

Acceptance of Electronic Health Record for Improving Quality of Health Service Delivery: Case Study of Aminu Kano Teaching Hospital, Nigeria.

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Abstract. This study investigated acceptance of EHRs for Improving Quality of Health Service Delivery at Aminu Kano Teaching Hospital, which is the largest teaching hospital in Northern Nigeria. Findings indicated that study participants accept and use EHRs in order to enhance their job performance and believed that the system is very useful in their work. EHRs improves Service Quality and most of the antecedents of technology adoption (Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions) are significantly correlated ($p < .01$, $p < .05$) with Quality of EHRs, but fall short with Employee Satisfaction. Acceptance of EHRs has brought tremendous changes to the healthcare service and there is need to upgrade the functionality of the EHRs for sustainability.

Keywords: Electronic Health Record, EHRs, System Quality, Employee Satisfaction, Aminu Kano Teaching hospital, Health informatics

1. Introduction

Electronic Health Record system is an integral part of medical informatics that supports and maintains information about patient's health problems and the treatments they have received. It is used by clinical staffs, to monitor, improve, and report data on health care quality and safety. It serves to provide medical staff, and also patients with timely information to support treatment. Electronic Health Records have been

used to improve quality of health service delivery for many decades (Adele-mari Kleynehans, 2011; Akanbi et al., 2012; Biruk Senafekesh, Yilma Tesfahun, AndualemMulusew, & Tilahun Binyam, 2014; Jawhari, 2016; Jeminiwa & Fox, 2016; Leventhal, Cummins, Schwartz, Martin, & Tierney, 2015; Luchenski et al., 2012; Sinsky, Beasley, Simmons, & Baron, 2014; Wasserman, 2016). Universal Electronic Health Records (EHRs) has become an inevitable technological advancement in the computerized, information system/management process. If properly implemented, the benefits of storing and sharing patient information electronically are many, which includes: Facilitation of patient safety; promote standardized, evidence-based practices; electronic prescribing and test-ordering that reduces errors and redundancy; Faster, more accurate health care communication, faster responses to patient inquiries; access and retrieval of medical records from both on-site and remote locations; fewer duplicative tests; more complete capture of charges; reduction in healthcare costs; efficient diagnosis; enhance coordination of complex care; reduction in adverse drug events; and general improvement in the quality and safety of medical services (Akanbi et al., 2012; Ann Swan, Lang, McGinley, & Ann, 2004; Jawhari, 2016; Jeminiwa & Fox, 2016; Silow-Carroll, Edwards, & Rodin, 2012; Sinsky et al., 2014).

Apart from using EHRs to collect and manage clinical data, EHRs data are also very useful for

assessment and evaluation studies to investigate social determinants of health, population health, practitioners and patients perception / attitudes towards a particular healthcare intervention and to control disease outbreak (Boonstra, Versluis, & Vos, 2014; Dixon, McGowan, & Grannis, 2011; Haneuse et al., 2016; Jeminiwa & Fox, 2016; Jones & Furukawa, 2014; Leventhal et al., 2015; May & George, 2011; Nguyen, Bellucci, & Nguyen, 2014; Silow-Carroll et al., 2012). Users of the EHR system comprises of clinical staff such as Doctors, who create records for patients, edit the information in the system, view patient history. Nurses, who regularly monitors the records of patients that are involved in treatment, health visitors (nurses who visit people at home to check on their treatment), and medical laboratory scientists. Nonmedical users include, receptionists who make appointments, health record managers, who maintain the records in the system, statistical officers, health record clerks, health record attendants, laboratory technicians, and other administrative staff who generate reports at different times. The system is used to record information about patients (name, address, age, next of kin, etc.), consultations (date, doctor seen, subjective impressions of the patient, etc.), conditions, and treatments. Reports are generated at regular intervals for medical staff and health authority managers (Ian Sommerville, 2015).

Electronic Health Record Systems are very popular in countries like Canada, Norway, Australia, Denmark, Estonia, Netherlands, and Sweden (Adele-mari Kleynhans, 2011; Jeminiwa & Fox, 2016), and currently gaining relevance in sub-Saharan Africa, with sixteen cases of successful implementation been reported (Jeminiwa & Fox, 2016). While the adoption and implementation of such systems have been successful in few social systems, there have been reported cases of slow adoption (Adele-mari Kleynhans, 2011; Biruk Senafekesh et al., 2014; Jawhari, 2016; Jeminiwa & Fox, 2016; Jones & Furukawa, 2014; Leventhal et al., 2015; Nguyen et al., 2014; Silow-Carroll et al., 2012; Sinsky et al., 2014; Wasserman, 2016) and even failure of such systems (Yogeswaran & Wright, 2010). There are reported cases where the system cost more than expected, some other

cases where the system was developed/deployed but never used, other cases where the system was used for a while, but later abandoned, and cases where the system created additional difficulty for users. The cost of running and maintaining an information system are not planned for or envisaged by many users; likewise is the cost and challenges of staff training and maintenance (Adele-mari Kleynhans, 2011; Akanbi et al., 2012; Biruk Senafekesh et al., 2014; Jawhari, 2016; Silow-Carroll et al., 2012; Yogeswaran & Wright, 2010). The fear is that EHRs might not be sustainable by the host institutions in sub-Saharan Africa if international partnerships are not maintained (Akanbi et al., 2012; Oyibocho, Irinoye, Sagua, Essien, & Okome, 2014). The aforementioned is a major reason why the use, adoption and implementation of information systems such as Electronic Health Record systems need to be studied carefully.

Many researchers and practitioners have advocated for a national/centralized electronic management system within states/countries, as this will inevitably improve quality of health care service delivery (Adele-mari Kleynhans, 2011; Ann Swan et al., 2004; Dixon et al., 2011; Yogeswaran & Wright, 2010). A nationally centralized Electronic Health Record Systems remain relatively rare in developing countries, but are currently been put in place, in most industrialized, developed countries to improve quality of health service delivery (Adele-mari Kleynhans, 2011; Akanbi et al., 2012; Jawhari, 2016; Jeminiwa & Fox, 2016; Leventhal et al., 2015; Silow-Carroll et al., 2012; Sinsky et al., 2014; Wasserman, 2016). There have been many challenges to a national or centralized electronic health record systems in most developed countries, which has largely to do with the issue of funding, unique patient identifier, standards, privacy and security, stakeholder buy-in and other complexities associated with the system (Adele-mari Kleynhans, 2011; Boonstra et al., 2014; Wasserman, 2016). However, beyond a national/centralized EHRs, healthcare centers in Africa and most developing countries, still struggles with managing and running their own in-house systems efficiently (Akanbi et al., 2012; Jawhari, 2016; Jeminiwa & Fox, 2016;

Jones & Furukawa, 2014; Oyibocha et al., 2014; Silow-Carroll et al., 2012; Yogeswaran & Wright, 2010). The challenges here are quite unique, which is generally as a result of resistance from end users, technical, infrastructure, and financial resource limitation, high cost of hardware, software and communications systems needed to manage the system. Some of these challenges can be overcome, through bridging the digital divide, wider use of information technology and studying the process of efficient technology penetration, adoption and implementation. It is also likely to see software and hardware cost been much more affordable with new entrants into the EHR system market, competition amongst service providers and introduction of improved easy to use technology.

Globally, lots of efforts have been made to encourage and advocate for the use of EHRs. For example, an initiative in the UK 'Connecting for Health' was developed with the primary purpose of developing a computer database of patient health records 'from cradle to grave' for use by clinicians (Friedman, 2006). This initiative has been widely successful and the government have since keep the policy and improved it by connecting local records systems in a centralized fashion. In the US, Health Information Technology for Economic and Clinical Health (HITECH) Act, part of the American Recovery and Reinvestment Act of 2009 (ARRA, or the stimulus package), established incentive Payments from the Medicaid and Medicare programs for hospitals who are in the forefront of adopting and implementing EHRs in order to encourage and speed up widespread adoption and use of EHRs, to improve healthcare service delivery (Jones & Furukawa, 2014; Silow-Carroll et al., 2012). To drive home the importance of Electronic Health Record Systems, a Commonwealth Fund report in 2007 recommended that a one percent assessment on insurance premiums and Medicare outlays should be used to finance and cater for the adoption and implementation of Electronic Health Record Systems. This demonstrates how significant and valuable EHR systems is in today's health care centers.

Most African countries face complex challenges in quality health care delivery, persistent high prevalence of communicable diseases and rising prevalence of non-communicable diseases due to many factors, some of which are: Insufficient skilled healthcare workers, resistance to change, lack of efficient health information systems, rising cost of medical facilities, corruption and wastage, limited financial resources as well as the huge burden of diseases (Abdulraheem, Olapipo R, & O, 2012; Adele-mari Kleynhans, 2011; Akanbi et al., 2012; Biruk Senafekesh et al., 2014; Jeminiwa & Fox, 2016; Langmia, 2016; Oyibocha et al., 2014; PharmAccess Foundation, 2014; Welcome, 2011). Rural communities fared worse in quality health care delivery and most patients find themselves in a precarious situation, accepting the services they get as the norm or, without complaints even when they imagine it to be sub-standard. Consequently, many victims of poor health care services decide to stay at home or engage in alternative medicines. They consult quacks in many circumstances, only to rush to health centers in period of emergency, often too late for life-saving interventions. Large percentage of rural dwellers living with HIV/AIDS in sub-Saharan Africa still depend largely on traditional healers and quacks for counseling, treatment and healthcare. Many of these challenges can be reduced with proper and efficient application of EHR systems, which will lead to the goal of achieving universal health coverage, defined as equitable access to affordable, accountable, appropriate health services of assured quality by all people (World Health Organization, 2016) .

Studies have revealed that small, community based clinics and health centers serving higher caseloads of low-income patients, are far less likely to implement EHRs than large clinics situated in urban areas (Adele-mari Kleynhans, 2011; Jones & Furukawa, 2014; Oyibocha et al., 2014). Similar conclusion was arrived at by (Yogeswaran & Wright, 2010) who studied EHRs implementation in South Africa and (Jawhari, 2016) who studied the challenges of Implementing EHRs in a Slum settings in Kenya. However, many clinics and hospital situated in urban centers in Africa and some developed countries face similar challenges with

proper EHRs implementation (Jones & Furukawa, 2014; Yogeswaran & Wright, 2010). This reality reinvigorated the need to investigate how electronic health record systems can be used efficiently to improve health record management and to find out about the problems associated with effective use of this technology. This is a problem that has been observed in many developing countries (Adele-mari Kleynhans, 2011; Biruk Senafekesh et al., 2014; Jawhari, 2016; World Health Organization, 2016; Yogeswaran & Wright, 2010) and that is why, it is necessary to study the acceptance of electronic health record in order to improve the quality of health service delivery at hospitals and medical centers.

The popularity of EHRs in hospitals and medical centers in sub-Saharan Africa was spurred by international efforts to collect data on, and combat the HIV/AIDS epidemic (Jeminiwa & Fox, 2016; World Health Organization, 2016). Besides, the availability of this system has been sustainable in most part, due to several factors, key factors being the narrowness in the digital divide gap, improved awareness, increased access to internet, and collaboration between African and international institutions in health care service delivery (Abdulaheem et al., 2012; Akanbi et al., 2012; Biruk Senafekesh et al., 2014; Jawhari, 2016; World Health Organization, 2016). Although, Internet access in Africa has grown from 2% in year 2005, to 10% penetration rate in year 2010 to 28.7% penetration rate in year 2016 (Internet World Stats, 2016). This currently represents close 29% of the population, which is far below the world average of 50.1%. Nigeria has one of the highest internet penetration rate among African countries with 52% penetration rate. Although the internet is present in all 54 African countries, access is often concentrated in urban centers, with no access in most rural centers where over 80% of the population resides. This uneven distribution has affected the realization of the full benefits of EHRs in sub-Saharan Africa.

Despite large investment in health care facilities in Nigeria, delivery of quality health care services remains a big challenge in the country (Abdulaheem et al., 2012; Akanbi et al., 2012;

Ayeni & Misra, 2014; Oyibocha et al., 2014; PharmAccess Foundation, 2014; Timothy et al., 2014; Welcome, 2011). Aminu Kano Teaching Hospital is the largest, most patronized and the only federal Teaching Hospital in Kano State. Besides, it is the biggest hospital in Northern Nigeria, and one of the few teaching hospital in the region. Kano state itself is one of the largest states in Nigeria, in terms of population. This is why this hospital has been selected for analysis. Nigeria's poor healthcare delivery has been blamed on rising cost, limited financial resources, inefficient health management systems, and huge burden of infectious disease outbreaks year after year (Abdulaheem et al., 2012; Ayeni & Misra, 2014; Oyibocha et al., 2014; PharmAccess Foundation, 2014; Timothy et al., 2014; Welcome, 2011). This is particular evident in the Northern part of the country. Despite the adoption of Electronic Health Record System at Aminu Kano Teaching Hospital (AKTH), the Quality of Health Service Delivery is still poor. Lack of infrastructure that will support the use of the system, poor utilization of the system, poor skill to use Electronic Health Records, resistance to change amongst staff, and unstable network are some of the hindrance to the quality health service delivery in many healthcare settings in Africa (Akanbi et al., 2012; Biruk Senafekesh et al., 2014; Jawhari, 2016; Jeminiwa & Fox, 2016; Langmia, 2016; Oyibocha et al., 2014; PharmAccess Foundation, 2014; Silow-Carroll et al., 2012). These factors constitute some of the indicators of poor Services Delivery and this could be explained by the theory of Consumer Acceptance and Use of Information Technology.

The Consumer Acceptance and Use of Information Technology (Venkatesh, Thong, & Xu, 2012), which is the Extended Unified Theory of Acceptance and Use of Technology (UTAUT) integrated constructs across eight models and provided a refined view of how the determinants of intention and behavior in a social system evolved over time. The authors identified that there are three direct determinants of behavioral intention (performance expectancy, effort expectancy and social influence) and two direct determinants of usage behavior (facilitating conditions and behavioral

intention) and three direct determinants of acceptance of technology (Hedonic Motivation, Price Value and Habit). This theory has been tested by many behavioral science researchers and provides a solid foundation that guides future studies in the area of technology adoption/acceptance/use

The constructs that are studied in this research are: Performance Expectancy, Efforts Expectancy, Social Influence and Facilitating Conditions in relation to Quality of Health Service Delivery and Employee Satisfaction. Although the UTAUT2 (Venkatesh et al., 2012) came with additional three construct: Price, Habit and Hedonic motivation that influence behavioral intention to use a technology. But they are not considered necessary in the current study. *Performance Expectancy* is defined as the level at which using technology will provide consumers benefits and improve their performance in certain activities. *Effort Expectancy* is defined as the degree of ease associated with using a technology by the consumers. *Social Influence* is the level to which consumers see that using a particular technology is very important and consumers associate (e.g., family and friends) believe that consumers need to use a particular technology. *Facilitating Conditions* is the degree to which consumer's view that the existing technology or resource of the organization will support the new incoming technology

Therefore, the purpose of this study is to investigate the use of Electronic Health Records for improving quality of health service delivery. The specific objectives under which the research was carried out are:

- (i) To investigate the level of "Acceptance of Electronic Health Records" at Aminu Kano Teaching Hospital, Kano State, Nigeria.
- (ii) To examine the extent at which "Electronic Health Records Improves Quality of Health Service Delivery" at Aminu Kano Teaching Hospital, Kano State, Nigeria.
- (iii) To determine if there is a significant relationship between "Acceptance

of Electronic Health Records" and "Quality of Health Service Delivery" at Aminu Kano Teaching Hospital Kano State, Nigeria.

- (iv) To determine if there is a significant relationship between the variables of "Consumer Acceptance and Use of Technology" and "Employee Satisfaction".

The outcomes of this study are useful to management of Aminu Kano Teaching Hospital to understand their weaknesses and area that should be improved to deliver Quality of Health Service to their customers. The result is also useful to other teaching hospital and medical facilities in Nigeria who are in the process of or already adopting EHRs in order to establish factors to consider for proper and efficient use of the system. The management and staff of Aminu Kano Teaching Hospital and other health centers will understand the ways they should approach Electronic Health Records usage for both staff and patients for better service delivery.

2. Research method

2.1 Research Design

Quantitative research approach was adopted in this study, which consists of descriptive research designs such as descriptive correlation, since the study intended to establish if there is a significant relationship between Acceptance of Electronic Health Records and Quality of Health Service Delivery and to establish if there is a significant relationship between Electronic Health Records and Employee Satisfaction. Cross sectional design was used since the study was carried out within a specified period of time, in such a manner that the data was collected from the respondents at once.

2.2 Study Population

The target populations of this study were staff of Aminu Kano Teaching Hospital majorly from the Health Record Department and Laboratory Department. The two departments consist of 150 employees, the Health Record Department consist of 80 staffs, the numbers of health record managers, 5; health records assistants, 15; health record technicians, 12; confidential secretaries,

5; statistical officers, 5; health record clerks, 15; health record attendants, 23;. The laboratory department consist of 70 staffs distributed as: no of blood analyst, 10; registrar, 5; senior registrar, 7; senior medical laboratory scientists, 5; medical laboratory scientists, 9; laboratory technicians, 14; internal medical laboratory scientist, 7; chief medical laboratory scientists, 9; assistant chief medical laboratory scientists, 4;

2.3 Sample Size and Sampling Procedure

The sample size for this study was 109 respondents who were selected from the target population of 150, at Aminu Kano Teaching Hospital Kano State, Nigeria. This sample was arrived at using Sloven's formula of sample size computation. To select the sample of 109 respondents from target population of 150, stratified sampling technique was used. In this technique, the respondents were grouped according to the interest of the researchers. The researchers grouped the respondents into smaller groups called strata depending on the category of the respondents and then simple random sampling was used to select respondents from different stratum until the required sample of 109 was reached. This gives every individual equal chances of participating in the study.

2.4 Data Collection and Analysis

Data for the purpose of this study was collected using a survey questionnaire. The questionnaires were administered personally by the researchers to the respondents. The questionnaires comprised of both open ended and closed ended questions. Participants were required to answer all the questions to the best of their knowledge. The questionnaires were used because they are cheap, quicker, can reach many respondents, and they are generally free from bias. Besides, they provide accurate information since respondents take their time to answer the questions. The researcher obtained an introductory letter from the School of Computing and Information Technology, Kampala International University, Uganda and took it to Aminu Kano Teaching Hospital Kano State Nigeria. After the letter was approved, the researchers proceeded to collect the data. After the collection of data, all returned questionnaires was checked to see if all questions are answered or are answered to a

level useful for data analysis. Afterwards, the data gathered was edited, coded into the computer and statistically treated using SPSS software.

2.5 Validity of the Data Collection Instrument

Validity is the degree to which results obtained from the analysis of the data actually represents the phenomenon under study. This study test two types of validity: that is, Face Validity and Construct Validity. Face validity was ensured with guidance of experts who studied the item statements in the questionnaire to ensure that it has meaningful statements related to the constructs intended to be measured. Construct validity was achieved through Exploratory Factors Analysis (EFA). Using principal component analysis and Varimax rotation method, Communalities, Determinant, Barlett's Test of Sphericity and Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy. For the factor analysis to be considered appropriate, Barlett's Test of Sphericity should be significant at ($p < .05$) and values of Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy must be between 0.6 and 1.0 (Kaiser & Derflinger, 1990).

SPSS software was used to perform the Exploratory Factors Analysis (EFA). The test was ran on the pilot data, and results show that the scale items measuring each of the constructs satisfy the condition of validity. For all the constructs, the value of *Kaiser-Meyer-Olkin* (KMO) is above 0.6. At this stage we were able to determine the construct or indicators and items or questions that should be retained on the questionnaire and conceptual framework. Consequently, all the items in the questionnaire were retained.

3. Data Analysis

The researchers used frequencies and percentages to analyze the profile of respondents. Mean and Standard Deviation was used to analyze Objective 1: *the level of Electronic Health Records Acceptance in Aminu Kano teaching hospital* and Objective 2: *the extent at which Electronic Health Record Improves Quality of Health Service Delivery*. Pearson's (r) coefficient value was used to

analyze Objective 3: *the relationship between Acceptance of Electronic Health Records and Quality of Health Service Delivery at Aminu Kano Teaching Hospital* and Objective 4: *relationship between the variable of Consumer*

Acceptance and Use of Technology and Employee Satisfaction.

The following mean ranges and interpretations were used:

A. For the level of Electronic Health Records Acceptance

Mean Range	Response Mode	Interpretation
3.26-4.00	Very high	Very satisfactory
2.26-3.25	High	Satisfactory
1.26-2.25	Low	Fair
0.26-1.25	Very low	Poor

B. For the Quality of Health Service Delivery

Mean Range	Response Mode	Interpretation
3.26-4.00	Strongly agree	Very satisfactory
2.26-3.25	Agree	Satisfactory
1.26-2.25	Disagree	Fair
0.26-1.25	Strongly disagree	Poor

The 0.05 and 0.01 level of significance was used and the Pearson's (r) linear correlation coefficient (PLCC) was used to determine if there is a significant relationship between the Acceptance of Electronic Health Records and Improvement on Quality of Health Service Delivery at Aminu Kano Teaching Hospital, Kano State Nigeria.

4. Results and Findings

4.1 Characteristics of Respondents

Respondents were asked to present information regarding their demographic information which was given in terms of their gender, age, level of education, marital status and their number of working years in the hospital.

Table 4.1 Respondents' Gender

Gender category	Frequency	Percentage
Male	48	65.8
Female	25	34.2
Total	73	100.0

Table 4.1 indicates the total number of respondents. The result show that most of the respondents in this sample were male with 65.8% of the total sampled population, whereas female represents 34.2 % of the total sampled population. Hence, the results suggested that most of the staff of Aminu Kano Teaching Hospital of Health Records and laboratory department are male.

Table 4.2: Level of Education

Level of Education	Frequency	Percentage
Secondary school	9	12.3
Diploma	32	43.8
HND	12	16.4

Bachelors degree	12	16.4
Masters degree	7	9.6
PhD	1	1.4
Total	73	100.0

Results from table 4.2 above indicates that 9 out of 73 respondents (12.3%) of the total sample population had attained secondary level of education. 32(43.8%) have attained diploma level of education, 12 (16.4%) have attained HND level of education, 12(16.4%) have attained Bachelor's degree level, whereas only 7(9.6%) and 1(1.4%) were Masters degree holders and PhD holder respectively. This implies that most of the staff of laboratory and health record Department in Aminu Kano Teaching Hospital were educated to a Diploma level.

Table 4.3: Years of Working Experience

Respondents' years of experience	Frequency	Percent age
below 2 years	14	19.2
3-5 years	26	35.6
6-8 years	23	31.5
10 years and above	10	13.7
Total	73	100.0

The result in Table (4.3) shows respondent's working experience at Aminu Kano Teaching Hospital. Most of the respondents have working experience of 3-5 years in the hospital (35.6 %) and the lowest percentage are respondents with 10 to above years of working experience (13.7 %). This implies that most of the respondents have been working at Aminu Kano teaching hospital for more than 4 years.

Table 4.4: Respondents' Age

Respondents' age	Frequency	Percent age
below 20	8	11.0
21- 30	29	39.7
31-40	24	32.9
41-50	9	12.3
61 years to above	3	4.1
Total	73	100.0

The results from (Table 4.4) shows that 29 (39.7%) out of 73 respondents were of the age group, 21-30 years and these were the majority, followed by 24 (32.9%) who were in the age group 31-40 years, followed by 9 (12.3%) who are under the age group of 41-50, whereas only 8 (11.0%) and 3 (4.1%) were in the age group of below 20 years and 61 years and above respectively. Hence this implies that most of the staff of Aminu Kano Teaching Hospital of the electronic health record; laboratory and record departments are between 20-30 years old.

Table 4.5: Electronic Health Record Acceptance at Aminu Kano Teaching Hospital

Performance Expectancy				
	Mean	Std. Dev.	Mean rank	Interpretation
PE1	3.25	.795	3	High

PE2	3.16	.782	4	high
PE3	3.33	.800	2	Very high
PE4	3.38	.659	1	Very high
Average mean	3.28			Very high
Effort Expectancy				
	Mean	Std. Deviation	Mean Rank	Interpretation
EE1	3.19	.700	4	high
EE2	3.23	.874	3	high
EE3	3.27	.731	2	Very high
EE4	3.47	.783	1	Very high
EE5	3.16	.928	5	high
Average mean	3.27			Very high
Social Influence				
	Mean	Std. Deviation	Mean Rank	Interpretation
SI1	3.10	.730	1	high
SI2	3.01	.773	2.5	high
SI3	2.77	.890	4	high
SI4	3.01	.717	2.5	high
Average mean	2.97			High
Facilitating Condition				
	Mean	Std. Deviation	Mean Rank	Interpretation
FC1	3.10	.767	2	High
FC2	3.21	.726	1	High
FC3	3.05	.896	3	high

The first Research Question: **What is the level of Electronic Health Record Acceptance at Aminu Kano Teaching Hospital Kano State, Nigeria?** The answer to the first research question is presented in Table 4.5 above. Results under “Performance Expectancy” generates a mean value of 3.28 which is very high. This implies that the employees surveyed at Aminu Kano Teaching hospital, perceived that the EHRs provides benefits to their daily work and improves their performances. From Table 3.6 the results of “Effort Expectancy” produced an average mean value of 3.27, which is also considered very high. This implies that, respondents perceive the EHRs to be easy to use, flexible and friendly. Similarly, the results under “Facilitating condition”, produced an average mean is 3.12, which is also considered high. This implies that staff perceived that the facilities and investment provided by the management largely facilitated the acceptance and use of EHRs in the hospital. However, the results under “Social Influence” shows an average mean of 2.97, which is considered moderate. This implies that patients, friends, management, and other people in the social circles can also see and appreciate the benefits of EHR system at Aminu Kano teaching hospital. The overall average mean of the four indicators is 3.16, which is considered very high. This gives a general impression that the employees surveyed have positive perception about the acceptance and use of Electronic Health Record System at Aminu Kano Teaching Hospital, Kano, State.

The second Research Question: **What is the level of Quality Health Service Delivery at Aminu Kano Teaching Hospital, Kano State, Nigeria.** The answer to the second research question is presented in Table 4.6. The respondents were surveyed about their perception on “Electronic Health Record” for improved Quality of Health Service Delivery at Aminu Kano Teaching hospital. The result provided an average mean of (3.30), which is very high. This implies that employees believed that the use of electronic health record in the hospital provides a lot of benefit to them and improves staff performance and service quality of the hospital.

Table 4.6: Quality of Health Service Delivery at Aminu Kano Teaching Hospital, Kano State, Nigeria.

	Mean	Std. Deviation	Mean Rank	Interpretation
EHR1	3.33	.746	1	Very high
EHR2	3.27	.692	4	Very high
EHR3	3.32	.831	2	Very high
EHR4	3.30	.794	3	Very high
Average mean	3.30			Very high

The third Research Question: **Is there a significant relationship between Acceptance of Electronic Health Record and Quality of Health Service Delivery?** The result of the third research question is presented in Table 4.7. The result of running, Pearson's (r) Linear Correlation Coefficient shows that there is significant relationship between Acceptance of Electronic Health Record and Quality of Health Service Delivery in Aminu Kano Teaching Hospital.

Table 4.7: Correlation between Acceptance of Electronic Health Record and Quality of Health Service Delivery

Acceptance of Electronic Health Record	Pearson (r)	Quality of Health Service Delivery
Performance Expectancy	Pearson Correlation	0.342**
	Sig. (2-tailed)	.003
Effort Expectancy	Pearson Correlation	0.516**
	Sig. (2-tailed)	.000
Social Influence	Pearson Correlation	0.369**
	Sig. (2-tailed)	.001
Facilitating Condition	Pearson Correlation	0.445**
	Sig. (2-tailed)	.000
	N	73
**. Correlation is significant at the 0.01 level (2-tailed).		

Respondents were surveyed about their perception of "Performance Expectancy" on the Acceptance of Electronic Health Record (Mean=3.28, SD=2.31) and "Quality of Health Service Delivery" (Mean=3.30, SD=2.42). A Pearson's r correlation analysis revealed a very significant but moderately positive relationship ($r=0.342^{**}$, $P \leq .01$, $N=73$). The result (Table 4.7) shows that "Performance Expectancy" is significantly related to "Quality of Electronic Health Records Service". The implication is that electronic health record improves job satisfaction of the employee. Therefore, it is recommended that hospital management improves and invest more on electronic health records as this likely to improve employee job performances.

Also respondents were surveyed about their perception of "Effort Expectancy" on Acceptance of Electronic Health Record (Mean=3.27, SD=3.18) and "Quality of Health Service Delivery" (Mean=3.30, SD=2.42). A Pearson's r correlation analysis (Table 3.7) indicated that there is significant positive strong relationship ($r=0.516^{**}$, $P \leq .01$, $N=73$) between the constructs. The findings of this study indicated that "Effort Expectancy" is significantly related with "Quality of Health Service Delivery". This suggests that the Electronic Health Record System at Aminu Kano Teaching Hospital is user friendly, the interface is

easy to use, and it improves data accessibility and retrieval. It is easy to learn, and the functionalities of the system is clear and understandable.

More so, respondents were surveyed about their perception of “Social Influence” on Acceptance of Electronic Health Record (Mean= 2.97, SD=2.15) and “Quality of Health Service Delivery” (Mean=3.30, SD=2.42). A Pearson’s r correlation analysis (Table 3.7) show that there is significance but moderate correlation ($r=0.369^{**}$, $P<01$, $N=73$) between the two constructs. The outcome of this study shows that “Social Influence” is significantly correlated with “Quality of Health Record Services”. This implies that both the patients, their families and other people associated with the hospital perceived that using the system is very important, very useful and improves quality of health service delivery.

Furthermore, respondents were surveyed about their perception of “Facilitating Condition”, on Acceptance of Electronic Health (Mean=3.12, SD=1.79) and “Quality of Health Service Delivery” (Mean=3.30, SD=2.42). A Pearson’s r correlation analysis (Table 3.7) revealed that there is a significant correlation but not so strong ($r=0.445^{**}$, $P<01$, $N=73$). The findings of this study indicated that “Facilitating Condition” is significantly related to “Quality of Health Service Delivery”. This implies that the adoption of Electronic Health Record at Aminu Kano Teaching Hospital provides benefit to both patient and management and it also improves the service delivery at the hospital, although the management has not fully adopted the system in all departments. But there is this belief that if the system is fully adopted, it will improve the general quality of health service at the hospital.

Fourth Research Question: Is there a significant relationship between Variables of Consumer Acceptance and Use of Technology and Employee Satisfaction? The result of the study presented in Table 4.8 shows the relationship that exists between Variables of Consumer Acceptance and Use of Technology and Employee Satisfaction in Aminu Kano Teaching Hospital.

Table 4.8: Correlation between Variables of Consumer Acceptance and Use of Technology and Employee Satisfaction

Consumer Acceptance variables	Pearson (r)	Employee Satisfaction
Performance Expectancy	Pearson Correlation	0.274*
	Sig. (2-tailed)	0.019
Effort Expectancy	Pearson Correlation	0.228
	Sig. (2-tailed)	0.052
Social Influence	Pearson Correlation	0.407**
	Sig. (2-tailed)	0.000
Facilitation Condition	Pearson Correlation	0.381**
	Sig. (2-tailed)	0.001
	N	73
**. Correlation is significant at the 0.01 level (2-tailed).		
*. Correlation is significant at the 0.05 level (2-tailed).		

Respondents were surveyed about their perception of “Performance Expectancy” as regard to Electronic Health Record (Mean=3.28, SD=2.31) and “Employee Satisfaction” (Mean=2.89, SD=3.24). A Pearson’s r data found a positively significant but low correlation ($r=.274^*$, $P<=.05$, $N=73$). The findings of this study reveal that “Performance Expectancy” of a technology does not necessarily leads to “Employee Satisfaction” with their job. This

might imply that technology has no relationship or affects job satisfaction. Future researchers may look into factors such as: incentives, promotion, salary increment that comes with acquiring skills in new medical technology as a factor that may lead to “employee satisfaction”.

In addition, respondents were studied about their perception of “Effort Expectancy” as regard to Electronic Health Records (Mean=3.27,

SD=3.18) and “Employee Satisfaction” (Mean=2.89, SD=3.24). A Pearson’s r data reveal that there is a no significant relationship ($r=.228$, $P>.05$, $N=73$) between the two constructs. Results indicate that “Effort Expectancy” does not improve job satisfaction. This may be due to the fact that the staffs are still not very comfortable with the use of technology. Further investigation and observation carried out suggest that many of hospital staff have not come to term with the application of advanced technology in their work. They see the Electronic Health Record System as the benefit and success of the hospital management and not part of their own personal achievement. There is no enumeration for skills competence in this new technology, and there is no additional or special recognition.

Moreover, respondents were surveyed about their perception of “Social Influence” on Electronic Health Record (Mean=3.30, SD=2.42) and “Employee Satisfaction” (Mean=2.89, SD=3.24). A Pearson’s r correlation analysis revealed that there is a positive significant relationship ($r=.407^{**}$, $P<=.01$, $N=73$) between the two constructs. The analysis of this study revealed that “Social Influence” is significantly related with “Employee Satisfaction”. This implies that employees perceived that the use of Electronic Health Record at Aminu Kano Teaching Hospital, is important to provide patients with timely and effective services.

More so, respondents were surveyed about their perception of “Facilitating Condition” on Electronic Health Record (Mean=3.12, SD=1.79) and “Employee Satisfaction” (Mean=2.89, SD=3.24). A Pearson’s r correlation analysis indicated that there is a significant positive moderate relationship ($r=.381^{**}$, $P<=.01$, $N=73$). The result of this analysis revealed that “Facilitating Condition” is significantly correlated with “Employee’s Satisfaction”. This implies that employees of Aminu Kano Teaching Hospital perceive the benefits of adopting Electronic Health Record System at the hospital to be substantial. Electronic Health Records improved their performance by reducing errors, data redundancy, and resolves the problems of missing of files. It facilitates patient safety and

quality improvement, faster responses to patient inquiries, faster data accessibility and retrieval, provides timely and accurate information to support treatment of patients.

5. Discussion

The study investigated the acceptance of Electronic Health Record System at Aminu Kano Teaching Hospital, so that there can be an improvement in Quality Health Service Delivery. We believe that the acceptance or adoption of a technology is not the end of discussion; it is a means to an end. There is need to constantly and periodically monitor and observe the way a new technology is been used and the changes (positive or negative) this technology has brought to the social system or institution for which it has been introduced. Electronic Health Record is a very important system in any hospital and medical center and it is important to study the transformation it has brought to health care service at Aminu Kano Teaching Hospital. Aminu Kano Teaching Hospital is located in the main commercial hub of Northern part of Nigeria, characterized by large population, persistent high prevalence of communicable diseases and rising prevalence of non-communicable diseases. The EHR system was adopted by the teaching hospital, recently to ease the problem of healthcare services and the result of our study suggests that, there has been an improvement in healthcare service as a result of the acceptance of the EHRs.

Findings with respect to demographic data, revealed that most of the participants amongst the departments surveyed were educated to a diploma level. This comprises majorly of the young group of employees who are very excited about the EHRs technology. Therefore, the management should focus more attention on these group, encourage them to pursue higher degrees and organize trainings for them on the advance use of EHRs. Majority of the employees accept and use Electronic Health Record System in order to enhance their job performance and they also believed that the system is very useful in their work. This demonstrate acceptance of the technology amongst participant and this is highly

encouraging for the teaching hospital. Electronic Health Record acceptance increases service delivery and staff performance by reducing data redundancy, missing files. It increases faster data accessibility and retrieval, and allow service providers to communicate regularly and securely within the hospital through the use of e-message communication. This shows that the level of acceptance of the EHR system is high and the management should focus on full implementation of the system. Employee acceptance of technology help in improving organizational performance and workflow of information. However, in some cases, like the one studied here, technology acceptance does not always improve employee job satisfaction. This may be due to the fact that the employee are still not very comfortable and skilled with the use of the technology. This is as a result of less-familiarity or literacy among older employee which can result in negative attitudes toward computing technology. In general, the performance of the hospital is likely to be on the increase due to potential benefit of the use of Electronic Health Record system.

According to (Silow-Carroll et al., 2012), the EHRs must be integrated through a well-designed process and into a receptive culture for successful implementation in any organization. All levels of staff must be involved from inception, requirement gathering, development, and training. this argument was also reinforced by (Yogeswaran & Wright, 2010). We observed that older employees are not very receptive to EHRs adoption. Similar findings was reported by (Jones & Furukawa, 2014). Therefore, we encourage the management of Aminu Kano Teaching Hospital to develop strong organizational culture amongst employees to pave way for easy acceptance of new technologies and also provide incentives for such, as this has also been noted (Adele-mari Kleynhans, 2011; Jones & Furukawa, 2014; Silow-Carroll et al., 2012) to be a key factor in the adoption process.

Furthermore, we will recommend to the management, the provision of facilities that support employees in the proper, efficient, and easy use of the Electronic Health Record system

and also for the management to adopt Electronic Health Record system for other departments. It is recommended that the Government of Nigeria and the hospital management, should support the adoption of other similarly useful health technologies and invest more in technology that supports increase service delivery, in order to enhance the performance of the hospital in healthcare delivery. It will be beneficial, if the management can focus more attention on the young employees, encourage them to pursue higher degrees and organize trainings for them on the advance use of EHRs. It will also be rewarding for the management to conduct constant evaluation to monitor the changes and impact newly adopted technology is having on their staff performance, service delivery and to understand factors that affect their employee's job satisfaction.

The Government of Nigeria should invest and advocate for a centralized EHRs that can connect all teaching hospital across the country. This will be a database of patient information and should be designed to run on PCs, so that it may be accessed and used from sites that do not have secure network connectivity. When there is secure network access, patient information in the centralized database, can be used. However, medical staff can also be able to download and use local copies of patient records when they are disconnected. The main requirement of such a system will be privacy, which is a critical system requirement. It is essential that patient information is confidential and is never disclosed to anyone apart from authorized medical staff and the patient themselves. The system must also function to interact and exchange data with other clinical information systems. This will go a long way in improving the quality of healthcare services across the country.

A recent study by (Jawhari, 2016) noted that research publications on EHRs implementation in African countries are still very limited, still growing and there is need for more research work on this topic, especially in resource-constrained (slums) and underdeveloped settings. Dixon et al (2011) also noted that assessment studies are very critical in enhancing

health care service delivery. Future researchers can study other aspects of the EHRs that are not yet studied. They can look at the aspect users find difficult to implement in the system and proffers solutions to them. Researchers should explore the possibilities of studying the information security aspect of EHRs and what systems developers, managements, and system managers need to do in order ensure that patient's information does not get into the hands of wrong individuals.

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