# THE ROLE OF ELECTRONIC HEALTH RECORD IN HEALTHCARE DEVELOPMENT: THE NIGERIAN PERSPECTIVE (A CASE STUDY OF KATSINA STATE)

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**Abstract**

Electronic Health Record is a systematic electronic collection of health information about patients such as medical history, medications records, investigations, inpatient and outpatient documentations. Electronic health information system is information that make use of developed software applications to manage, process and use information designed for administration and clinical support functions to deliver efficient and effective health care services. This study used survey research technique using Quantitative method. Purposive sample of **60** physicians was selected, sample size is **60.** Data was collected from Federal Teaching Hospital Katsina, Nigeria. A close ended questionnaire was used to collect the data, questionnaire comprises **15** items. The data analysis was done using Statistical Package for the Social Sciences; For the purpose of optimal result mean and standard deviation was used to answer the research questions. The findings of the study indicate that implementation of EHR plays a critical role towards healthcare development more especially during Covid19 pandemic, it eases the work of physicians, saves a lot time and efficiency. The government should encourage adoption of EHR by developing public private partnership. Overall in this study the physicians were satisfied with role EHR play towards healthcare development. In their opinion there is significant changes in the quality of care provided to the patients and also their waiting time is reduced.

**Keywords:** Perspective, Electronic Health Record (EHR), Healthcare, Development, Nigeria.

## Background

With the emergence of Covid19 pandemic Electronic Health Record is widely accepted in the healthcare organizations in Nigeria which is considered as quality improvement initiative (Moses, 2018). Electronic Health Record is a systematic electronic collection of health information about patients such as medical history, medications records, investigations, inpatient and outpatient documentations. Electronic health information system is information that make use of developed software applications to manage, process and use information designed for administration and clinical support functions to deliver efficient and effective healthcare services. Using Electronic Health Record (EHR) is a key component of a comprehensive strategy to improve healthcare quality and patient safety. The incentives provided by the meaningful use program are intended to encourage increased adoption of EHR as well as more interactions between EHR and medical providers (Muhammad, 2019).

## Objectives

- To identify the major constraint in the adoption and implementation of EHR towards healthcare

development.

- To evaluate the extent to which physician capacity, access to healthcare, infrastructure influences the adoption of EHR
- To ascertain the influence and physician capacity in the adoption and implementation of EHR

**Questions**

- What are the major constraint in the adoption and implementation of EHR towards healthcare development?
- What are the extent to which physician capacity, access to healthcare, infrastructure influences the adoption of EHR?
- What are the influence and physician capacity in the adoption and implementation of EHR?

**Role of EHR toward Healthcare Development**

Electronic Health Record implementation plays a critical role toward healthcare development, it assists with longitudinal collection of electronic health information about individual patients and population. It has been recognized as a system that has a wide range of benefits such as judicious use of physician time, improved patient safety, improve healthcare outcomes and increase efficiency (Moses, 2018).

EHR provides good quality of care to the patients and help the healthcare professionals to make better decisions, patients are more aware of their rights and they take responsibility of their own health. Government is now taking interest in health needs and development towards Electronic Health Record in the country. Many people are now aware of risks and prevention of diseases due to the adoption of EHR.

Using EHR plays a critical role in providing a patient care which makes it possible on healthcare organizations to depend solemnly on Information Technology (IT) systems. A lot of study conducted have in their report stated that HIT have an impact on quality of healthcare, lower mortality rate, high vaccination rates, and patient safety indicators. The main concern of healthcare organization is to provide treatment and patient diagnosis (Anwar. S 2021). Using IT systems, it reduces the cost of health care and medical errors, thus making it possible to meet the growing demand for quality of health care and makes it very easy to retrieve patient data, and to improve its efficiency (Rand 2019).

**Literature Review**

In the year 1967 Mayo clinic started developing Medical Record System in order to facilitate easy access to healthcare and to save the time spent when attending to patient (Qamar Y et. al, 2020).

EHR refers to the use of information communication technology (ICT) devices and the internet to aid public health care, medical informatics and business to render quality services and improve information dissemination (Rand 2019). It provides a platform through which electronic health record media are used to facilitate and enhance quality assurance of the public consumer's health care service delivery by providers.

Health care informatics has been defined by these authors as "A field of study concerned with the broad range of issues in the management and use of biomedical information, including medical computing and the study of the nature of medical information itself With the use of EHR there is a possibility of

increasing patient health care quality, safety and the efficiency of health care with the hope of adding financial, human and organizational investment being offered in EHR, electronic prescribing and related healthcare technologies (Sulaim H, 2019).

In 2009, as part of the American Recovery and Reinvestment Act (ARRA), President Barack Obama signed the Health Information Technology for Economic and Clinical Health (HITECH) Act which allocates an estimated $27 billion in incentive payments for hospitals and health professionals to adopt and effectively use certified electronic health records (ARRA, 2009). Furthermore, hospitals that fail to achieve the "meaningful use" of health IT by 2015 will face reductions in Medicare payments (Rand, 2019). Based on a survey sponsored by US government more than 2600 doctors in the country with regard to their use of EHR indicated that 82% of doctors that use the system say that it has improved the quality of clinical decision, 86% of them said it help in avoiding medication errors, and also 85% are of the view that the system improves preventive healthcare delivery (Nicolas P, 2017).

Effective training is less a means to solve a specific problem than preparation for administrators to solve many problems. This training help expose the staffs to what the system can do make their job easier and more efficient. This new system needs to be usable by end-users, especially healthcare professionals in term of time-efficiency, cost-effectiveness, and interoperability with other systems as they are ultimate care givers to patients (Ajayi, 2020). In order to prevent errors and security issues, securing the appropriate infrastructure needed is the most important factor in the implementation of HIT systems. Infrastructure serves as the platform on which software and hardware operate. The risk associated with the inappropriate infrastructure include reduction in speed of the system, regular loss of network connection and inevitable loss of data as well as damage to the systems sometimes. Furthermore, users might get frustrated and develop negative attitude to use systems, resulting in the systems being under-utilized and eventually the technology being discarded (Nicolas P, 2017).

The researcher suggests that planning and putting the appropriate infrastructure into place, there is need to engage and train the staff. A set of end-users that posses' basic computer knowledge would tend to be very comfortable with the new system than those with relatively low computer literacy. He also found that for training to be effective, it is necessary for users to be frequently using the system and continue having experience. It is important for end-users to continuously use the features relevant to their work processes in order not forget how the system functions. He also suggests on enhancing patient confidentiality within the system as emphasize by the respondents (Indika 2013).

Mix methodology and phased approach were adopted using survey findings in order to determine health information system failure in the region with the concern of six major components health information system resources, health indicators, data sources, data management, data quality, and information dissemination were investigated in his findings he discovered that accurate, timely and reliable health information is unavailable and there evidence based health planning is lacking in the region that was studied (Moses, 2018). He also found that strength of the current HIS were identified that it will contribute to developing countries because it will attempt to bridge the gap of existing knowledge by presenting the findings of a comprehensive case study to reveal the strength of decentralized HIS in a developing country. He also found that it will enrich the literature by providing an assessment tool and a research method for the evaluation of regional HIS (Moses, 2018).

Using cross-sectional study in his findings he indicates that 27% of health workers have access to computers, level of education, organizational cultures are among the factors that encourage the use of

the system. While age, community health worker engagement level, inaccessibility of the output information and lack of resources are among the obstacles to the adoption of the system (Muhammad, 2019). In his recommendation he therefore include make additional resources to the facility to improve community health worker's participation i.e. improve computer use, make training and retraining program in computer packages and the system for sustainable development of the program (Muhammad, 2019). There are wide differences across countries in access to primary care and affordability, often reflecting national policies (Joseph D. Bronzino, 2016). Also in those countries there are a lot of variations with regard to patient electronic access, including making appointments or refilling prescriptions online, often tracked country policies to invest in such capacities. However, based on his findings electronic access depends on physician's acceptance and the use of the technology, which may lag behind technical (Cathy, 2016). Based on user willingness to adopt EHR in developing countries, his findings indicate that implementation of eHealth systems in most of the developing countries face users' resistance specifically doctors due the advanced mode of IT-applications for health organizations (Qamar Y et. al, 2020). Also in his findings said the complicated and sophisticated nature of structuring of eHealth systems and the modifications in work pattern of healthcare professionals require basic needs, engagement, technological and societal readiness for success of IS-projects in healthcare sector. Also the willingness assessment is not only to identify the basic needs of healthcare professionals about the eHealth systems but also to spells out the required hardware, software and other facilities for the success of EHR systems in hospitals (Qamar Y et. al, 2020). Linking EMR use to physician's performance, according his findings indicate that use of EMR should be complemented by information sharing, shared values, and physician employment mechanisms to yield positive effects on physician's performance. Also it was indicated in the findings that information sharing and shared values among healthcare delivery professionals fully mediate the relationship between EMR use and physician's performance (David et, al. 2016). Also physicians' employment determines which mediating variable constitutes the pathway from EMR use to physician's performance (David et, al. 2016).

**Research Design**

The research design approach adopted in this work is the survey research technique. The survey approach appeared best suited for this work since it is not feasible to interview the entire population. Furthermore, in surveys, there are fixed sets of questions, and responses are systematically classified, so that quantitative comparison can be made. The sources of primary data were through questionnaire that were administered to the Physicians of the hospital.

**Sample**

For this study, a purposive sample of 60 physicians was selected. Data was collected from Former Federal Medical Center Katsina, now known as Federal Teaching Hospital Katsina.

**Instrument**

A structured questionnaire was designed using Google form and was used to collect data. Link was sent to the target respondents in order to get the actual data required. The instrument was structured into two sections to actualize the research objectives. Section A biodata of the respondent and section B fifteen **(15)** questionnaire items.

**Procedure for Data Collection**

The research questionnaire was administered via WhatsApp groups of the target respondents. High level of anonymity was granted by not allowing the respondents to include their names when login in to the details of the form. Confidentiality of data and liberty of respondents to decline their participation in the study at any time were emphasized. Consequently, **52** out **60** physicians fully completed the questionnaire for the research study. The respondents were restricted to respond only once, the data collection was conducted for a period of three (3) weeks to allow them log in and fill the questionnaire at their convenient within the period. Respondents were also acknowledged for their cooperation and participation in the study.

**Result**

The present study is designed to investigate the role of Electronic Health Record towards healthcare development in Nigeria.

| *Variable* | **Category** | **Frequency (n=75)** | **Percentage %** |
|---|---|---|---|
| ***Gender*** | Male | 181 | 54.7 |
| | Female | 150 | 45.3 |
| | **Total** | **331** | **100%** |
| ***Age*** | 20-34 years | 2 | 0.6 |
| | 35-44 years | 83 | 25.1 |
| | 45+ | 190 | 57.4 |
| | **Total** | **331** | **100%** |
| ***Marital Status*** | Single | 69 | 20.8 |
| | Married | 233 | 70.4 |
| | Other | 29 | 8.8 |
| | **Total** | **331** | **100%** |
| ***Length in Service*** | Less than 10 years | 109 | 32.9 |
| | 10 but less than 25 years | 180 | 54.4 |
| | 25 years above | 35 | 10.6 |
| | **Total** | **331** | **100%** |

**Table 1:** Demographic data of the respondents

**Question One:** What are the major constraint in the adoption and implementation of EHR towards healthcare development?

| *S/N* | Variables | Mean | SD |
|---|---|---|---|
| *1* | Lack of technical know-how among physicians hinders implementation of HER | 3.37 | 1.03 |
| *2* | Inadequate facilities needed for the implementation of EHR | 3.47 | 0.86 |
| *3* | Lack of proper funding in the healthcare sector hinders implementation of HER | 2.76 | 0.87 |
| *4* | Lack of government policies towards implementation of EHR | 3.14 | 1.06 |
| *5* | Managerial incapacity toward healthcare hinders the EHR implementation | 3.23 | 0.99 |
| *6* | Physicians attitude and beliefs toward technology based system hinders implementation of HER | 2.39 | 0.57 |

| | | | |
|---|---|---|---|
| | **Total Mean** | **3.06** | **0.77** |

**Table 2**

The data in table 2 indicate that the respondents from the hospital scored up to the acceptable mean of 2.50 and above in these items 1,2,3,4,5 and 6 with their corresponding SDs. The grand mean of all the respondents are above the acceptable mean. This indicate that physicians agree that there is a lot of constraint that hinder the successful implementation of EHR.

**Question Two:** What are the extent to which physician capacity, access to healthcare, infrastructure influences the adoption of EHR?

| *S/N* | Variables | Mean | SD |
|---|---|---|---|
| *7* | EHR implementation requires constant and un interrupted power supply with back-up. | 3.02 | 0.96 |
| *8* | Provisions of adequate functional computer system in every department of the hospital with necessary software. | 2.97 | 0.65 |
| *9* | Using EHR requires reliable accessible internet service connection | 3.65 | 1.13 |
| *10* | There is need for regular and proper maintenance of all equipment's and e-facilities | 3.32 | 1.04 |
| | **Total Mean** | **3.24** | **0.95** |

**Table 3**

The data in table 3 has shown that the respondents from the hospital scored up to the acceptable mean of 2.50 and above in these items 7,8,9, and 10 with their corresponding SDs. The grand mean of all the respondents are above the acceptable mean. Its indicated that physicians agree that there is need of some infrastructure to be in place in order to attend to patient effectively and efficiently.

**Question Three:** What are the influence and physician capacity in the adoption and implementation of EHR?

| *S/N* | Variables | Mean | SD |
|---|---|---|---|
| *11* | I have enjoy working with EHR for long period of time | 2.98 | 0.94 |
| *12* | I attend to my patients within shortest time with the use of EHR | 3.62 | 1.04 |
| *13* | Using EHR requires physicians to undergo training on how to use it effectively | 2.18 | 0.62 |
| *14* | Using EHR requires professionalism with the system | 3.79 | 1.07 |
| *15* | I have acquired a lot of training on how to use EHR | 3.45 | 0.97 |
| | **Total Mean** | **3.20** | **0.93** |

**Table 4**

The data in table 4 indicate that the respondents from the hospital scored up to the acceptable mean of 2.50 and above in these items 11,12,13,14 and 15 with their corresponding SDs. The grand mean of all the respondents are above the acceptable mean. Its indicated that physicians are okay working with the system and saves a lot of time of both the patient and healthcare providers. Even though the respondents

did not agree that using the system it requires someone to undergo into trainings. This is an indication in their mean scores 2.18 and 0.62 standard deviation which is below the acceptable mean of 2.50 for the responses.

**Discussion**

Electronic Health Record is well recognized as a costly investment, the implementation requires a considerable commitment of time and money by hospitals and medical staff. (Campanella et al, 2020) however, have shown that EHR can reduce the costs associated with medical errors, adverse drug effects and time efficiency. In fact, it had shown that appropriate use of EHR can improve hospital efficiency with benefits exceeding the costs of adoption and patient satisfaction rating. In addition, it was found that EHR has advantage of management of critical patient's medical history and chronic diseases.

Our results indicate that EHR plays important role towards healthcare development and there's significant increase in saving patients time and services provided.

(Muhammad, 2019) had conducted a study to investigate the impact of EMR implementation on operating room efficiency from United States. In his study, they have undertaken a six-month training program including video presentations and lectures for all medical members. There are many hospitals that are moving towards technology and Electronic Health Record systems. Mostly have started but not fully implemented the system due to the lack of professionalism among staff which requires them to undergo into training on how to use the system.

**Limitations and Suggestions**

Covid-19 pandemic has exposed all the sectors of the healthcare in the country, which makes a lot of restrictions to the hospitals when attending your basic care. So implementation of EHR will help shelves a lot of problems in the sector but before implementing EHR we should apply change management which is an approach to shift organization from the current state to future state. There are operational changes, technological changes, and behavioral changes. We should focus on behavioral changes more because physicians are used to making decisions by their own for the patients and writing prescriptions on the paper. They feel they are expert in their field so they don't need the technology. There should be awareness programs about the benefits and role EHR play towards healthcare development in order to convince the physicians to adopt the technology.

**Conclusions**

Implementation of EHR plays a critical role towards healthcare development more especially during Covid19 pandemic, it eases the work of physicians, saves a lot time and efficiency. The government should encourage adoption of EHR by developing public private partnership. Overall in this study the physicians were satisfied with role EHR play towards healthcare development. In their opinion there is significant changes in the quality of care provided to the patients and also their waiting time is reduced.

Contrary to the general believed notion or assumption, this research found out that access to healthcare, infrastructure is not the greatest problem facing EHR implementation in Nigeria. The greatest or worst problem confronting EHR implementation in Nigeria is managerial capacity.

**Recommendation**

For the government to succeed in reinventing the future of hospitals, it has to extend the current reforms

to our healthcare system to make it more functional and produce a physician that are technology oriented in order to achieve a meaningful use objective. The thrust and emphasis should be on modern technology, practical technological studies aimed at producing technology based physicians. This implies change in our culture, value system and orientation as well as Nigerians overall attitude, ethics and appreciation of the need for every Nigerian to contribute in making our country better.

## Conflict of Interest

The authors declare no potential conflict of interest with respect to the research.

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