

Exploring the Adoption of Electronic Medical Records in Primary Health Care Centres in Calabar Municipality: The Challenges and Prospects of E-Governance

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Abstract

A key aspect of good governance is efficient and effective service delivery through public administration. Today, Information and Communication Technology (ICT) is making in-roads into various sectors like education, commerce, agriculture and even in governance. Despite many achievements, very little has been done towards entrenching e-governance in healthcare delivery in Nigeria. Consequently, many stakeholders have recognised the potential of ICT to improve healthcare, especially the in use of Electronic Medical Records (EMRs). Using the qualitative research method, this study examined the extent of adoption of EMRs in primary healthcare centres in Calabar Municipality, Cross River State, Nigeria, in addition to identifying the challenges of adoption. A review of relevant literature revealed a myriad of benefits associated with EMR adoption. Some of these include efficiency, accuracy and quality of data, patient safety, quality healthcare, and improved accessibility to patient data. The findings of the study revealed that EMR adoption in primary healthcare centres in Calabar Municipality is significantly low. A review of several health ICT initiatives in Nigeria shows that only a few of these initiatives implemented in Cross River State are EMR-related. The study further identified a number of challenges responsible for the low adoption of EMRs in the Calabar Metropolis, including poor implementation of ICT initiatives, epileptic power supply, high cost of ICT equipment, funding constraints, resistance to technology, low technical expertise, and so on. The study recommends that government should be committed to developing and funding EMR systems, the paper-based system should be phased out gradually, basic training and skills building on ICT should be consistent, financial and non-financial incentives for ICT usage should also be initiated, and the local governments and local community actors should play a significant role in primary health care development.

Keywords: *Electronic Medical Records, ICT, Primary Healthcare, E-governance*

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Introduction

A key aspect of good governance is efficient and effective service delivery through public administration. As modern governments face the pressure to perform, they resort to Information and Communication technology (ICT)-driven solutions to deliver better services to the people and also to establish a connection with their constituents. ICT has been described as tools that support information processing and communication functions, and includes technology such as computers, software, peripherals, and internet connections (United Nations Development Programme, 2003). Today, ICT is making in-roads into various sectors like commerce, health, agriculture and even governance (Okwueze, 2010).

This application of ICT to government processes in order to accomplish speedy, responsive and transparent governance is what is known as E-governance or Electronic Governance. E-governance as a democratic practice is gaining universal acceptance and applicability. Many industrialised countries with better e-infrastructure are going full steam to make all services available electronically

to their citizens (Abasilim & Edet, 2015). In spite of the fact that the progress made by many developing countries towards e-governance has not been quite significant, the Nigerian government has taken calculated steps towards the goal of e-governance. This progress is reflected in initiatives such as government websites, web pages, emails, and electronic services such as e-passport application, e-payment platforms, e-licensing, e-registration portals, etc.

Despite the above achievements, very little has been done towards entrenching e-governance in health service delivery. According to available statistics, about one million women and children in Nigeria die from preventable diseases every year. Approximately 33,000 of such deaths are pregnancy related and 241,000 are new-borns. Moreover, the country still records the highest rates of maternal and child mortality in the world (with 560 maternal deaths per 100,000 live births and 125 child deaths per 1000 live births), despite efforts to address health challenges (United Nations Foundation, 2014). Majority of the aforementioned health challenges occur in the rural areas where primary health care facilities are available. In Cross River State, only 54 percent of expectant mothers attend ante-natal four times and above, only 47 percent have their deliveries at a health facility, only 22 percent of children under 5 years are exclusively breastfed (Canadian International Development Agency, 2013), and only 52.5 percent of children aged 12 to 23 are fully immunised (National Population Commission, 2013). There is therefore an urgent need to support the primary health system.

Against this backdrop, both the public and private sectors have recognised the potential of ICT to improve primary healthcare, especially the utility of Electronic Medical Records (EMRs). The use of ICT in records management is very crucial to the attainment of Universal Health Coverage in Nigeria, and would cater for the increasing demand for detailed and reliable data in health records management practice (Federal Ministry of Health, 2016).

Arising from the significance of EMR system in healthcare delivery in Nigeria, this study seeks to answer some pertinent questions: To what extent has EMR been adopted in primary healthcare centres in Calabar Municipality? What are the challenges facing the adoption of EMRs in primary healthcare in Calabar Municipality?

This study aims at examining the extent of adoption of EMRs in primary healthcare centres in Calabar Metropolis, and identifying the challenges surrounding such adoption.

Literature Review

An increasing number of computer programs and applications are currently in use in public servant-citizen interactions. The manipulation of these ICT tools in public sector processes in order to improve service delivery is known as E-Governance. Hence, e-governance centres on government to citizen service delivery using internet technology, and data exchange between different levels of government (Vann, 2005). Other scholars maintain that the primary focus of e-governance should be free access to government services. Norris (2001) and Denhardt and Denhardt (2009). opine that e-governance involves digital access to government information, and ensures that information on government operations and public services are available, that feedback is communicated and that citizens participate directly in public affairs.

The primary objective behind the application of e-governance in public affairs is to promote good governance, characterised by equality, democratic processes, transparency and accountability (Adeyemo, 2013) Accordingly, Ojo (2014) describes the following as the scope of e-governance: E-administration (involving the electronic delivery of information, programmes and services of the government); E-commerce (refers to processes involving e-business, e-payments, e-taxation); and E-

democracy (involving the use of ICT in enhancing citizens' participation in decision-making processes).

Primary Health Care refers to that part of the health care system which serves as first point of contact for the people when they have health challenges. Primary Healthcare also means accessible care. The World Health Organization (WHO) defined Primary Health care as essential health care, based on practical, scientifically sound, and socially acceptable methods and technology. It is made universally accessible to individuals and families in the community through their full participation, and at the cost which the country can afford to maintain at every stage of their development, in the spirit of self-reliance and self-determination (World Health Organization, 1978). This definition of Primary Health care emphasizes its relative importance as the first level of contact of the individual, family, and community with the national health care services. It also brings healthcare as close as possible to the people (Toyo, 2016). Primary health care centres provide basic care services such as the treatment of fever, colds, nutrition disorders, infant, maternal and pregnancy matters, etc. They also handle cases relating to reproductive health and family planning, nutrition education, health education, diagnosis and treatment of common ailments, and rehabilitation for convalescent and disabled patients (Iluyemi, 2009).

Gilliam (2008) identified 12 essential components of effective primary health care. they include: Well trained, multidisciplinary workforce; Properly equipped and maintained premises; Appropriate technology, including essential drugs; Capacity to offer comprehensive preventive and curative services at community level; Institutionalized systems of quality assurance; Sound management and governance structures; Sustainable funding streams aiming at universal coverage; Functional information management and technology; Community participation in the planning and evaluation of services provided; Collaboration across different sectors – for example, education, agriculture; Continuity of care; and Equitable distribution of resources. It is based on the eighth essential component- functional information management and technology-that EMRs are conceived.

An Electronic Medical Record (EMR) is a computerised system that contains the medical records of patients in a health care facility. The International Organisation of Standardisation defines EMR as a storehouse of patient data or information in a digital format, which can be stored and exchanged securely, and accessed by multiple authorised users (International Organisation of Standardisation, 2004). This electronic record system exists within a medical practice or community health centre, and includes patient identification details, medication and prescription generation, laboratory results, and in some cases all health care information recorded by the doctor during each visit of the patient (World Health Organisation, 2006). EMRs are used for diagnosis and treatment by health care providers. A typical EMR system contains the same information routinely entered in paper medical chart, such as registration information, name, address, date of birth, health services number, medical information, and treatment notes.

Although the terms Electronic Medical Record, Electronic Health Record (EHR), and Personal Health Record (PHR) have often been used interchangeably, they are not exactly the same. While an EMR is a digital version of a medical paper chart that contains all of a patient's medical history, created and maintained by a local health facility, EHRs on the other hand contain all personal health information about a patient, entered and accessed electronically by health care providers from a variety of health care facilities over the patient's lifetime. The information in the EHR goes beyond medical information; it documents full patient health history. PHRs on the other hand, are partial or complete records of a patient's lifetime health, managed by the patient or family member (Hamade, 2017). Other common terms related to EMR include Computerised Patient Record, Computerised Medical Record and Computerised/Automated Health Record.

Whether on papyrus, scrolls, or paper, physicians through the ages have always documented health information such as patient history, drug doses, and prescriptions. The growth of computer technology in the 1980s encouraged the advent of Hospital Information Systems (Keenan et al., 2006). EMR was the earliest Hospital Information Systems (HIS) used in electronic record keeping. The first EMR System was developed in 1972, as a way to organise, secure, complete and improve the quality of patient health records (Homade, 2017). Today, HIS have advanced into almost all areas of medical discipline, such as computerised physician order entry, pharmacy information systems, laboratory information systems, radiology information systems, telemedicine, and many others.

The benefits of an EMR system in healthcare in general are numerous. Firstly, a good EMR system ensures increased efficiency of the healthcare facility with decrease in the long term costs, through the reduction of superfluous prescriptions or duplicated testing (World Health Organisation, 2006; Protti & Peel, 1998). Remlex (2007) and Okwueze (2010) agree that the automation of certain processes reduces the size of the required manpower, and by extension personnel costs. In addition, patients spend less money, time and effort in accessing information and medical personnel or in filling out forms and documents electronically (Joos et al., 2006).

Another benefit of EMR is accurate, reliable and quality data. For medical personnel, EMRs make medical information legible and available in easily readable formats, especially through handheld smart devices or computers (William & Boren, 2008). Legibility of clinical notes ensures the easy detection of data entry errors. EMRs further eliminate problems associated with filling, loose sheets, and storage (World Health Organisation, 2006).

Furthermore, the quality of healthcare is enhanced through access to better information that help healthcare providers make informed decisions about treatment and healthcare planning (World Health Organisation, 2006; Laing, 2002). As such EMR affords the healthcare provider an opportunity to become easily abreast with the patient's health status, through laboratory results, prescription and drug administration, helping them quickly provide feedback to the patients (William & Boren, 2008). In addition, EMRs support widespread clinical data exchange, in order to improve the integrity, continuity, safety and speed of delivery of patient care (Neame & Olsen, 1998). In the area of patient safety, EMRs ensure that medical errors, especially in diagnosis and drug administration are minimised (William & Boren, 2008). Interestingly, Fuji and Gait (2008) have noted that more than 1.5 million persons in the United States suffer injuries from prescription errors and other medical errors annually. Cannon and Allen (2000) have also observed an improvement in the quality of patient care when EMRs are used to automatically generate alarms, alerts, and reminders on prescription use.

Again, EMRs, enable access to patient data or information. William and Boren (2008) have noted that some EMRs are able to check for drug allergies, drug doses and appropriateness of medication, so that health care providers do not have to worry about finding the paper chart of the patient before administering medication. Access to patient data by multiple care providers is another advantage of EMRs. Especially in cases of emergency, healthcare providers can access patient health information from anywhere as long as these have been stored in a central database or network.

Other benefits of an EMR system include: providing an effective educational tool for training of resident doctors and medical students (Keenan et al, 2006); improved physicians' collaboration and networking in patient care (Weimar, 2009); and facilitating instantaneous communication between organisations and their stakeholders (Sisneiga, 2009).

Theoretical Framework

New Public Management

Before the 1980s, the prevailing organisational model for the public sector was Bureaucracy. However, a number of drawbacks, such as deep hierarchical organization structure, bureaucratic complexity among departments, excessive and time-consuming duplication of paperwork have made this approach very unpopular. The Weberian bureaucratic principles were castigated for promoting tardiness, complacency, red tape, and discouraging the use of initiative and personal discretion (Ibietan, 2013). In time, the public bureaucracy became unnecessarily bloated in size, unproductive, and ineffective as an instrument of national development. Hence, ‘the-bureaucrat-must-go’ became the rallying cry for a new system (Sharma et al., 2011).

The inadequacies of this old paradigm and rising expectations of citizens from national and sub national governments (Ibietan, 2013), led to a paradigm change in the thinking and practice of public administration. This paradigm shift is referred to as New Public Management (NPM). Some synonyms of NPM include Post-Bureaucratic Paradigm, Managerialism, Market-Based Public Administration, and Entrepreneurial Government. Fredriksson and Pallas (2018) define NPM as a set of reforms that aim to radically change the nature of public sector organisations. The thrust of the NPM ideology is to apply market principles to governance and public administration in order to achieve efficiency in public service delivery. As such, NPM is expected to guarantee not only efficiency and effectiveness in public service delivery, but also ensure decentralized decision-making (Ibietan, 2013). Noteworthy is the fact that NPM did not dismantle the traditional bureaucratic model completely. It rather aims at a reduction in the size and complexity of the bureaucracy, through the adoption of managerial practices and methods, information technologies, and other innovations borrowed from the private sector.

The NPM aims at achieving the 3Es: Economy (the eradication of waste), Efficiency (the streamlining of services), and Effectiveness (the specification of objectives to ensure that resources are targeted at problems). Accordingly, various models of NPM exist. These include (a) The Efficiency Drive Model, geared towards making the public service more business-like; (b) The Downsizing and Decentralisation Model, which focuses on disaggregation, organizational flexibility and downsizing; (c) The Management of Change Model, which aims at integrating bottom-up and top-down approaches to change; (d) The Public Service Orientation to Change Model, which emphasizes quality of service delivery (Dahida & Ahmed, 2013).

A close examination of the tenets of NPM reveals a significant relationship with e-governance. In this vein, NPM as a paradigm can be used to explain and describe the relevance of e-governance. For one, e-governance aims at making governance more customer-oriented, a principal objective of the NPM movement. The red-tape and unnecessary duplication common with traditional bureaucracy can be limited with the use of computers and internet processes. Again, e-governance engenders efficiency, another basic tenet of NPM. Once processes and procedures are automated and accessible on the internet, costs in terms of man and materials are minimised. A third aspect of the relationship is modernization. Especially in this internet-driven century, governance cannot afford to operate on obsolete principles or techniques. E-governance ensures that public administration is in tune with technological development. This relationship highlights the importance of an EMR system in healthcare delivery. Hence, it is against this framework that this study is hinged.

Methodology

The study adopted the qualitative research method. On-the-spot observation of the health facilities and in-depth interviews with officials in charge were the main sources of data. This was complemented with content analysis of secondary data sources such as books, academic journals, theses, official reports and other documents. The study location was the Calabar Municipality Local Government Area (LGA) of Cross River State, Nigeria, The study focused on only Primary Healthcare Centres (PHCs), which are first-level primary health facilities based on the ward health system. There are nine standard PHCs in Calabar Municipality LGA. Five PHCs were purposively selected and studied. Purposive sampling was also used in identifying and selecting officers in charge of the PHCs, who were interviewed using a semi-structured interview guide. This method was chosen due to ease of administration and proven efficacy in other studies. Data from the interviews were coded and analysed using content analysis approach.

Discussion

Electronic Medical Records and Primary Healthcare Delivery in Calabar Municipality

The Cross River State Health Care Policy identifies primary healthcare as the bedrock of the entire state health system, in line with its vision of universal and comprehensive coverage of quality health care services across the state by 2030. One of the core objectives of the policy is to strengthen the health information system for generating quality data for evidence-based planning, monitoring and evaluation (Cross River State Ministry of Health, 2016). It is expected therefore, that the adoption of EMRs (a component of health information system) to PHC administration serves as a basic step towards that direction.

According to the Minimum Standards for Primary Health Care in Nigeria, the basic ICT equipment a PHC is expected to have is: (a) one mobile phone or communication radio, (b) two computers, and (c) internet service (National Primary Health Care Development Agency, 2012). However, as the findings reveal, this national standard has not been met. There is a significantly low adoption of ICT in medical records management in PHCs under Calabar Municipality LGA. Interestingly, only one out of the five PHCs under study has facility-owned computer units. While one of the computer unit was donated to the facility by a community leader, the other one was donated by FHI360, an international Non-Governmental Organization (NGO) for the management of data relating to FHI360 interventions. Unfortunately, only one of the available computer units was in working order at the time of the study. Also, none of the PHCs has a facility-owned mobile phone.

Even though network coverage exists in the areas where the PHCs are located, none has a facility-provided internet service. In terms of power supply, all rely on the national grid as the major source of electricity, which is unreliable. In fact, one PHC has been disconnected for over two years due to unpaid electricity bills. Hence the facility has had to depend on kerosene lanterns and rechargeable lamps for night deliveries, until four solar-powered light bulbs and points were donated to the facility by PATHFINDER, another international NGO. Only one PHC had a functioning petrol generator donated by a politician from the ward. All the facilities use solar energy, but only to power the vaccine refrigerator and a few light bulbs at the maternity ward at night during power outages.

In all the facilities visited, Patient registration, medical records, drug inventory and filling system are still done manually, using forms and registers. Referrals of sophisticated cases to secondary or tertiary health facilities are still paper-based using referral forms or referral notes. Generally, apart from FHI360 reports (which are sent electronically to the organization using mobile phone), paper-based monthly reports are still being sent to the PHC local government coordinating office, using the General Register and Monthly Summary Form. Only one PHC sends its monthly reports

electronically using the District Health Management Information System (DHMIS). Nonetheless, data validation is still done in person with the PHC local government coordinator. Medical records are mostly arranged in files and stored in wooden cupboards or shelves, subject to unfavourable elements such as rodents, insects, moisture, and so on. The roof of the storage area in one of the PHCs was so dilapidated at the time of this study, that majority of the files were already destroyed by rainfall.

Some stakeholders have made concerted efforts towards establishing EMR systems across the country. For instance, the United Nations Foundation conducted a desk review of several databases, and identified 84 unique ICT for health initiatives in Nigeria (United Nations Foundation, 2014). The Table below shows some of these EMR-related initiatives that were implemented in Cross River State. A cursory examination of these initiatives shows that only few EMR systems are actually implemented across all healthcare facilities in the state.

Table 1. Some EMR related projects implemented in Cross River State, Nigeria

Project	Description	Target Area	Implementing Organisation(s)	Funder
Community Surveillance System (CSS)	Health workers use mobile phones to collect the data that feeds up the NHMIS	Maternal, New born and Child Health (MNCH)	CIET Trust; IDRC; FMOH	IDRC
Lafiya Management Information System (LAMIS®)	A web based client level EMR system for managing ART program data across 141 facilities.	MNCH; Essential Commodities; eMTCT	FHI360	USAID
Midwives Service Scheme MADEX	An electronic reporting tool used for timely retrieval, storage, processing and interpretation of data from PHCs under MSS	MNCH	NPHCDA; Dabar Objects; Galaxy Backbone	Federal Government
National HMIS	A decentralized integrated portal for submission of data from all facilities in Nigeria.	MNCH; Nutrition; Immunizations; eMTCT; Malaria; Essential Commodities	FMOH; SMOH; Numerous partners	FMOH; Numerous funders
RapidSMS Birth Registration	Birth registration officers in health centers submit the number of registrations bi-monthly to district managers via SMS	MNCH	UNICEF	UNICEF

Source: Adapted from United Nations Foundation (2014)

Majority of these projects had no significant government backing as they were funded by donor agencies and international NGOs. Many were designed basically for the management of Maternal and New Born Child Health (MNCH) and a few other programme areas, as such they were not comprehensive enough to include every component of a typical EMR system. Some were pilot schemes that were not scaled up. For others, like the National Health Management Information System (NHMIS), input into the database is not done directly from most facilities, but at the PHC coordinating office at the LGA.

Challenges Facing EMR adoption in Primary Healthcare in Calabar Municipality

Concerning the application of ICT to healthcare, much has been said than done. Successive governments have introduced one strategy or the other towards enhancing healthcare delivery through e-governance. Unfortunately, policy implementation has remained a problem. Political instability is a constant impediment in the way of implementation. For instance, a previous government in Cross River State began the ICT for Primary Healthcare Initiative, but this programmes ended with that government.

Again, available funding for healthcare in Nigeria is limited (World Health Organization 2006). As a result, much of the equipment and materials available in the PHCs in Calabar Municipality are donated by NGOs and international donor agencies. The acquisition of computer hardware and peripherals is highly capital intensive, making it difficult for lower tier health facilities in developing countries to embark on ICT systems (William & Boren, 2008). As a consumer society, Nigeria imports most of the requisite computer technology (Okeke, 2008). This is a factor behind the high cost of procuring and maintaining internet services in the country. As such, most private and government health institutions cannot provide internet access or even host websites (Oak, 2007).

Related to this are infrastructural challenges. For instance, the few internet service providers offer very poor services because of bandwidth constraints (Ayo, et al., 2008). Also, ICT equipment such as computers and other mobile devices that contain EMR systems require constant and reliable power supply. Unfortunately, epileptic power supply has remained a recurring decimal in Nigeria. In some cities, the supply is less than an average of 12 hours daily (Okwueze, 2010). Frequent power interruptions lead to system damage, and alternative sources of power like generators or solar energy are very expensive for the PHCs to procure and maintain.

In addition to the above, resistance by some medical practitioners and health professionals generally to a change from manual to electronic documentation has been a problem (World Health Organization, 2006). Many health workers still resist the use of computer technology when attending to patients. They prefer to write by hand, finding it difficult or uncomfortable using electronic systems. Furthermore, due to fear, change is often considered a threat to their jobs (William & Boren, 2008). Some health workers view the adoption of new technology as an indication of imminent downsizing. In their view, the application of ICT to healthcare system will mean that some paper-based processes will be discarded, along with some of the personnel that hitherto handled them. This fear of losing their jobs has led to sabotage of ICT innovation in some cases, and in other cases, public servants use their positions to frustrate any plans for e-governance. Many of the Health workers own personal computers, procured under a loan arrangement with the state government some years ago. Nonetheless, they do not use them in carrying out any facility business.

Furthermore, the lack of technical expertise and computer skills is another reason for the low adoption of EMRs in primary healthcare. A major challenge to e-governance in Nigeria is the adoption of new technologies without the development of relevant skills and capacities to manage and sustain them. A number of ICT equipment remain dormant and unused in some healthcare facilities, because of the lack of skilled personnel to use them. The absence of relevant in-service training program to develop the required skills is also responsible for this situation. In the past, the Cross River State government sponsored a six-week long training on ICT for primary health workers. However, no ICT equipment was provided since then, and where laptops were made available to health workers on loan, the interest rates were very high, making it difficult for many to access them.

Corruption by public officials, issues surrounding data privacy and security, bureaucratic bottlenecks, lack of support from host community leaders are other challenges affecting the adoption of EMRs in PHCs in Calabar Municipality.

Conclusion

Globally e-governance has revolutionised health care delivery. Many developed and developing societies are already reaping the benefits of the application of ICT to patient care. Yet, ICT implementation in health services in Nigeria is still incipient, despite the progress evident in other sectors. The gains of ICT application to healthcare delivery are numerous, and the adoption of EMRs can improve the quality of primary healthcare. An assessment of the situation in Calabar Municipality LGA has revealed a number of challenges that hinder the development of EMR systems in primary healthcare delivery. For progress to be made, the following recommendations should be considered:

1. The state government should be committed to funding the procurement of computer units, mobile phones, and other ICT support equipment and infrastructure for PHC facilities. A state government-sponsored EMR system should be developed for all PHC facilities. This should be adequate and sustainable. Public-private partnerships in this area should be encouraged.
2. Migration to the EMR system from the paper-based system should be gradual. This will allow time for all processes to be fully integrated.
3. Basic training and ICT skills building for current and potential health workers should be consistent. Such trainings could help garner buy-in and foster the necessary cultural change needed for the adoption of ICT. Financial and non-financial incentives for ICT usage should also be initiated. This will encourage use of ICT by health workers in their job functions.
4. The local governments and community actors should play a more significant role in primary health care development in the state.

References

- Abasilim, D. & Edet, L. (2015). E-Governance and its implementation challenges in the Nigerian public service. *AUDA*, 7(1), 30-42.
- Adeyemo, D. (2005). Local government and health care delivery in Nigeria. *Journal of Human Ecology*, 16(1), 149-160.
- Ayo, C., Ayodele, A., Tolulope, F., & Ekong, U. (2008). A framework for e-commerce implementation: Nigeria a case study. *Journal of Internet Banking and Commerce*, 13(2), 1-11. <http://www.arraydev.com/commerce/jib>
- Canadian international development agency (2013). Nigeria evidence-based health system initiative report. Canadian international development agency
- Cannon, D., Allen, S. (2000). A comparison of the effects of computer and manual reminders on compliance with a mental health clinical practice guideline. *Journal of the American Medical Informatics Association*, 7(2), 196-203.
- Cross River State ministry of health (2016). Cross River State health policy. Government Printer
- Dahida, D. & Ahmed, T. (2013). New public management and public sector administration in Nigeria. *International Affairs and Global Strategy*, 14(4).
- Denhardt, R. & Denhardt, J. (2009). *Public administration: An action orientation* (Sixth ed.). Wadsworth
- Federal ministry of health (2016). National Health ICT strategic framework 2015-2020. Federal government press
- Fredriksson, M. & Pallas, J. (2018). New public management. *International Encyclopaedia of Strategic Communication*. <https://doi:10.1002/9781119010722.iesc0119>

- Fuji, K., & Galt, A. (2008). Pharmacists and health information technology: Emerging issues in patient safety. *HEC Forum*, 20(3), 259–275. <https://doi:10.1007/s10730-008-9075-4>
- Hamade, N. (2017). Improving the use of electronic medical records in primary health care: A systematic review and meta-analysis. *Electronic Thesis and Dissertation Repository*. 4420. <http://ir.lib.uwo.ca/etd/4420>
- Ibietan, J. (2013). New public management and public service effectiveness in Nigeria: A pragmatic discourse. *Public Policy and Administration Research*, 3(7), 53.
- Iluyemi, A. (2009). *Telehealth in the developing world*. Royal Society for Research and Academic Excellence in Medicine Press
- International organization of standardization (2004). Health informatics: Electronic health Record-definition, scope and context. <https://www.iso.org/obp/ui/#iso:std:iso:tr:20514:ed-1:v1:en>
- Joos D., Chen Q., & Jirjis J. (2006). An electronic medical record in primary care: Impact on satisfaction, work efficiency and clinic processes. *AMIA Annual Symposium Proceedings*, 394-398.
- Keenan, C., Nguyen, H., & Srinivasan, M. (2006). Electronic medical records and their impact on residents and medical student education. *Academic Psychiatry*, 30(6), 522-527. <https://doi:10.1176/appi.ap.30.6.522>
- Laing, K. (2002) The benefits and challenges of the computerized electronic medical record. *Gastroenterology Nursing*, 25, 41-45.
- National population commission. (2013). *National demographic and health survey*. National population commission and ICF international.
- National primary health care development agency. (2012). *Minimum standards for primary health care in Nigeria*. Federal government press.
- Neame, R. & Olson, M. (1998). How can sharing clinical information be made to work? *Medinfo*, 9(1), 315-318.
- Norris, P. (2001). *Digital divide, civil engagement, information poverty and internet worldwide*. Cambridge University Press. <http://www.man/acuk/dpm-dphtm>
- Oak, M. (2007). A review on barriers to implementing health informatics in developing countries, *Journal of Health Informatics in Developing Countries*, 1(1).
- Ojo, J. (2014). E-governance: An imperative for sustainable grassroots development in Nigeria. *Journal of Public Administration and Policy Research*, 6(2), 77-89.
- Okeke, J. (2008). Shortage of health professionals: A study of recruitment and retention factors that impact rural hospitals in Lagos state, Nigeria (Dissertation). University of Phoenix.
- Okwueze, F. (2010). E-Governance as a tool for public sector development in Nigeria. http://academicexcellencesociety.com/e_governance_as_a_tool_for_public_sector%20ad_development_in_nigeria.html
- Protti, D. & Peel, V. (1998). Critical success factors for evolving a hospital toward an electronic patient record system: A case study of two different sites. *Journal of Healthcare Information Management*, 12(4), 29-38.
- Remlex, D. (2007). Information and communication in chronic disease care. *Medical Care Research and Review*, 64(2), 123-147.
- Sharma, M., Sadana, B. & Kaur, H. (2011). *Public administration in theory and practice*. (47th ed.). Kitab Mahal.
- Sisniega, L. (2009). Barriers to electronic government use as perceived by citizens at the municipal level in Mexico (Dissertation). ProQuest Dissertations & Theses database. (AAT 3364168).
- Gillam, S. (2008). Is the Declaration of Alma Ata still relevant to primary health care? *BMJ*, 336, 536-538.

- Toyo, O. (2016). Information and communication technology (ICT): A catalyst for promoting primary healthcare delivery services in rural communities in Nigeria. *International Journal of Sustainable Development*, 11(1), 49-57.
- United Nations Development Programme (2003). *Achieving MDGs through ICT: Experiences and challenges in Vietnam*. UNDP
- United Nations Foundation (2014). *Assessing the enabling environment for ICTs for health in Nigeria: A review of policies*. UN Foundation in Support of ICT450ML
- Vann, I. (2005). Electronic data sharing in public sector agencies. In Garson, D. (Ed.), *Handbook of public information systems*. (Second ed.). Taylor and Francis.
- Weimar, C. (2009). Electronic healthcare advances, physician frustration grows. *Physician Executive*, 35(2), 8-15.
<http://www.acpe.org/generalerror.aspx?aspxerrorpath=/education/courses/listing.aspx>
- William, F. & Boren, S. (2008). The role of electronic medical record in care delivery in developing countries. *International Journal of Information Management*, 28(6), 503-507. <https://doi:10.1016/j.ijinfomgt.2008.01.01>
- World Health Organization (1978). *Declaration of Alma Ata: Report of the international conference on primary health care, Alma-Ata, USSR, 6-12 September, 1978*. WHO. <https://www.who.int/publicztion/i/item/924180001>
- World Health Organization (2006). *Electronic Health Records: Manual for Developing Countries*. WHO Regional Office for Western Pacific. <https://apps.who.int/iris/handle/10665/207504>