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ENHANCING HEALTH DATA MANAGEMENT SKILLS OF PRIMARY HEALTHCARE WORKERS IN THE LIGHT OF ELECTRONIC HEALTH RECORDS

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Abstract

This paper reported ways of enhancing health data management skills of primary healthcare workers in the light of electronic health records. The article, aimed at combining insights of how electronic health records implementation, bridges different aspects of health data management skills of primary healthcare workers; through objective identification of electronic health records applications, their place in health data management skills and assessment of the effect electronic health records on enhancing health data management skills of primary healthcare workers.

The method used for this study are; literature review, theoretical discussion, and qualitative analysis. Inferences drawn from existing literatures and qualitative analysis indicated that, nexus exists between health data management skills of primary healthcare workers and electronic health records as evident in previous research work and case studies.

Findings revealed the prevalent electronic health records application packages used by primary healthcare workers for health data management are: District Health Information System (DHIS-2), Mobile Strengthening Epidemic Response System (mSERS) and Surveillance Outbreak Response Management and Analysis System (SORMAS).

This study recommended the need for government at all levels to give maximum support and required encouragement to the implementation of electronic health records so as to enhance health data management skills of primary healthcare workers and primary healthcare workers should get acquainted with the use of electronic health records applications, for them to be able to navigate database software successfully in order to enhance their health data management skills. Government should also organize regular training and re-orientation workshop for primary healthcare workers on electronic methods of managing healthcare data for improved health data management skills of primary healthcare workers.

Key words: *Health data management skill, Primary healthcare workers, Electronic health records, Health data management process, Primary healthcare services.*

Primary Health Care service is the closest to the people and is constitutionally the responsibility of the local government. The challenge at the primary health level is to establish a health care system that will touch the life of every citizen and tackles the conditions that cause the highest mortality and morbidity. The system must be organized from grassroots and woven into the fabric of the community participation. It must integrate preventive, promotive, rehabilitative and curative healthcare services using the type of technology that the community will accept and at the cost it can afford.

The primary healthcare service is provided by a team of health workers which includes: Doctors, Nurses, Health Information Management Practitioners, Midwives, Community Health Practitioners, Health Superintendents, Health Assistants, Public Health Officers and so on (Federal Ministry of Health, 2019). Therefore, primary healthcare delivery services require accurate and adequate health data management as documentary evidence of the care and healthcare intervention delivered within the system by these primary healthcare workers.

Health data are raw facts collected either on all items or characteristic of an individual patient or group; health related events or activities that assume a set of values, which must be treated statistically to produce information for evidence based decision making; through effective health data management process. Health data management process consists of the following set of interrelated activities; data collection, data analysis, data reporting, data storage, data retrieval and data quality assurance (Omole, 2021).

Technology has the potential to help with each of these activities. With the advent of the internet, high speed computers, voice recognition, wireless and mobile technology, primary healthcare workers today has many more tools available at their disposal for effective health data management through application of electronic health record.

Electronic Health Records System involves the scientific/systematic application of information and communication technology into the acquiring, storage, retrieval, and processing of healthcare data, information and knowledge for the purpose of problem solving and decision making (Omole, 2018)

Omole (2017) also affirms that, the need for evidenced-based result is growing in all areas of development project implementation: In terms of quality management; process evaluation has become a critical part in program's implementation. To this end, the need for quality data gathering cannot be under-estimated. In order to accurately and transparently measure progress and track the performance of key program indicators; there is need to ensure the availability of good, quality and reliable data.

Health data are usually transmitted through the Bottom-up program approach, with the smallest unit and point of data generation being PHC facility/Referral General Hospital/ Teaching Hospital. After service delivery, health data is expected to be transmitted across the local government area and State levels before it gets to Federal level.

Therefore, it is important to stress that an electronic data flow mechanism is critical to an effective health data management at primary healthcare level, which can be used to manage and improve effectiveness in service delivery (SURE-P, 2013). It is against this backdrop, that this paper examined the strategies for enhancing health data management skills of primary healthcare workers in the light of electronic health records system.

Statement of the Problem

It is assumed that application of electronic health records is critical to enhancing health data management skills of primary healthcare workers and personal observation of the investigator as monitoring and evaluation /disease surveillance officer in the primary healthcare system for over two decades in Nigeria, has shown that there is partial implementation of electronic health records in most of the primary healthcare facilities in Nigeria, which has devastating consequence on health data management skills of primary healthcare workers.

Based on this assumption, this study examined the strategies for enhancing health data management skills of primary healthcare workers in the light of electronic health records in Nigeria with a view to contributing to finding solutions to problems associated with the implementation of electronic health records towards enhancing health data management skills of primary healthcare workers in Nigeria

Objective of the Study

This study examined the strategies for enhancing health data management skills of primary healthcare workers in the light of electronic health records in Nigeria. The specific objectives of the study are to;

find out the existing electronic health records applications available to primary healthcare workers.

identify the basic health data management skills of primary healthcare workers.

ascertain the strategies for enhancing health data management skills of primary healthcare workers.

determine the nexus between health data management skills and electronic health records.

identify the challenges of enhancing health data management skills in the light of electronic health records.

2.0. Review of Literature

2.1. Primary Healthcare workers

Primary healthcare workers consist of: Doctors, Nurses, Health Information Management Practitioners, Midwives, Community Health Practitioners, Health Superintendents, Health Assistants, Public Health Officers and so on (Federal Ministry of Health, 2019). Hence, primary healthcare workers are responsible for provision of primary healthcare services and they require health data management skills to generate accurate, adequate and reliable health data as documentary evidence of the care and healthcare intervention they delivered within the primary healthcare system.

2.1.1. Electronic Health Records

Russel (2011) asserts that electronic Health Record is a record that resides in a system specifically designed to support users by providing accessibility to complete and accurate data, alerts, reminders, clinical decision support systems, links to medical knowledge, and other aids. It is otherwise called computer–based health records. Electronic health records are designed to contain and share information from all providers involved in a patient's care.

Omole (2016) submits that, with electronic health records; data can be created, managed and consulted by authorized providers and staff from across more than one health care organization. Health care providers who use electronic health records report tangible improvements in their ability to make better decisions with more comprehensive information.

Specific benefits of electronic health records to health care services are: Accurate and complete information about a patient's health is guaranteed, the ability to quickly provide care is assured, the ability to better coordinate care is enhanced, it reduces patient waiting time generally, a way to share information with patients and their family/caregiver if need be, it identifies patients who are due for preventive visit and screening, it exposes those patients that has missed hospital appointment visit and it also improve the overall quality of care in a practice (Russel, 2011).

2.1.2. Features of Electronic Health Records System Application

Omole (2016) posits that, any Electronic Health Records System application must have the following features:

Physician order entry system: it must be able to capture and process information about clinical services, nursing services, laboratory services and physician orders entered into the system for continuity of care at the next stage of care.

Decision support system: electronic health records application must be able to generate information on diagnostic services and other related issues that are relevant to the condition under treatment, so as to ensure that informed decision about the treatment or procedure is taken by the attending physician

Health information exchange system: it must be able to perform patient management functions such as: registration, admission, transfer and discharge. Generation of discharge summary and referral letters is very germane to continuity of patient care. These functions are expected of a good electronic health records application.

2.1.3. Existing Electronic Health Records Applications

Omole (2019) asserts that electronic health records application packages such as: Document Imaging System (DIS) and Surveillance Outbreak Response Management and Analysis System (SORMAS), Personal Health Records (PHR), Mobile Health (MHealth), District Health Information System (DHIS-2), Multipurpose Primary Healthcare Information System (MPHIS) and Tele-medicine are useful for health data management at primary healthcare level.

However the prevalent electronic health records application packages used by primary healthcare workers for health data management in Nigeria are: District Health Information System (DHIS-2), Mobile Strengthening Epidemic Response System (mSERS) and Surveillance Outbreak Response Management and Analysis System (SORMAS), which are used for case based and aggregated health data reporting from community level to health facility level, to LGA, State and National levels (Omole, 2019). It is worthy of note that these applications are web-based, which make their use to be network and internet services dependent.

(a) District Health Information System (DHIS-2): DHIS-2 Provides a comprehensive health data management solution based on data warehousing principles and a modular structure which can easily be customized to the different requirements of a management information system, supporting analysis at different levels of the organizational hierarchy.

DHIS-2 supports the different facets of the information cycle indicated in the picture bellow: The information cycle pictorially depicts the different components, stages and processes through which the data is collected, checked for quality, processed, analyzed and used.

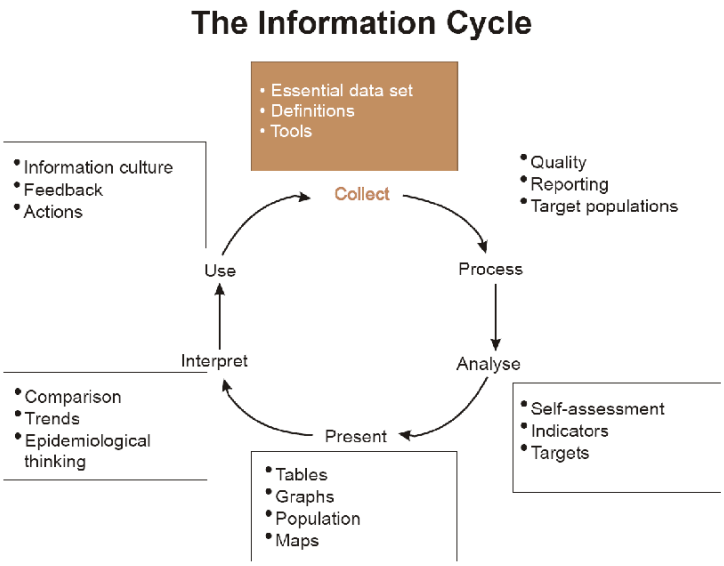

Figure 1.1: The health information cycle

(b) Mobile Strengthening Epidemic Response System (mSERS); mSERS is a system that enables real-time reporting, two-way feedback, and easy validation during outbreaks. It is designed to improve disease outbreak detection and strengthen weak national surveillance systems, particularly in emergency settings. Strengthening outbreak management and emergency response systems is crucial in preparing for effective disease control and public health interventions.

(c) Surveillance Outbreak Response Management and Analysis System (SORMAS): SORMAS is a Web-based application, which was specifically designed to enable primary healthcare workers notify health departments about new cases of epidemic-prone diseases, detect outbreaks and simultaneously manage outbreak response through electronic case-based health data management.

Therefore, the goal of implementing electronic reporting of integrated disease surveillance and response (IDSR) data is to enhance the disease surveillance system, for early detection and real-time reporting (Federal Ministry of Health, 2019)

2.2. Strategies for Enhancing Health Data Management Skills

Health data management is concerned with the process of identifying, acquiring, distributing and maintaining data that are essential to healthcare delivery services. It involves application of socio-technical skills into each component of health data management process, which comprises of data collection, data analysis, data reporting, data storage and retrieval, data dissemination and use, including data quality assurance (Omole, 2018).

2.2.1. Health Data Management Process

Delloitte (2023) asserts that, health data management is the practice of making sense out of these health data and managing them to the benefit of healthcare organizations, practitioners, and

ultimately patient well-being and health. The basic components of health data management process are:

Data Collection **-** Involves accurate capturing of required data in the right form and format.

Data Analysis **-** Cleaning and transforming data with the goal of highlighting useful information

Data Reporting **-** Converting analyzed data into actionable information that supports decision making

Data Storage and Retrieval **-** Secure storage and protection of data for easy retrieval when needed

data dissemination and use – Transmission of data to the user and application of data (by the user) to solve practical problems

Data Quality Assurance **-** Mechanisms put in place to ensure good quality data are obtained, analyzed and reported/stored

Therefore; as health data management progresses, primary healthcare workers will collect a larger variety of health-related data, and integrate them to generate new insights that can enhance patient health and improve health status of the society.

2.2.2. Five Health Data Management Benefits

Health Data Management can have significant benefits for primary healthcare workers, patients, and the public in the following ways:

Create a comprehensive view of patients, households, and patient groups—composite profiles that provide status and enable predictions.

Improve patient engagement—target patients with reminders and care suggestions that can be relevant for them, based on predictive modeling.

Improve health outcomes—track health trends in certain areas or among specific populations, predict new trends and suggest proactive measures to counter rising health issues.

Business decision making—help healthcare providers make better data-driven decisions, such as, which types of medical professionals to recruit, what equipment to invest in, or which types of patients to focus on in marketing efforts.

Analyze physician activity—analyze data on medical practitioners such as success rates, time invested in different treatments and medical decisions, and aligning physicians' activities with the goals of the healthcare organization (Delloitte, 2023)

2.2.3. Health Data Management Skills

Important skill for health data management is being able to navigate database software successfully; writing reports, using query tools and duplicating data sets into other formats for further analysis. Possessing a strong comprehension of how various components of a database relate to each other is key to developing your skills in health data management (Amber, 2023).

Therefore, health data management skills of primary healthcare workers involve the ability of these healthcare providers to navigate database software successfully towards accomplishing the components of health data management process.

Amber (2023) explains that, health data management involves; gathering, storing and using data in a secure, efficient and cost-effective way. Learning various types of skills is necessary for efficient health data management. If you're seeking to develop your skills in this vocation, you may wish to focus on the following skills:

a. Account and File Management Skill

Organizing files and folders on your computer or network is crucial for managing health data effectively. It's also important to know how to upload, download, duplicate or rearrange files. This includes tracking online accounts and supporting others to record and monitor passwords, usernames and accounts securely.

b. Database Software Management Skill

An important skill for health data management is being able to navigate database software successfully. This involves developing an understanding of various functions in the database, including knowing how to find records and using reporting features and built-in forms.

c. Data Integrity Skill

Data integrity is an essential aspect of health data management, design and usage. It refers to the practice of ensuring health data accuracy, consistency and understanding any potential limitations when using and analyzing data. It also means understanding definitions, data sources and program guidelines.

d. Database Planning and Design Skill

Having a comprehensive knowledge of database design concepts is key to becoming skilled in health data management. It's important that you understand the advantages and limitations of the various forms of databases. It's also beneficial to learn how to plan for data projects and analyze and store the various types of data.

e. Business Intelligence Skill

As health data are business assets, having skills in health data management means that you're aware of the significance of health data to the healthcare organization you work for. It's important that you know the purpose of health data collection before you begin and understand

how it can help the business meet its strategic goals. This helps to ensure the health data you gather are relevant to the needs of the healthcare organization.

f. Communication Skill

Developing clear channels of communication with your team is key to data management. This helps to ensure data accuracy and reliability. Effective communication is essential among healthcare providers, patients and healthcare administration. It's also important to communicate with software vendors when discussing the specific type of assistance you require.

2.2.4. Strategies for Enhancing Health Data Management Skills

As health data management is continuously evolving, developing and building skills in this field can be an ongoing process to ensure they are up to date with current health data trends and the skills of primary healthcare worker. Amber (2023) asserts that, if you would like to develop and enhance your skill set, you can consider the following steps:

1. Participate in Further Education

Effective health data management can require knowledge of intricate technological functions and programming languages. A good method of building these skills is to participate in further education. If you haven't yet completed university, consider undertaking a degree or master's degree in a related subject, such as software engineering, computer science or health information management and technology.

2. Complete a Specialized Certification Program

A specialized certification program can be an excellent way of developing skills in health data management. There are many organizations that can provide you with training in this field. Consider certifications in programming languages/applications that are useful for health data management, such as Python, Java, SPSS, MS-excel, MS-access, MS-PP, Epi-Info, E-View etc.

3. Develop your Communication Skills

As jobs in health data management typically require the ability to correspond with healthcare team to relay information and insights, it's important to develop good written and verbal communication skills to be successful. You can enhance these skills by looking for opportunities to practice these both inside and outside of the workplace. This can include ensuring you make eye contact when interacting with others, using active listening and writing any professional emails or messages in an easily understandable format.

2.2.5. Implementing Health Data Management Abilities in the Workplace

There are several ways in which you can implement health data management skills at work to highlight and develop your capabilities, while also improving efficiency and simplifying workplace procedures. Some of these are as follows:

1. Ensure Others Receive Adequate Training on Database Use.: You can work alongside members of the IT department to create a record and training plan to ensure that everyone using the database receives adequate instruction.

2. Make Sure the Health Data is Collected and Managed in the Central Database: It can be challenging for an organization that develops its own distribution lists and standalone databases. Skills in data management can help you to pinpoint these databases, learn how they're operated and collaborate with the relevant members of the team to return the health data to the central database.

3. Identify Ways Health Data Can Support Business Objectives: By determining the healthcare organization's goals and objectives, you can identify the ways in which health data can help the business to meet its aims. This is one of the most valuable ways in which you can use your ability to manage health data in the workplace (Amber, 2023)

2.3. Nexus between Health Data Management Skills and Electronic Health Records

Omole (2020) in his book titled Electronic Health Records for Health Students and Professionals, reports that, electronic health records, otherwise called computer-based health records perform a number of separate functions in health data management. These are:

Input: computer accepts data from the environment for processing.

Process: computer performs operation on the data it holds.

Storage: computer holds data internally for ease of use.

Output: computer generate reports to the environment for the actual use (decision making)

Resource sharing: interconnection of many computers via internet enhances inter-operability of the various components of electronic health records (AHIMA, 2013).

In view of the above the roles of information and communication technology in health data management cannot be under estimated: Because, application of information and communication technology in health data management consists of the tools and techniques that are involved in managing health data, based on data management responsibilities. Data management responsibilities are: Creating data, Capturing data, Processing data, Storing data, Disseminating data and Utilization of data

Therefore, application of information and communication technology into health data management is tantamount to electronic health records, which is a digital version of paper-based chart that contains all patients' medical history from one practice to another. An electronic health records application where it is being practiced is mostly used by healthcare providers for diagnosis, treatment and health information exchange

2.4. Challenges of Health Data Management Skills in the Light of Electronic Health Records

Popoola (2010) submits that poor perception of health data management practices, lack of improved health data planning and management practices, inadequate skilled manpower in information and communication technologies, and lack of mission oriented leadership with the right perception of health data as national health care resource are some of the limitations of health data management via electronic health records in Nigeria

Osundina (2014) identifies high starting cost, low budgetary allocation to health sector, epileptic power supply, network issues, inadequate skilled manpower and delay in data entries at the starting point as impediments to successful implementation health data management via electronic health records.

Omole (2016) buttresses that unauthorized access, data corruption, destruction of backup, reduced productivity at the initial stage, staff retrenchment and unstable network availability may be experienced in the course of implementing health data management via electronic health records.

Amber (2023) reports that, nowadays, health data management began with a transition from purely paper-based tracking to digitized information. However, many types of health data are yet to be digitized, or have not yet been integrated into health data management systems. Here are a few important challenges facing health data management, especially in the primary healthcare settings:

1. Fragmented Health Data: Health data can be structured data in spreadsheets or databases, images or video files, digital documents, scanned paper documents, or may be stored in specialized formats. Health data are widely duplicated, collected multiple times and stored in different versions by healthcare providers, public health organizations, insurance bodies, pharmacies, and patients themselves. There is no one source of truth for information on patients' well-being.

2. Changes to Health Data: Health data constantly changes as do the names, professions, locations and conditions of patients and physicians. Patients undergo numerous tests and are administered many types of treatment over the years; the treatments and medications themselves evolve over time. New types of medical treatment, such as telehealth models, create new types of data.

3. Regulations and Compliance: Health data are sensitive and must adhere to government regulations. Health data discovery challenges and poor health data quality make it much more difficult to perform the required audits and meet regulatory requirements and limits the diversity of health data that healthcare providers can use for the benefit of patients.

Methodology

Analytical research design was used for the study. The method used in this paper is literature review, theoretical discussions and qualitative analysis, to draw inferences from existing

literatures that; nexus exists between Health Data Management Skills of primary healthcare workers and electronic health records, as evident in previous research work and case studies.

Summary of Findings

Major findings of the study are outlined below:

Findings revealed that, the prevalent electronic health records application packages used by primary healthcare workers for health data management, are: District Health Information System (DHIS-2), Mobile Strengthening Epidemic Response System (mSERS) and Surveillance Outbreak Response Management and Analysis System (SORMAS).

Findings unveiled that, the basic health data management skills of primary healthcare workers are: Account and File Management Skill, Database Software Management Skill, Data Integrity Skill, Database Planning and Design Skill, Business Intelligence Skill and Communication Skill.

Findings revealed that, the strategies for enhancing health data management skills of primary healthcare workers are; Participation in Further Education, Completion of Specialized Certification Program and Development of Communication Skills

Findings established that nexus exists between health data management skills and electronic health records; as electronic health records facilitates effective health data management based on data management responsibilities, which are: Data creation, data capturing, data processing, data storage, data dissemination and data utilization.

Findings identified the challenges of health data management skills in the light of electronic health records, among these are: Low budgetary allocation to health sector, epileptic power supply, network issues, inadequate skilled manpower and delay in data entries, fragmented health data, changes to health data, regulations and compliance.

Conclusion

In the course of the study, inferences were drawn from existing literatures and theoretical analysis that, nexus exists between health data management skills of primary healthcare workers and electronic health records.

Health data management skills of primary healthcare workers involve the ability of these workers to navigate database software successfully. Because, possessing a strong comprehension of how various components of a database relate to each other is key to developing skills in health data management.

Enhancing health data management skills depends on the extent to which electronic health records are taken seriously by primary healthcare workers at various health facilities, so as to

promote availability of accurate, timely, reliable, and relevant health information, which is the most fundamental step towards informed public health action.

Recommendations

On the basis of the findings and conclusion of this study, the following recommendations are made;

1. Government at all levels are advised to give maximum support and required encouragement to the implementation of electronic health records, at primary healthcare level so as to enhance health data management skills of primary healthcare workers.

2. National Primary Healthcare Development Agency should provide health data management infrastructure that facilitates availability of hardware, software and procedures for enhancing health data management skills of primary healthcare workers.

2. Primary healthcare workers should get acquainted with the use of electronic health records applications, for them to be able to navigate database software successfully in order to enhance their health data management skills.

4. Government at all levels should also organize regular training and re-orientation workshop for primary healthcare workers on electronic methods of managing healthcare data for improved health data management skills of primary healthcare workers.

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