EFFECT OF ELECTRONIC HEALTH INFORMATION SYSTEM ON MEDICAL RECORDS MANAGEMENT IN PUBLIC HEALTHCARE INSTITUTIONS

Ikechukwu Michael Elikwu

Nnamdi Azikiwe University, Awka

Anthony C. Igbokwe

Nasarawa State University, Keffi

&

Gloria Emokhare

University of Salford, Manchester, United Kingdom

Abstract

The worrisome state of Nigerian hospitals in the last decades owing to continued to adopt the global trend on information systems to move away from healthcare delivery characterised by inefficiencies, poor management practices evidenced by continuous use of the traditional paper record system in most public health facilities in Nigeria, which often time causes delay and long patient waiting time, resulting in cases of infant and maternal mortality. Hence, this study investigated how an electronic health information system can improve medical records management in Nigeria's public healthcare institutions. The study employed the numerical and qualitative research philosophy, adopted the survey and case study research strategies, the cross-sectional and qualitative research designs. The study sample covered 332 respondents spread across four selected Federal Medical Centres in Makurdi, Keffi, Lokoja and Abuja FCT, all located in the North Central Region of Nigeria. In the collection of primary data, the researcher took cognisance of ethnic consideration regarding the confidentiality of data and protection of respondents' trust. The study used the simple frequency percentage table to analyse collected data. The finding revealed that, though there is still heavy reliance on traditional paper-based records system, however, adoption of eHIS will reduce risk of treatment errors, decrease patient waiting time, enhance timely communication among practitioners, protects patient information from unauthorised personnel and enhance healthcare service delivery. The study, therefore, recommended that the government and hospital management should prioritise the provision of necessary infrastructure in the health capital budget to support adoption and implementation of the electronic health information system and electronic medical records management to reduce high mortality rates from delayed treatments and preventable medical errors.

Keywords: Medical, records, electronic, management, health, information, system

Introduction

In recent time, the prevalent use of information and communication technologies (ICT) has saturated almost all phases of human and organisational lives, including the healthcare sector. Electronic Health Information System (eHIS), often referred to as the interface between people, process and technology, was designed to support daily operations and management in delivering essential information to facilitate better healthcare delivery services; owing to the continuous increase in medical information needed for clinical decision making and the quality of processed data available to medical practitioners inpatient healthcare, which sways the result and continuity of healthcare delivery to patients (Ojo & Popoola, 2015).

According to Umar (2015), e-HIS was defined by the World Health Organisation (WHO) as the utilisation of information and communication technology (ICT) to link healthcare service providers, their patients and governments. Hence, e-HIS are unified, computer-aided systems programmed to collect, store and collate wide-ranging patient medical information within a healthcare institution (Adeleke, Asiru, Oweghoro, Jimoh & Ndana, 2014). Conventionally, patient medical data are handwritten on numerous paper versions, which makes searching and comparison of information slow and difficult; hence, limiting the process of information sharing needed for timely healthcare service delivery. Also, prompt access to quality healthcare information requires a structured and secured documentation mechanism for the provision of quality patient care, achievable through Electronic Health Records (Adedeji, Irinoye, Ikono & Komolafe, 2018).

Globally, healthcare delivery systems are anchored on how well healthcare institutions can deliver affordable and qualitative healthcare to its citizenry. However, healthcare delivery in Nigeria is perceived to still be below qualitative level given that, accessibility to medical information remains poor in Nigeria's public healthcare institutions (Ojo & Popoola, 2015), usually resulting in delayed, inappropriate decisions and ineffective service delivery; hence, the need to evaluate the implications of electronic health information system on medical records management in Nigeria's public healthcare institutions.

Healthcare service delivery in Nigerian hospitals has become worrisome over the last decades. Hospitals and clinics in public and private sectors have failed to follow the global trend of information systems or competently implement policies to ensure patient health information are not just properly stored, but retrieved easily for prompt and efficient health service delivery. Health services in Nigeria are characterised by inefficiency and poor management practices, which has become major obstacles to healthcare delivery.

One major challenge has been the continued use of the traditional paper record system in most public health facilities in Nigeria, which often time causes delay and long patient waiting time. Apart from the difficulties in retrieving patients' medical records, there is also the possibility of misplacement of the medical records (Adeleke, 2014). These usually cause long patient waiting time, as well as inaccurate treatments or increased complication as a result of the non-availability of medical record and history (Adefolaju, 2014). The resultant effect of this scenario, according to the World Health Organisation is the increase in adult (maternal inclusive) mortality rate in Nigeria, which as at 2015, the mortality rate of ages 15 – 60 was 32.83 death per 1000 population, but lesser (25.54) in 1970 with fewer hospitals and medical facilities. UNICEF affirmed that daily, Nigeria records 2,300 cases of infant mortality and over 145 cases of maternal mortality (Attah, 2017). This positions Nigeria as the country with the second-largest contribution to the high infant and maternal mortality rate in the world. One basic tool that can change the narrative is the introduction of an electronic health information system. This study aims to determine how an electronic health information system can improve medical records management in Nigeria's public healthcare institutions.

Based on the stated objective, the research question to be answered is how can electronic health information system improve medical records management in Nigeria's public healthcare institutions?

Literature review

Concept of electronic health information system

In today's healthcare service delivery, health information is fundamental to continually monitor and appraise health status, to ensure and continually boost the quality of medical care programs and services (WHO, 2015a). Globally, healthcare services have moved from the curative to preventive care system, from precise intervention to a broad-based and inclusive approach, from an integrated to decentralised healthcare system (Nwankwo & Sambo, 2018). This has compelled the need for reformation of uneven health information systems into an all-inclusive but single health information management system (WHO, 2015b). Electronic health is perceived as a general term that denotes any types of digital information associated with and important to healthcare delivery. It is the integration of information supported equipment to aid every aspect of medical care services, literature, research, surveillance, education and knowledge (Umar, 2015). It is also described as an enormous integrated system that aids the wide-ranging information requirement of medical facilities in the areas of patient, ancillary, clinical and financial management; which can also be perceived as a holistic healthcare information system, designed to store, operate and retrieve administrative and clinical information (Ojo & Popoola, 2015).

Considering its function of constant facilitation and enhancing the process of service delivery within medical facilities, eHIS serves as the link between individuals, processes and technology, which firmly supports the administration of essential information operations and availability (Almunawar & Anshari, 2012). Hence, the health sector over time has changed to a dynamic sector from a relatively stable one, of which the prime objective of eHIS is to enhance the efficiency, service delivery quality of the sector (Sokolow, Bowles, Adelsberger, Chittams & Liao, 2014), and also encourage an expansive development of its management, to achieve security, reliability, quality, interoperability standards and timeliness in the processing and storage of data (Jardim, 2013).

Notably, modern electronic health applications, which includes electronic medical records (EMR), health information management systems (HIMS), internet supported telemedicine, among several others are essential information technology tools employed to increase patient safety, enhance care delivery quality, and reduce associated medical costs (Luna, Almerares, Mayan, Bernaldo & Otero, 2014). Other benefits of e-health information systems include access to updated medical records and interrelated information, clinical decision aided systems, electronic prescriptions (Zayyad & Toykan, 2018), well-structured interdepartmental information sharing, convenient maintenance of clinical services and improved health services administrative system (Meier, Fitzgerald & Smith, 2013).

Medical records management

Another prominent term in eHIS is the electronic medical records; which is central to any health information system (Almunawar & Anshari, 2012). The electronic medical record is a digital layout, upon which medical health records are created, used to capture and refer to patient's medical record in a digital format (Msiska, Kunitawa & Kumwenda, 2017). It coordinates the storage and retrieval of individual records with the aid of installed software accessible on a computer, often through a computer network (Welborn & Winter, 2014).

Highly essential in the healthcare services is information captured in medical records, vital for provision of decent healthcare delivery; while quality medical data is very necessary for

planning, improvement and optimal preservation of the healthcare system (Adeleke, 2014). Thus, a timely accessed patient's historical information via medical record is highly essential in medical care decisions to achieve efficient care delivery within health facilities (Attah, 2017). Also, a patient's continued care, impact and outcome of healthcare services received are largely determined by the volume and quality of information available to medical professionals (Kabashiki & Moneke, 2014; Melanie, 2016); recalled from a patient's record, employed to pass information, monitor response to treatment and to confirm treatments made (Nwankwo, 2018).

The electronic medical record has been acknowledged as a facilitator for modern productivity, efficiency and effectiveness in medical care (Sockolow, et al., 2014); premised on the fact that it represents a departure from out-dated paper records keeping to electronic records management in a computerised format (Adeleke, Asiru, Oweghoro, Jimoh & Ndana, 2014), supported with internet network systems and offering versatility in the ability to transfer information and effective communication among medical practitioners and other health facility personnel in enhancing service quality (Weeks, 2013). To optimally serve the purpose for which they are meant to, Msiska, et al., (2017) think that electronic medical record systems are designed to provide solution in some core healthcare functional areas, which includes recording and provision of patient's basic demographic and clinical information (Akor & John-Mensah, 2016), such as identification information, clinic attendance details, known allergies, test results, weight and height, among others (Waithera, Muhia & Songole, 2017)

It provides clinical decision support, by highlighting abnormal test results, alerting care providers of abnormal vital signs, alerting care providers if a prescription is a recorded allergic drug or a possible reaction if a recorded drug is administered (Melanie, 2016) and provides reminders of recommended tests, medication, or care due (Osundina, Kolawole & Ogunrewo, 2015). The system serves as a platform for order entry and medication prescriptions, which involves electronically recording instructions for treatment of patients' within and under the care of medical personnel (López, López, Torres & Santiago, 2014); accept prescription orders, capture dose and administer immunisations (Waithera, Muhia & Songole, 2017); manage orders for referrals together with particulars of referring and referred-to providers. Additionally, electronic medical records serve as an information reporting medium, helps to improve the reportage and use of derived information (Jardim, 2013; Nzuki & Mugo, 2014). Facilitating this task, the systems are pre-programmed to generate reports from treatment data to aid enhancement and create aggregate reports for planning and policy decision making (Zayyad & Toykan, 2018). Central to facilitating these tasks, it supports the confidentiality and security of all medical data, ensuring the maintenance of a patient's information privacy (Eason & Waterson, 2013).

The system also enables control settings that limit access to health data only to authorised health personnel, premised on documents and outlined functions (Justice, 2012), maintain thorough audit tracks of happenings within the organisation, follow programmed standard practices on passwords and logins (Luna et al., 2014), guarantee data protection by creating data documentation, backup, recovery and integrate technical security mechanisms associated with data encryption and transmission (Sockolow, et al., 2014). Finally, it facilitates the electronic exchange of information with other integrated systems such as medical record, laboratory and pharmaceutical systems within the same medical facility (Walker-Czyz 2014), to promote interoperability between systems.

In every organisation, the healthcare sector inclusive, information serves as the lifeblood, which is core to the healthcare delivery system globally (Qureshi, 2016). The medical records in automated or manual form, stores the medical information that labels all features of patient care, which makes it an essential tool in the daily operations of healthcare organisations within the private and public sector (Ondieki, 2017). The introduction of information technologies into health institutions has resulted in an information explosion, stimulating an increase in the volume of accessible records (Osundina et al., 2015), enhancing healthcare service delivery.

Medical records are clear, brief and precise information containing patient's health history, illness and medical occurrences recorded from a medical perspective, which represents the primary source of clinic materials and health statistics (Lungile & Trywell, 2017). They are a recorded version of a patient's medical history, containing patient's complaints, examination and medical treatments (Vesna, 2014); diagnostic laboratory test results, doctor's opinions, medical procedures adhered to, therapeutic procedures and medications (Asunmo & Yaya, 2016). It represents the only historical documentation of the extent of work done and achievements by the medical and nursing staff, the only record showing patients' recovery progress and source of information for diverse purposes (Garba, 2016).

Records management encompasses the administration of digital or paper records, irrespective of its layout. Its activities involve receipt, creation, use, maintenance and eventual disposal of records (Aljumah, Ahamad & Siddiqui, 2013). The central purpose of records management among others include to provide timely, complete and accurate information whenever needed to manage and operate the organisation efficiently (Callen, 2014); process recorded information as efficiently as possible, provide information and records at minimal costs (Ajala, 2015); offer quality service to customers (Park, 2015) and support organisational decision-making and control (Anyika, 2014; Akhtar, 2016).

Medical records management in public healthcare institutions

In public healthcare institutions, medical information and related records are collected, created, disseminated and utilised daily in vary large volumes than any other organisation (Weiskopf & Weng, 2013). These records are fundamental to the well-being of the public and employed to ensure service delivery accountability of such public health facilities (Ondieki, 2017). Over the years, medical records have served and still serve multiple purposes in both private and public healthcare institutions; from purposes of births to the recoding of deaths of individuals; while also serving as data for equipping and provision of needed medical facilities by visionary governments (Garba, 2016).

The significance of records management to public healthcare facilities and institutions includes operational cost reduction and elimination of duplicated overhead costs; eliminates the creation of irrelevant records (Milena, 2015); reduces future costs by ensuring that expensive new equipment are only purchased for upgrading information management (Marinič, 2014); saves spaces by transferring inactive records to storage areas from busy offices and also ensure the timely destruction of expired records (Vesna, 2014). Also, health records management saves time by ensuring proper organisation and maintenance of records (Aljumah, et al., 2013); promotes effective public service delivery via access to needed information for programme monitoring, guarantee administrative stability and ensure informed policy decisions are made; upholds history by identifying and preserving vital research records and evidential information (Asunmo & Yaya, 2016).

Electronic medical records management and public healthcare delivery

The multifaceted benefits of health information system and associated information technologies in public healthcare delivery cannot be overemphasised. Management Information Systems are essential tools in public healthcare institutions deployed to aid in monitoring and combating the outbreak of diseases, among others (Knobler, Mahmoud, Lemon, Mack, Sivitz & Oberholtzer 2004 in Umezuruike, et al., 2017). The benefits of adopting and implementing electronic health information system in records management within public healthcare institutions are enormous, some of which include, decrease inpatient waiting time, reduced duplication of laboratory tests, reduction in medical errors (Open Clinical, 2013).

Studies have shown that adoption of electronic health information system will cause an upsurge in digitisation, enabling broad management of medical records, from patient information to prescription data and diagnostic care, achieving a straight, effortlessly and seamless process (Yoon, Chang, Kang, Bae & Park, 2014). The electronic health information system also enables healthcare service providers to get multiple opinions on diagnostic treatment and care; evaluates results of research and clinical trials against preventive measures adopted for different illnesses (Ojo & Popoola, 2015); limiting redundant workflow, enhancing the standard of healthcare, increased employee productivity (Chao, Hu, Ung & Cai, 2013). It also has vast potentials to promote patient safety, satisfaction and efficiency of the organisation, thus, enhancing medical outcomes for patients (Postema Peeters & Friele, 2012).

Furthermore, there abound financial and clinical benefits associated with the adoption of electronic health information system in public health institutions. **The** financial benefits include a reduction in the cost of medical care, efficient documentation process; avoidance of improper filing, damage or loss of patient records, efficient utilisation of resources, and decrease in repetitive laboratory tests and other related services (Yoon, et al., 2014). Implementation of electronic health information system in the public healthcare also supports core management functions of initiating, planning, controlling and organising operations of the subsystems of hospitals; therefore, providing synergy among the various units and departments of the organisation (Open Clinical, 2013); reduction of work-related errors and enabling accurate and timely communication among all practitioners involved in healthcare provision (Uluc & Ferman, 2016).

Clinical benefits of the electronic health information system include uninterrupted access to patient records by authorised personnel, all through the day; medical practitioners' duty reminders and alerts; constant learning for healthcare specialists; improved decision support system via electronic connections to the body of scientific knowledge and other external medical and related sources; prompt, effective and smooth follow-up of patient care (Postema Peeters & Friele, 2012). Also, it ensures quality patient care, enables hospitals to move from an out-dated position to a contemporary and appropriate care management. Furthermore, it shows an objective connection between the extent of implementation of eHIS in medical facilities and reduced health complications and mortality rates in hospitals (Yoon, et al., 2014).

Empirical review

Empirical pieces of literature abound on adoption and application of eHIS in Nigeria's public healthcare institutions. In a recent study, Adedeji, et al., (2018) examined factors influencing the use of electronic medical records by nurses in one of Nigeria's teaching hospitals, indicating that Nurses are willing to use the system, but require practical hands-on training, necessary

technological devices and enabling environment are not supportive of their interest. Also, Zayyad and Toykan (2018) investigated factors affecting the sustainable implementation of e-health technology in Nigeria: The study indicated that belief, attitude, supposed usefulness and willingness of healthcare specialists significantly influence their intent to embrace and use e-health technology applications. However, in another study on the effect of training healthcare workers on data management practice in health management information systems in primary health care (PHC) centres in Kaduna State by Nwankwo and Sambo (2018), the result revealed that health management information system training achieved a significant improvement in the management of data of primary healthcare workers.

In another study, Ojo and Popoola (2015) explored factors in Nigerian teaching hospitals likely to contribute to the success of electronic Health Information System. The results indicated a positive and close relationship between all the identified factors and eHIS success, the factors which include technical, social, organisational, financial and political factors. Adeleke, et al., (2014) examined the usage of internet-supported computers among tertiary healthcare practitioners, focusing on a Nigerian public hospital, as a means of enhancing healthcare delivery process. The result indicated that healthcare practitioners and trainees at the federally owned Medical Centre in Bida have a favourable outlook towards the use of internet-supported computers, to improve their professional practice and enhance the quality of patient care. Finally, Welborn and Winter (2014) examined how implementation and usage of information technologies can change the efficiency of healthcare delivery in West Africa; indicating the willingness of health managers and practitioners to adopt ICT in care delivery. However, they are still faced with enormous economic and political challenges considered insurmountable and crucial to the adoption of ICT in their line of duty.

Theoretical framework

This dissertation on implications of electronic health information systems on medical records management in Nigeria's public healthcare delivery institutions is anchored on the Churchmanian theory of knowledge management systems, defined as an ethically focused information system that generates exoteric knowledge and provides a connection between knowledge and action within an organisation (Richardson & Courtney, 2004).

Knowledge management involves the creation of value from an organisation's intangible assets (Holsapple & Joshi, 2001; Rubenstein-Montano, 2001). Public healthcare institutions are introducing information systems programmed to enable integration and dissemination of health-related information. Thus, it is pertinent to integrate the notion that knowledge management encompasses more than just knowledge creation and sharing technology (Davidona, Kokina & Zarina, 2014). Globally, there has been a realisation by industry actors that individuals and workplace culture are driving factors that eventually determine the success or possible failure of knowledge management resourcefulness.

The Churchmanian theory is a theoretical principle with a strong emphasis on success benchmarks, ethical behaviour, the need to ensure that health information systems and medical records management (knowledge management) improve the dignity of humanity, a highly participatory procedure for medical practitioners, desire to merge health information records for the prompt access and use by appropriate medical personnel, decision-makers and patients, and the need for protection of such sensitive information residing in the system.

Methodology

For this study, the mixed-methods design research was employed, which involved the integration of numerical and qualitative research and data. The mixed-methods design adopted the cross-sectional survey design, which provided a numeric description of trends, attitudes and opinions of the sample; hence, it helped measure sample elements selected from the population of interest at a single point in time (Creswell, 2014), and qualitative design, which involved open-ended interview questions, without predetermined responses; with the intent of generalising from a sample to a population. This study was anchored on the use of primary data, which was collected using a structured questionnaire and open-ended interview questions. The study will adopt the 4-point Likert scale to indicate the degree of agreement or disagreement. Data collected were analysed using simple percentage statistical frequency tables and appropriate charts, which helped in making inferences, to answer the research question and achieve the study objective.

The selected Federal Medical Centres are FMC Makurdi Benue State, FMC Keffi, Nasarawa State, FMC Lokoja, Kogi State and FMC Abuja - FCT, with an estimated total population of one thousand four hundred and sixty-seven (1,467) medical and non-medical employees (National Human Capital Health Strategy, 2018). The selected Federal Medical Centres are FMC Makurdi Benue State, FMC Keffi, Nasarawa State, FMC Lokoja, Kogi State and FMC Abuja - FCT, with an estimated total population of one thousand four hundred and sixty-seven (1,467) medical and non-medical employees (National Human Capital Health Strategy, 2018). For this study, three hundred and seventy-seven (377) copies of the adopted and structured questionnaire were administered to the augmented sample size using the simple random sampling technique; three hundred and thirty-two (332) copies of the questionnaire were found usable after collection, hence it forms the actual sample size of this study. This represents 88% of the total copies of questionnaire distributed.

Results and discussions

From the analysis, the gender distribution of the participants revealed that 35.8% were males, 64.2% were female respondents; while concerning the length of years already spent in service, the results revealed that 29% of the respondents have spent between 11 and 15 years, 25% have spent between 16 and 25 years, while 23% have spent between 6 and 10 years. This implies that majority of the respondents have served long enough to know methods of operations and the records management system in place.

The analyses revealed that 58% of the respondents are holders of the first degree, 22% have acquired postgraduate degrees, 8% are professional qualifications holders, which implies that all the respondents are educated and knowledgeable enough to understand and contribute to this study; while distribution according to job titles of respondents showed Cashiers and Registry clerks represent 33%, Nurses represent 29%, Medical Doctors represent 20%, Laboratory Scientists and Radiographers represent 11%, while Pharmacists represent 7% of the sample size (see figure 6 below).

Table 1: Respondents opinion on benefits of adopting electronic health information system in medical records management

STATEMENT	SA 4	A 3	D 2	SD 1
Adoption and use of eHIS gives timely access on 24hrs basis to patients' records without delays than paper records	93 28%	179 53.9%	49 14.8%	11 3.3%
Use of eHIS platform ensures safety and protection of patient's medical records	53 16%	137 41.3%	88 26.5%	54 16.3%
Use of eHIS platform provides prompt access to patients' medical history on diagnosis, prescriptions, treatments and care	114 34.3%	172 51.8%	39 11.8%	7 2.1%
Use of eHIS platform reduces duplication of laboratory tests and X-rays	45 13.6%	111 33.4%	107 33.2%	69 20.8%
Use of eHIS platform reduces overall patient waiting time and enhances the quality of care delivery	98 29.5%	185 55.7%	43 13%	6 1.8%

Source: Field Survey, 2019

On effects of adopting electronic health information system in medical records management, Table 4.2 revealed that a total of 81.9% of the sample size agreed that, adoption and use of eHIS will give timely access on 24hrs basis to patients' medical records without delays; while a total of 190 respondents representing 57.5% of the sample size think that use of eHIS platform will ensure safety and protection of patient's medical records. This finding supports the assertion of Zayyad and Toykan (2018) that it promotes access to updated medical records and interrelated information; also with Uluc and Ferman (2016) assertion that it enables accurate and timely communication among all practitioners involved in healthcare provision; and with Walker-Czyz (2014) who stated that it promotes interoperability between systems.

Also, Table 4.2 revealed that 86.1% of the sample size think that the use of eHIS platform will provide prompt access to patients' medical history on diagnosis, prescriptions, treatments and care; though, 107 and 69 respondents representing 33.2% and 20.8% of the sample size respectively disagreed and strongly disagreed respectively that the use of eHIS platform does not reduce duplication of laboratory tests and X-rays; however, 58.7% and 29.5% of the sample size agreed and strongly agreed that use of eHIS platform will reduce overall patient waiting time and enhances the quality of care delivery. This finding supports Yoon et al., (2014) who revealed that eHIS platform enables proper documentation process; avoidance of improper filing, damage or loss of patient records, promotes efficient utilisation of resources, and decrease in repetitive laboratory tests and other related services.

Concerning the present shortcomings in the hospital's record management system; the absence of a modern records management tools, thereby overwhelming current staff with work pressure, this work pressure most times result in improper placement of patient files to the right shelf. Also, they experience large patient turn-ups with less staff to efficiently manage without keeping them for long hours. This finding is in agreement with the findings of Attah (2017) whose study revealed that demand for medical attention amid the declining and overstretched manpower often result to unrealistic expectations such as high rate of misdiagnosed cases, some of which may be grave. Also, the finding is supported by Nwankwo (2017) whose study revealed that shortage and inadequate training of healthcare

personnel makes available workers perform under pressure and attending to long queues of patients.

Concerning what is done if a patient's file is not located in its normal place, the respondents interviewed variously stated that such issues are encountered regularly, that first, they check in the heaps of files not yet returned to the shelves before tracing it back to the department or clinic where the patient was attended to by a Doctor. In the event where it is not found, a new file is created for the patient to see a doctor. This implies that no one is held accountable for misplacement of sensitive files containing a patient's medical history, diagnosis, allergies, past medication prescriptions and treatments; which also implies that any recent tests, scans or X-rays done by the patient will have to be repeated, thus making service delivery expensive and poor.

Concerning the effects negligence, improper records storage and protection have on continuity of healthcare service delivery; the respondents interviewed were unwilling to admit the resultant effect, this, however, implies that without records of a patient's diagnosis, allergies, prescribed medications and treatments there is the likelihood of wrong prescription and treatment, which can lead to series of harmful side effects on patients or death in extreme cases. This finding is supported by Adedeji, Irinoye, Ikono and Komolafe (2018) whose finding indicated that professional negligence has grave effects usually increases the risk of treatment errors.

Concerning how patients' medical records management can be improved, the interviewed respondents stated that the introduction and use of computer-aided software, which will make records search easier and faster, will reduce paperwork and also reduce the heaps of records in files usually occupying spaces. While, delay of patients' receiving public healthcare services has a direct resultant negative effect on lives of patients', constantly impinging on the productivity of the medical care and records management personnel, and ultimately the corporate image of that public healthcare facility and the human capital index of the country.

Conclusion and recommendation

This study, therefore, concludes that prompt access to patients' medical records through electronic health information system platform is highly essential in medical care decisions to achieve efficient care delivery within health facilities, reduces the risk of treatment errors decreases patient waiting time and reduces medical errors, enhances timely communication among practitioners, enhances healthcare service delivery and protects information from unauthorised personnel.

Based on the findings and conclusion, this study therefore recommends that,

The hospital management and government at various levels should prioritise the provision of necessary infrastructure in the health capital budget to support the adoption and implementation of the electronic health information system and electronic medical records management.

This will promote prompt access to patients' records for medical care decisions, reduce risk of treatment errors, decrease patients' waiting time, protect patients' information from unauthorised personnel, enhance timely communication among practitioners, enhance healthcare service delivery quality and reduce high mortality rates from delayed treatments and preventable medical errors.

References

- Adedeji, P. Irinoye, O. Ikono, R. and Komolafe, A. (2018) Factors influencing the use of electronic health records among nurses in a teaching hospital in Nigeria: *Journal of Health Informatics in Developing Countries*; 12(2), pp. 1-20. Google Scholar
- Adefolaju, T. (2014). "Repositioning Health Insurance in Nigeria: Prospects and Challenges: *International Journal of Health Sciences*; 2(2), pp. 151-162." Google Scholar
- Adeleke, I.T. (2014). "Relevance of health information management (HIM) and the roles of HIM professionals in healthcare delivery systems: Accessed: 2017 May 7, Available from
- Adeleke, I.T, Asiru, M.A. Oweghoro, B.M. Jimoh, A.B. and Ndana, A.M. (2014) Computer and internet use among tertiary healthcare providers and trainees in a Nigerian public hospital; *American Journal of Health Research*, 3(1-1), pp. 1-10
- Ajala, F. (2015). Development of an Electronic Medical Record (EMR) System For A Typical Nigerian Hospital: *Journal of Multidisciplinary Engineering Science and Technology (JMEST)*. 2015; 2 (6): pp. 1253-1259.
- Akhtar, N. (2016). "eHealth willingness assessment framework with special reference to electronic health records (EHR) in developing Countries: *International Journal of Management and Business Studies*; 6(3), pp. 247-250
- Akor, O. and John-Mensah, O. (2016). "Nigeria: Why Hospitals Should Embrace Electronic Medical Records. DAILY TRUST Newspaper. 2016 Apr.19 [Accessed: 2017 May 28]. Available from: <http://allafrica.com/stories/201604190753.html>."
- Aljumah, A. A, Ahamad M.G, and Siddiqui, M.K. (2013) Application of data mining: Diabetes health care in young and old patients: *J King Saud Univ-Com Info Sci*: 25; 127-136
- Almunawar, M.N. and Anshari, M. (2012) Health Information Systems (HIS): Concept and Technology: In *Proceedings of the International Conference on Informatics for Development*
- Anyika, E. (2014). "Challenges of implementing sustainable health care delivery in Nigeria under environmental uncertainty: *Journal of Hospital Administration*; 3(6), pp. 113-126
- Asunmo, A.O. and Yaya, J.A. (2016). Management and preservation of health records in some selected hospitals in Lagos State, Nigeria: *International Journal of Information Research and Review*, 3(1): 1601-1605.
- Attah, A.O. (2017) Implementing the Electronic Health Record in a Nigerian Secondary Healthcare Facility: *Prospects and challenges; Department of Clinical Medicine the Faculty of Health Sciences, the Arctic University of Norway*
- Callen, J. (2014) What is the impact of electronic health records on the quality of health data? *Health information management journal*; 43(1), pp. 42-43

- Chao, W.C. Hu, H. Ung, C.O.L. and Cai, Y. (2013) Benefits and Challenges of Electronic Health Record System on Stakeholders: A Qualitative Study of Outpatient Physicians; *Journal of Medical Systems*; 37:9960
- Creswell, J. W. (2014) *Research design: qualitative, quantitative and mixed methods approaches*; Thousand Oaks, CA: Sage.
- Davidona, J. Kokina, I. and Zarina, Z. (2014) From knowledge management theories to practice in public organisations: Towards a transdisciplinary approach (Theoretical background); *European Scientific Journal*, 10(31), pp. 118 – 132
- Eason, K, and Waterson, P. (2013). The implications of e-health system delivery strategies for integrated healthcare: lessons from England. *International Journal of Medical Informatics* 82(5):e96–e106 DOI 10.1016/j.ijmedinf.2012.11.004.
- Holsapple, C.W., and Joshi, K.D., (2001) Organisational Knowledge Resources: *Decision Support Systems*, 31, pp.39-54
- Jardim, S.V.B. (2013) The Electronic Health Record and its Contribution to Healthcare Information Systems Interoperability: *Procedia Technology* 9 (2013) 940 – 948
- Justice, E.O. (2012). E-healthcare/telemedicine readiness assessment of some selected states in Western Nigeria: *International Journal of Engineering and Technology* 2(2): pp. 195–201.
- Kabashiki, I.R, and Moneke, N.I. (2014). The impact of the use of health information and communication technology on health care delivery in Manitoba, Canada: *Journal of Hospital Administration* 3(6), pp.8–19
- López R.Y.M. López, R.D.M. Torres, G.V. and Santiago, M.M. (2014) Electronic Medical Record: Exploring Benefits and Barriers Perceived by Mental Health Providers: *American International Journal of Contemporary Research*; 4(11), pp. 51-57
- Luna, D, Almerares, A, Mayan, J.C, Bernaldo, FG, and Otero, C. (2014). Health informatics in developing countries: going beyond pilot practices to sustainable implementations: a review of current challenges; *Healthcare Informatics Research*, 20(1): pp. 3–10
- Lungile, P.L. and Trywell, K. (2017) The management of medical records in the context of service delivery in the public sector in KwaZulu-Natal, South Africa: the case of Ngwelezana hospital; *Journal of Library and Information Sciences*; 83(2), 1 – 11
- Marinič, M. (2014) Reclaiming Health Data Forensic Experts, Researchers and Other Healthcare Providers Treatment. In: Marinič, M., Ed., *Privacy Pacietov in Practice*, University Psychiatric Clinic, Ljubljana
- Meier C.A, Fitzgerald, M.C, and Smith, J.M. (2013). eHealth: extending, enhancing, and evolving healthcare. *Annual Review of Biomedical Engineering* 15:359–382

- Melanie, L.B. (2016) Electronic Health Records: Patient Care and Ethical and Legal Implications for Nurse Practitioners: *The Journal for Nurse Practitioners*; 13(2), pp. 105 – 111
- Milena, M. (2015) The Importance of Health Records: *Health*, 7, 617-624.
- Msiska, K.E.M. Kunitawa, A. and Kumwenda, B. (2017) Factors affecting the utilisation of electronic medical records system in Malawian central hospitals: *Malawi Medical Journal*; 29 (3): pp. 247 – 23
- Nwankwo, W.N. (2017) “Harnessing E-healthcare Technologies for Equitable Healthcare Delivery in Nigeria: The Way Forward”, *International Journal of Science and Research*; 6(3).
- Nwankwo, B. and Sambo, M.N. (2018) Can training of health care workers improve data management practice in health management information systems: a case study of primary health care facilities in Kaduna State, Nigeria: *Pan African Medical Journal*; 30:289–ISSN: 1937- 8688
- Nzuki, D, and Mugo, D.M. (2014). Determinants of electronic health in developing countries: *International Journal of Arts and Commerce* 3(3):49–60.
- Ojo, A. I and Popoola, S.O. (2015) Some Correlates of Electronic Health Information Management System Success in Nigerian Teaching Hospitals: *Biomedical Informatics Insights*; 7; 1-9
- Ondieki F. (2017) Effects of Health Records Management on Service Delivery: A Case Study of Kisii Teaching and Referral Hospital: *Journal of Hospital & Medical Management*; 3(1:6), pp. 1-5
- Open Clinical Definitions (2013) in Adeleke, I.T. Lawal, A.H. Adio, R.A. and Adebisi, A.A. (2014) Information technology skills and training needs of health information management professionals in Nigeria: a nationwide study; *Health Information Management Journal*
- Osundina, K.S. Kolawole, J.A. and Ogunrewo, J.O. (2015) The Role of Records Management in Secondary Health Care Delivery System in Selected State Hospitals in Osun State, Nigeria: *Information and Knowledge Management*; 5(12), pp. 105 -115
- Park, L. (2015). Electronic measurement of medication adherence: *Western Journal of Nursing Research*; 37(3): pp. 28-49
- Postema, T.R, Peeters, J.M, and Friele, R.D. (2012) Key factors influencing the implementation success of home telecare application; *International Journal of Medical Information*; 81(6), pp. 415–23
- Qureshi, S. (2016). Creating a better world with information and communication technologies: health equity; *Information Technology for Development* 22(1): 1–14

- Richardson, S.M. and Courtney, J.F. (2004) A Churchmanian Theory of Knowledge Management System Design: *Proceedings of the 37th Hawaii International Conference on System Sciences – 2004*
- Sockolow, P.S, Bowles, K.H, Adelsberger, M.C, Chittams, J.L, Liao, C. (2014) Impact of homecare electronic health record on timeliness of clinical documentation, reimbursement, and patient outcomes: *Applied Clinical Informatics*; 5: pp. 445–462
- Uluc, N.C, and Ferman, M. (2016). A comparative analysis of user insights for e-health development challenges in Turkey, Kingdom of Saudi Arabia, Egypt and United Arab Emirates: *Journal of Management and Logistics*; 3(2): pp. 176–18
- Umar, F.A. (2015) Health information systems in a developing country (Case study of E-health System in a Nigerian Hospital); *European Scientific Journal*; vol.3, pp. 173-182, ISSN: 1857 – 7881
- Umezuruike, C. Okolie, S.O. Adebayo, A.O. Nwankwo, W. and Jonah, J.V. (2017) Developing an informatics model for effective healthcare in military health facilities in Nigeria: *World Journal of Engineering Research and Technology*; 3(5), pp. 69-99
- Vesna, P.P. (2014) Medical Data in the Work of the Court and Privacy pacietov in Practice. In: Milena, M., Ed., University, Psychiatric Clinic, Ljubljana, 70-77
- Waithera, L. Muhia, J. and Songole, R. (2017) Impact of electronic medical records on healthcare delivery in Kisii Teaching and Referral Hospital: *Medical & Clinical Reviews*; 3(4:21), pp. 1-7
- Walker-Czyz, A.M. (2014) The Impact of an Integrated Electronic Health Record Adoption on the Quality of Nursing Care Delivered: A Thesis Submitted in partial fulfilment of the requirements for the degree Ed.D. in Executive Leadership; Ralph C. Wilson, Jr. School of Education St. John Fisher College
- Weeks, R.V. (2013) Electronic health records: Managing the transformation from a paper-based to an electronic system; *Journal of Contemporary Management*, 10, pg. 135 – 155
- Welborn, A.M. & Winter, A. (2014) Information technology meets healthcare in West Africa: a literature review; *Journal of Health Informatics in Africa*; 29-35
- Yoon, D, Chang, B-C, Kang, S.W, Bae, H, and Park, R.W. (2014) Adoption of electronic health records in Korean tertiary teaching and general hospitals. *Int J Med Inform.* 81: pp.196–203.
- Zayyad, M.A. and Toycan, M. (2018), Factors affecting sustainable adoption of e-health technology in developing countries: An exploratory survey of Nigerian hospitals from the perspective of healthcare professionals. *PeerJ* 6:e4436; DOI 10.7717/peerj.4436