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A Qualitative Study on Impact of Electronic Health Records System (EHRS) on Healthcare Quality at Academic Research Hospital

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Abstract - The main objective of this study was to explore the impact of EHRs on healthcare quality at the Research Government Hospital. The research used three objectives thus, explore the use, behavioural intent, and the impact of EHRs on healthcare quality among clients and staffs of the facility. This is qualitative research with a case study design with data gathered through interviews from five clients and eight staffs. The study proved all departments of the Hospital were fully using EHRs with all respondents willing to continue its use. The key findings of the study were, firstly, improved storage and quality of medical records and easy retrieval of records by healthcare practitioners. EHRs reduces administrative and operational cost. Thirdly, EHRs improves client safety, staff productivity and efficiency healthcare delivery. Furthermore, it reduces clients' waiting time, waste of resources and helping track expiry dates of medications and improves health outcomes. Finally, EHRs improves triaging and responsive care and the personal healthcare of clients thereby improving clients' satisfaction on services rendered at the facility. The EHRs however faced challenges such us unstable internet network, electricity instability, inadequate training of staffs, etc. The study concludes EHRs has improved healthcare quality at the Academic Research Hospital.

***Key Words*:** Electronic Health Record system, Hospital

1.INTRODUCTION

Brief Analysis of the Topic:

Information and Communication Technology presents several opportunities for improving the performance of health systems in developing countries and has become a major transformational part of enhanced healthcare especially in the aspect of patient safety, quality of care and reduction of medical errors. Electronic health record (EHR), also referred to as electronic medical records (EMRs) is a repository of electronically maintained information about an individual's lifetime health status and healthcare, stored such that it can serve the multiple legitimate users of the record The EHRs easily stores, retrieves, uses, and exchange patient data/information among health workers and relevant agencies to aid in decision making.

The Institute of Medicine (IOM) defined quality as "degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge". It determines the satisfaction level of patients the frequency of patients revisiting a facility, serving as a measure for improving healthcare. The Electronic Health Records system has been linked to improved quality of care in healthcare due to its efficiency, effectiveness, timeliness, among other benefits.

Several studies conducted concerning the electronic health record system thrown less light of the impact of EHRs on healthcare quality. There is therefore the need to conduct a study on the impact of EHRs on healthcare quality to fill this gap.

2. Aims and Objectives

Main Objective

The main objective of the study is to evaluate the impact of EHRs on quality healthcare at Academic Research hospital with the goal of measuring the quality of care using the Hospital's method, structure, and outcome of EHRs.

Specific Research Objectives

1. To study the use of EHR at the Academic Research Hospital
2. To underscore the behavioral intent on the use of EHR among staffs and clients of the Hospital
3. To evaluate the impact of EHR on quality of care among the hospital staffs and patients in Academic Research Hospital

Methodology

This is primary research using qualitative research method and case study design. Qualitative research methods include action research, case study, ethnography, grounded research, etc. Case study design involves an attempt to describe relationships which exist and generate deep understanding of complex issues Data will be mainly collected through observation, interviews. This would aid researcher to generate adequate data to test the hypothesis that, EMRs has an impact on quality of care at the Academic Research Hospital.

3. Synopsis of the Chapters

The study has four chapters. Chapter one presents a general literature review on information technology in health whilst chapter two comprises of specific literature review on electronic health record system, quality of care, ethical review and other relevant theoretical evidence. In chapter three, the methodology of the study shall be broken down into research design and the procedure for data collection and analysis. The study is then analyzed, interpreted, and discussed to bring out the impact EHRs has had on healthcare quality at Academic Research Hospital. The next chapter is a general review of the relevant journals, studies, etc. pertaining to the current study touching on the general overview, history, and benefits of EHRs as well as general explanation of Quality of care.

4. Literature Review I

Introduction

This chapter and the next presents a review of literature on the impact of Electronic Health Record System (EHRs) on quality of Care. It has become essential to divide the literature review into two chapters to serve readers with needed understanding of the various facets of the study. The literature review one presents a general concept on the electronic health system and quality of care, discussing into details its meanings, overviews and intrinsic analysis of the salient words and concepts. It begins by briefly touching on records keeping in healthcare and then

presents an overview of EHRs, explaining some concepts and then goes through its components. It further reviews the history of EHRs with a link to its implementation benefits and challenges. The chapter continue to review the concept of quality of care, its components then discuss the five principles of quality. It ends with a summary of the topics discussed. The next chapter also reviews the more specific literature on the connection between electronic health system and healthcare quality, how it has been measured in the healthcare industry and present the theoretical and conceptual framework adopted for the study.

4.1 Records Keeping in Healthcare Industry

Records keeping is a major part of any industry and the healthcare sector is not an exception. Keeping personal health information of clients is such an important aspect of healthcare that needs the best of attention and security. There are two major ways of keeping records in the healthcare industry namely the paper-based record system and the electronic health record system. The paper-based record which used to be the main means of health records keeping presented a lot of challenges such as missing folders, misplaced laboratory report, etc. it is explained that, the paper based system alone is just not good enough anymore as it presents various challenges including no guarantee for information backup, difficulty in accessing and sharing medical history of patients, improper organization of patient records, breach of patients' privacy and error in prescriptions and Medications. It is in this light that many health facilities have adopted the use of the electronic health record system to curb such challenges, which has prompted the researcher to study its impact on healthcare quality. The literature below discusses more details of the EHRs.

4.2 Overview of the Electronic Records Health System

The healthcare industry has witnessed massive application of information and communication technology with the introduction of the Electronic Health Record system (EHRs). International Standard Organization (ISO) (2005) described EHRs as "a repository of data regarding the health of a subject of care in computer processable format". EHRs have been used in the United States of America in one form or another since the 1960s. Between the years of 1960 and 1970 a fast-evolving healthcare system arose after the federal government of the United States of America passed laws to establish Medicare

For many years, the Institute of Medicine had been urging the medical community in the United States to adopt electronic health record arguing that it would improve quality of healthcare by making it safer and more efficient.

1.3 Components of EHRs

The Electronic Health Records system has a multi-functional health system used to store, retrieve, communicate and disseminate medical data/information among health personnel. This was proved that an efficient EHRs should be capable of longitudinally storing patient health information and data, correctly managing the outcomes produced from the scheme, facilitate electronic communication and connectivity, provide assistance for patients and assist in administrative procedures and reporting. EHRs software have features such as demographics records, clinical documentation, booking, communication, laboratory, pharmacy, accounting, billing.

4.3 Benefits of EHRs

The implementation of EHRs presents users with many benefits. The Institute of Medicine revealed that, when properly designed and used, health IT is anticipated to assist improve health professionals ' efficiency, decrease operating / administrative expenses and improve patient security. On the other hand, opined that it enhances completeness, efficiencies, integrity, precision of health documents, timely and accessibility of documents. Physicians using EHRs are more likely to achieve better service delivery outcomes, including e-consults, e-billing, e-prescribing, and set aside same day appointments, as compared to their counterparts. The benefits of EHRs also include enhancing/quality improvement of patient documentation, communication, easy and quicker billing and error reduction such as prescription mistakes. EHRs improves the medical documentation, decreases medical errors and general healthcare costs. Finally, EHRs ensures proper data protection and security, enhances efficiency, effectives, improves care and increases productivity in the healthcare sector.

4.4 Challenges of Electronic Health Records System

EHRs aside its benefits have some challenges as certain difficulties needs to be cracked to ensure health facilities enjoy the benefits EHRs bring to healthcare. Challenges such as lack of infrastructure, lack of basic knowledge, poor electricity supply, Cost of implementation, Poor Internet Connectivity, Resistance to new technologies, Lack of ICT Infrastructure.

5. Literature Review II

The chapter breaks down the more specific concept of the study by analyzing various literature on the relationship between EHRs and improved healthcare quality beginning with the theoretical framework adopting the Technology Acceptance Model (TAM). The TAM shows the relevance of
the connectivity between EHRs and quality of care.

5.1 Technology Acceptance Model (TAM)

Technology Acceptance Model in his research study entitled "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of IT which is summarized in figure 1 below."

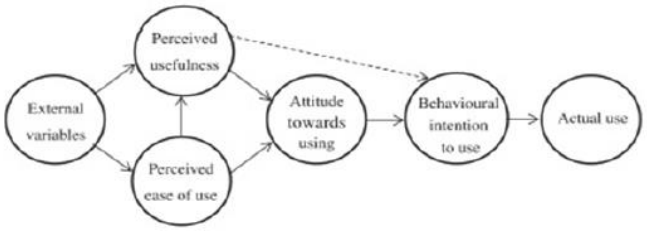

Figure 1:

The fundamental objective of the theory outlines the factors that impacts the acceptance of technologies of self-service. It implored that, the model assists practitioners and researchers to identify the reason for unacceptability of a certain system. It starts his model on the premise that the real use of the technology, defined as "one particular conduct of concern conducted by people with respect to certain data technology scheme" is influenced directly by behavioral intent to use, which he also calls "acceptance", normative and control believe. Behavioral intent is defined as "an individual's motivation or willingness to exert effort to perform the targeted behavior". The TAM theory is based on reasoned action theory

which is aimed at explaining the behavior and connecting two main predictors, thus convenience of usage and useful and dependent variables. The theory further opined that, utilizing a system of information is openly measured by the intention of using it, then affected by the attitudes of the users to usage of that system and apparent system usefulness. This theory is relevant to the study because the acceptance and behavioral intent to us affects the impact Electronic Health Records System has on quality of care in the health sector which is vital in transforming the phase of healthcare
across the globe. Again, the TAM theory is adopted because it sought to connect the usability and its connections to enhancing quality agrees to the main objectives of the study as will serve as a theory to evaluate the impact of EHRs on quality healthcare at Academic Research Hospital with the goal of measuring the quality of care using the Hospital's method, structure and outcome of EHRs.

5.2 The use of EHRs in a Health Facility

The first objective seeks to review literature on the adoption, implementation and usefulness of the EHRs among both staff and patients. The Electronic Health Record system can be useful in many ways for both patients, healthcare workers and facility management team. The EHRs is used to capture, store and analyze clinical data of patient right from the records department to the last point of care of clients before departure even including the morgue. Its operation entails care of patients since it operates as a core information source for communication amongst healthcare providers, handling the history of the patients, observing, diagnosing and the therapeutic conclusions as well as a broad range of unstructured information and documents. The investigative arm of EHRs helps clinicians to easily request, view, analyze and interpretation client's laboratory and radiological investigations with ease. EHR reduces the task of the pharmacy by aiding in the costing or billing of patients' drugs,
makes it easier to track expenses owed to the facility by virtue of the health service provided to the patient and help in administrative processes and report. Finally, EHRs is used in the general management of the hospital such as procurements,
financial accounting and billing, generating reports from various departments, monitoring and evaluating of the facility's performance.

5.3 Impact of EHR on healthcare Quality

We review various literature and study on the perceived benefits and impact of the EHR system on the quality of healthcare delivery. Quality of care is the degree to which health facilities for individuals and people improve the probability of required health results (quality principles). It is indicated that, when the system design is poor and improper can cause errors that jeopardize the integrity of the information, leading to errors that endanger patient safety or decrease the quality of care, which agreed. These draw backs do not impede the impact of electronic health record system on healthcare quality since there are millions or literature proving its successes especially in America. Therefore, to achieve the high-level quality of care and improved patient safety anticipated from the use of EHRs, the
above problems need to be addressed. EHRs promotes easy sharing of information, transparency and time serving, ensured security of information, proper data management, promotes customer satisfaction and enhance efficiency Furthermore, EHRs' improves Out-patient department care delivery by ensuring that proper triaging is done and as well is able to arrange patients in order of the time they arrived at the clinic and the consulting room they are supposed to be seen. The findings of Nkansah indicated that the EHR system improves triaging, reduces discrimination, reduces waiting times and improved clients' satisfaction. Clearly, it can be said that the EHRs presents a lot of benefits to both users and healthcare managers such as, reduction of waste, reduction of waiting time and harmful delays, respectful and responsive healthcare delivery, reduction of various harm to patient due to medical errors and improved appointment booking and improved healthcare outcomes.

5.4 Conceptual Framework

It is concluded that the conceptual framework is an overall comprehensive presentation of the main ideas raised in the literature sources and theories reviewed. This is a special aspect of the study in which the relationship between the main variables of the study objects is analytically presented in a diagram/pictorial form. A conceptual framework is a synopsis of various findings from the literature sources that have been reviewed about the research, setting out the research agenda for increased understanding of the research intentions in the below figure (conceptual framework) summaries and merges the key points or findings of the review, into one unit with a common literature position that can easily be understood.

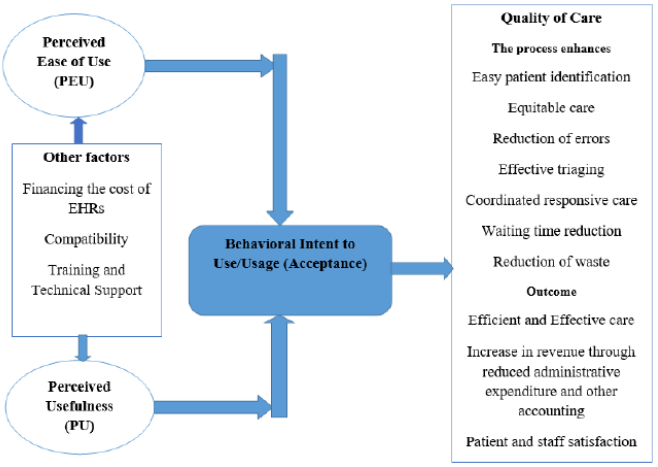

Figure 2:

5.5 Gap filled by study

Many of the above reviewed literature highlighted more on the uses of ICT in health, implementations, and adoption of electronic health record system in health facilities across the world. The less literature is found on electronic health record system most especially on its impact/benefits on healthcare in the country. Although the current research study delves deep into the electronic health records system of the Academic Research hospital and its impact on healthcare quality, it is meant to fill the big gap in literature concerning EHRs. Again, it gives a qualitative view on the importance EHRs in the health system thereby filling the literature gap on proves of positive impacts on quality.

5.6 Summary

The chapter reviewed literatures which were specifically connecting the connection between electronic health system and quality of care. It adopted the Technology Acceptance Model (TAM) to expand the connectivity between information technology and benefits such as improved healthcare quality.

The chapter was further broken down based on the study objectives to review previous literatures that were in consonance to the study and then a conceptual framework was formulated to underscore the connection of EHRs and healthcare quality. The various literature indicated the existence of a relationship between electronic health records system and healthcare quality. Even though this literature has contributed greatly in understanding of EHRs especially, most focused on the adoption of the system and the challenges faced with literature on the electronic health records impact on healthcare quality appearing to be uncommon. This makes it imperative that, this study will bring a new light to the EHRs and add to the inventory of data relevant to electronic health records system. The next chapter discusses the methodology used for the study, justifying why the qualitative design was appropriate and its relevance to the study, sample size and its sampling method/techniques among others.

6.Methods

6.1 Introduction

The chapter explains research methodology considering why the study chose the qualitative approach over others. It gives a brief history and services rendered by the research setting. It also discusses the case study design which affords the researcher the needed impetus to choose the sampling technique/size, the study population, and the data collection instruments used. The sources of data, its validity/reliability as wells key constraints to this study and the ethical consideration were not left out.

6.2 Study Setting

Academic Research Hospital, established in 2000 is a Health Service facility proving general consultation services, emergency, general surgical and in-patient services, ophthalmology, maternal and child health, laboratory and radiological servicers, mortuary services, etc. to many communities. It has 118-bed capacity with average bed occupancy rate of 61.67 and average Out-patients attendance of 164 per day for the year 2021 serving several communities and beyond with over 200 staffs. It is accredited by the National Health Insurance Scheme (Academic Research Hospital health informatic Unit 2022).

6.3 Research Approach

According to research both qualitative and quantitative research approach have their variable features and benefits when chosen for a particular research study. Quantitative research is based on the measurement of quantity or amount thus expressing or describing in terms of one or more quantities employing tools like questionnaires or surveys, time studies, etc. to achieve its objectives whereas qualitative research is concerned with qualitative phenomenon, which is non-numerical, descriptive, applies reasoning and uses words and aims to get the meaning, feeling and describe the situations. Knowing the current study sort to measure the connection between EHRs and quality healthcare, an approach which is non-numerical and allows respondents to freely express their opinions without prejudice had to be chosen hence qualitative approach was more appropriate. The qualitative approach deals with quality correlation, describes how and why there is a connection between the EHRs and gives much more details to the researcher on the study. Qualitative methodology depends subjectively on observations and description to assess knowledge, attitudes, behaviors, and opinions of people and how variables inter-relates with others. The qualitative approach made it easier to understand the complex issues underlying the study phenomenon, allowing certain modification to be made to the study and giving room for unpredicted findings obtained from the study to be inputted into the study framework.

6.4 Design

The research design is the general plan of how a researcher will go about answering research question. There are many types of designs such as experiments, surveys, action research, etc. but the case study design was adopted. It defines case study as 'a strategy for doing
research which involves an empirical investigation of a particular contemporary phenomenon within its real-life context using multiple sources of evidence'. The case study was chosen above other designs since it goes very well with qualitative analysis and had the potential of arming the researcher to thoroughly study the impact of EHRs on quality of care at the study site by enabling combination of different data sources (interviews, observations, etc.), to take subjective opinions of staffs and clients using the electronic health records. Again, case study design is more appropriate in studying a single entity like a hospital to evidently ascertain a connection between a phenomenon. Also, it was chosen above others because it afforded considerable ability to generate answers to the question 'why?' the 'what?' and 'how?' questions, using various data collection techniques singularly or in combination.

6.5 Study Population

The study population is the people which the researcher wants to study and generalize the study findings on. It consists of all cases of individuals or elements that fit a certain specification. The study population involved patients, management and staffs who uses the electronic health record system in the Academic Research hospital.

6.6 Sample Size/technique

Sample size and the technique used are influenced by the availability of resources, in particular financial support and time available to select the sample and to collect and analyze the data. The sample size represents the specific people the researcher intends to seek their opinions, understanding and experience on the current study. Smaller samples sizes are used in qualitative research so far as the selected are homogenous and possess experience to give the requisite information to enable subsequent statistical analyses to be undertaken. The study sample size was thirteen (13) which were determined by the principle of saturation including one physician, one physician assistant, a record officer, a laboratory technician, EHRs manager, a pharmacist, two nurses and five patients. The researcher adopted the principle of saturation to reduce repetitiveness of respondents' responses and also used a purposive and convenient non-probability sampling techniques based on respondent's demographic and user experience of EHRs, which provided the opportunity to reach difficult-to-identify members of the study population.

6.7 Data Collection Instruments

Data was gathered mainly through a semi-structured interview questionnaire which included 10 open-ended questions derived through the review of literatures on

EHRs and quality of care considering the TAM theory. The questionnaire was drafted to assess the opinions, experiences of the EHRs and its relationship with improved healthcare quality of respondents. This approach helped researcher gather the best of data to make meaningful interpretation of findings and to validate the responses from the respondents.

6.8 Sources of Data

Data were acquired from primary sources, thus from field observation as well as a guided interviews with management, staffs, and patients. Secondary data sources abstained from books, internet, previous scientific studies as well as other journals were basically used for an empirical literature review which served as a guide for the study.

6.9 Data Analysis

Robson iterated that, qualitative data analysis requires the "clear thinking on the part of the analyst" so as to make meaningful and useful presentation of the data gathered. This is important since it involves the analyzing of words in the form of narratives or accounts. Again, qualitative data analysis is enriched by the ability to triangulate with observations and field notes. The interview questionnaires were structured according to themes to reflect the study's main objectives to aid easy analysis. The in-depth interviews were recorded using a voice recorder and played back at least three times whiles transcribing them into words under the various themes of the study to ensure the exact words of respondents are established leading quality and accuracy of responses. The content of the transcribed data, and observations were then analyzed and interpretated.

6.10 Validity and Reliability

In order to evaluate qualitative research, it describes validation as a method to convey accurate findings through established validation strategies including: prolonged commitment and persistent observation, peer review or debriefing, negative case analysis, clarification of research bias; etc. The various chapters of the study together with including interview questionnaire were thoroughly reviewed by research supervisor who made the needed corrections and suggestions on the study to reduce biases before its approval. The investigator should recognize biases that may add to the study's interpretations and conclusions. Also, the researcher's personal experiences working with EHRs and prior interactions with the hospital management and other respondents helped tackle the inevitable bias in order to better interpret the study findings. Reliability weighs extent to which a research instrument produces similar findings when it replicated ensuring consistency of responses. Reliability in this study was ensured through piloting of interview questionnaire on three potential respondents including a physician assistant and two patients. The integrity of the study was ensured as researcher responses of each participant were reviewed with them to prove the data captured was accurate and reflected the expected responses, making data gathered not only reliable but quality and credible.

6.11 Ethical Consideration

Ethical consideration is an integral essential aspect of research which ensures researcher is granted the needed and free space to conduct a study and respondents are given the needed protection and their anonymity, confidentiality and avoiding deception. The identities of respondents remained confidential as they were adequately informed about the purpose of the study and their liberty to withdraw at any time. Since there was no separate ethical research committee in the facility, the research proposal was sent through the hospital administration and was approved by the hospital management.

6.12 Limitation of the Study

The results of this study cannot be generalized to reflect other health facilities in Hospital, as it concentrated only on the staff and patients of Academic Research hospital. Secondly, since the study's objective concentrated more on structural, process and outcome factors ensuring improved healthcare quality with EHRs it did not investigate certain issues like negative attitude of staff towards its use, however, future researchers are encouraged to do further research in these areas. Also, the fear of being victimized due to their response made some respondents feel reluctant to give out information but the challenge was resolved as researcher assured them of maximum confidentiality as well as explained that although the study can help the facility to improve upon its services, it was purely for academic and scholarly purpose. Finally, some respondents especially clients went a bit overboard with their response by trying to chip in certain issues that were not related or relevant to the study, however the researcher used his experience to explain to such respondents how such issues can be channeled to authorities.

6.13 Summary

The chapter discussed the methodology used in the study of relationship between EHRs and improved healthcare quality at the Academic Research Hospital. It justified the selections of qualitative research and the case study design over others and proved how they were relevant in the study. It also justified participant selection, data collection techniques being mainly interviews and data analysis technique of the study. Finally, the chapter proved the validity of data gather, its limitations and the ethical considerations observed.

7 Results/Findings

7.1 Demographics

The demographic data of staff are presented with their codes in terms of their job positions, gender, work experience and their experience level with use of EHRs. That of the patients are presented with their codes in terms of their job, gender, age, number of years they have received care at the facility and their knowledge in information communication technology (ICT).

Respondent	Job Title/Position	Gender	WorkExperience	EHRExperience
ST001	Medical Laboratory Scientist	Female	6-10 years	3-5 years
ST002	Head of records department	Male	Over 10	3-5 years
ST003	Head of Pharmacist	Male	years	3-5 years
ST004	IT/EHRs manager	Male	Over 10	6-10 years
ST005	Physician Assistant (Clinical	Male	years	6-10 years
ST006	Psychiatrist)	Male	6-10 years	3-5 years
ST007	Medical Officer	Male	Over 10	3-5 years
ST008	Nurse	Female	years	3-5 years

Table 1 Summary of Staff demographics

As shown in table 1, the 8 staffs who were interviewed had varied working experience ranging from three (3) to over

ten (10) years with all respondents having at least three years working experience with EHRs. They include 2 nurses, a medical laboratory scientist, head of records department, head of pharmacy department, ICT/EHRs manager, a physician assistant who is also a clinical psychiatrist and then a medical doctor. This shows that the respondents were from various departments of the hospital with different jobs descriptions as well as exemplifies their varied experience in their current jobs and the use of EHRs making them have the knowledge and experience to respond to the study in terms of their departments.

Respondent	Job Title/Position	Gender	WorkExperience	Years receiving c	ITKnowledge
P001	Student (3) year, SHS)	Male	18	3-5 years	Working skills
P002	Trader	Female	45	< 3 years	Beginner
P003	Farmer	Male	50	6-10 years	Beginner
P004	Teacher	Female	40	6-10 years	Working skills
P005	Banker	Female	36	6-10 years	Working skills

Table 2 Summary of patients' demographics

As shown in table 2, the five (5) patients who were interviewed had varied IT experience with three having working skills and two beginners. This means majority of the clients have a fair idea of IT making them fit for the study. Three (3) of them have been receiving care at the facility between 6-10 years making them have the experience of both the paper-based system and EHRs. Finally, the different professions namely, banker, teacher, farmer, trader, and student exemplify opinions of varied individuals with different economic status and literacy was sorted.

8 Discussion

This section discusses the findings from the analyzed data collected through the interviews under the three study objectives and connect/compare findings with other studies from the literature review.

8.1 The Use of Electronic Health Records System

The first objective of the research was to study the implementation/adoption and the use of EHRs in the Academic Research hospital. The objective was analyzed using the thematic analysis of the response from both the staffs and clients of the hospital. The analysis from the response of the staffs proved that, all departments of the hospital including records, laboratory, pharmacy, etc., were using EHRs to keep data of clients and that all the department were fully electronic. This means the facility has fully adopted the EHRs and the system is the main medium of communicating client's health data among all clinicians and staffs including records keeping, laboratory reports, drugs history, diagnosis, etc. Again, the analysis shows that the hospital easily creates, manages and safely keep all health data using EHRs. The findings also reinstate the fact that, hospitals and health facilities and other countries are adopting and investing heavily in EHRs so as to improve patient safety, healthcare quality, and transforming the healthcare industry.

8.2 Behavioral Intent/ Willingness to use EHRs

The second objective of the study aimed at assessing the willingness of both clients and staffs of the Academic Hospital to continue using the Electronic Health Records System. The analysis reviewed that, all the staffs of the hospital were happy with the use of EHRs as it makes work easier and faster than before with all the clients acknowledging the quality improvement of EHRs and expressed their satisfactions and willingness to continue using the EHRs. This proves that health professionals showed positive attitude towards the use of the EHRs and are ever ready to continue using it since it is having a positive impact on clients and also improving their efficacy efficiency. Again, the findings proves that healthcare workers are more likely to accept EHRs and other health innovations once it's safe, yields positive results and improves the care of their clients. This finding also underscores the fact that, users are likely to use tools, equipment and systems that ensures their convenience as well as contributes to their effectiveness, efficiency, efficacy and transforms their efforts into a meaningful result with less energy and times use. Also, some respondents had mixed feelings concerning the EHRs including waiting time at certain department, electrical instability, etc. This finding brings to notice that due to the perceived benefits from users, some people may have a higher expectation of the EHRs and when such expectations are not met accordingly due to certain constrain, users may have mixed feeling about the use of EHRs regarding its sustainability. The above findings defeat the mindset that healthcare workers are highly likely to reject the use of new technologies they are not familiar. Finally, the findings affirmed that, the willingness of users to use EHRs is a key aspect of the success of the system since psychologically, the user may refuse its usage if he or she doesn't have trust or has no intent.

8.3 Impact of EHRs on Healthcare Quality

The third study objective was to evaluate the impact of EHR on quality of care among the hospital staffs and patients in Academic Research Hospital. This was measured by thematic analysis of the responses of the 13 respondents from various semi-structure questions on quality healthcare as well as giving respondents opportunity to express their opinions on any other benefits/quality impact they have enjoyed through the use of EHRs. The respondents enumerated many roles EHRs has had on quality improvement in services at the hospital. The study found that, EHRs has improved the quality of medical records keeping as every data of clients are kept on the EHRs software. This means medical records staffs do not have to comb through thousands of folders in search of the folder of clients. This also brings a stop to records staff reregistering clients when their folder or folder number is missing since even without the client's hospital identity number, clients' phone number or name or other demographic data can be used to search for their hospital identity number so their records can be retrieved. Again, findings prove that EHRs has brought an end to the issues of missing clients' records such as medical history, laboratory report and other relevant information as every data of client is stored on the serve and can be easily retrieved at any time. Furthermore, this finding means clinical staffs can easily have access to the past medical history, previous diagnosis, previous medications, treatment and any other relevant information about a client with just a click on the computer aiding in easy continuity of care. The finding again shows that EHRs promotes easy sharing of clients' information among clinical staff in a

transparent manner in less time which makes clinicians such as specialist know what had already been done for clients by their junior colleagues. Also, the analysis found that EHRs ensured security of health data information. Since the EHRs is securely encrypted and each account holder has restricted access to certain areas with their unique username and password, the information of clients is secured and cannot be stolen by a lay person. Clients feel their information is safe with EHRs since all their records are on the system and so can be saved during emergencies. The study again found that, EHRs reduces waste of resources such as time, money, and others. Staffs wouldn't have to go through many files for hours to retrieve laboratory report or other relevant health data. Using EHRs, the healthcare facility saves a lot of money from procuring notebooks for recording clients' identity numbers and other information, folders, papers as well as other resources which came with the paper-based system which help reduce administrative and operational cost of the facility. Again, the analysis found that EHRs improves the efficiency and productivity of staffs. Since there is less writing and movements with the use the EHRs, clinicians can deliver care services with less amount of time and effort. Again, the ease EHRs provides in care helps clinicians conserve more energy to effectively produce the best of care. Again, the study found that, EHRs has reduced waiting time and client centered values are placed above everything else. Again, the EHRs enhances the responsiveness of clinicians to care especially in emergencies as they would be able to quickly know the history and relevant information about clients with less effort. The analysis found that, EHRs reduces various medical errors and improved the quality of drugs served. EHRs has certain features that prompts users whenever a perceived error is detected such as prescription errors. The EHRs software can support prescribers in drug dosing, route and the quantity to serve and it's able to detect and prompt the prescriber in case there is over prescription, overdosing and any other prescription errors. This ensures that clients receive the right medications at the right dose and frequency. Also, the analysis found EHRs to be helpful in pharmacy management by helping track expiry of drugs. The EHRs gives pharmacy staffs the opportunity to input the expiry dates of drugs into the system and gives them reminders when a drug is near its expiry date as well as when a drug expires so that it is not served to clients without knowing. This also means that authorized people at the hospital pharmacy would be able to tract and make corrections in the system concern drugs thereby improving the quality delivery of pharmacy services. The study also found that EHRs undoubtedly has improved healthcare outcome such as reduced morbidity like convulsions at the OPD and helped make clients better. The EHRs enhances nurses' ability to know which patient is at risk of immediate morbidity at the OPD as the nurse can easily check clients' previous diagnoses with just a click on the computer. Again, the triage features on EHRs software can group clients into the various codes of triaging based on their vitals and the short history taken at the history room by the OPD nurses thereby reducing a potential morbidity. The accuracy and safety EHRs bring to service providers supports them to provide the best of services to clients with less errors which makes them get better with no harm caused them. The analysis also realized that EHRs ensures nondiscrimination in care giving as it improves the use of first come, first serve care delivery as well as ensures the right patient receives the right kind of care without prejudice to economic status, religion, ethnicity, etc. EHRs helps service providers to deliver services at a faster rate in less time making clients spend less time waiting for services to be rendered. This makes clients feel more respected and cared for since they realize their care givers can meet their needs in less times with efficacy. The analysis again found that EHRs doesn't directly reduce the cost of healthcare service but helps make billing easier, transparent, and faster. The EHRs software automatically captures the cost of services rendered to clients with service providers knowing and being able to communicate to clients the cost of services to be rendered. The billing system makes clients spend less time at payment points as the system has already calculated the amount to be paid with client already in the known. Finally, one key finding was client satisfaction of services rendered through EHRs with clients rating the facility very high as clients feels safer with the use of EHRs. This proves that the introduction of EHRs has improved the personal health of patients thereby increasing their satisfaction levels. This means facilities using EHRs are likely to have a higher patient turnout than facilities using the paper-based system due to the higher client satisfaction level and testimonies on the use of the electronic health records system.

8.4 Additional findings

Although the study objectives were set to know the impact of EHRs on quality healthcare at the Academic Research Hospital, a strong theme that waved itself into the study was the various challenges and fears of both staff and clients faced with the use of EHRs which affected the smooth running of the electronic health records. The analysis found that breach of clients' privacy and confidentiality was a concern with the use of EHRs as certain users of electronic health system can breach the integrity of the therefore system managers of EHRs must ensures proper data protection and security measures are put in place. Again, the analysis found inadequate staff training on the use of EHRs and information communication technology illiteracy of some user as a threat to the system. Staff who lack basic skills in information communication technology have difficulty using the system. Also, when less effort is put in place to adequately equip staffs on the use of EHRs software, it reduces its effectiveness. Again, the analysis found proper maintenance of the EHRs system, and its cost threatened the smooth implementation of EHRs since poor maintenance of EHRs equipment can compromise the system and impede its smooth running. Another challenge found from the analysis which was of paramount concern was poor electricity and unstable, poor internet connectivity. Frequent power outages at a health facility can reduce the effectiveness of the EHRs since the server and other equipment are powered with electricity. Again, the system require internet connectivity and so unstable and poor internet serves in a hospital makes the system slow. This finding means that, developing areas or countries with very poor internet connectivity and

electrical stability would have difficulty implementing electronic health records system

9. Limitations of the study

The study focused on the impact of electronic health records system at the Academic Research hospital with study samples that represented the views of users of the system at the facility therefore this study cannot be generalized as a representation of the impact EHRs is having on all health facilities. Also, since a small sample size was used, the findings may not represent the general views of all users of EHRs at the Academic Research Hospital. The qualitative approach and the small sample size can also be a limitation as only few had the opportunity to participate in the study since there could have been more nuanced findings if a mixture of qualitative and quantitative approach was used to include more participants. Again, since staffs and clients were posed with questions concerning their experience and perceived impacts of EHRs on healthcare quality, there is a possibility of recall and confounding bias. The above limitation notwithstanding, the study was able to generate enough data to achieve its main objective of assessing and proving the impact of EHRs on quality healthcare at the Academic Research Hospital making the study credible and very helpful to EHRs literature.

10. Concluding Remarks

Healthcare quality is a major important factor in the health sector with current stakeholders finding ways of improving the quality of healthcare delivery. One of the main headache healthcare stakeholders have had in the past that posed a major concern to quality is the management of client's records and data at various healthcare facility. The adoption and use of the electronic means of managing healthcare data has evolved over the years to solve this perennial headache and become the main source of data management in many health facilities across the world. As a result, a lot of studies have been done concerning the use, implementation and full adoption of Electronic Health Records System (EHRs) in the healthcare industry, but little was known concerning the impact it has had on improving the quality of care at the various health facilities using it especially. This study was therefore conducted at the Academic Research Hospital with the main objective of evaluating the impact of EHRs on quality healthcare at the facility. The study yielded a positive result proving to a larger extent that EHRs has helped improve quality care delivery at the Academic Research Hospital by exposing many positive impacts the EHRs has had on quality improvement. Although the use of EHRs faced some challenges such us unstable internet network slowing down the system on some occasions, electricity instability which can be frustrating as well as inadequate training of staffs, IT illiteracy and concerns with breach of privacy, which all can be improved to make the integrity of the system better, it did not defeat the far-reaching benefits of it. The key successes in quality improvement choked through the EHRs on the part of the hospital staffs were, improvement in the storage and quality of medical records solving issues of missing records, easy retrieval of records by healthcare practitioners, reduction in administrative and operational cost, improvement in client in safety, improved staff productivity, efficiency, effectiveness of healthcare delivery, reduction of waste of resources and helping track expiry dates of medications as well as improved health outcomes whiles clients also enjoyed reduction of waiting time and harmful delays at the OPD, improvement in triaging and responsive care, improvement in non-discriminatory care, improved personal healthcare of clients, improved clients satisfaction on services rendered at the facility. The findings of the study confirm the results of other studies on the benefits of using EHRs and affirms the conceptual framework of the study as well as the Technology Acceptance Model (TAM) theory. The study therefore succeeds in filling the gap in literature concerning the impact of EHRs on quality care delivery and the world.

11. Recommendations

Based on the study findings, the following recommendations should be considered. Firstly, the study recommends that the management of the Academic Research hospital must take proactive steps in organizing in-service training and retraining of staffs on the use of the EHRs so as enhance their skills and use of it to aid in the smooth running of the system. Also, the facility should put systems in place to maintain the tools used for EHRs such as computers, servers, etc. to avoid breakdown and help sustain the use of EHRs. Furthermore, the facility should put up a good institutional measure to maintain adequate privacy and security of clients' data. The study again recommends that, the Academic Research Hospital improve upon its electrical power supply especially by getting adequate alternative power source to sustain the EHRs whenever the national electrical power supply is cut off. The study further recommends all health organizations take a clue from the numerous benefits of the EHRs and put measures in place to fully adopt it or sustain it in their facilities. The study again also recommends that its various stakeholders review its policy used in healthcare delivery and implement highly technological schemes such as the EHRs across healthcare facilities so as to improve upon the integrity and quality in healthcare delivery. The study also recommends that the current study be replicated in other healthcare facilities using the EHRs to assess the impacts the system is having on healthcare quality to amass more literature on the electronic health records system. Finally, the study recommends that since this study used the qualitative method, further studies on same subject using other research methods like the quantitative analysis or mixture of methods could be used to accommodate a bigger sample size to offer alternative findings to either support or dispute the current findings and also reveal the shortcoming is this study.

12. Declarations

Ethics approval and consent to participate: The study and all methods used was conducted in accordance with the strict regulation and guidelines of the International Standards. Availability of data and material. The datasets generated and/or analyzed during the current study are

available as Dataset Generated and Analyzed during the study and uploaded in the supplementary file section/repository.

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