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Implementing E-Health Initiatives In Zimbabwe's Public Health Sector

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Abstract

The Zimbabwean government has instigated various policies and strategies as part of e-government initiatives to provide members of the public with convenient access to health information and services. Currently, efforts are made to embrace ICTs in Zimbabwe's public health sector. The performance of health institutions in Zimbabwe however continues to deteriorate at a time when the use of ICTs in health is gaining momentum in Africa. This paper therefore seeks to assess the implementation of the E-health strategy revealing the current state of e-health systems in Zimbabwe's public hospitals. The study adopted an exploratory research design. Participants in this study were selected using purposive sampling. Data were gathered through participant observations, in-depth interviews and documentary research. The study established that even though e-health is an indispensable tool in improving quality, timely and cost effective health care, its implementation in Zimbabwe has not been easy and it is still in its infancy stages. The study concluded that e-health is a reliable tool for promoting successful and effective public health service provision in Zimbabwe. The study therefore reflects and proposes elements necessary for the successful implementation of e-health in Zimbabwe's public health sector.

Key words: E-health; Information and Communication Technologies; public health sector; Zimbabwe.

Introduction

The World Health Organisation (WHO) has been spearheading the development of health initiatives in member countries and has identified the important developmental role and crosscutting impact of ICTs in regard to all aspects of national life. In this regard, the use of ICTs in health is seen as essential in accomplishing universal health coverage by 2030 as stipulated in Sustainable Development Goal Number 3. The use of ICTs in health care service delivery is termed electronic-health (e-health). ICTs can therefore transmogrify how health care is delivered and how health systems are managed. The use of ICTs in health care service delivery has led to the adoption and implementation of e-health or digital technology systems. In fact, the introduction of e-health as argued by Erlingsdóttir & Sandberg, (2016) has been seen as a paradigm shift with the purpose of providing patients with improved access and influence over their health by emphasizing "patient authorization", "patient transparency" and "patient empowerment." Numerous key stakeholders in the health sector have therefore come to view e-health as a solution for the imminent deficiency of healthcare resources.

With regards to the African continent, Gomes & Casalino, (2013) postulate that e-health plays a unique and pivotal role in achieving universal health coverage and also as a tool to address a matrix of health problems that the African continent is experiencing. These problems include the dearth in competent health personnel which is further complicated the by the lack of health infrastructure, limited funding and corruption (Chilunjika, 2021) as the returns on health investments of international financial institutions, health organisations and donors are mismanaged due to dysfunctional structures of health care systems. Most importantly, Adeloye & Adigun, (2017) note that there is a shortage of ICT and mass internet connectivity, compounded by a paucity of ICT-related knowledge and skills limiting capacities of national health management information systems (HMIS) to generate, analyse and disseminate information for use in decision-making and information exchange in a standardised way between health care establishments.

Like most African countries, Zimbabwe is no exception to the matrix of health challenges experienced in the continent. It can be noted that the Zimbabwean health sector is struggling mainly due to the economic climate prevailing in the country (Muzvidziwa-Chilunjika & Chilunjika, 2021; Masiyakurima, Chilunjika and Muzvidziwa-Chilunjika, 2020; Zhou and Chilunjika, 2013). Moreover, the GoZ, (2012) notes that the growing need for health related information by policy makers, programme managers, donors, non-governmental organizations, the public at large and other stakeholders demanded a unified, well defined system of data collection and reporting which central hospitals at the apex of the information superstructure in Zimbabwe lacked. Hence the introduction of the e-health systems were received as an important element in healthcare systems, to help transform the public health sector (Chilunjika & Chilunjika, 2023). This study therefore, argues that e-health can be the answer to give better access to healthcare services for patients and improve policy making in health systems. However, developing countries such as Zimbabwe should be cognizant of the fact that e-health opens both exciting opportunities and real threats to the central features of contemporary health management in Africa (Chawarura, Stam & Van Dijk, 2019). The study will examine Zimbabwe's public health sector, the current state of e-health as well as the dynamics of adoption and operationalization of e-health in the country.

The subsequent section sets out the conceptual framework used for this paper and the methods used to collect and analyze data. Next, the findings are presented and analyzed, followed by conclusions.

Literature Review

E-health as a concept

E-health as noted by Erlingsdóttir and Sandberg, (2016) is probably the largest wave of change in healthcare since the New Public Management wave between 1980 and 2000. As a concept e-health unites medical informatics and public health. Eysenbach's definition in Shaw, (2017), however conceptualises e-health in a broad sense. Thus e-health is understood as:

"...an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the internet and related technologies. In a broader sense, the term characterises not only a technical development, but also a state-of-mind, a way of thinking, an attitude and a commitment for networked, global thinking to improve healthcare locally, regionally, and worldwide by using information and communication technology."

Similarly, the WHO, (2016) delineates e-health as the application of telecommunications and computer technology to transmit and provide medical information and services to the population. Accordingly, Molefi, (2010) argues that e-health is the use of telecommunications and computer technology to transmit and provide medical information and services. These services include health promotion, prevention, education, research, population data collection and health management.

Depending on different scholars, e-health therefore encompasses a wide variety of sub-domains of digital health such as:

- Electronic Health Records (EHR);
- Telehealth or telemedicine;
- Health IT systems;
- Virtual healthcare;
- Mobile Health (m-health); and
- Big data stems used in digital health.

The health sector has always depended on technologies to function efficiently and effectively in line with this the WHO, (2016) discovered that e-health is crucial for the bulk of information used to diagnose and to treat diseases. E-health is a very crucial element in health delivery systems, as such it has become the backbone in health-care delivery. Given the right policies, organisation, resources and institutions, e-health can be a powerful tool in the hands of those working to improve health (Daly, 2003). To this effect, Crede and Massell (2000) stipulate that the importance of using ICTs in health is now being known by developing countries to stimulate sustainable health care systems (Chilunjika, Zimano and Chilunjika, 2022; Muzvidziwa-Chilunjika, Mutizwa and Chilunjika, 2020; Crede and Massell, 2000).

Moreover, Adeloje and Adigun, (2017) postulate that the introduction of e-health services is meant to reduce health care costs and increase efficiency of health service delivery in many low-and middle-income countries (LMICs), where weak governance, poor funding, and recurrent health workforce crises, among others, have been

major health system challenges. Kgasi & Kalema, (2014) note that, the introduction of e-health also seeks to address prevailing inequalities in health care provision across many LMICs, bridging the ‘urban *versus* rural’, and ‘rich *versus* poor’ gaps, respectively. The significance of e-health is therefore shown in its ability to customise the provision of health information to patients and policy makers at the appropriate place and time using secure electronic tools that encourage research and knowledge sharing (Deloitte & Touche Tohmatsu, 2008).

Theorising the adoption of e-health

Zhang et al., (2015) state that numerous competing theoretical models have been suggested and used to study the determinants of acceptance and use of new ICTs. However, in regards to e-health, Rogers’ (1995) Diffusion of Innovation (DOI) theory has been widely used to conceptualise technology adoption in health systems (Caldwell & Kleppe, 2010). This study therefore employs Rogers’ (1995) Diffusion of Innovation (DOI) theory as it has been extensively used to theorise technology adoption in health systems. The theory seeks to understand the way in which new technologies spread within and between societies hence bringing to light the factors that ensure the success of e-health systems. It also seeks to explain how, why and at what rate new ideas and technology spread.

According to Rogers, (1995) innovation is perceived as an idea, process or a technology that is new or unfamiliar to people within a specific area or context, while diffusion is the process by which information about the innovation moves from one individual to another over time within the social system (Caldwell & Kleppe, 2010). The key to adoption is that the community should perceive the idea, behaviour as new or innovative. It is through this that diffusion is possible. The adoption of a new idea or behaviour however does not happen simultaneously in a social system but rather it is a process whereby some people are more apt to adopt the innovation than others due to a number of reasons (Rogers, 1995). Accordingly, there are five key constructs which influence the adoption of an innovation which are: relative advantage, trial ability, compatibility, complexity and observability (Rogers, 1995).

Lien & Jiang, (2017) stipulate that, the five constructs of DOI highly influence the manner in which medical practitioners and patients accept the new technology. It has been observed that the medical personnel accept technology that is compatible with their day-to-day work and processes for example, the use of telemedicine and m-health technologies to deliver services to patients and to share experiences in real time with their colleagues (Muzvidziwa-Chilunjika & Chilunjika, 2021; Lien & Jiang, 2017). On the other hand, patients accept technology that is less complex to use and understand. New technology should also usher in new advantages over the current practice of traditional paper-based health systems that are deemed strenuous and prone to error. Moreover, pilot tests should be conducted before using new technologies to observe their impact before use and above all these technologies should be easy to use and have a user-friendly interface (Zhang *et al.*, 2015). The theory has been chosen because e-health is new and unfamiliar to many medical practitioners and patients in Zimbabwe. For these reasons, this theory was used to study the adoption and implementation of e-health in public hospitals in Zimbabwe.

Methodology

An exploratory case study research design was purposely selected and used to achieve the objectives of this study. With the use of qualitative content analysis, articles were selected from peer-reviewed international scientific journals, books, Government publications, conference papers and dissertations based on the matter under study. The articles were examined to determine the state of e-health in Zimbabwe’s public hospitals. This included defining the codes to be used, the data to be captured by each code, through means of auto-coding that allows search on all textual articles either through text, word, expression and regular expressions.

The target population comprised of health practitioners such as doctors, nurses, health information officers, administrators, and patients from three major public hospitals in Harare (Pairenyatwa Group of Hospitals, Harare Central Hospital and Chitungwiza Central Hospital) and a member of the Ministry of Information Communication and Cyber Security. These central public hospitals were suitable for selection in this study because they handle a majority of citizens in Zimbabwe and they are among the major referral hospitals in the country. Patients were drawn from Antenatal Department, Out Patients Departments (OPD) and the Laboratory Departments which are key units in using ICTs at these hospitals. Harare was chosen for this particular research since it is usually the primary launchpad of any health plan or policy decided upon by the government. Accordingly, it provided a crucial window of insight into any research inquiry on health issues in Zimbabwe. Through purposive sampling, study identified the participants who can provide detailed and relevant data for the research. In this regard the researchers targeted information rich participants who were readily available at the three central hospitals in Harare.

For the purpose of this study, primary sources of data included in-depth interviews with key informants such which included Health Services Administrators, medical doctors, nurses, Health Information Officers and patients. A total of 15 participants were used for this research. The researchers asked questions orally using an interview guide and recorded participants' answers. These interviews were meant to give an in-depth understanding on the implementation of the e-health Zimbabwe thereby determining the state of e-health systems. The researchers also conducted direct observations on the three public hospitals' visible and observable activities, systems and processes to determine the current state health institutions, e-health systems and infrastructure. Ethical considerations such as anonymity of responses, right to participate and right to exit, protection against harm, reporting of accurate responses and other relevant ethics were properly observed throughout the research. Data was analysed using content and thematic analysis techniques.

Results and Discussion of Findings

Public Health Care in Zimbabwe

Narratives from interviews brought to light that Zimbabwe has a diversified health-care facility system which is operated by a diverse range of actors. According to Participant 2 (Health Information Officer), *the public health system is the largest provider of health-care services, complemented by Mission hospitals and health-care delivered by Non-Governmental Organisations (NGOs)*. This Participant further stated that *public health-care is delivered at four levels (entry level facilities such as urban clinics, District hospitals, Provincial or General Hospitals and Central or Special hospitals) which are meant to function as a referral chain*. In light of this, the researchers observed that the dilapidated state of hospital buildings and machinery could be a result of economic challenges and this explains the substandard quality of health care delivery in public health care facilities. This is supported by Chilunjika, Chilunjika & Uwizeyimana, (2023) who states that due to declining budgets necessitated by a contracting economy, the quality and quantity of health-care delivery has declined considerably in Zimbabwe. This situation has mostly affected the country's poor citizens whose level of access to health care facilities has dropped significantly to 40% (Muzvidziwa-Chilunjika & Chilunjika 2021; Muzvidziwa-Chilunjika *et al.*, 2020).

However, the study revealed that though there are pitfalls such as inadequate hospital equipment, health personnel shortages among others in health care delivery at these hospitals, there are numerous steps that have been made to minimize these gaps. These include partnerships with the donor community such United States Agency for International Development (USAID), Global Fund, and United Nations Development Programme (UNDP), as well as accepting the use of modern technology so as to lessen the ineffectiveness and poor quality health care delivery.

According to of the Participant 1 from the MICTCS in terms of cellular network coverage there has been some tremendous improvements to cover 94% of all public health facilities. The Participant further stated that the cellular network coverage enables both voice and data and this has enabled public hospitals to embrace and implement e-health initiatives in response to the Zimbabwe's E-Health Strategy (2012-2017). However, the researchers observed that despite several technological introductions in Zimbabwe each of the hospital used for this research has adopted and customised e-health initiatives that best suit their budgets, infrastructure and systems. These customised systems however do not communicate with each other that is, there is no interoperability of these systems. This is hindering the full operationalisation and the standardisation of e-health in Zimbabwe's public health domain as information such as patient health history, prescriptions and other information such as laboratory results cannot be electronically communicated to different hospitals.

The current state of e-health in Zimbabwe's public health sector

A report by the UNDP, (2016) states that a working group consisting of the MoHCC, UNDP, WHO, the National AIDS Council and the Research Triangle Institute (RTI) members explored options being used in other African countries such as Zambia, Tanzania and Namibia to carry out an assessment of Zimbabwe's health needs. This led to the decision to develop a number of e-health based systems that manage common patient registrations, demographic details, past medical history, patient follow-up visits, laboratory investigations and Human Resource Management. The table below shows the major technologies available and that are in use at central hospitals in Zimbabwe.

Table 1: E-Health Technologies used in Zimbabwe's Public Hospitals

System	Human Resource Information Management Systems (HRIMS)	Laboratory information Medical System (LIMS)	Trifour Medical System (TRIMED)	Picture Archiving and Communication System (PACS)
System use	The HRIMS is software solution that helps hospitals manage their Human Resources, Payroll and accounting services	LIMS is a health-care system used to keep clinical data.it is used to process, manage and store data from all stages of medical tests	TRIMED is an integrated management system that facilitates electronic medical record administration of patients	PACS is a healthcare technology for short and long term storage, retrieval, management, distribution and presentation of medical images

Source: Authors' construction.

The table above shows the current health technologies that are used at the Central Hospitals. The above mentioned health digital platforms have transformed information management and health service delivery. These platforms are enabling health professionals at these hospitals to expeditiously share, access and store digital images such as X-rays, Magnetic Resonance Imaging scan (MRIs), ultrasounds and Computed Tomography (CT) scans across departments. These systems facilitate knowledge-sharing and enhance diagnoses as the consultative process is significantly improved with authorised specialists at the three hospitals having immediate access to patient's images especially from the antenatal and laboratory units.

Participant 4 (Medical Doctor) asserts that, "...e-health systems are largely being used for in-house purposes to manage the administrative and operational needs of health care centers." In this instance, the HRIM system is allowing these three hospitals to manage their master employee data, track career development planning and training activities and also to create and track performance appraisals. However, Participant 5 (Health Information Officer), stipulated that, "The use of ICTs to engage with patients is still in its infancy, but we are working hard to put in place systems that will open up lines of communication between patients and their doctors thus improving health care provision in Zimbabwe." This also reveals that e-health is still in its burgeoning and nascent stages and that there is visible commitment towards the implementation of e-health in the public health care centres in Zimbabwe.

The Dynamics of Adoption and Operationalisation of E-health technologies in Zimbabwe's Public Health Sector

In further exploring the degree of implementation as well as the current state of e-health in Zimbabwe the study also examined the diverse forms and manifestations of e-health in Zimbabwe's public health sector. The study examined mobile health, telemedicine, and electronic health records.

Mobile health

Mobile Health is a component of e-health, and it is defined by the Global Observatory for eHealth (GOe), (2011) as a medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs), and other wireless devices. Moreover, m-health involves the use of and capitalisation on a mobile phone's core utility of voice and short messaging services (SMSs) as well as more complex functionalities and applications including general packet radio service (GPRS), third and fourth generation mobile telecommunications (3G and 4G systems), global positioning system (GPS), and Bluetooth technology (GOe, 2011).

The country's e-health strategy was premised on the National ICT strategy which seeks to ensure that right health information is provided to the right person at the right place and time in a secure, electronic form through mobile technologies (Furusa, 2018). According to Participant 1 (from the MICTCS), their ministry is on a quest to 'increase Zimbabwe's mobile density by 10% every year while promoting innovative locally developed applications and technology solutions to boost development. In line with this Participant 5 (Health Information Officer) had this to say, "The key to m-health's success in Zimbabwe is a collaboration between the MoHCC and local IT experts or software developers however, it has proved to be quite a nightmare finding a skilled and experienced software developer who can choose to spare time to work on an idea that will convince donor agencies who are the biggest investors in healthcare in Africa. In most cases, convincing them to accept a new innovation in health requires a demonstration by means of a working prototype which most local IT experts are failing to come up with." This therefore points to the need for joint efforts between the government and the private sector in developing initiatives that can catch the attention of the prospective financiers of e-health initiatives.

In this vein, the study observed that, despite the implementation of m-health some slow progress has been registered in Zimbabwe. This reveals that the MoHCC is failing to fully take advantage of the benefits of the existential mobile technologies such as GPRS, GPS, SMS, 3G and 4G systems to disseminate information. Participant 6 (Nurse) was asked why there was no free m-health services for patients at these public hospitals, the Participant cited the unavailability of resources at both human and technological levels as the reason why they could not pioneer it. However, the researchers established that the MoHCC through SMS platforms has been educating communities (Chilunjika and Gumede, 2021) on deadly diseases such as Cholera and Typhoid mainly when they are outbreaks of such diseases.

In terms of m-health enhancing knowledge sharing among medical practitioners Participant 10 (Medical Doctor) stated that, *"Mobile devices are enhancing the interconnectedness of medical professionals as we are able to exchange information in real time, especially for intricate and critical medical conditions."* The Participants 9 and 13 (Health Services Administrator and Nurse) converged on the notion that there is need to move beyond the culture of focusing on internal information exchange only towards an outward focus on the patient. Their sentiments are a reflection of Zimbabwe's E-Health Strategy which stresses much emphasis on improving the flow of information across health-care centers across the country and between health professionals and patients.

Tele-medicine

Originally the term telemedicine was coined in the 1970s which literally means "healing at a distance". Jolly, (2011) however adopts the following broad definition:

..the delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities.

Telemedicine technologies include live interactive video-conferencing, with the patient seeing the doctor face to face over a distance, with special devices used to assist clinical examination (Crede & Massell, 2000). Telemedicine also increases access to scarce medical specialists in bigger centres and academic institutions hence improved service delivery. It can also provide rural health care in the most remote areas, all that is needed is a satellite or cellular communication link (Chilunjika & Chilunjika, 2023:6; Samusodza, 2017).

The Zimbabwe Telemedicine Network was established in 2015 and one of its objectives being to educate the public on new technologies in health. Moreover, the Zimbabwe Telemedicine Network was also established as a response to the lack of doctors and other key health personnel in rural and remote areas. To date the Telemedicine Network based at Parirenyatwa hospital is set to extend to all provincial district and rural health centers and clinics in order to improve access and delivery of medical services to the population in remote and rural areas. According to Respondant 11 (Health Services Administrator), *"The government in 2016 identified twelve (12) sites in Nyanga and Chimanimani in Manicaland province to be connected to specialist doctors stationed at Nyanga and Mutambara district hospitals, Mutare Provincial Hospital and Parirenyatwa Hospital using a state-of-the-art ICT platform through a pilot project facilitated by the Postal and Telecommunication Regulatory Authority of Zimbabwe (POTRAZ) and the MICTCS."* The project was launched in July 2018 and since then Manicaland province has been benefiting from the project.

On being asked if patients were aware of telemedicine and how it functions Participant 12 (Patient) who had a complicated pregnancy who was referred to one of the central hospitals in Harare from Tsakare a rural area in Mt Darwin was very surprised to know that such facilities are available in Zimbabwe. She had this to say: *(Ndiri kure nemurume wangu nevana vangu ende zviri kuti dburira tinotarisiramo kuti vaunzweni michina iyoyi kwevedu kuDarwin pane kuti pese patarwara tuye kuno kuHarare -being far away from my husband and my small children is very stressful and costly, we can only hope that these services become available in our own areas so that we do not have to travel all the way to Harare to get medical attention).* Moreover, this study found out that the generality of the patients were ignorant and uninformed about what telemedicine is all about. Thus underscoring the need for telemedicine facilities to be decentralised and adopted in different parts of the country in order to become popular among community members.

On the other hand, doctors at these three hospitals hailed the telemedicine facility for aiding learning opportunities in public health. This is so because telemedicine enables discussions between health professionals

on how best they can treat certain diseases in real-time using medical video conferences with desktop or mobile based software. However, from the observation made by the researchers at these hospitals there is still a lack of adequate and sophisticated ICT infrastructure to successfully operationalise e-health. Similarly, Participant 15 (Medical Doctor) stressed that, *“There is no adequate infrastructure to sustain e-health’s full swing and proper usage at this hospital. A lot of technologies such as computers, mobile and monitoring devices are prerequisite to implement e-health. This is one of the major challenges being faced by health care centres where the infrastructure to support e-health systems are not there.”*

In order to counteract the inadequate e-health infrastructure at these central hospitals, these medical doctors indicated that they are now using personal gadgets such as mobile phones, laptops and iPads. In spite of this, the researchers observed that healthcare provision at these public hospitals still revolve around basic technology, pen and paper, simple database systems and human memory.

Electronic health records

Canada Health Infoway, (2013) defines an electronic health record (EHR) as a longitudinal comprehensive health record, under the stewardship of a health-care provider that provides a biographical record detailing a patient’s medical history over time. Its individual-specific nature enables health-care professionals across various disciplines to properly diagnose a patient at any given time. The importance and benefits of EHRs in health-care provision can therefore not be understated, because they have transformed health-care provision by refining the quality of decision making, knowledge-sharing among professionals and improved access to real-time health-care information (Chilunjika & Chilunjika, 2023; Molefi, 2010).

Since the initiation of HIV prevention programmes in Zimbabwe in the late 1990s all patient-related data was collected using manual, paper-based systems. By 2008 the system in the country was not operating properly due to the increase in the volume of patients needing treatment, which by 2014 had increased to over 740,000 patients (UNDP, 2016:2). This increase had affected the accurate monitoring and reporting of patients accessing HIV services, as the paper-based patient information systems could longer cope with the patient volumes. This also translated into a huge workload, straining the already over-burdened health worker. To address this, gap the MoHCC, in conjunction with its partners, resolved to adopt and establish an electronic system to collect and manage HIV and TB data at the patient level, with the ultimate aim of phasing out paper registers throughout the country (Chilunjika and Uwizeyimana, 2024).

To date the MoHCC is implementing the Systems Applications Products (SAP) Healthcare applications for its central hospitals as part of EHRs (Chilunjika and Uwizeyimana 2024). These central hospitals have since incorporated electronic health records in their antenatal and laboratory departments instead of the paper-based, manual record keeping. Participant 14 (Nurse) from the OPD noted that, *“ePMS have come a long way in improving access to patient health information, leading us to make well informed clinical decisions.”* However, the researchers also observed that despite the fact that government health care institutions have made some in-roads in adopting electronic health records, they have not completely phased out the paper based system as it is still noticeably operational together with the electronic documents. This therefore shows that there are some elements of duplicity as the same documents are made to appear manually and electronically.

Participant 9 (Patient) from the OPD who was interviewed noted that the use of ICTs against manual systems would enhance service delivery as it reduces the workload among health workers thus motivating them to be professional with the patients. It was further stated that hospital staff are usually very rude due to their workload of paper based recording therefore they transfer their anger and frustrations on clients. Participant 7 (Patient) from the antenatal department also stipulated that, *“Our antenatal information is entered in at least three or four medical manual documents thereby spending more than 20 to 30 minutes per patient.”* Similarly, from the observations made by the researchers at these three hospitals the maternity units were very busy with more than 20 patients queuing for health services. Such long queues and the time spent with each patient reveal that manual systems are time consuming and inefficient. One can therefore conclude that traditional health care delivery methods are inefficient and can breed toxic nurse-patient relationships while e-health enabled systems can lead to improved health care delivery.

Furthermore, Participant 5 (Health Information Officer) stated that, *“Electronic health records (EHRs) have helped simplify electronic calculations, management and analysis of patient data. Moreover, detailed patient information is helping us create more robust programme evaluations and eliminating multiple entry of patient data across different paper registers.”* Similarly, Participant 3 (Health Services Administrator) credited EHRs for making inventory management a much easier task which is free from human errors. This Participant further stated that, *“...in critical units such as the pharmacy*

department ICT systems facilitated by e-health keep drug stocks on record as it is easier and faster to audit the available drugs and those that need to be purchased than manually accounting for drug stocks hence reducing corrupt activities.” It is thus clear that ICTs make auditing easier compared to going through huge piles of records manually hence reducing fraudulent activities.

However, Chilunjika and Uwizeyimana, (2024) asserts that legislation should be put in place to protect privacy, confidentiality and autonomy when using digital technologies in the health sector. This is of vital importance as EHRs can threaten autonomy if proper protections are not put in the legislation to prevent personal health data from being used in secondary ways in public health research or by curious entities, such as insurance companies.

Conclusion

The research findings reveal that e-health holds significant promises for the health sector in Zimbabwe. However, the state of public hospitals in Zimbabwe in as far as the implementation of e-health initiatives and strategies is concerned still lags behind. Despite the adoption and operationalisation of mechanisms to improve health service delivery through the use of ICTs, e-health is low and very unsatisfactory in most public healthcare institutions. Findings indicated that e-health systems are mainly focused on selected central hospitals, thereby neglecting other hospitals, thus digital divide among communities. Patients were also undivided in their admission that there was limited use of ICTs in the country's health-care centres to enhance user experience. There is still an over-reliance on traditional forms of health services such as paper filing and manual records even though most central hospitals have adopted ICTs due to lack of resources and this has made e-health implementation difficult. The reason behind the failure to implement e-health in developing countries such as Zimbabwe is that, it is done without first gauging the readiness of the settings: healthcare workers meant to use the technology, the facilities in which such technologies will be used and the communities or patients to benefit from the technologies. Thus the need for developers in Africa to take into consideration realities that influence technical performances due to latency, congestion, and the vast variety of technologies, tools, platforms, and applications that are applicable to the continent.

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