



Digital Systems in Healthcare Service Delivery in Africa: Challenges and Prospects.

Jonathan Okwor Ugwu¹, Onyemauche U. C² & Mbanusi Charity. E.¹

¹Department of Computer Science Federal College of Education(Technical), Umunze Aambra State

²Department of Computer Science Federal University of Owerri, Imo State

Corresponding Author: jonathanokwor@gmail.com

Abstract

Efficient Health systems are fundamental in ensuring improved citizens' welfare and the nations in general, while underdeveloped health systems not only hinder individual's social and economic development, but also have detrimental effect on national economic growth and prospects. African nations, like other developing nations of the world, experience low quality and limited access to efficient healthcare service delivery, contributing to steady growth, high poverty levels and high burden of, non-communicable and communicable diseases. Even though information and communication technology (ICT) is playing a desirable role in improving healthcare service delivery, its integration into healthcare system delivery is limited among resource-limited African nations. This paper extensively discussed ICT system models called digital systems currently used in healthcare system delivery and the challenges hindering the integration of these system models into healthcare systems in Africa. These challenges are not limited to poor leadership and governance, lack of human resources, poor finances, poor supplies of medical drugs, equipment and technology, poor knowledge and information, poor healthcare service delivery, poor infrastructure and supplies. Finally, the paper examined the ways forward towards eliminating these challenges in order to build efficient healthcare service delivery among developing African countries.

Keywords: Healthcare, Infrastructure, Finances, Leadership, Governance, Integration, Human Resources, Technology Digital systems

Introduction

Good health is an important facet of development. It potentially determines how individuals can actively get involved in productive activities or contribute to the welfare of his country (Kiberu, et al, 2017). According to World Health Organisation (WHO, 2014), good health is the state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. Hence, improving the health of individuals and communities in general and strengthening health systems, disease detection and prevention are crucial to development and poverty reduction. WHO (2016) reports on Africa region clearly indicate that Africa is largely behind the economic development due partly to health related challenges such as HIV/AIDS, tuberculosis and malaria. These challenges are further exacerbated by the shortage of health professionals and health service delivery facilities; hence, African nations are engulfed in abject poverty. Other reports showed that Africa lags behind other regions in most of the health indicators (Labrique, 2013). Thus, the integration of information and communication technology resources into existing infrastructure becomes unavoidable in order to meet the optimal healthcare need of the populace.

Information and Communication Technology (ICT) is described as a general-purpose technology (GPT) that can impact growth and transform countries over a prolonged period of time

(Bresnahan, and Trajtenberg, 1995). Other reports further emphasised that ICT processes and systems are pivotal to community development, including public health and the availability or non-availability of ICTs facilitate or limit the state of healthcare service delivery in any defined community (Blaschke and Labrique, 2018). ICT cuts across a variety of technologies including computer, mobile phones, microelectronics, internet-based software and microprocessor-based technologies. Other technologies that form part of ICTs are computer-integrated manufacturing systems, robotics technologies, and biotechnology-related equipment and systems; and integrated multimedia transmission and communication platforms (Harding, et al, 2018). Muinga, et al, (2018) reported that the popularity and growth of the Internet and mobile wireless technologies have assisted in changing the face of healthcare delivery and health education for health professionals in many countries. ICT resources are effective tools for reducing child mortality; improving maternal health, and combating HIV/AIDS, malaria, and other endemic diseases. Healthcare workers use ICT resources to establish databases to track vaccination programs, coordinate shipments of antibiotics, and inform communities of medical services that can prevent the incidence of maternal and child mortality. In the fight against HIV/AIDS, ICT helps in strengthening disease monitoring and management, drug distribution, training of caregivers and health service personnel,



patient education and monitoring (Kiberu, and Scott, 2017). The recent outbreak of Ebola and COVID- 19 pandemic not only in Africa but the world over has not only caused economic downturn but has almost brought to a halt the economic activities globally.

Models of ICT Used in Healthcare Services: Digital Systems

The advent of internet and mobile phones as the commonest technological devices in recent years has revolutionised healthcare systems globally. As a result, a variety of innovations that integrate mobile phones and the internet into healthcare services have been developed and used at local, national and regional levels in many nations of the world. These ICT innovations, called digital systems, have numerous applications in healthcare delivery, including disease surveillance, control and monitoring, drug distribution and checks especially in remote areas (Sim, et at, 2017). Ogech and Olaniyi (2019) described digital health systems as the development of interconnected health systems using computational technologies, smart devices, and communication media to aid healthcare professionals and patients in managing illnesses and health risks, and promoting health and wellbeing of the community. It is also described as the utilization of ICT resources to address health challenges faced by health professionals and patients (Razmak and Bñlanger, 2018). Though the potentials of digital health systems in healthcare services delivery are enormous, their integration into many African nations has been inadequate due to a number of factors or problems. These problems include excessive burden of disease, the dearth of health professional workers, high telecommunication cost, unstable power provisions, and lack of government will or poor leadership (Kiberu et al., 2017).

WHO (2018) defined digital system as the field of knowledge and practice associated with the development and use of digital technologies to improve human health. This definition encompasses electronic health (eHealth) and mobile health (mHealth). Electronic health (eHealth) is the cost-effective and secure use of information and communication technologies for health and health-related fields while Mobile health (mHealth) is a component of eHealth, and involves the provision of health services and information via mobile technologies, such as mobile phones, tablet computers and personal digital assistants. (Sam et at, 2020). eHealth systems have the potential to motivate and improve patient's engagement in their healthcare (Kip, et al, 2018). Telemedicine, a popular form of eHealth, is designed to interchange medical

information between different parties situated at separate geographical areas through the use of a telecommunication link. Telemedicine is rarely administered in developing countries due to poor connectivity and inadequate infrastructure, lack of ICT skills by medical professionals (Mars, 2013). Other challenges in the implementation of eHealth in developing countries, like Africa, include, low awareness, poor funding, lack of integrated and accessible health system and bureaucracy of the ministry of health on utilization of e-health (Adebayo, et at, 2019).

Challenges and Constraints in Integration of Digital Systems into Healthcare Service Delivery in Africa

African nations, like other developing nations of the world, experience low quality and limited access to healthcare service delivery, contributing to the steady growth and burden of non-communicable and communicable diseases. According to the WHO (2018) press release, people in developing countries spend trillion US dollars annually in provision of primary healthcare delivery and about 400 million people lack access to essential health services. The report further emphasised that over eight million people per year in low-and middle-income countries (LMICs) die as a result of adverse conditions that are treatable by the health systems, resulting to loss of large economic resources. According to Kruk (2018), addressing these challenges in order to achieving sustainable universal health coverage (UHC) requires a thorough and holistic understanding of health systems. The report further stated that efficient health systems have three primary goals: to improve the health of populations; to enhance responsiveness to the population's health needs and expectations and to ensure that the financial burden of paying for health systems is fairly distributed. These goals should be routinely monitored by all countries and should form the basis for assessments of any health system performance. Digital Health systems are often complex, adaptive systems that function at multiple, interconnected levels with a range of stakeholders and those that run efficiently provide healthcare where it is mostly needed (Sam, et al, 2020). A good digital health system successfully delivers treatments, prevents disease and delivers cost-effective care to improve the health of a population (Muinga et at, 2018).

The major health system challenges in developing countries of Africa include poor knowledge and information, lack of infrastructure and supplies, lack of human resources or expertise, poor service delivery, context and population, finance,



leadership and governance (Sam, 2020). These challenges are discussed in details below.

1. Knowledge and information relate to individual patient-provider interactions at the health facility level and population-level decision making. It includes the health information systems that contribute to the production, analysis, dissemination and use of reliable and timely health information by decision makers and practitioners at different levels of the health system, both on a regular basis and in emergency cases (Mulusew, 2015).

2. Healthcare Service delivery refers to the various packages of care and services delivered for the prevention, promotion and treatment of acute and chronic conditions.

3. Context and population are concerned with contextual and demographic factors within the health system that call for responsiveness and adaptation to social, economic, technological, cultural, political, regulatory and environmental changes and transitions over time. Within the context and population challenge is the high burden of disease that is closely tied to other challenges such as lack of strong leadership and governance, inefficient allocation of financial resources, untrained human resources and poor healthcare delivery, low health awareness and poor health-seeking behaviour in the population. These challenges have, in no small measure, exacerbated the challenges of HIV/AIDs, COVID-19 and other deadly diseases among African nations (Makinde, et al, 2018).

4. Another reported challenge is lack of clear and consistent strategic health policies which do not often include the private sector players in policy design phase or when appropriate health policies are established, they are neither known, enforced nor implemented due to lack of government accountability characterised by both central- and district-level authorities. This challenge was often linked to corruption and a lack of transparency and political will.

5. Health systems in African countries are often characterised by a poor financing resulting from disaggregated mix of health financing such as government budgetary allocation, health insurance, external funding and private out-of-pocket spending. This results to poor allocation of resources, poor accountability, little or no health insurance coverage and lack of financial protection among low-income populations.

6. More importantly, lack of access or poor access to healthcare services is another serious challenge in Africa. This challenge is directed to the inefficient connection between affordability, acceptability and geographical (rural and urban) accessibility leading to

poor access to healthcare services and low-quality healthcare.

7. Moreover, lack of human resources, especially the healthcare professionals are another main challenge among African nations. The key drivers of staff shortage in Africa are migration abroad, poor incentives for workers and the exclusion of trained, qualified women healthcare workers due to socio-cultural reasons, geographical (rural/urban) burden, imbalance between the public and private health sectors and lack of staff-patient communication.

8. Poor infrastructural facility is one of the biggest barriers that hinder effective and efficient delivery of healthcare services in Africa. Infrastructure is classified into three main categories: public infrastructure, comprising roads and electricity; healthcare infrastructure comprising hospitals, clinics and pharmacies) and ICT infrastructure such as digital technologies and medical hardware solutions. Lack of infrastructure has had a detrimental impact on the efficient delivery of medical products, vaccines and technologies, inaccurate prescription and poor quality of drug supplies and treatment.

9. Poor collection of healthcare data and inefficient health information systems (HIS) are also identified as major barriers to efficient healthcare delivery in Africa. Many African countries rely heavily on paper-based, analogue data and information collection methods which are prone to errors. Data and information on patient-provider interaction, health records and status, and health facility-level status are often lacking, while poorly collected information are prone to error, resulting in poor-quality analysis and prescription (Holderried et al, 2018).

Summary and Conclusion

Efficient Health systems are fundamental in ensuring improved citizens' welfare and the nations in general. On the other hand, poorly developed health systems not only hinder individual's social and economic development, but also cause a detrimental effect on national economic prospects. Digital health solutions are often used to mitigate lots of challenges in healthcare service delivery, especially in infrastructure and supplies. These technologies have the potential to shift health service delivery from facility-based providers, to community-based service providers. However, the integration of digital health solutions into healthcare service delivery in developing nations of the world are prohibited by lots of challenges such as poor infrastructure and supplies, lack of human resources, poor leadership and finances.



Recommendations

The key stakeholders in the healthcare delivery have vital role to play in strengthening health systems of their communities, particularly in resource-constrained areas (Sam et al, 2020). Hence, the following recommendations are provided to achieve sustainably universal health coverage in developing countries.

1. Efficient Financing Digital Health Systems:

Developing African nations should integrate digital health solutions into their various health financing arrangements to help them offer effective insurance packages to low-income households, provide individuals or families different health coverage options.

2. Optimising Health Service: Digital health solutions are often used to mitigate challenges in healthcare service delivery through adequate provision of infrastructural facilities. These technologies have the potential to shift health service delivery from facility-based providers, to community-based service providers. Digital solutions like telehealth and drones are designed to root out inefficiencies while making affordable and quality healthcare available. (Meesen, 2018).

3. Training of Human Resource: Mobile apps are used to provide on-demand training, enable communication between health workers, implement clinical decision support systems and provide work planning and scheduling tools especially in low-income countries. In Sierra Leone, for instance, a digital technology called MOTS is a mobile system that provides community health workers (CHWs) with refresher training through feature phones. This technology should be employed in health workers training for efficiency and to reduce cost. (Meesen, 2018).

4. Integrating Digital Solutions into of Health Information Systems: Developing African countries should also make effective use of digital health solutions in data collection and reporting. Several private companies have developed technologies to address data gaps in health systems. For instance, OGOW is digital solution that runs an electronic medical record (EMR) and practical management system designed for hospitals in Somalia with the primary goal to improve the delivery of healthcare through collaboration, innovation and efficiency. Such digital solutions should be integrated into healthcare systems for effective data collection and reporting.

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