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ICT Facilities Used in Managing Electronic Records By The Public Healthcare Institutions in Kano Metropolis

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Abstract
The study investigated the ICT facilities used in managing electronic records by the public healthcare institutions in Kano metropolis. Three research objectives were formulated and answered accordingly. The qualitative research method was adopted for the study using narrative based design. Structured interview with open ended questions was used as instrument for data collection. The population of the study constituted eighty-four (84) participants from nineteen (19) PHIs in Kano metropolis out of which fifteen (15) participants from ten (10) PHIs were purposively sampled. The data was collected by administrating interview and analyzed using thematic analysis with open coding. The findings of the study revealed computer, printer, spreadsheets, word processors and the Internet as the types of ICT facilities used in managing e-records in PHIs in the Kano Metropolis.The challenges facing the management of ERs were lack of skilled manpower, inadequate ICT facilities, and the measures to overcome the challenges were found to be the provision of adequate funds, ICTs among others. The study concluded that PHIs were managing their ERs with few lapses and recommended that PHIs in Kano Metropolis should provide adequate, effective, and efficient modern ICT facilities for effective management of e-records. This would promote better service delivery, enhance productivity and enable access within the healthcare institutions. The physical infrastructures and the computer systems should be tightly protected from viral attacks on records.
Keywords: *ICT Facilities, Management, Electronic Records, Public Healthcare Institutions, Kano Metropolis*

1.1 Introduction

The development and availability of information and communication technologies (ICTs) in healthcare institutions have today not only increased and broadened the impact of healthcare services at the doorstep of the patients, but also placed more emphasis on effective and efficient records services. Application of information and communication technologies for managing the records of public healthcare institutionsPHIswhich are commonly known as e-records, digital records or records automation, have indeed continued to ease and promote quick and timely access to and transfer of records that are distributed round

the globe.

From the foregoing, ICT facilities use for e-records creation, organization, storage, preservation, retention and disposal includesoftware, hardware and network infrastructures are the most appropriate approach for handling records (Bantin, 2012). bIn view of the above, ICTs are indispensable in managing e-records in PHIs in Kano Metropolis. It enhances the efficiency, security and quality of healthcare services, contributing to better patient outcomes and the overall improvement of the healthcare system. As information professionals, records on net can be created, arranged stored, preserved, retained and discarded in a structured manner. These e-records can be clinical and non-clinical. The former are patients' health records, patients' financial records, pharmacy and drugs records, medical history, medication and allergies, immunization status, laboratory test results, radiology images etc. The latter are financial, human resource, emails correspondences, minutes and reports among others (Funmilola, Jinmisayo & Ozichi, 2015; Yaya, Asunmo, Abolorinwa & Onyenekwe, 2015).

1.2 Statement of the Problem

E-records are inevitably an important and valuable tool for information managers, medical doctors, *patients* and researchers as it improves quality healthcare services delivery. It was observed by the researcher that, most PHIs that incorporate the use of e-records are encountering difficulties in the process of managing them. The problems are software, hardware and network facilities used for managing e-recordsin PHIs.

There are challenges of inadequate coordination of ICT development, such as lack of computer operation skills, substandard software and hardware devices, erratic power supply, poor Internet connectivity (Sani, Manohar & Alkali, 2017), other challenges are poor skill in computing, harsh environmental conditions, lack of ICT infrastructure, and technical know-how (Yaya, Asunmo, Abolarinwa, & Onyenekwe, 2015). These factors contribute negatively to effective service provision to the clients, which require investigation with specific reference to PHIs in Kano Metropolis.

1.3 Research Objectives

1. To find out the types of ICT facilities use for managing electronic records by the public healthcare institutions in Kano metropolis.
2. To identify the challenges facing the use of ICT facilities in managing electronic records by the PHIs
3. To present measures to overcome the challenges.

2.1 Review of Related Literature

ICT has changed the way healthcare institutions manage their records, which enhances quality service delivery. Nowadays patients can consult physicians and diagnose from the comfort of his/her office due to the application of ICT facilities. In view of Abdullahi, Mijinyawa, and Danladi (2020:3), it was postulated that information and communication technology is a broad-based technology, which includes methods, management, and applications that are employed in the creation, storage, manipulation, and communication of information. This implies that, the above definition of ICT mainly incorporates computer accessories and other telecommunication facilities such as smart phones and Internet facilities that are used for managing e-records in healthcare institutions.

From the foregoing, Williams (2010:44) reported on computers, the Internet and medical education in Africa found that ICT infrastructure in Africa lags behind than in other regions; poor download speeds, limit the potential of Internet resources (especially videos, sound and other large downloads) to benefit students, particularly in East and West

(including Cameroon) Africa. CD-ROM capability is more widely available, but has not yet gained momentum as a means of distributing materials. In this direction, ICT facilities are best used in the process of creation, organization, storage, preservation, access and utilization, retention and disposal of records in healthcare institutions as it reduces error, eases access, transmits and amends records in short period of time in the organization.

A number of studies had shown ICT infrastructure used in managing e-records in healthcare institution. This view was supported in the study conducted by Akusa (2014.66) investigated generation, organization and use of medical records in Primary Health Care Centres of Ahmadu Bello University, Zaria. Based on the data collected and analyzed, the result of the findings indicated that computers and photocopiers were the commonest ICTs used for generating and use of medical records which carried the highest response rate. It was recommended that qualified and competent staff be used for generating and organization of medical records, a uniformed method of organizing medical records be adopted across the five primary Health Care centres.

There should be diversified sources of generating medical records and Primary Health Care Centres should enhance the use of adequate and relevant ICTs gadgets which can lead to full automation system.

Similarly, Idris (2019) examined preservation of electronic records in selected federal universities in Nigeria. The study found that Federal Universities in Nigeria were not preserving their electronic records effectively due to lack of ICT facilities, technical skills of staff and e-records preservation policy. The study also found that staff preserving e-records had never attended any form of staff training and development programme. The study recommends the establishment of policy framework on e-records preservation, provision of adequate and up to date ICT facilities, training of e-records personnel, provision of e-records management framework and infrastructure. The originality of the study lies in its ability to exposed Nigerian Universities to the global best practices in e-records preservation.

However, Duradolu, Mamudu and Tsabedze (2020:208) investigated the challenge of managing electronic records in developing countries: Implications for records managers in sub–Saharan Africa.

The study shows that the major problems of e-records management in Africa are administrative and the technically induced challenge and the benefits of managing hybrid records in Africa can only be realized if the appropriate infrastructures, workable legislation and regulatory frameworks, adequate finance, and competent ICT personnel are available.

In another study conducted by Yaya, Asunmo, Abolarinwa, & Onyenekwe, (2015)examined Challenges of Record Management in two Health Institutions in Lagos State, Nigeria. Its findings show that the major challenges faced in handling health records in the surveyed hospitals include; poor funding, inadequate computer and other ICT devices, poor skill in computing, harsh environmental conditions, lack of preservation and conservation policy. Hence, the study concludes as it recommends that: Owners of health institutions should inject more financial resources into the organization in order to solve the problem of inadequate funding of the health records management. It takes real money to acquire and maintain good health records. Besides, money should be injected in the infrastructure development and acquisition of modern equipment that would facilitate and sustain the general health condition of their patients. These could help in saving cost and manpower at the long run. Also, managers of the surveyed health institutions should intensify their efforts in encouraging their

health workers to maintain good handling care of records; while some of the paper based records should be microfilmed in order to sustain their durability.

Furthermore, Sani, Manohar & Alkali (2017) provides a review of related literature on the factors hindering the adoption of electronic health records in Nigeria. The results elucidates commonalities derived Common standpoints were lack of Limited Computer Skills, Poor Electricity Supply and Lack of Constant Internet Connectivity, Lack of Prioritization of Electronic Health Records, Lack of effective network performance, and In adequate facilities to run the system these are the major barriers hindering the adoption of EHR in Nigeria. Recommendations and conclusion were made that government should embark on remediating all factors hindering the adoption of electronic health records in Nigeria. In a nutshell, the literature has categorized ICT facilities like computer technologies, telecommunication technologies, reproduction technologies and reprographic technologies and storage technologies for managing e-records in PHIs. These technologies have a huge impact on the healthcare institutions in carrying out their duties of providing quality healthcare services. With this, the researcher tends to determine the types of ICTs facilities used for managing e-records by the PHIs in Kano Metropolis.

3.1Research Method

This study employs the narrative-based research design. Therefore, the entire population for this study comprised of eighty-four (84) records of staff of nineteen (19) PHIs in Kano Metropolis. The study used an eligibility criterion to select the participants of the study by requiring them to be responsible for managing e-records, have five years of experience and have competence in database management. Exclusion criteria included staff not in charge of e-records, less than five years of working experience and not having database management competence. In this direction, it was observed that eligibility criteria include a list of characteristics for eligibility for membership in the target population (Haruna, 2010). The purposivesamplingwas used to draw a sample of fifteen (15) participants. Kumar (2011) opined that the primary consideration in purposive sampling is the researcher's judgments as to who can provide the best information to achieve the objectives of the study. The researcher used open-ended interviews as an instrument for data collection and four (4) criteria for validating qualitative research, viz.: credibility, transferability, dependability, and confirmability were used as a means of validation and reliability of the instrument. The data was collected by administrating interviewed and analysed using thematic analysis with open coding.

4.1 Data Presentation, Analysis and Discussion

The PHIs under study were coded from P1 to P15 and collected data was presented and analyzed in line with the objectives of the study. The researcher interviewed a total number of fifteen (15) participants, who are electronic record managers in the investigated PHIs in Kano metropolis.

The participants were asked to mention the types of ICT facilities they use in managing e-records in their healthcare institutions. Their responses are categorized in to the following emerging themes:

Theme One (T1) - Hardware
Theme Two (T2) - Software
Theme Three (T3) -Network Facilities

The responses of the participants indicate that both hardware and software ICT facilities are used by all the participants p1-p15, while p1, p3, p5, p6, p9, p10, p11, p12, p13 reported network ICT facilities i.e. Internet and websites. From the above data, it is evident to see that the participants indicated that they use hardware, software and network

facilities to manage their e-records which can be seen above.

On the types of hardware ICT facilities as sub theme, the participants further revealed the following hardware devices used in their healthcare institutions:

Sub theme one (ST1) – Computer /Generator
Sub Theme Two (ST2) - Printer
Sub Theme Three (ST3) – Scanner
Sub Theme Four (ST4) – Digital Camera
Sub Theme Five (ST5) – Cell phone / Calculator
Sub Themes Six (ST6) – Photocopier
Sub Themes Seven (ST7) - Projector / Uninterruptable Power Supply
Sub-theme eight (ST8) –Inverter / Router
Sub- theme nine (ST9) – Fire walls /Stabilizer
Sub Theme Ten (S10) – Web server
Sub theme (ST11) -Barcode Encoder / POS Machine

The responses of the participants on the type of ICT facilities used in managing e-records reveal that all the participants use computers to manage their e-records. All the participants reported use of printer with the exception of p5. p1, p2, p3, p4, p5, p6, p9, p10, p12 and p15 used scanner and web server was used by p1, p3, p4, and p9 as an ICTs used for managing e-records.

Additionally, the use of digital cameras was reported by p1, p2, p3, p4, p5, p6, p7, p8, p9, p10, p11, p12 and p13, whereas p1, p2, p4, p5, p6, p7, p8, p9, p10, p11, p12, p13 and p14 reported the use of cell phones and calculators. Projector is used by p1, p4, p5, p6 and p15. p2, p5, p9, p10, p11, p12, p13 and p15 reported inverters and routers. However, POS and barcode encoder are used by p1, p2, p3 and p4. p2, p3, p4, p5, p6 and p15 use photocopier. However, X-ray machines are used by only p5, the use of stabilizer was reported by p2 and p3 and p3 uses routers and fire walls. Uninterruptable power supply (UPS) was used by p6.

It is evident to note that the PHI understudy uses a number of hardware ICT facilities as indicated in figure 2. Below are some of the direct quotations from the participants on the types of ICT facilities used in managing their e-records:

P3: In this hospital, computer, printer, scanner, camera, cell phone, website, server, air conditioner, switches, router, POS, Internet connectivity, photocopier and fire wall for security purpose are used for managing e-records in our department.

P4: Here in Aminu Kano computer, printer, scanner, POS, photocopier, cell phone, digital camera, Internet, web site (www.akth,org), and web server are the ICT facilities for managing our e-records.

P6: We are using computer, printer, scanner, projector, uninterruptible power supply (UPS) cell phone, photocopier, and Internet to manage our e-records.

It can be deduced from the above analysis that the studied healthcare institutions use different types of hardware specially to do with computer, generator, printer, calculators and cell. However, there were other software used in managing e-records and are common among the healthcare institutions (that is, p1, p2, p5, p7, p8, p9, p10, p11, p12 and p13.

In the aspect of the types of software used in managing e-records, the participants were asked to provide the types of software used for managing their e-records in their healthcare institutions, their responses are categorized in to the following sub themes:

Sub Theme One (ST1) – Spreadsheet (Health Information Management Software)
Sub Theme Two (ST2) – Word Processors
Sub Theme Three (ST3) – Rogan Delt and vital Images Canon Application Software
Sub Theme Four (ST4) – Database Management System

Based on the responses of the participants, the types of software used for managing e-records in the healthcare institutions are spreadsheets (Health Information Management software, Health in the box) as reported by p1, p2, p4, p6, p7, p8, p10, p9 p11, p13, p14 and p15. P2,

p3, p4, p8, p9, p11, p13, p14 and p15 use word processors for managing their e-records. Only p5 reported the use of Rogan Delt and vital images canon application software. P1, p3 and p4 used database management system for managing their e-records.

It is clear from the above data that the PHI under study uses a number of computer software facilities in managing their e-records especially to do with spreadsheets and word processors. However, it can see that there are other types of software which are used in one healthcare institution. Each institution is peculiar to using certain types of software in managing their e-records. For instance, p11, 12, p13, p14 and p15 clearly indicates the types of software they use in managing their e-records.

P11: Our e-records are managed with spreadsheet (Lafiya Management Information System) and word processors.

P12: Here are the software we use in managing our e-record: spreadsheets and word processors.

P13: Spreadsheets and word processing packages are the software we use so far.

P14: Well, the software we use in this hospital are spreadsheets and word processing.

P15: We use word processors and spreadsheets to manage e-records.

The above analysis reveals that majority of the PHI in Kano metropolis use spreadsheets and word processors in managing their e-records. However, there are other soft wares which some of the healthcare institutions use in managing their e-records (that is, p1, p2, p3, p4, p5, p6, p7, p8, p9, and p10 – see appendix for direct quotations of the participants).

On the aspect of the types of network facilities used in managing e-records in the healthcare institutions under study, the participants were asked to provide the types of network facilities they use in managing e-records in their healthcare institution, their responses are presented as the followings sub themes:

Sub Theme Two (ST2) - Internet

Sub Theme Three (ST3) – Web site

Based on the responses of the participants the use of Internet was reported by p1, p3, p5, p6, p9, p10, p11, p13 While p1, p2, p3, p5, p9, p12 reported the use of website. It is evident that the PHI under study use a number of network facilities as indicated in figure 4. Although, it can be seen that not all the network facilities are used in one healthcare institution, each institution is using certain network facilities as indicated by the participants. For instance, p5, p6, p10 and p11 only use Internet connectivity in managing their e-records.

P5: We have Internet connectivity in our healthcare institution.

P6: The network facility we use in managing our e- records is only the Internet

P10: Yes, we use the Internet.

P11: Here Internet connectivity is uses in managing our e-records.

P12: We use the Internet

P13: The network facility we used here is Internet connectivity

The analysis above shows that the healthcare institutions under study use different types of network facilities in managing their e-records especially the Internet connectivity.

Generally, based on the analysis on the types of ICT facilities used in managing e-records in PHI in Kano metropolis, the findings reveal that the healthcare institutions under study use hardware, software and network facilities in managing their e-records. These findings are similar to the findings of Duradolu, Mamudu and tsabedze (2020.211) who reveal that the study established that most staff (85.7%) was computer literate. Equally, the findings of the study are supported by that of Akusa (2014.66) who shows the types of ICTs used for medical records generation and used in the Primary Health Care Centres of Ahmadu

Bello University, Zaria. These are computers, 57 (70.4%) and photocopiers, 43 (53.1%); they are the most commonly used ICTs for medical records generation. On the other hand, it was discovered that the list of the ICTs used are Intranet, which has a frequency of 6(7.4%), followed by CD-ROMs with a frequency of 7(8.6%).

Furthermore, the findings of the study are supported by the postulations of Siang, Prakash and Ramaiah, (2010:10) who stated that Word processors (for example, Word Perfect, Microsoft Word), Spreadsheets (for example, Excel), E-mail, Computer-Aided-Design (CAD) and Web publishing tools (for example, Dream weaver) are the software's for generation of e-records. In contrast with the above assertions, Siang, Prakash and Ramaiah, (2010:10) further elaborated the following e-records management systems (ERMS) that are used in various healthcare institutions, health centers for the creation and generation of e-records, they are *NextGen* (http://www.nextgen.com/proemr.asp),*Visionary Medical Systems, Inc* (http://www.Visionarymed.com/home.php): *AdvantaChart* (http://www.advantachart.com/), *National Computer System,* electronic Medical Records Exchange (EMRX).

In terms of challenges associated with the use of ICT facilities in managing e-records by the PHI, the participants were asked to provide the challenge they encountered in managing their e-records, their responses were categorized in to the following sub themes:

Sub Theme One (ST1) – Inadequate ICT Facilities

Sub Theme Three (ST2) – Inadequate Buildings

Sub Theme Four (ST3) –Poor Network

The responses of the participant indicate that inadequate ICT facilities were reported by p5, p6, p7, p10 p13, p14 and p15, while, inadequate buildings were reported by only p11 and poor network was reported by p1 and p4.

From the above data, it can be deduced that, the PHI under study are faced with infrastructural challenges to do with inadequate ICTs, inadequate buildings and poor network as indicated in Below are some direct quotations from the participants.

P5: We are facing some challenges to do with Inadequate storage devices and other ICT facilities.

P6: The hospital is having issues in the process of managing e-records because of inadequate ICT facilities

P13: Our problem is inadequate ICT facilities.

P14: Well, we do not have available ICT devices to manage our e-records.

P15: The information and communication devices are not adequate in our hospital, therefore, we are facing certain problems in managing the e-records in our custody.

Similarly, the participants also indicated that they are facing infrastructural challenges to do with poor network, where p1 and p4 clearly indicated the following submissions

P1: Poor network is the challenge we faced in managing our e-records.

P4: *We are experiencing the problem of slow network.*

In addition, the participants also indicated that they are facing infrastructural challenges to do with poor network, where p11 also made the following submission:

P11: Poor infrastructural facility to undertake the work such as building, furniture and fittings, lack of space in the office, lack of waiting area for the clients are the challenges major we faced.

From the above analysis, one can see that the public healthcare institutions under study encounter infrastructural challenges, which include inadequate ICT devices, inadequate buildings and poor network.

From the foregoing, it can be seen

that, the PHI in Kano metropolis encounter administrative, human factor and infrastructural challenges associated with the management of their e-records. The findings of the study are in line with that of Sani, Manohar and Alkali (2017:5) on the factors hindering the adoption of electronic health records in Nigeria. A systematic review was used in the research. The results elucidate commonalities derived from common standpoints where lack of limited computer skills, poor electricity supply and lack of constant Internet Connectivity, lack of effective network performance, and inadequate facilities to run the system these are the major barriers hindering the adoption of HER in Nigeria. This is supported by the ideas of Yaya, Asunmo, Aolarinnwa and Onyenekwe (2015:1) who opined that poor skill in computing, harsh environmental conditions, lack of ICTs infrastructures and technical know-how are some the common challenges hindering management of electronic record in healthcare institutions.

On the measures to overcome the above challenges, the participants were asked to suggest possible measures to overcome the challenges associated with the management of e-records in their healthcare institutions, their responses are categorized under the following sub themes:

Sub Theme One (ST1) – Training and Retraining of Staff
Sub Theme Two (ST2) – Provision of Constant Power Supply
Sub Theme Three (ST3) – Provision of Adequate ICT Facilities
Sub Theme Four (ST4) – Effective Network Performance
Sub Theme Five (ST5) – Description of e-records
Sub Themes Six (ST6) – Effective Disposal
Sub Theme Seven (ST7) – Prioritization of e-records
Sub Theme Eight (ST8) –Effective Preservation, Provision of Anti-virus and Fight Corruption
SubTheme Nine (ST9) – Independent Healthcare System
Sub Theme Ten (ST10) – Adequate Funding
Sub Theme Eleven (ST11) – Effective Maintenance
Sub Theme (ST12) –Poor Network
Sub Theme (ST13) – Creation of Central Database.

Other probable measures include: exposure of staff to computer & ICT skill training has 67 cases (10.45%), computerization has 63 cases (10.29%), refreshing (period from one physical medium to another) has 56 cases (9.15%), regular training of manpower in record management has 55 cases (8. 99%), while microfilming has the minimum cases of 49 (8.01%).

Conclusion and Recommendations

The study, however, reveals that computers, printers and cell phones were the prominent types of ICT facilities used in managing e-records in PHI in Kano metropolis. Additionally, spreadsheet, word processors and databases management system are the prominent type of software use for managing e-records. The challenges associated with management of e-records in the healthcare institutions that have been studied is duplication of effort, insufficient fund, political issues and lack of skilled manpower and inadequate ICT facilities and the suggested solutions are provision of adequate fund, provision of adequate ICT facilities training and retraining of staff and independent healthcare system. Management of PHIs in Kano Metropolis should provide adequate, effective and efficient modern ICT facilities for effective management of e-records. This would promote better service delivery, enhance productivity and enable access within the healthcare institutions. The physical infrastructures and the computer systems should be tightly protected from viral attacks on records.

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