



Review Article

Electronic Health Record: An Underutilized Tool in Nigeria's Healthcare System

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Abstract

Healthcare delivery services in Nigeria over the last decades has been worrisome because hospital and clinics have not followed the global trend of information system and still rely on the traditional method of record keeping which comes with challenges such as delay, long patient waiting time and difficulty in retrieving patient's medical record. Electronic health records (EHR) are digitized records of clinical services. Utilizing electronic health records is an essential tool whose benefits cannot be overemphasized and it includes, record accessibility, improved documentation, reduced errors and leading to professional satisfaction with its benefits, its demerits also are embedded in it, which include less patient contact, frustration if there is lack of technical know-how, error in documentation and the problem of interoperability. The challenges to the implementation of electronic health records in Nigeria include government policy, lack of information communication technology infrastructure, lack of exposure to advanced concepts in training, poor internet connectivity and financial constraints. The aim of this paper is to assess the current state of EHR adoption and utilization in Nigeria's healthcare system. Through an examination of the rate of use and factors limiting its use in Nigeria. This article seeks to sensitize relevant stakeholders to take appropriate action in mitigating factors limiting its use and improving health care delivery. Over 75 pieces of literature were initially examined concerning electronic health records, with 50 of them undergoing rigorous critical evaluation. Ultimately, 36 selected works were incorporated into this comprehensive review. Results showed that most of the literature surveyed indicated a low utilization rate of electronic health records in Nigerian hospitals. Estimates suggest that the adoption of electronic health records stands at 18-23%, while computerized physician order entry utilization is as low as 15%. In conclusion, addressing the factors that hinder the implementation of electronic health records across all levels of the healthcare system, from primary to tertiary, is crucial for ensuring successful adoption throughout the entire state and country. It is therefore recommended that health information technology courses should be inculcated into the medical professionals' curriculum, information technology specialists should be employed in the health care system for improvement of health care delivery, there should be the training of health staff in the working system on use of computer and information technology, positive attitude of health care professionals towards adopting the electronic health record system should be adopted and appropriate inter-sectoral collaboration with telecommunication system and electrical distribution company to enhance the implementation of

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electronic health record. More research should be carried out on electronic health records in Nigeria and its rate of usage as limited research exists on the rate of utilization in Nigeria hospitals.

Keywords: Electronic health records, Nigeria health care system.

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Introduction

The health of a nation signifies the wealth of a nation as the popular saying goes health is wealth (Bello, Faruk, Oloyede and Popoola, 2016) and harnessing information technology into health delivery system has the ability to improve the nation's general outlook (Bello et al., 2016). Health care delivery system of a nation depends on how well health institution can deliver quality and affordable care to its citizens (Ojo and Popoola, 2015) and every citizen in a country has the right to quality care which is to be provided by a responsive government (Agbese and Ikonne, 2021) to which government globally are making a massive investment in health information technology in order to achieve improved health and the most popular form of health information technology is electronic health record (Agbese and Ikonne, 2021). Electronic health records are digitized records of clinical services (Stephen, 2020) and the components within it include patient registration, scheduling, patient encounter documentation, prescription, document management lab and imaging reports, clinical decision support and inter-office communication (Siegenthaler, 2016). Different acronyms exist for handling patient data which are electronic medical records, electronic patient's record, computerized medical record, computer-based patient record, their difference in meaning depends on country of origin, health sector, professional discipline and period of time (Nohr, 2006). In every organization including the healthcare sector, information serves as an important blood line to delivering healthcare system globally (Qureshi, 2016). According to the World Health Organization, health information forms an important bedrock to monitor, appraise health status, ensure and boost the quality of medical care programs and services. The World Health Organization building block depends on six structures and the health information system forms one of them (Alobo, Soyannwo, Ukponovan. Akogu et al., 2020). Health record is important for good and quality health care data which is used for planning, developing and maintaining optimal healthcare (Adeleke, 2014).

Record keeping is vital in health care services and there are two major ways of keeping patient's medical records, paper-based and electronic health records (Adeleke, 2014). Medical records whether automated or manual stores medical information that label all features of patient care which makes it an important tool to operate health care institution

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daily within the public and the private sector (Ondieki, 2017). They are clear, brief and precise information that contains patient medical history, illness, and medical occurrence which represent the primary source of health statistics (Lungile and Trywell, 2017). The introduction of information technology into health institutions has led to an information explosion, and an increase in the volume of accessible records thus leading to enhanced healthcare delivery service (Osundina, Kolawole and Ogunrewo, 2015)

Electronic health record has been identified as an essential technology to improve the safety, quality and efficiency of medical care (Sander, Read-Brown and Tu et al., 2014). It is a record in digital form that is theoretically capable of being distributed across various health settings (Ajala, Awokola and Ozichi, 2015). Its distribution can be network-connected or enterprise-wide information (Ajala et al., 2015) and it may include a wide range of data that include demographics, medical history, medication and allergy, immunization status, laboratory test, radiological images, vital signs personal statistics like age and weight (Ajala et al., 2015).

Healthcare delivery services in Nigeria over the last decades has been worrisome because hospital and clinics have not followed the global trend of information system (Elikwu, Ibgokwe and Emokhare, 2020). Most hospitals in Nigeria still rely on the traditional method of record keeping which comes with challenges (Ajala et al., 2015). Adeleke (2014) stated that the continuous use of traditional paper records in public facilities causes delay, long patient waiting times and difficulty in retrieving patient's medical record. Long patient waiting time leads to inaccurate treatment or increased complications due to the non-availability of medical records and history (Adefolaju, 2014).

The rise in technology and high rate of non-communicable diseases has led to a huge number of registered patients leading to the need for space to keep and store information. The paper-based method relies on the handwriting of individual professionals, and illegible handwriting can lead to difficulty in assessing information at times (Ajala et al., 2015). Patients who have paper records might require carrying them physically from one unit to another thus allowing them access to information they should not be privy to (Ajala et al., 2015). There could be natural disasters like floods, fire outbreaks or even termite attacks which could destroy paper records, searching for a wide range of files if not electronically checked (Ajala et al., 2015).

Electronic health record has its impact on patient satisfaction and it is mentioned in three dimensions which are direct function, supportive function and information infrastructure function (Gumus et al., 2023). Direct function means performing functions connected to general clinical responsibility such as collecting, storing, management,

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retrieving and communicating health data that is patient-related (Dickinson, Fischetti, and Heard 2004). The direct function also entails offering stand-alone reminders that provide caution to the patient about contraindications and mistakes in prescriptions (Dickinson et al., 2004). It allows tasks to be tracked to ensure quality of care in a timely fashion (Dickinson et al., 2004).

Supportive function are those that are not directly to provision of health care but contribute to overall delivery of health care (Dickinson et al., 2004). It improves quality of care by providing input for medical research and public health promotion (Dickinson et al., 2004) and information infrastructure relates to provision of technical groundwork for successful achievement of direct and supportive care functions (Dickinson et al., 2004).

Review Questions

What is an Electronic Health Record?

What is the history of electronic health records?

What is the electronic medical record software for Nigerian hospitals?

What are the benefits of electronic health records?

What are the demerits of electronic health records?

What are the challenges to the implementation of electric health records in Nigeria?

What is the rate of implementation of electronic health records in Nigerian hospitals?

The aim of this review paper is to assess the rate of use and factors limiting its use in Nigeria and sensitize relevant stakeholders to take appropriate action in mitigating factors limiting its use and improving health care delivery to all its citizens.

History of Electronic Medical (Health History)

The technological advance of electronic health records is being utilized daily by healthcare employees but the rich history of this technological solution is not understood (Siegenthaler, 2016). The idea of recording patient information electronically instead of paper was conceived in the late 1960s. Larry Weed presented the concept of generating an electronic record to allow a third party to verify diagnosis. Clinical data management was Weed's vision which was also known as hospital information systems. The first electronic medical record was developed in 1972 by the Regenstreif Institute and was accepted as a major advancement in health care or medical practice. It was not widely used as anticipated due to its high cost and was primarily used by government hospitals. In the 1990s, computers became more affordable and more common as the internet emerged and it was projected by the Institute of Medicine that by the year 2000, every physician's office should use computers to improve patient care (Siegenthaler, 2016).

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During the tenure of President George W. Bush, the healthcare information technology project budget doubled alongside the need for industry-wide adoption of electronic health record systems. This mandate has been supported by Obama through the American Recovery and Reinvestment Act to provide additional funding and incentives to healthcare professionals who adopt electronic medical record systems (Siegenthaler, 2016).

History of Electrical Health Record in Nigeria

The history of health care records in Nigeria can be traced back to the 80's during which there was a collaborative research project between University of Kuopio, Finland, Obafemi Awolowo University and Obafemi Awolowo University Teaching Hospital (Idowu, Ogunbodede and Idowu, 2003). The project involved creating a basic hospital software for veteran's health record which included information about admission, discharge and transfer. It was adopted for use in Obafemi Awolowo University Teaching Hospital in 1991 (Daini, Korpela Ojo and Sonyan, 1992). In the late 90's, the research team expanded the system by ensuring all teaching hospital had health information unit which could use this basic standardized software they developed. The plan was that by 2001 all teaching hospitals in Nigeria would have health informatics system making use of standardized software. It was not tested in Obafemi Awolowo Teaching Hospital and only five teaching hospital and medical centers made use of it as at 2007. It lacked progression in Nigeria due to high cost of purchasing commercial software (Idowu, Cornford and Bastin, 2008). In 2003, a non-commercial software package called State Hospital Network was developed for sharing hospital resources over computer network in Nigeria (Idowu, Adagunodo, Aderounmu and Ogunbodede, 2004). A system was designed for referral of patient from one hospital to another in which patient's case file, referral note and laboratory investigation were transferred over a computer network instead of manual and it was designed by the Department of Science and Technology, Obafemi Awolowo University, Nigeria (Idowu et al., 2004)

Electronic Medical Record Software for Nigeria Hospitals

Having digital, searchable and regularly accessible information about each patient helps medical professional make the best health care decision for their patients in the shortest possible time (Issac, 2021) and furthermore stated that protecting sensitive information is important and the best electronic medical record system keeps data safe also accessible to professional involved in care. Some soft wares were identified which include: CliniquePlus, Advanced MD, Athena Health, Care Cloud, Green way Health Intergy, and NextGen Health Care.

Each of this software are beneficial but has its disadvantage which will be described as follows Cliniqueplus and Advanced MD has the advantage of allowing detailed scheduling interface, plenty customizable features and excellent tracking capability but its disadvantage is takes time to learn its use effectively (Issac, 2021).Athena Health is a web based electronic medical record suitable for small and average based hospital (Issac, 2021) has the advantage as the previously mentioned one but has the benefit of good customer service and easy to use compared to cliniqueplus and Advanced MD but has the disadvantage of not securing data (Issac, 2021). Care cloud has the advantage of tracking patient flow but not recommended for large hospital or clinic. Green way Health Intergy has the advantage of highly customizable electronic medical record and nice collection of shortcut to streamline work but takes time to learn how to use and NextGen Health care has the advantage of easy to use without needing technology staff for training but is not powerful enough for large practice (Issac, 2021).

Benefit of Electronic Health Record

According to Regis College (2023), some benefits of electronic records were highlighted which include:

Record Accessibility: It makes patients' records faster to retrieve as they are easily organized and easier to read, especially in emergency and acute care situation.

Improved Documentation: It makes documentation easier to assess and interpret and more thorough than writing notes on charts.

Reduces Error: It helps reduce medical error by tracking medication, dosage and time.

It leads to professional satisfaction: It helps to improve operational efficiency and patient care thus promoting satisfaction within the profession (Regis College, 2023).

Demerit of Electronic Health Record

It leads to less patient contact: Less time is spent with the patient because time is spent entering data thus not allowing eye contact to be achieved when assessing the patient.

There could be frustration if there is a lack of technical know-how as the electronic health record system has a learning curve.

There could be errors in documentation if there is time pressure that leads to incomplete data entry, auto-filling of incorrect information by the system or forms that do not include necessary fields to describe the patient's condition.

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There could be a problem of interoperability in which electronic health records in one department cannot share data with a system of another (Regis College, 2023).

Challenges in Electronic Health Record Implementation.

Globally, there are challenges intertwined in implementing electronic health record which varies from one country to another, thus challenges experienced in developing countries differ from developed countries (Sood, Nwabueze, Mbarika, Prakash, Chatterjees et al., 2008) but emphasis is going to laid on challenges of implementation in Nigeria and they include:

Government policy constitute a barrier that hinders the adoption of electronic health record (Benson, 2011) thus there is a need for robust government policy in health care technology in Nigeria to facilitate E-health initiative (WHO, 2008).

Lack of information communication technology infrastructure: Limited access to computers and other information technology facilities poses a challenge to successful implementation and its ease in Nigeria depends on existing infrastructure in a healthcare organization (Ward, Jana, Bahensky, Vartak and Wakefield, 2006).

Lack of basic information technology and skills: Lack of exposure to advanced concepts in training widens the gap between professionals trained in developed and developing countries which inadvertently has an effect on the success and efficiency of electronic health record implementation (Sood et al., 2008).

Poor Internet connectivity: Electronic health record requires an Internet connection to transfer information through effective data management, picture archival, running radiological information system and teleradiology (Benson, 2011). Access to the internet in the past decade has improved and all African countries have access to it (Bukachi and Pakenham-Walsh, 2007) but its implementation has been hindered due to low speed and expensive bandwidth in Nigeria (Osaugwu, Okide, Edebatu and Udoka, 2013).

Financial Constraint: Huge financial responsibility is involved with electronic health record in terms of purchase, installation, training of hospital staff and maintenance which may discourage public hospitals from embarking on it (Durrani and Khoja, 2009). In addition, lack of technical support in terms of technical expertise and the cost of migrating to an electronic system, paucity of healthcare funding and healthcare professional resistance to change from manual to electronic (Bello et al., 2016).

Rate of Utilization of Electronic Health Record

Despite the benefit this technology provides, most Nigerian hospitals are lagging behind in embracing contemporary healthcare technology despite the fact that most hospitals globally are making an effort to deliver quality healthcare and be competitive through the use of electronic health records (Gumus et al., 2023). Furthermore stated that the use of electronic health records in physicians' offices according to interviews done in North Central Nigeria was estimated to be 15-21% (Gumus et al., 2023). According to Aloba, Soyannwo, Ukponwan, Akogu and Akpa et al. (2020), it was estimated that the use of electronic health records was estimated to be 18-23% and the use of computerized physician order entry was 15%. Elikwu, Igbokwe and Emokhare (2020) stated that public hospitals rely solely on paper-based record systems and most of them are slow to adopt the global trend of information to move healthcare service from inefficiency and poor management (Gumus et al., 2023).

According to study by Adedeji, Irinoye, Ikono and Komolafe (2018), shows that 80% of nurses in the teaching hospital has never used it, 86.9% do not have training in it but 79.6% signified willingness to use it. In another study by Aloba et al. (2020) shows that 60% of physicians are competent to use and 74.3% feel comfortable to use it. This shows that despite the willingness of health care professionals to use it there are factors mitigating its use in the Nigerian health system.

Conclusion

Electronic health record is an essential tool in record keeping which has numerous benefit but despite, their limited use among health care professionals in Nigeria, and various barrier or challenges has been identified. The use of electric health records will have a great impact on the quality of health service delivery thus it is important to mitigate those factors that impede the implementation of electronic health records in the health care system such as improving its use in health facilities from primary to tertiary level of health care delivery across all state and country at large. Also sectorial collaboration with appropriate sectors by investing in improving the epileptic power supply and internet connectivity across the board. The end users, who are the health workers, should also be sensitized and positively tilted towards the use of electric health records for improved output in terms of patient care and also to save time.

Recommendations

From the above-stated information on electronic health records, its benefits and challenges in implementation. The following recommendations are made: Inclusion of health information technology courses (theory and practical) into the medical professionals' curriculum. Employment of information technology specialists into the health care system for improvement of health care delivery. Training and re-training of health staff in the working system on the use of computer and information technology. The positive attitude of health care professionals towards adopting the electronic health record system. Appropriate inter-sectoral collaboration with telecommunication systems and electrical distribution companies to enhance the implementation of electronic health records.

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