re-entered in a pharmacy system. While re-entry is not desirable, this is a 35 percent improvement overall since 2003, and a 14 percent improvement from that reported in 2004."

Computerized Physician Order Entry: Computerized physician order entry (CPOE) permits clinical providers to electronically order laboratory, pharmacy, and radiology services. CPOE systems offer a range of functionality, from pharmacy ordering capabilities alone to more sophisticated systems such as complete ancillary service ordering, alerting, customized order sets, and result reporting. According to Klas Enterprises, a data provider for the hospital informatics industry, only four percent of U.S. hospitals reported that they are using CPOE systems. Ondo, et al, report that 113,000 physicians are using CPOE regularly and 75,000 of these physicians are using CPOE in teaching hospitals. Forty teaching hospitals reported in 2005 that 100 percent of

their physicians were using CPOE for placing orders, an increase from eight teaching hospitals in 2004. The uptake among teaching hospitals may be happening because, Ondo reports, "...teaching sites typically have employed—as opposed to privileged—physicians as well as a significant number of residents and interns, it's easier to gain physician buy-in for the system."

This slow dissemination rate may be partially due to clinician skepticism about the value of CPOE and clinical decision support. There have been some major CPOE successes and some notable failures. Handler, et al, in an overview article concerning CPOE and clinical decision support systems, stated "that CPOE has been well demonstrated to reduce medication-related errors. However, CPOE and dosing calculators do not entirely eliminate error and may introduce new types of error. It has been shown that weight-based drug dosing calculators are faster for complex calculations and may be more accurate than hand calculations. Many CPOE systems have dosing calculators. However, the net effect of CPOE can be to slow clinicians."

Clinical Documentation: Electronic clinical documentation systems enhance the value of EHRs by providing electronic capture of clinical notes; patient assessments; and clinical reports, such as medication administration records (MAR). As with CPOE components, successful implementation of a clinical documentation system must coincide with a workflow redesign and buy-in from all the stakeholders in order realize clinical benefits, which may be substantial as much as 24 percent of a nurse's time can be saved.

Examples of clinical documentation that can be automated include: Physician, nurse, and other clinician notes ; Flow sheets (vital signs, input and output, problem lists, MARs); Peri-operative notes ; Discharge summaries ; Transcription document management; Medical records abstracts; Advance directives or living wills; Durable powers of attorney for healthcare decisions; Consents (procedural); Medical record/chart tracking; Releases of information (including authorizations) ; Staff credentialing/staff qualification and appointments documentation; Chart deficiency tracking and Utilization management

Medical devices can also be integrated into the flow of clinical information and used to generate real time alerts as the patient's status changes. Haugh reports that "At Cedars-Sinai Medical Center, Los Angeles, for example, intravenous medication pumps connected to the clinical information system provide automatic dosage verification and documentation for medication management. All of Cedars-Sinai's physiologic monitoring systems are networked, and data on patients is viewable on other clinical information systems in the hospital. From his office, Michael Shabot, M.D., can monitor patient EKGs using a Web-based viewing system created at Cedars-Sinai that incorporates a vendor product that provides live waveforms from ICU and monitored bedsides.

Theories of Electronic Health Information Management

In 1998 the British prime minister, Tony Blair expressed his vision for universally accessible electronic patient's records. The information is linked at policy level with anticipated improvements in the efficiency, safety, equity, and cost effectiveness of care. It has not yet been realized on a large scale anywhere in the world, however, and many examples exist of it turn into an expensive failure. In general, the larger the scale of a new technology project in health care, the greater failure. This is because health care information systems are complex, they raise unique technical, administrative, and security challenges; and introducing new technologies into a complex system requires extensive changes in individual roles, relationships and business processes the so called "socio-technical" aspects of change.

Individuals play unique roles within each healthcare organization, and contribute to the organization's cultural system adding specific behaviors, approaches and Communication styles to the daily interactions of the group. Michael Pacanowsky's theory of organizational culture (Griffin 2009, p. 252) sheds light on how an ethnographic approach to each organization can assist in ensuring the best approach is taken for training and implementation. These theories assess that "culture is not something an organization has; culture is something an organization is" (Griffin 2009, p.253). Therefore, each organization within this research will be treated as an individual Culture with specific norms, understandings and folklore. It is vital for an outside Consultant to understand the important aspects that make up each individual Organizational culture in order to gain a holistic perspective on the challenges faced by members, especially during a large transition such as an electronic health records (EHR) adoption.

Electronic forms of information and communication can promote the emergency of patients as strategic partner in health care. Active use by patients of electronic mail, personal health records, and the internet, especially integrate within the context of an effective physician-patient relationships holds the potential to improve both individual and organizational health outcomes. Integrated, comprehensive, two-way information and communication technology (ICT) are envisaged as part of the future of patient-physician interaction. There

are numerous barriers facing the implementation and integration of patient-use ICT in the case of patient-accessible electronic medical records (EMR), at the level of health care organizations, insurers, and health systems, many of these barriers are political, fiscal and cultural. At the physician level, concerns about patient misunderstanding of physician notations as well as concern over a lot of control over patient interactions and increasing work land complicate the acceptance of these technologies.

At the patient level, barriers include the individual's state of general health, uncertainty, perceived social support, age, education, income, race, general literacy, functional health literacy styles, psychological profile (e.g health locus of control). Perceived self-efficacy access to computers and the internet, perceived cost and perceived difficulties of health providers access, as well as fear (of death, incapacity, or cancer), guilt and concepts of disease as retribution or punishment.

Types of Electronic Health Records

Two popular types of electronic health records has been established in the literature namely:

Physical – Hosted System– under this system, the HER data is stored on the physicians own server. In addition to purchasing the hardware (including servers) and software, the physician is responsible for maintenance, security, and data backup. While the data remains under the control of the physician, vendors can include a disabling code in their software. This means that in the event of a dispute (such as one involving a price dispute), the vendor can hold the data hostage.

Remotely Hosted System- under this system, the HER data is stored on another entity's servers. This other entity is responsible for storing the data and would also be responsible for maintenance, security, and data backup. The data is under the control of the third party (owner of the server where the data are stored) rather than under the control of the physician. Generally speaking, there are three types of remotely hosted EHR system.

- **Subsidized system:** under this system, an entity with whom the physician has a relationship, such as a hospital, subsidizes the financing for the HER. Typically the subsidizing entity's servers are utilized rather than the physicians, so the physician does not have control over the data. Important consideration include legal concerns (e.g antitrust / anti – kickback issues), particularly with subsidies from hospitals and ownership of the data if the relationship changes, such as the physician moves or no longer participate in the health insurance plan.
- **Dedicated hosted system:** under this system, the physician does not store the HER data on his / her own server. Rather, the data is stored on the vendor's dedicated servers. While the physician does not have control in terms of data storage, the data is stored on server in specific, known physical locations.
- **Cloud system (internet-based computing):** under this system, the physician does not store the EHR data on his/her own servers, but rather the vendor stores the data on the internet (in the cloud). Such vendor are called "saas" (software as a service). Providers, which were formerly known as "ASPs" (application server providers). The physician's computers do not have the EHR software, but rather the software is accessed through the vendors website, vendors who offer the online software tend to move the data frequently, so the physician may not know where the data is located, other than "somewhere in the clouds". The physician does not have control of the data and does not have control over when the data is moved or where it is moved.

Barriers to Electronic Health Records Management in Developing Nations

Health is one of the most important sectors in any country's economy. A country that has spoor health systems and policies is bound to experience poor economic growth as productivity of citizens might be greatly affected when they fall sick or die from curable cases. According to the World Health Organization (WHO), increasing life expectancy at birth by 10% will increase the economic growth rate by 0.35% a year (World Health Organization, 2001). Despite the important role played by health sector, serious problems continue to be experienced. These countries experience the problem of:-

- Lack of qualified doctors due to brain drain and scarcity in medical training facilities.
- Lack of enough money to equip health institutions with modern technologies.
- Poor health policies that fail to address short and long term needs.
- Low budgetary allocation to the health sector among others.
- Lack of ICT equipment.
- Lack of trained staff.
- Network issue.
- Inadequate manpower skill.
- Non-challant attitude of people to electronic health records.
- Redundant personnel without necessary skills.
- Overheating.

In general, there is a major problem of access to healthcare services by majority of citizens in developing countries, low quality of healthcare services due to scarcity of highly trained clinicians and high cost of healthcare services unaffordable to majority of citizens, problems that can be alleviated through embracing e-Health in developing countries (Currie & Finnegan, 2009; Ojo *et al.*, 2007). Recording of patient information in many hospitals in developing countries has been on papers. Miller *et al* (2005) identifies limitations of these paper-based records as including, Illegibility, Ambiguity, Incompletedata, Poor availability and data fragmentation.

Laerum (2003) argues that recording of patient information on papers impede the continuity and quality of care for patients. As argued by Currie & Finnegan (2009), these are the problems that eHealth through electronic medical records seeks to address. In particular, Chaudry *et al* (2006) says that electronic medical records applications can prompt for completeness; provide better ordering for searching and retrieval, and permit validity checks for data quality, research, and especially decision support.

The value of e-Health is in its ability to help lower costs in health sector while delivering better care within a citizen centered approach (Currie & Finnegan, 2009). Additionally, e-Health through the use of Personal Health Records (PHR) is a key factor in empowering patients and will help them to play an increasingly central and active role in their own healthcare (Markle, 2004).

Adoption of E - Health In Developed Countries

Hospitals in developed countries continue to implement electronic medical records to lower costs and to improve quality of care. In United States of America for instance, \$1.2 billion grant was unveiled to facilitate adoption of electronic health records in all hospitals by 2014 (Stacy & Ulku, 2012). With the adoption of electronic medical records, patient information will be electronically captured in any care delivery setting. This is aimed at increasing Health Information Exchanges (HIEs) and eventually maintaining a Nationwide Health Information Network (NHIN), which aims to provide a secure and interoperable health information infrastructure that allows stakeholders, such as physicians, hospitals, payers, state and regional HIEs, federal agencies, and other networks, to exchange health information electronically (Cline, 2012).

There are many examples of successful e-Health developments including health information networks, electronic health records, telemedicine services, wearable and portable monitoring systems, and health portals” (European Union, 2005). One notable observation in Europe is that each country has its own distinctive approach in the journey towards enabling technologies in healthcare. France is developing the concept of *digital hospitals* via telemedicine technologies (Currie & Finnegan, 2009). Germany is working on an Electronic Health Card (EHC) which will allow the physicians to check the administrative data of the patient and to write prescriptions on EHC. The EHC will also have voluntary medical functions like the emergency data record and later an electronic patient record that can be checked anywhere using appropriate card readers (Sunyaev *et al.*, 2009). Denmark leads the way in European eHealth and patient-controlled health records (Cruickshack *et al.*, 2012). It boasts a universal Electronic Health Record system and a national PHR service available to any Danish citizen to allow them control who accesses their medical information and how it is accessed. Launched in 2003, the country’s government-run PHR portal is *Sundhed.dk*, a website where, a citizen can view treatments and diagnoses from his/her own hospital patient record, book appointments with his GP, renew prescription drugs, monitor own drug compliance, survey shortest waiting lists for operations and quality ratings of hospitals, register as organ donor, and get access to local disease management systems in out-patient clinics (Makori, Musoke & Gilbert, 2013).

ICT training among clinicians is cited as a key determinant of electronic health (Ochieng & Hosoi, 2005; Martins & Oliveira, 2008; Terry *et al.*, 2009; Marques *et al.*, 2011). According to Ochieng and Hosoi (2005) on a study that sought to establish the factors influencing diffusion of electronic medical records in Japan, ICT skills are required to foster positive attitudes about electronic medical records which translate to greater adoption of electronic medical records. Therefore developed countries in an effort to raise ICT skills amongst clinicians have incorporated ICT training in health courses offered at various academic levels. New courses such as medical informatics, bioinformatics, computational biology, and health informatics have been started. Sood *et al* (2008) notes that developed countries are using cutting edge technologies like 3D simulations, virtual reality and robotics to train clinicians and that ICT is included in the curriculum of medical courses.

Availability of ICT skills amongst clinicians is likely to lead to the acceptance and actual use of eHealth in primary healthcare. This is because clinicians with ICT skills are able to appreciate the possible benefits of ICT in execution and improvement of the various processes they are engaged in. Hospital Information Systems (HIS) have been introduced in most developed countries in European (Currie & Finnegan, 2009). These systems allow for seamless flow of administrative as well as clinical data between various hospital departments such as outpatients, accounts office, wards, pharmacy, laboratories, and theatres among others depending on the units within a hospital.

Role of Electronic Health Records in the Management of Patient Waiting Time

One of the main benefits of electronic health records (EHRs) is increased patient satisfaction. EHRs can help the hospital offer better health care and: Reduce waiting time for office appointments and improve appointments scheduling through integrated scheduling systems; Decrease unnecessary tests and immunizations, which can be costly and unsafe for patients; Improve communication with patients and reduce turn – around time responding to billing and clinical inquires; Access clinical protocols and guidelines in other to provide the best and most current care for patients; Encourage the patients to take ownership of and manage their health and health care using clinical summaries and educational resources; Provide patient with quick, easy access to their health information and give them the peace of mind their information will be secure and available to the right people in the right place at the right time; Better manage of patient prescriptions through e-prescribing and reduce patient wait times; Reduce wait times for laboratory test results and clinical diagnosis; Improved security of confidential health information through modern, encrypted data protection system.

Role of Electronic Health Records In Patient Appointment System

Electronic health information exchange allows doctors, nurses, pharmacists, other health care providers and patients to appropriately access and securely share a patient's vital medical information electronically-improving the speed, quality, safety and cost of patient care. Despite the widespread availability of secure electronic data transfer, most American's medical information is stored on paper-in filing cabinets at various medical offices, or in boxes and folders in patients' homes. When that medical information is shared between providers, it happens by mail, fax or-most likely-by patients themselves, who frequently carry their records from appointment to appointment. While electronic health information exchange cannot replace provider-patient communication, it can greatly improve the completeness of patient's records (which can have a big effect on care), as past history, current medications are jointly reviewed during visits. Appropriate, timely sharing of vital patient information can better inform decision making at the point of care and allow providers to avoid readmissions, avoid medication errors, improve diagnosis, decrease duplicate testing. If a practice has successfully incorporated faxing patient information into their business process flow, they might question why they should transition to electronic health information exchange. Many benefits exist with information exchange regardless of the means of which it is transferred

Role of Electronic Health Records In Planning, Education And Research

More than ever, the healthcare industry is making significant progress in the quest for electronic health records (EHRs), which will improve the quality and safety of patient care and achieve real efficiencies in the healthcare delivery system. Emphasis has been placed on intelligent systems that support the care process and clinical decisions as well as the creation of health information for patient care. From a strategic standpoint, it is important to go beyond the information creation phase and develop a plan that results in an EHR and EHR system that maintain a high level of integrity for business and legal purposes. The management of the EHR and the EHR system is and will continue to be a mission-critical function in the provision of care across the healthcare continuum. However, in today's urgency to begin deploying EHRs, healthcare entities, vendors, and others sometimes neglect to build in the processes and system capabilities needed to enable optimal EHR management functions and ensure the electronic rather than the paper version can stand as the legal business record. Traditional business and health records management concepts and processes must be evaluated and applied in this relatively new world of EHRs. Business process redesign and an understanding of the change management process are fundamental to this activity. Healthcare organizations need to analyze and assess all downstream uses of EHRs and see those uses reflected in requests for proposals, system selection, development, installation, and implementation in order to ensure that all needs of the organization are met.

EHRM requires decision making and planning throughout the entire life cycle of the EHR—from planning, processing, distribution, maintenance, storage, and retrieval of the health record to its ultimate disposition, including archiving or destruction. Decision making includes, but is not limited to, what EHRs to keep and for how long, the assignments of authorities and responsibilities, the design and administration of the process, and the audit and review of the process's performance. In the early phases of EHRM system development, it is important to make critical decisions about the role and use of paper and film to avoid the dilemma of maintaining dual systems.

The evolution from a paper-based medical record model to an EHR model has opened up many avenues for HIM experts to apply and share their core competencies, knowledge, and skills. Advanced technologies and systems make it possible for HIM practitioners to fulfill roles such as patient advocate, data translator, and public health officer. The e-health environment encompasses much more than the storage and retrieval of information. It places new demands on the HIM professional to assist the consumer in healthcare across the continuum of care. As a patient advocate, HIM practitioners have a vital role and responsibility in the use of patient portals for e-mail, personal health records, scheduling healthcare appointments, completing

patient health questionnaires and surveys, and transferring electronic clinical information. HIM practitioners play a role in working toward the exchange of healthcare data among providers, healthcare professionals, and patients. Other traditional patient advocate responsibilities, such as protecting patient privacy, maintaining confidentiality, and promoting and enhancing public policy, will continue to be a critical HIM responsibility. HIM professionals have long been translators of clinical data for their business and financial offices through their clinical expertise, understanding of documentation, and coding functions. Now is the time for HIM practitioners to share their knowledge with healthcare consumers in the role of data translator. The shift to a consumer-centric model requires HIM practitioners to educate and assist consumers in accessing secure patient information and translating medical terminology across the continuum of care and in advanced technologies.

The e-health environment is, therefore, increasing the ability of HIM professionals to manage data and assist in the development of decision support systems for individual, aggregate, and public health data. HIM practitioners have a tremendous responsibility in providing the support for organizational, local, and national systems that ensure quality, integrity, and availability of healthcare data. The role of the public health officer in providing strategic leadership of health information in the public health sector has been gaining importance such that we may, in fact, say that these activities are already underway and can be fully supported by the EHR. The EHR and EHRM are expanding the roles and responsibilities of HIM practitioners. Legal, regulatory, and accrediting environments will need to adapt to the emergence of new technologies and applications in healthcare, and so the traditional leadership role of HIM will continue to influence and adapt the management of health information.

III. Methodology

The research design used in this study is descriptive design. It involves the design and administration of questionnaire to the staff of the hospital. The populations for this study are the members of staff of Obafemi Awolowo University Teaching Hospital Complex and Seventh Day Adventist Ile Ife. In all, one seventy respondents were sampled for the study cutting across the various departments of the hospital. 100 from OAUTHC and 40 from SDA. The reason for the huge difference is due to staff strength in the hospital. Simple random sampling (SRS) technique was adopted in this study, to select a total enumeration that is a total of one hundred and seventy respondents from the two hospitals. Information was obtained from primary source with the aid of questionnaire. The questionnaire comprised five main sections (A-E). Section A focuses on demographics characteristics of the respondents such as: age, education level, sex, marital status and religion. Section B assessed the concept of electronic health records keeping in patient care. Section C investigated the barriers to effective use of electronic health records management in health care service. Section D compares the difference in the software used in developing electronic health information management. Section E investigates the strategies adopted in the management of electronic health records system.

A self-administered questionnaire method was adopted in the course of this study. The questionnaires were distributed to members of staff of Obafemi Awolowo University Teaching Hospital Complex and Seventh Day Adventist Hospital, after which they were retrieved and check for consistencies. The researcher waited for respondents to complete the questionnaire before retrieval and this assisted greatly in achieving the overall objectives of the study. Validity was obtain through face and content checks. This involves removing ambiguous and wrongly worded question before proceeding to the field for data collection. Each item on the instrument was cross-examined for consistency and relevance to the study. All necessary corrections and modifications were made by the supervisor before proceeding to the field for the actual administration. The data collected were edited, organized and tabulated using frequency counts and percentages distribution with the aid of statistical package for social science (SPSS) version 16.0

IV. Result And Discussion

Analysis of Research Questions

Research Question 1: What are electronic health records keeping in patient care?

Table 1: Electronic health records keeping in patient care.

Parameters	A%	SA	D%	SD %	Mean	SD
Electronic health records work at a very high speed	49.4	49.4	0.6	0.6	1.52	.55
Electronic health records provide patient with quick and easy access to their health information and give them the peace of mind	54.1	44.1	1.8	–	1.48	.54
Electronic health records restrict unauthorized person to have access to patient information	48.2	41.8	7.6	1.8	1.64	.73
Electronic health records reduce the waiting time of the patient in the hospital	47.1	47.6	3.5	1.8	1.60	.65
Electronic health records reduce the cost spend in maintaining patient records	47.6	42.9	7.6	1.8	1.64	.70
Electronic health records reduces duplication of patient records	47.1	48.2	3.5	1.2	1.59	.62
Electronic health records has the ability to link records to sources of relevant and current research	55.3	40.6	4.1	–	1.49	.58
Electronic health records improve the quality of care as a result of having patient information immediately available at all times for patient care.	57.1	41.2	0.6	1.2	1.46	.58
Electronic health record facilitate speed and accessibility in obtaining consultation from distant specialist	58.2	35.5	6.5	–	1.48	.62
electronic health records decrease unnecessary tests and immunization, which can be costly and unsafe for patients	44.1	27.1	23.5	5.3	1.90	.94

Table 1 showed that electronic health records work at a very high speed (mean and standard deviation= 1.52 ± 0.55), electronic health records provide patient with quick and easy access to their health information and give them the peace of mind(mean and standard deviation= 1.48 ± 0.54), electronic health records restrict unauthorized person to have access to patient information (mean and standard deviation = 1.64 ± 0.73), electronic health records reduce the waiting time of patient in the hospital (mean and standard deviation= 1.60 ± 0.65),electronic health records reduce the cost spend in maintaining patient records (mean and standard deviation= 1.64 ± 0.70), electronic health records reduces duplication of patient records (mean and standard deviation= 1.59 ± 0.62), electronic health records has the ability to link records to source of relevant and current research (mean and standard deviation= 1.49 ± 0.58), electronic health records improve the quality of care as a result of having health information immediately available at all times for patient care(mean and standard deviation 1.46 ± 0.58), electronic health records facilitate speed and accessibility in obtaining consultation= from distant specialists (mean and standard deviation= 1.48 ± 0.62), electronic health records decrease unnecessary tests and immunization, which can be costly and unsafe for patients (mean and standard deviation= 1.90 ± 0.94).

Research question 2: What are the barriers to effective use of electronic health records management in health care service?

Table 2 The barriers to the use of electronic health records management in health care service.

PARAMETERS	A %	SA%	D %	SD %	Mean	SD
Network problem, poor internet connection can be frustrating in electronic health records system	53.5	42.9	2.9	0.6	1.51	.59
Inadequate staffs training affect good electronic health records	48.8	45.9	4.7	0.6	1.57	.61
Implementation of electronic health records is costly therefore most hospitals in Nigeria cannot afford it	52.9	28.8	14.1	4.1	1.69	.86
Poor health policies that fails to address short and long term needs	56.5	29.4	11.8	2.4	1.60	.79
Low rate of internet penetration and low bandwidth are among the challenges to electronic health implementation.	55.3	33.5	9.4	1.8	1.49	.71
Insufficient ICT resources limit health organization in performing the searches.	61.2	31.2	5.3	2.4	1.51	.64
Cost of computers and lack of computers hinders the adoption of electronic health among hospital in the rural areas.	56.5	35.9	7.6	–	1.61	.71
Lack of computer skills among clinicians.	54.7	30.6	11.8	2.9	1.63	.81

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Low budgetary allocation to the health sector among others.	51.8	35.9	10.0	2.4	1.63	.76s
lack of enough money to equip health institution with modern technologies	51.2	37.6	10.0	1.2	1.58	.74

Table 2 revealed that network problem, poor internet connection can be frustrating in electronic health records system (mean and standard deviation= 1.51 ± 0.59), inadequate staffs training affect good electronics health records (mean and standard deviation= 1.57 ± 0.61), implementation of electronic health records is costly therefore most hospital in Nigeria cannot afford it (mean and standard deviation = 1.69 ± 0.86), poor health policy that fail to address short and long term needs (mean and standard deviation= 1.60 ± 0.79), low rate of internet penetration and low bandwidth are among the challenges to electronic health implementation (mean and standard deviation= 1.49 ± 0.71), insufficient ICT resources limit health organization in performing the searches (mean and standard deviation= 1.51 ± 0.64), cost of computers and lack of computers hinders adoption of electronic health among hospital in the rural areas (mean and standard deviation= 1.61 ± 0.71), lack of computer skills among clinicians (mean and standard deviation= 1.63 ± 0.81), low budgetary allocation to the health sector among others (mean and standard deviation= 1.63 ± 0.76), lack of enough money to equip health institution with modern technologies (mean and standard deviation= 1.58 ± 0.74).

Research Question 3: What are the differences in the software used in developing electronic health information management?

Table 3: The differences in the software used in developing electronic health information management.

PARAMETER	A %	SA %	D%	SD%	Mean	SD
In particular electronic health records application can prompt for completeness.	65.3	27.6	5.9	1.2	1.43	.66
It provides better ordering for searching and retrieval.	50.6	47.6	1.8	–	1.51	.54
Permit validity checks for data quality, research and especially decision support.	55.9	38.8	5.3	–	1.49	.59
Improve operating efficiency, thus improving medical care quality.	54.7	41.8	2.4	1.2	1.50	.61
Electronic health records uses secure internet-based technology	55.9	37.1	5.3	1.8	1.53	.68

Table 3 showed that in particular electronic health records application can prompt for completeness (mean and standard deviation= 1.43 ± 0.66), electronic health records provides better ordering for searching and retrieval (mean and standard deviation= 1.51 ± 0.54), electronic health records permit validity checks for data quality, research and especially decision support (mean and standard deviation= 1.49 ± 0.59), improve operating efficiency thus improving medical care quality (mean and standard deviation= 1.50 ± 0.61), electronic health records uses secure internet-based technology (mean and standard deviation= 1.53 ± 0.68).

Research question 4: What are the strategies adopted in the management of electronic health records system?

Table 4. The strategies adopted in the management of electronic health records system.

Parameter	A%	SA %	D %	SD%	Mean	SD
Quality of ICT system is noted as a significant factor in determining adoption of electronic health records.	70.6	29.4	–	–	1.29	.46
Internet connectivity is vital for successful adoption of electronic health records.	53.5	43.5	2.9	–	1.49	.56
Funding of health sector determine implementation of electronic health records	61.2	34.1	4.7	–	1.44	.58
Provision of computers for use in managing patient records	62.9	34.7	2.4	–	1.39	.54
Staff should be trained on how to operate computer.	47.1	51.2	1.2	0.6	1.55	.55

Source field survey, 2015

Table 4 showed that quality of ICT system is noted as a significant factor in determining adoption of electronic health records (mean and standard deviation= 1.29 ± 0.46), internet connectivity is vital for successful adoption of electronic health records (mean and standard deviation= 1.49 ± 0.56), funding of health sector determine the implementation of electronic health records (mean and standard deviation= 1.44 ± 0.58),

provision of computers for use in managing patients records (mean and standard deviation =1.39 ± 0.54), staff should be trained on how to operate computer (mean and standard deviation=s 1.55 ± 0.55).

Table 5 other known barriers to electronic health records keeping in the hospital.

Other barriers**	Frequency	Percentage
Lack of ICT equipment	22	6.8
Lack of trained staff	70	21.7
Inadequate power supply in the hospital	73	22.7
Non-challant attitude of people to electronic health records	25	7.8
Redundant personnel without necessary skills	15	4.7
Inadequate security of the ICT storage	38	11.8
Poor funding	58	18.0
There may not be proper back up for system	21	6.5
TOTAL	322	100

** multiple response analysis allowed

Table 5 showed that,22(6.8%) of the respondent said that lack of ICT equipment can be a barrier to electronic health records, 70(21.7%) said lack of trained staff can be one of the major barrier to electronic health records, also 73(22.7%) said that inadequate power supply in the hospital is one of the barriers, yet 25(7.8%) said that non-challant attitude of people to electronic health records, and 15(4.7%) said redundant personnel without necessary skills, while 38(11.8%) said inadequate security of the ICT storage, 58(18.0%) said poor funding can be a barrier to electronic health records, while 21(6.5%) said if there is not proper back-up for system.

Table 6 suggestion on improving electronic health records

Classification (multiple response analysis allowed)	Frequency	Percentage
Government should provide ICT facilities in the hospital	21	4.4
Training of staff on how to operate the computer	68	14.2
Government should provide a stable power supply	74	15.4
Recruitment of trained health information managers	53	11.0
More computer system should be in circulation	42	8.8
Staff should be educated on the importance of electronic health records	38	7.9
Internet connectivity should be adopted	27	5.6
Adequate funding	55	11.5
Provision of adequate and standard equipment	13	2.7
Installation of computer in various department in the hospital	08	1.7
Good network facility	24	5.0
Updating officers from time to time	25	5.2
Orientation of staffs on the need for electronic health records	32	6.7
TOTAL	480	100

Table 6 showed that 4.4% said that government should provide ICT facilities in the hospital, 14.2% said that training of staff on how to operate the computer, 15.4% said that government should provide a stable power supply; also 11.0% said that recruitment of trained health information managers, while 8.8% said more computer system should be in circulation. Moreover,7.9% said that staff should be educated on the importance of electronic health records, and 5.6% contributed that internet connectivity should be adopted, while 11.5% said that adequate funding, and 2.7% suggested that provision of adequate and standard equipment, 1.7% said that installation of computer in various department in the hospital, furthermore, 5.0% said that good network should be available, in addition 5.2% said that updating officers from time to time, lastly, 6.7% said that orientation of staff on the need for electronic health records.

V. Discussion of Findings

From the analysis it is inferred that 98.8% of the respondents agreed that electronic health records work at a very high speed, it provide patient with quick and easy access to their health information and give them peace of mind, it facilitate speed and accessibility in obtaining consultation from distant specialist, 1.2% do not support this depicting that electronic health records decrease unnecessary tests and immunization, which can be costly and unsafe for patients. Also, it was observed that implementation of electronic health records is costly hence, most hospitals in Nigeria cannot afford it, cost of computers and lack of computers hinders adoption of electronic health records at 96.4% and below revealing that electronic health records provides better ordering for searching and retrieval, it improving operating efficiency thus improving medical care quality.

Based on the assessment done in implementing electronic health information, it was revealed that in OAUTHC and SDA it is not properly done because most of the staff does not have knowledge about computer system. Also it is noted through their responses that staff should be educated on the importance of electronic

health records, recruitment of trained health information managers, government should provide a stable power supply. This study examined the barriers to implementation of electronic health information management in Ife Central Local Government. In the course of carrying this study it was discovered that the efficiency and success of any health care organization depend upon the establishment of an effective keeping of patient records in the hospital. The data gathered through the questionnaire administered on the selected members of staff of the Obafemi Awolowo University Teaching Hospitals Complex and Seventh Day Adventist Ile Ife revealed that they preferred electronic health information because it works at a very high speed and has the ability to link records to sources of relevant and current research. It was also observed that most of the department/ unit in the hospital lack the knowledge about computer and therefore cannot use computer effectively, and scarcity of computers in each of the unit, this limit the full implementation of electronic health information.

VI. Conclusion

It is concluded from this study that:

1. Most of the staff cannot operate computer system properly.
2. Not all the department in the hospital has a functioning computer system.
3. Some staff preferred electronic system of keeping health information.
4. Non-challant attitude of people to electronic health records.
5. Inadequate power supply in the hospital.

5.3 Recommendation

In view of the findings of this study, the following recommendations were made:

To the Government:

- I. Government should provide information communication technology (ICT) facilities in the hospital.
- II. Government should provide a stable power supply to the hospital to enhance effectiveness of electronic health information.
- III. More computer system should be in circulation within the hospital.
- IV. Government should release adequate funding to the health sector and provide adequate and standard equipment to the hospital as necessary.

To the Hospital:

- I. Internet connectivity should be adopted.
- II. Updating the hospital staff from time to time.
- III. Training of staff on how to operate the computer system.
- IV. Staff should be educated on the importance of electronic health records.

5.4 Contribution to the Existing Knowledge

The study has helped to appreciate the significance of electronic health records and how it can enhance effective patient care. It has enhanced the knowledge of the researcher and is expected to contribute to policy making in the implementation of health policy.

Limitation of the study

The study is limited to Obafemi Awolowo University Teaching Hospitals Complex and Seventh Day Adventist Ile Ife due to the following reasons: Short period for the study, Lack of finance, Lack of material / resources to use, Lack of co-operation among the staff in filing the questionnaire. Nevertheless, this does not in any way hinder the quality and success of the study.

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