

AN ASSESSMENT OF THE EFFECT OF E-HEALTH ADMINISTRATION ON EFFICIENT SERVICE DELIVERY IN FEDERAL TEACHING HOSPITAL GOMBE

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ABSTRACT

The Federal Teaching Hospital Gombe initially introduce the electronic health(e-health) system with the aim of enhancing efficient service delivery to the patient, as well as to move from use of the traditional paper record system to information and communication technology models which often eliminate delay in service delivery and long patient waiting time. Despite the services delivered by the hospital the system still observes many obstacles. Therefore, this study was conducted to investigate the effect of e- health on efficient service delivery in Federal Teaching Hospital Gombe (FTH, Gombe). It focuses on the perception of medical staff and out – patients to understand the influence of e-health on the perceived quality and accessibility of the delivered medical service. The study adopted survey design and the source of data comprised both primary and secondary. The population comprised only twenty five (25) medical practitioners rendering services in a General out- patient department (GOPD), and four hundred and twenty five (425) patients whose receives services in the (GOPD). The sample size were twenty five medical practitioners and two hundred and six (206) patients selected using Slovene’s formula. Random sampling technique were used in distributing two hundred and thirty one (231) questionnaires among the respondents within the GOPD Unit of the hospital. The data collected was analyzed using simple percentage and Chi-Square (χ^2) analysis and the hypotheses was tested at 0.05 level of significance. The study concluded that, service delivery is not efficient to doctors and patients of Federal Teaching Hospital, Gombe, and also the E-health service delivery is accessible to both medical practitioners and the service receivers in Federal Teaching Hospital, Gombe and the study recommended that the management of Federal Teaching Hospital (FTH) Gombe should create training and development unit within the ICT unit of the hospital and encourage the system users to apply for such training and development preferably on annual basis. Budget should be created to such unit and training allowance should be allocated to every participant, this will create competition in the application process.

Keywords: E-Health, E-Service Delivery, Efficiency, Quality, Accessibility, Out- Patient

Introduction

Information and Communication Technology (ICT) has the potential of changing healthcare services. The use of ICT in the healthcare sector, i.e. e-Health, has in recent years started to change

medical work in revolutionary ways but the expectations on future benefits of e-Health is constantly high. The First Innovation Actions Network for the Information Society (IANIS) project in 2014 described in the report on e-Health, that; e-Health is an umbrella term encompassing a broad range of ICT-driven activities that are transforming the delivery of healthcare. E-health is the use of Information Technology possibilities and health resources in the enhancement and promotion of health and health services (WHO, 2016). The essence of e-Health, whatever the definition, is that it leads to improvement of healthcare services. Improving quality of care, increasing the efficiency of healthcare work, making healthcare services more accessible and improving the effectiveness of medical interventions and patient care.

Apart from the African countries, the adoption of e-health is gradually gaining momentum as governments recognize its potential to drive socio-economic development. The African Union's Digital Transformation Strategy for Africa (2020-2030) outlines a vision for harnessing ICT to foster inclusive growth and improve public service delivery (African Union, 2020). Countries like Rwanda, Kenya and many more have made significant strides in this regard.

In Nigerian hospitals, Healthcare service delivery has become worrisome over the last decades. Hospitals and clinics in public and private sectors have failed to follow the global trend of information systems or competently implement policies to ensure patient health information. Health services in Nigeria are characterized by inefficiency and poor management practices, which has become major obstacles to healthcare delivery.

Federal Teaching Hospital, Gombe (FTH, Gombe), like other Nigerian own public hospitals, has recognized the potential of e-health in enhancing efficient service delivery. The strategy for the implementation of e-health at FTH, Gombe - as contain in the Universal Health Coverage (UHC) vision 2022 title as "Bringing healthcare services to all families" through the provision of Accessible, Affordable, Sustainable and Qualitative healthcare delivery services through sector-wide adoption of e-Health by 2022" - gradually started in June, 2021 by the Health Information Department (HID) which serve as heart of the hospital, gradually the installation process of the system move to the Account section of the hospital, then Laboratory Unit, Pharmacy Unit, other Clinics within the hospital and lastly to the Wards of the hospital.

Various studies have been carried out and many are still in progress with the aim of assessing the effect of e-Health solutions on the quality, efficient service delivery and safety of health care, and to inform policy decisions on e-Health deployments. Based on the above, a study will also be undertaken to assess the effect of e-Health Administration on efficient service delivery specific in Federal Teaching Hospital Gombe (FTH, Gombe).

The Federal Teaching Hospital Gombe (FTH, Gombe) initially introduce the e- health system with the aim of enhancing efficient service delivery to the patient, as well as to move from use of the traditional paper record system to information and communication technology models which often eliminate delay in service delivery and long patient waiting time. Despite the services

delivered by the hospital the system still observes many obstacles such as wrong perspective by the staff of the hospital against the entire system, selfish interest, resistance to change by both the clinical and non- clinical staff of the hospital, computer illiteracy by the majority of the hospital staff and the system interface itself (field survey, 2025). How does the e-health provide efficient service delivery to both clinical and non-clinical staff of the Federal Teaching Hospital Gombe? Does the system ensure efficient service delivery to patients? What are the parameters to be employ for measuring efficient service delivery and what are the setbacks encountered by the system? The aim of this study will investigate the effect of e- health on efficient service delivery in Federal Teaching Hospital Gombe (FTH, Gombe). This helps to fill the gap in literatures since many scholars have undertaken studies on the related fields namely; Alawiye etals (2024), and Elikwe etals (2019) and many more. This study has its uniqueness in assessing the effect of e- health Administration on efficient service delivery in Federal Teaching Hospital Gombe (FTH, Gombe) making emphasis on quality service delivery and accessibility of the services which are the main core for efficient service delivery in Federal Teaching Hospital Gombe.

The main objective of this study is to assess the effect of e-Health Administration on efficient service delivery in Federal Teaching Hospital Gombe (FTH, Gombe). Specifically, the study aims:

- i. To determine the quality of e-Health on efficient service delivery in Federal Teaching Hospital Gombe,
- ii. To determine the accessibility of e-Health on efficient service delivery in Federal Teaching Hospital Gombe.

Hypotheses

H₀¹: E-health service delivery is not qualitative in Federal Teaching Hospital Gombe.

H₀²: E-Health service delivery is inaccessible in Federal Teaching Hospital Gombe.

Literature Review

Service Delivery

Service delivery simply means the extent to which an individual, unit or department of an organization discharge their assigned or statutory responsibilities. It also serves as a method for organizations to assess the input and output levels of individual employees or units, particularly in achieving assigned goals or tasks. According to Byars & Rue. (2006), service delivery reflects the extent to which an employee completes the tasks that define their job. Service delivery is the process of providing services to customers in a way that is efficient, smooth, and high quality. It's a key part of creating a good customer experience. They summarize service delivery as the degree of performance, output, and productivity of an organization or employee in fulfilling their responsibilities within the constraints of time, money, and other resources, aiming to achieve the organization's overall goals. Service delivery is one of the most important aspects of running a business. It provides the opportunity to impress customers and show them what the business can

do and the value it offers. This can create an excellent relationship with the customer and lead to good reviews and word-of-mouth marketing. The level of service delivery is influenced by employees' performance in reaching organizational objectives and satisfying public needs. For this study, service delivery is viewed as the attainment of targets (performance/output/productivity) related to tasks assigned to organizations or employees within a specific timeframe. It involves executing duties and responsibilities assigned by authorities, aimed at achieving organizational goals. Therefore, the degree to which an organization or its employees perform their duties and functions to meet set goals determines the efficiency, effectiveness, economy, and productivity of service delivery, as stated by Danowski (2015).

E-Service Delivery

An e-service is a service that is delivered electronically to customers using a network, such as the internet. E-services can be used for a variety of purposes, including selling goods, providing administrative services, and enabling democratic participation. According Tiwana & Ramesh (2002) e- service is the internet based application that fulfill service needs by seamlessly bringing together distributed specialized resources to enable complex, often real time transaction. (Bello, 2025), define Electronic services or e-services are services that make use of information and communication technologies (ICTs). The three main components of e-services are:

1. service provider;
2. service receiver; and
3. the channels of service delivery (i.e., technology)

Danowski's (2015) survey titled "The Failure of e-Government in Developing Countries," the number of country websites providing information about specific programs and initiatives to benefit women, children, youth, persons with disabilities, older persons, indigenous peoples, people living in poverty, and other vulnerable groups has been steadily increasing since 2012.

Measuring E-Service Delivery

Zethaimal, Parasuraman & Malhotra (2022) have developed e-SERVQUAL as a tool for measuring e-service delivery. Through focus group interview, they identified seven dimensions of e- service delivery namely;

- i. Efficiency,
- ii. Reliability,
- iii. Fulfillment,
- iv. Privacy,
- v. Responsiveness,
- vi. Compensation and,
- vii. Contact.

They identified four dimensions efficiency, reliability, fulfillment, privacy to form the core e-SERVQUAL scale that is used to measure customer perceptions of service quality delivered by online retailers.

Meaning of E-Health Services

E-health is the use of Information technology possibilities and health resources in the enhancement and promotion of health and health services (WHO, 2016). The first IANIS project in 2014 described in the report on e-Health, that; e-Health is an umbrella term encompassing a broad range of ICT-driven activities that are transforming the delivery of healthcare. Electronic health is perceived as a general term that denotes any types of digital information associated with and important to healthcare delivery. It is the integration of information supported equipment to aid every aspect of medical care services, literature, research, surveillance, education and knowledge (Umar, 2015). It is also described as an enormous integrated system that aids the wide-ranging information requirement of medical facilities in the areas of patient, ancillary, clinical and financial management; which can also be perceived as a holistic healthcare information system, designed to store, operate and retrieve administrative and clinical information (Ojo & Popoola, 2015). E-Health is defined as the use of information and communications technology (ICT) for health in support of health and health-related fields. Other benefits of e-health information systems include access to updated medical records and interrelated information, clinical decision aided systems, electronic prescriptions. Countries can harness e-Health for improving service delivery, as the visible face of universal Healthcare coverage (UHC).

Types of E-Health

According to Dawit (2019) there are numerous different types of **e-Health**, however there is two main categories of **e-Health** where most systems fit into one of the two categories; Electronic medical/health record (EMR), and, Clinical decision support system (CDSS).

Electronic Medical/Health Record (EMR) - EMR handles patient records or information where each patient's medical information is collected, processed and stored in electronic form (Muhanga 2020). These records include patient details, patient health history, test results, diagnosis, medications, and doctor appointments/special visits. EMR enables records to be shared by other health professionals and ensure the streamline of patient data to be accessed by various professionals and doctors in different health facility, clinic or hospital to ensure easy access of information, better treatment as well as time saving.

Clinical Decision Support System (CDSS) - CDSS manages information, clinical data sharing, and helps clinicians make better clinical decisions. According to Agyepong, (2020) “the clinical decision support in facilitating clinical work flow integration among nurses and other medical professionals”. CDSS analyzes data using the system, the availability of analyzed data assist professionals and health providers in improving care to patients and decisions making.

Information Collected by e-Health - The kind of information collected in health information systems includes patient information, laboratory test results, diagnosis report, treatment, and medical history (Brook, 2020). HIS collects information from health industry; in clinics, dispensaries, health facilities and hospitals (WHO, 2020). The information collected is needed and used by health providers, nurses, doctors, health planners, decision makers and policy makers; used to improve patient safety, service delivery, make plan and decisions on health matters and enact effective health policy.

Risks and Challenges of E-Health

In spite of all these benefits, e-Health is not without its potential risks. Some health care professionals have concerns about the use of e-Health services. One of these concerns is the safety of e-Health. A dysfunctional e-Health system may issue erroneous patients' information. How secure of information stored through e-Health? How private are patients' data kept? These are questions that are yet to be answered. The system had been identified as not sufficiently secure. Data stored may be manipulated, and this may cause erroneous judgments to be made (Miyazaki et al., 2012). Besides the risks that have been attributed to the adoption of e-Health for healthcare delivery, there have also been challenges that have been identified. Sustainability of the e-Health system, education and training of all service users and providers, availability and acceptance of necessary technology have been suggested as possible bottle necks that need to be resolved before e-Health can be fully implemented globally (Miyazaki et al., 2012). More noteworthy, is the fact that in spite of the wide coverage of e-Health, there is still a considerable disparity in equity of access. This is attributed to poor technological advancements in middle- and low-income countries. In addition, Zach et al., (2012) reportedly that, a lot of individuals globally have been reported to be less likely to seek health information from online sources. This may be due to poverty or low levels of education.

E-Health and Healthcare Service Delivery

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

Studies have shown that adoption of electronic health information system will cause an upsurge in digitalization, enabling broad management of medical records, from patient information to prescription data and diagnostic care, achieving a straight, effortlessly and seamless process (Yoon etals 2014). The electronic health information system also enables healthcare service

providers to get multiple opinions on diagnostic treatment and care; evaluates results of research and clinical trials against preventive measures adopted for different illnesses (Ojo & Popoola, 2015); limiting redundant workflow, enhancing the standard of healthcare, increased employee productivity (Chao et al. 2013). It also has vast potentials to promote patient safety, satisfaction and efficiency of the organization, thus, enhancing medical outcomes for patients (Postema et al. 2012). Furthermore, there abound financial and clinical benefits associated with the adoption of electronic health information system in public health institutions. The financial benefits include a reduction in the cost of medical care, efficient documentation process; avoidance of improper filing, damage or loss of patient records, efficient utilization of resources, and decrease in repetitive laboratory tests and other related services (Yoon, et al., 2018). Implementation of electronic health information system in the public healthcare also supports core management functions of initiating, planning, controlling and organizing operations of the subsystems of hospitals; therefore, providing synergy among the various units and departments of the organization (Open Clinical, 2013); reduction of work-related errors and enabling accurate and timely communication among all practitioners involved in healthcare provision (Uluc & Ferman, 2016).

Clinical benefits of the electronic health information system include uninterrupted access to patient records by authorized personnel, all through the day; medical practitioners' duty reminders and alerts; constant learning for healthcare specialists; improved decision support system via electronic connections to the body of scientific knowledge and other external medical and related sources; prompt, effective and smooth follow-up of patient care (Postema et al. 2022).

E-Health and E-Service Delivery In Fth, Gombe

The Federal Teaching Hospital Gombe has fully gone digital with the activation of E-health platform in wards 1 to 4, on Monday December 28, 2022. In his determination to transform and improve clinical services, as well as launch the hospital into the global village, the Chief Medical Director, Dr Yusuf Mohammed Abdullahi had in late 2021, facilitated the introduction of Health-In-a-Box. Health-in-a-box is an initiative of the Federal Ministry of Health that seeks to provide a digital health information platform across the National Health System. The platform provides a consistent telemedicine platform, plugged into the Hospital Management Information System (HMIS) to enable remote access to health services provided by qualified medical practitioners over the internet. It also facilitates automated administration, billing and reconciliation of health insurance services. The project began in October 2021 with Health Information Management Department, and gradually progressed to Family Medicine Department (GOPD), Clinics, Investigations, and finally the wards. With this latest development, visitors to the hospital are expected to experience remarkable improvement in service delivery, patient turn-around-time, easily accessible records for referrals, as well as, secrecy and security of patient records.

Methodology

The study adopted survey design and the source of data comprised both primary and secondary. The population comprised only twenty five (25) medical practitioners rendering services in a General out- patient department (GOPD), and four hundred and twenty five (425) patients who receive services in the (GOPD). The sample size were twenty five medical practitioners and two hundred and six (206) patients selected using Slovene's formula. Random sampling technique was used in distributing two hundred and thirty one (231) questionnaires among the respondents within the GOPD Unit of the hospital. The data collected was analyzed using simple descriptive statistics and Chi-Square (χ^2) analysis and the hypotheses were tested at 0.05 level of significance. The decision rule was that; if $P < 0.05$ we reject H_0 , otherwise we accept the null hypothesis.

Data Presentation and Analysis

Testing of Hypotheses

The following hypotheses were formulated to guide the study;

H_0^1 : E-health service delivery is not qualitative in Federal Teaching Hospital Gombe.

H_0^2 : E-Health service delivery is inaccessible in Federal Teaching Hospital Gombe.

To test the hypotheses of the study, the Chi-Square (χ^2) analysis was conducted and the results are shown below in the table.

For the hypothesis number one (1) on the Doctors opinion which state:

E-health service delivery is not qualitative in Federal Teaching Hospital Gombe.

The table 1 shown the result of the test

TABLE 1 OBSERVED VALUES OF THE TEST

E- Health Use	Not qualitative	Neutral	Qualitative	Row Total
Strongly Agreed	0	0	7	7
Agreed	0	0	14	14
Disagreed	0	0	2	2
Strongly disagreed	0	1	1	2
Column Total	0	1	24	25

TABLE 2 EXPECTED VALUES OF THE TEST

E- Health Use	Not qualitative	Neutral	Qualitative
Strongly Agreed	0	0.28	6.72
Agreed	0	0.56	13.44
Disagreed	0	0.08	1.92
Strongly disagreed	0	0.08	1.92

The calculated value of the Chi – Square (χ^2) = 11.98

The tabulated value of Chi – Square (χ^2) is = 12.59

For the hypothesis number two (2) on the Doctors opinion which state:

E-Health service delivery is inaccessible in Federal Teaching Hospital Gombe.

The 2 table shown the result of the test

TABLE 3 OBSERVED VALUES

E- Health Use	Inaccessible	Neutral	Accessible	Row Total
Strongly Agreed	0	0	8	8
Agreed	0	0	14	14
Disagreed	0	0	1	1
Strongly disagreed	0	2	0	2
Column Total	0	2	23	25

TABLE 4 EXPECTED

E- Health Use	Inaccessible	Neutral	Accessible
Strongly Agreed	0	0.64	7.36
Agreed	0	1.12	12.88
Disagreed	0	0.08	0.92
Strongly disagreed	0	0.16	1.84

The calculated value of the Chi – Square (χ^2) = 25.01

The tabulated value of Chi – Square (χ^2) is = 12.59

For the hypothesis number one (1) on the patient's opinion which state:

E-health service delivery is not qualitative in Federal Teaching Hospital Gombe.

The table 4 shown the result of the test

OBSERVED VALUES TABLE

E- Health Use	Not qualitative	Neutral	Qualitative	Row Total
Strongly Agreed	0	0	41	41
Agreed	0	0	86	86
Disagreed	0	0	24	24
Strongly disagreed	0	46	9	55
Column Total	0	46	160	206

TABLE 5 EXPECTED VALUES

E- Health Use	Not qualitative	Neutral	Qualitative
Strongly Agreed	0	9.16	31.84
Agreed	0	19.20	66.80
Disagreed	0	5.36	18.64
Strongly disagreed	0	12.28	42.72

The calculated value of the Chi – Square (χ^2) = 162.63

The tabulated value of Chi – Square (χ^2) is = 12.59

For the hypothesis number two (2) on the patient's opinion which state:

E-Health service delivery is inaccessible in Federal Teaching Hospital Gombe.

The table5 shown the result of the test

TABLE 6 OBSERVED VALUES

E- Health Use	Inaccessible	Neutral	Accessible	Row Total
Strongly Agreed	0	0	44	44
Agreed	0	0	98	98
Disagreed	0	0	13	13
Strongly disagreed	0	45	6	51
Column Total	0	45	161	206

TABLE 7 EXPECTED VALUES

E- Health Use	Inaccessible	Neutral	Accessible
Strongly Agreed	0	9.61	34.39
Agreed	0	21.41	76.59
Disagreed	0	2.90	10.16
Strongly disagreed	0	11.14	39.86

The calculated value of the Chi – Square (χ^2) = 175.06

The tabulated value of Chi – Square (χ^2) is = 12.59

Major Findings of The Study

- i. The study revealed the need for frequent training and development of the system users in the hospital.
- ii. The study revealed that the majority of the medical practitioners who serve in the GOPD unit of the FTH, Gombe are newly employed staff ranging from one to five years.
- iii. The study also revealed the need of upgrading the speed of the system in general.

Discussion

Based on the Research Hypotheses and the result obtained after Chi-Square analysis which indicated that e-health service delivery is not qualitative to doctors while qualitative to patients of Federal Teaching Hospital, Gombe, and also the E-health service delivery is accessible to both medical practitioners and the service receivers in Federal Teaching Hospital, Gombe. This means that from the responses (doctors and patients) obtained by the researcher on their opinions on the e- health service delivery by the Federal Teaching Hospital Gombe, the result shows that the service providers (Doctors) shows that the system (e-health) is not qualitative to them best on the Chi-square result of calculated value 11.98 and the tabulated value of 12.59 and has easily accessible during service delivery by the Chi-square result of calculated value 25.01 and the tabulated value of 12.59. This may occurred as a result of natural resistance to change by some doctors on a particular system, wrong perspective by the doctors against the entire system, selfish interest, computer illiteracy by some staff of the hospital and the system interface itself. While the service receivers (patients) opinions stated that the system (e-health) is qualitative best on the Chi-square result of calculated value 162.63 and the tabulated value of 12.59 and has easily accessible to them by the Chi-square result of calculated value 175.06 and the tabulated value of 12.59 during receiving services in the hospital.

Conclusion

Based on the findings of the study it was concluded that, e-health service delivery is not efficient to doctors while efficient to patients of Federal Teaching Hospital, Gombe, and also the E-health service delivery is accessible to both medical practitioners and the service receivers in Federal Teaching Hospital, Gombe

Recommendations

The following recommendations were made:

1. The study recommended that, the management of Federal Teaching Hospital (FTH) Gombe should create training and development unit within the ICT unit of the hospital and encourage the system users to apply for such training and development preferably on annual basis. Budget should be created to such unit and training allowance should be allocated to every participant, this will create competition in the application process.

2. The study also recommended that the management of the FTH, Gombe should create the policy which stipulated such number of senior medical experts must be serve in the GOPD unit. This will assist in given the newly employed staff access to acquire new knowledge in their unit and give them motivation in service rendering in the unit, it may also reduce the long queues in the various hospital clinic and may also give the patients sense of confidence in attending GOPD units of the hospital
3. Lastly, the study recommended that the management of the FTH, Gombe should create periodic system upgrading preferably on annual basis. This can be achieved through creation of sub-unit within the ICT unit taking care with the system upgrading. Budget allocation should be allocated and ensure monitoring of budget spending.

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