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E- HEALTH CARE SYSTEM IN NIGERIA: THE CURRENT STATUS, ISSUES AND FUTURE PROSPECTIVE

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ABSTRACT

According to deployments of electronic health (eHealth), the health industry has advanced tremendously in recent years. E-Health offers a huge potential to provide high-quality, affordable healthcare in underdeveloped nations. E-health applications will assist healthcare services, enhance patient monitoring, enhance proper patient record storage, save time, raise resources, support referral systems, and guarantee a decrease in medical mistakes. The current status of e-Health in Nigeria is the endorsement of district health information system, establishment of the national health promotion policy, implementation of open medical record system, national ICT health plan and WHO and International Telecommunication Union (ITU) health framework. Yet, the majority of Nigerian hospitals continue to provide healthcare using a paper-based system, despite the difficulties in satisfying the rising needs of the country's residents who want medical treatment owing to the country's vast population. The Nigerian e-healthcare system is in a poor condition due to a number of challenges, including inadequate infrastructure and equipment, insufficient knowledge and competence, legal complications, and weak leadership. However, this research comes to the conclusion that for Nigeria's e-healthcare system to be fully implemented, the current and future governments should create internet information portals, use mass media to broadcast widely, create interactive programming for broadcast media, utilise existing communication systems more effectively, and create community access points.

KEYWORDS: E-Health, E-Health care system, Nigeria, Information and Communication Technology, Hospital.

INTRODUCTION

The current focus of medical practise is the expanding drive for technical development in the provision of healthcare. A variety of technologies for acquiring, storing, retrieving, processing, analysing, and sending information are referred together as information and communication technologies. Patient self-care and education is a widely popular kind of information and communication technology health (eHealth), encompassing things like interactive websites and self-monitoring medical gadgets. The most recent platform for addressing several healthcare challenges is e-health. E-health systems have introduced a wide range of devices that are employed in both developed and developing nations.[1]

Technology can improve the efficiency, security, and consistency of healthcare facilities, according to research. These programmes, which are still largely in their pilot stage, do not fully comprehend the expected targets in a number of developing nations.[2,3] According to[4], a number of factors, including high costs, patient data protection concerns, a system that is too challenging to use, social impact, and a lack of education, contribute to the low use of technology in developing countries. Despite the perceived potentials of technology in both private and public hospitals, healthcare professionals still find it simple to work within the paper-based system in developing countries, according to.[5]

There are three levels of care in Nigeria's healthcare system: primary, secondary, and tertiary. These levels fall under the Federal Ministry of Health (FMOH), State, and Local, which are the three levels of government. The poor condition of Nigeria's public and private health services has come under increasing scrutiny. Nigeria's strike rate is evident, especially in public health organisations located all over the country. Both public and private clinic services are lacking.[6] There is a need to take into account e-healthcare system application in urban as well as rural settings because Nigeria's health care system is going through significant changes and is

under constant financial pressure. Despite the fact that the e-healthcare system is unique among health care services, it also lacks evidence of its efficacy, proponents of clinical e-medicine are challenged to conduct more and better assessments of its applicability, worth, and affordability due to the growing demand for such evidence by health plans, patients, clinicians, and policymakers. E-health's adoption by the public and medical professionals will, however, ultimately determine how widely it is used.[7]

E-health, to put it simply, is the delivery and support of healthcare services using information and communication technology without physically moving the patient. E-health refers to the use of information and communication technology by all parties involved in the health sector, including patients, nurses, doctors, hospital managers, data processing experts, and social security administrators. World leaders in industry, government, and civil society groups are using the potential of information and communication technology for development as the threat of the widening digital divide looms even larger.[8]

The American Telemedicine Association (ATA) was founded as a nonprofit organisation in 1993 with the aim of promoting access to medical care and health professionals through telecommunications and information technology, as well as all aspects of clinical e-health practise, technical advancements, and enabling technologies, and eradicating the current issues, such as insufficient medical professionals, time commitment, insufficient storage for medical records, challenging remote access, e-health has also lately reemerged as a potentially clinically relevant, cost-effective method of assisting patients and clinicians in the evolving healthcare system in many developing nations, including Nigeria.[9] The reason for this evaluation is because it has been seen as a viable tool that tackles many of the issues associated with providing healthcare in rural and underserved regions.[7]

Overview of Nigeria Healthcare System

The state sector, non-governmental organisations (NGOs), commercial for-profit organisations, traditional healthcare providers, and community-based organisations (CBOs) are all included in Nigeria's health sector. The biggest of the services are the public government facilities. It is said that 38% of licenced institutions in the Federal Ministry of Health database are run by private companies. In contrast, primary health hospitals make up 75% of these private hospitals, while secondary institutions make up the remaining 25%.[10]

Nigeria particularly operates as a federation with three levels of government: federal, state, and municipal (local). The rules governing the three levels of government are established by the federal government. They are in charge of assisting with logistics, coordinating the state's aims for its national health strategy, and executing and updating policies. The three-level structure is therefore made up of healthcare delivery in the public sector.[10] Nigeria's national point of entry into the healthcare system is the primary healthcare. It continues to be the backbone of the health system, particularly serving rural areas where the majority of Nigerians reside.[10] Primary healthcare providers often provide curative, emergency, educational, and pre-referral treatment in community centres, hospitals, pharmacies, and post offices. These facilities are often hired by nurses, midwives, senior Community Health Extension Workers (CHEW), junior CHEW, Community Health Officers (CHO), and environmental health officers.[11] The administration of basic healthcare facilities in their communities, general welfare, including emergency treatment, hygiene services, and sanitation are all tasks that fall within the purview of Nigeria's 774 local government areas. The State Ministry of Health, however, is in charge of these operations.[10] General hospitals and integrated health centres provide secondary level services. The state government regulates these hospitals, which provide a variety of specialised services such as radiographic, laboratory, referral, and emergency medical and surgical services. The tertiary facilities are highly specialized and have to prioritise teaching, research, and curative care.[10]

Tertiary hospitals serve as referral hubs for general and secondary care in addition to providing specialized care. Nigeria's health workforce has been found to be underwhelming in comparison to the demands of the nation.[12] However, the shortcomings in rural regions across all nations are observed more severely. For instance, Nigeria has 12 physicians per 100,000 people on average, compared to barely four doctors per 100,000 people in certain other countries.[10] The countrywide average for nurses and midwives is 21 per 100,000.[12] Over 115,000 licenced professionals work as community health practitioners in Nigeria as a whole.[13] Inadequate funding, unsuitable environment, and subpar facilities are some areas of worry that have an impact on Nigeria's healthcare system.[10] It has been observed that these frustrate healthcare professionals and lower their morale, which causes a brain drain in the industry and a migration of healthcare personnel to other nations. Inadequate facilities, outdated infrastructure, and ineffective and disorganised referral systems are a few major issues in the healthcare industry.[13]

The Notion of ICT in Healthcare System

ICT in the healthcare sector is often referred to as e-health, health information technology, or medical informatics, which includes telemedicine. It will be a great idea for the transition of our health sector's record keeping and reference practises from paper to computers since it will significantly increase patient information security and make it safer in the event of a fire or other calamity.[13]

The influence of ICTs in society is already defining and redefining everyday living and experiences in highly developed nations, and it looks that this trend will continue in the next years. Healthcare providers may quickly and readily access medical information and prescriptions using e-health methods rather than searching through a large number of files that are stacked on shelves.[14] With the usage of ICT in the health sector, several issues will be resolved and patient care will improve, including the time patients spend waiting for their turn, lost patient cards and files, a lack of information, and others. Since there is more information about them, the doctor's job will be expedited in order to please the patients, increasing the likelihood of survival and providing proper treatment.[13]

ICT has recently become a communication tool for healthcare professionals including physicians, nurses, medical laboratory scientists, and radiologists in contemporary healthcare. ICT has been effectively integrated into the delivery of healthcare, particularly in developed nations where few doctors are able to use computers for the purposes of disease and injury prevention, promotion and maintenance of health, pain relief, care and cure for those who are ill, avoiding premature death, and pursuing a peaceful death.[15] Facilities for intense patient monitoring services may be set up online, allowing clinicians to keep an eye on their patients from a distance, track their vital signs in real time, and provide treatment recommendations. ICTs may be used for information sharing amongst various health practitioners.[16] By allowing surgeons to see the region of the body that will be operated on using an endoscope, scanned pictures of tumours, or other technology instruments to help surgical interventions with minimum consequences, surgery may be made simpler and more successful. It is crucial to note that inadequate ICT in health systems would not only impede people's social and economic growth, but they may also have a negative impact on the prospects for the national economy, particularly in emerging nations like Nigeria. The most recent Covid 19 epidemic in the globe has sparked a global economic depression and almost put an end to it.[17]

The Current Status of E-Health in Nigeria

The first attempts to deploy a clinical integrated workstation with only a single point of entry into medical systems were made by institutions and health care practitioners in the early 1980s.[18] The workstation also helps with administrative and financial needs, according to.[19] It was discovered that several e-Health apps were being utilised to track patients' vital signs in order to provide quick, in-the-moment diagnoses and treatments.[20] Figure 1 shows the current status of e-health in Nigeria.

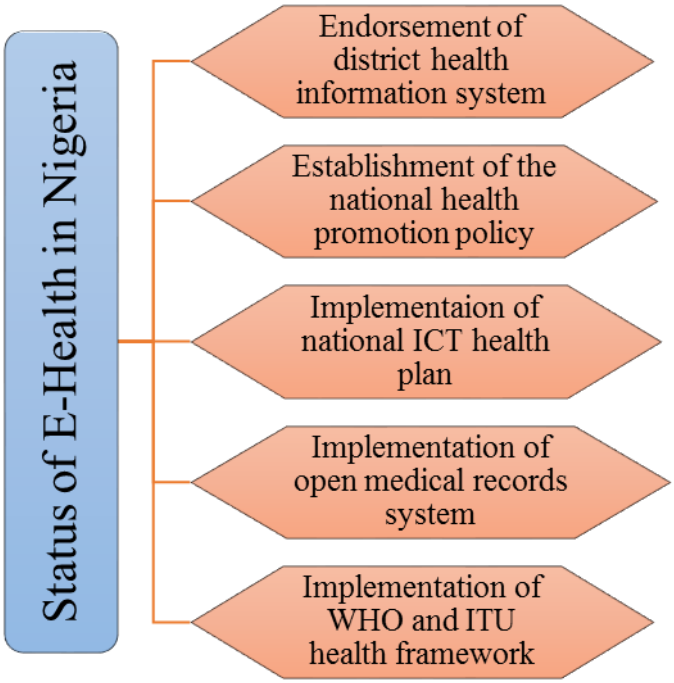

Figure 1: Current status of e- Health in Nigeria.

Endorsement of District Health Information System

[21]claims that the Department of Planning, Research, and Statistics, which supplied the necessary papers, began the establishment of an electronic health care system in Nigeria in 1994. The Nigerian government has developed some initiatives for the implementation of eHealth, including the support of a district health information system (DHIS) as a tool for reporting corporate data at all levels and UNICEF-supported mobile Health Rapid SMS action to monitor the spread of malaria, among other things.

Nigeria tried to implement the eHealth system when it launched the Electronic Information System in 2011,

according to the World Health Organization's (WHO) health care services report from 2013. This system's objective was to compile information on the birth and death rates as well as their causes. They did note, however, that the system lacks both a resource tracking system that could record the entire reproductive child health and maternal infant as well as a resource tracking system that could dispatch general health costs by funding authority.[22]

Establishment of The National Health Promotion Policy

The Nigerian government has put up a general and comprehensive health ICT plan that may be utilised to spur demand for raising the standard of healthcare services and implementing suitable IT solutions.[23] The National Health Promotion Policy, which was established in 2016, developed an ICT department to assist the health sector electronically by digitising and automating the different healthcare operations, which is one of the strategies to accomplish this goal. With assistance from the Federal Ministry of Communication, Federal Ministry of Science and Technology, Office of the Head of Service of the Federation, and National Information Technology Development Agency, the Policy also offers a strong infrastructure and technical support for solutions.[24]

Implementation of Open Medical Record System

Nigeria's national healthcare system is responsible for ensuring that the populace has access to quality health programmes and services. The federal government sets the health policies and ensures that the state and local governments adhere to them.[25] Ten percent of the 500,000 women worldwide who die from maternal infant mortality, according to a WHO study, are claimed to be from Nigeria; this is mostly due to insufficient treatment and poor data management.[26] The Nigerian government is making an attempt to introduce the open medical record system (Open MRS). Given that Open MRS is thought to have limited computational capacity and can only be operated for a maximum of eight hours without the usage of a power source, it is anticipated that it will able to give appropriate medical support for maternal/child healthcare assistance. This system is anticipated to provide accurate and current patient medical information needed to dispense medications, fill prescriptions, and provide any other medical services.[27]

Implementation of National ICT Health Plan

The situation of ICTs for an eHealth enabling environment was examined by WHO (2013). A national information and communication technology (ICT) strategy for health was put into place as early as 2005. This proposal intends to lower the cost of health IT infrastructures while also providing funding for internet connection and the education of medical professionals. Notwithstanding this national strategy, it has been found that politics, a lack of proper technical assistance, and inadequate finance represent an existential danger to ICT infrastructures.[22] According to[28], ICTs have had greater success in Nigeria than ICT policies for health, which has led to various obstacles that prevent project expansion**.**

Implementation of WHO and ITU Health frame work

The WHO and International Telecommunication Union have created a framework for the status of ICTs in Nigeria. This framework explains the stages of development for Nigerian health ICTs. Nigeria falls under the category of nations mandated to strengthen already-existing systems, ensure that adequate policies are set and enforced, enact means of funding, and implement strategies that will aid in a complete transition and an enabling environment. Nigeria is seen as a country transitioning from experimentation/early acceptance into advancing/building.[29,30]

Nigerian E-Health care system issues

Notwithstanding all of the advantages and possibilities for health communication that e-health may provide, it also raises significant worries that, in different ways, impede or hinder its development and use. It is not an exaggeration to suggest that health services in Nigeria, particularly in rural regions, are subpar. Inadequate human resources, subpar treatment, a shortage of equipment and pharmaceuticals, and inadequate referral systems—mostly in distant areas—all hinder the delivery of high-quality healthcare in Nigeria.[31] In addition to these general difficulties in the Nigerian health sector, the following problems have made it difficult to introduce and use IT in the Nigerian health care system (Figure 2)**:**

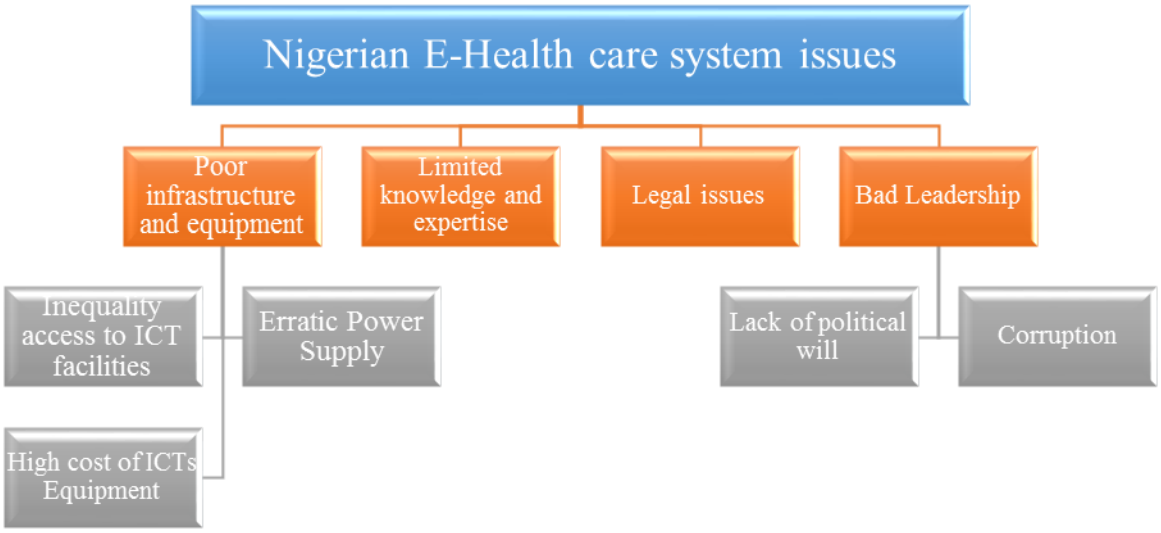

Figure 2: Nigerian E-Health care system Issues.

1. Poor infrastructure and Equipment

Inequality access to ICT facilities: The health sector in Nigeria has a severe issue with access to ICT services due to the uneven distribution of computers, phone lines, satellite dishes, and other equipment needed for internet connection, particularly in rural areas.[32] Also, there are severe problems with the installation of internet and the unavailability of ICT equipment in Nigerian general hospitals. Even projectors and other digital electronics are often unavailable to healthcare personnel in general hospitals, and the majority of these electronic medical devices, including computed tomography (CT) and magnetic resonance imaging (MRI), are costly to set up.[15]

Erratic power supply: Every industry needs electricity, but the health sector more so since it directly affects people's lives. Sadly, Nigeria's electricity industry is one of the least productive industries there. [33] Nigeria has been labelled as having an epileptic power supply and being a significant generator set importer. The majority of IT facilities need electricity to operate. Most of the hospitals that are owned by the government have intermittent electricity. When a stable power supply fails, electricity is interrupted during surgical procedures, which may be harmful to the patients having such procedures. So, it is important for health care in Nigeria to have a sufficient supply of electricity.

High cost of ICTs equipment: The high cost of ICT-related equipment for the health sector in Nigeria is one of the several obstacles preventing people from using ICT and the Internet. Also, due to the exorbitant expense of Internet Service Providers (ISPs), the majority of general hospitals in Nigeria do not have connections.[34] As many citizens undergo medical care abroad, the government is unwilling to make sufficient investments in the health sector and does not see any compelling justifications for doing so. Also, some hospitals that are privately held have financial limitations. Due to the high cost of necessary current technical equipment, the majority of privately held hospitals are unable to purchase it.[35]

2. Limited Knowledge and Expertise

Medical professionals now lack a basic understanding of how to utilise different types of e-health efficiently and successfully. Lack of knowledge about e-health apps' shortcomings makes it difficult for innovators to devise new, more effective methods of using them. As a consequence, one of the biggest obstacles to adoption is training medical professionals in this new method of providing health services via e-health.[36-39]

Prior to e-health adoption, specialised skill is also needed. In this sense, a specific expertise in electronics is needed in order to implement this specialised kind of healthcare.[37] [38] asserts that such health communication aptitude involves a three-stage process, including planning and developing, learning and using, and formalising procedures. However, since extensive training and funding are not always available, reaching this level of competency might be seen as a significant barrier to the implementation of e-health. To this aim, the complete implementation of e-health may not be a practical or cheap choice in certain Nigerian health care systems where resources are constrained.

3. Legal issues

Due to the fast changes brought on by technological innovation, the implementation of e-health as a fundamental component of the whole healthcare delivery

system demands lively and dynamic regulatory frameworks. Any member of the medical community would find it challenging to go above and beyond in their caregiving without the required confidence that they are protected by the law. The rules in this area must be flexible and enforceable in order for its provisions to account for the quick pace of technological change and include clauses that are suitable for such advances.[24] The existence of rules and regulations to control its activities is undoubtedly one of the most crucial variables associated to the allocation and growth of e-health. Most nations, especially developing nations like Nigeria, face legal obstacles to implementing electronic health systems. These obstacles include: a lack of adherence to ratified laws by the government; a lack of support for national and international standards; an inadequate body of laws protecting individual rights and patient privacy. It is essential to create a legislative framework for governing the supply of e-healthcare in Nigeria.[40]

4. Bad leadership

Lack of political will: Very frequently, bad public sector performance has been more strongly correlated with inadequate leadership within the public service than with a lack of national resources. Several industrialised nations that have effectively improved healthcare delivery have a strong political commitment, establishing regulations and allocating funds to guarantee advancement. In Nigeria, many governments use various methods or strategies to carry out their agendas, terminating earlier strategies.

***Corruption*:** Corruption is seen as a social issue, meaning it is a habit or conduct that significantly affects a section of society and necessitates a collective response from that community.[41] Social issues are major behavioural abnormalities that impair society's ability to operate and thwart its demands and objectives.[42] Corruption is to blame for the ongoing breakdown of institutions and infrastructure, and it is also seen to be the root of Africa's pervasive poverty.[43] One of the main reasons hindering Nigeria's health sector's progress is corruption. Hence, corruption not only hinders but also cripples the use of IT in the healthcare sector**.**

Possible solutions to the issues

If IT in the health sector can be built around four important pillars—information surveillance, research administration of health services, human resources, and financing—it will be amazing. It takes minimal effort to use ICT in every industry and at any level in industrialised nations with high literacy rates. Nigeria needs development programmes that are oriented on the needs of the people and are backed by substantial financial resources as well as strong political will to put policies into place.[42] So, these are some methods for resolving issues with Technology in the health industry;[44] making more efficient use of current communication systems, creating Internet information portals, using mass media to broadcast widely, creating interactive programming for broadcast media, developing community access points, and more (CAPs) (Figure 3).

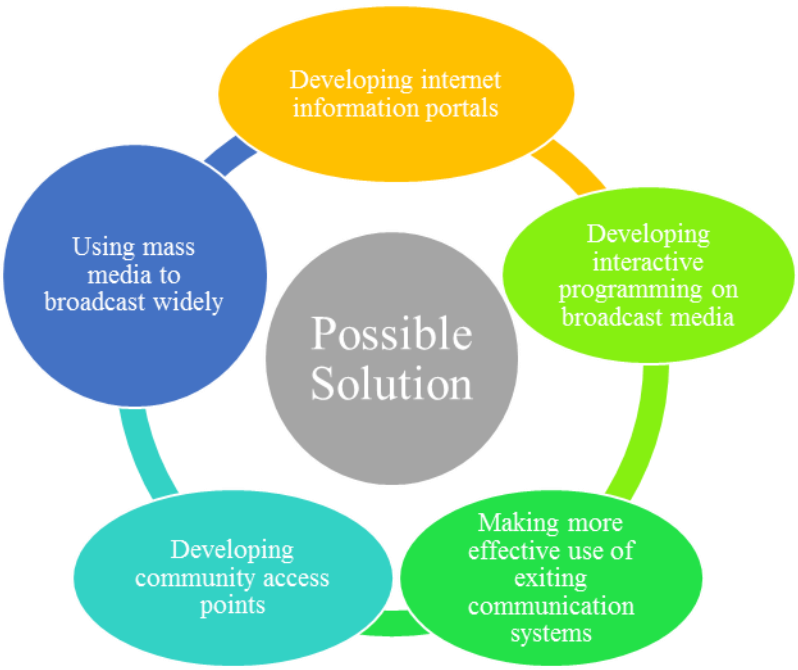

Figure 3: Possible solution.

Future Prospective

In the global effort to lessen the burden of diseases and health inequalities, especially in developing nations like Nigeria, it is crucial to comprehend the role of information and communication technology in the delivery of health care. The use of ICT for health care

delivery, especially in rural regions where access to medical services is poor, offers a promise in extending health care access in the Country. In rural regions, where sickness is common, physicians are rare, and health care infrastructure is poor, e-healthcare system is an innovative solution that links the developing world to the resources of the developed world.[45] E-health care solutions have a high possibility in improving the health conditions of people in an environment without enough healthcare facilities and staff such as Nigeria. It gives the possibilities of transmission of health information for diagnosis and treatment at a cheap start‑up cost for successful implementation of medical care in the middle of understaffed clinics and undertrained health practitioners.

In order to facilitate the export of medical knowledge and the exchange of ideas through a visual communication system between patients in Nigeria and consultants abroad, e-healthcare systems can offer a network of professional interactions between health practitioners in Nigeria and experts in other nations through ICT. In certain circumstances, the patient and the consultant will communicate through ICT, and all the details from the completed investigation will be digitalized and promptly made accessible to the consultant across. The expert may then make a diagnosis and provide the patient potential treatment options. Local medical professionals may study and gain the skills necessary to handle specific instances by employing basic digital cameras and other visual technologies to capture patients' problems and transmit them to an expert doctor for assessment and assistance.

It's interesting to note that several African nations are using ICT for the delivery of healthcare extremely effectively. Josh Nesbit of Medic Mobile in Malawi created the programme that allows medical professionals to text patients' medical information.[46] Instead of spending hours travelling to clinics, individuals might get prompt diagnoses for common symptoms and treatment recommendations. He claims that "within six months of the system coming live, the number of TB patients being treated quadrupled, more than 1200 hours of travel time were reduced, and emergency services were accessible in the region for the first time."[46] Doctors are more effective thanks to e-healthcare since they can assess a patient's status without having to be in person. Visual technology enables medical professionals to access information remotely and circumvent geographic restrictions in health care, which is exactly what Nigeria needs at this moment to deal with the rising illness load and constrained availability of diagnostic and treatment options.

Mobile phone use cannot be undervalued. Medical professionals in remote locations may update and access patient records using mobile phone technology from any location that is covered by a network. This guarantees that the patients' medical records are consistently up to date. The implementation of e-prescription software not only improves the quality of patient care, but also enables more effective and efficient patient care delivery by removing superfluous paperwork. [47]

Nigeria is becoming more typical due to its rising health care costs, subpar infrastructure development, unstable power supply, inadequate road system, and difficulty accessing specialised health facilities. If applications and phone prescription use are correctly developed, they will provide accurate billing procedures, reduce the amount of prescription mistakes, enable real-time access to medical information, and lessen the inefficiencies of script writing in the back and front offices. [48] The apps might be made to offer a feature that instantly warns the doctor if the recommended prescription interacts negatively with other drugs. [49]

CONCLUSION

The e-Health technology is seen as a system that may provide effective patient record keeping, simplified operations by combining the efforts of many hospital departments into a single repository unit, and improved administration and correct control as a result. Instead of manually collecting and storing patient information, the technology is used to save and retrieve healthcare data electronically using information and telecommunications technologies (ICTs). Effective e-Health applications, such as telemedicine, electronic medical records, and mobile health, are seen as crucial instruments for delivering high-quality medical care. The adoption of the district health information system, the creation of the national health promotion strategy, the implementation of the open medical record system, the national ICT health plan, and the WHO and ITU health framework make up Nigeria's present state of e-Health. Yet, the majority of Nigerian hospitals continue to provide healthcare using a paper-based system, despite the difficulties in satisfying the rising needs of the country's residents who want medical treatment owing to the country's vast population. The Nigerian e-healthcare system is in a poor condition due to a number of challenges, including inadequate infrastructure and equipment, insufficient knowledge and competence, legal complications, and weak leadership. It was discovered that e-Health technologies are underutilised in the Federal Republic of Nigeria, despite the many advantages that can be gained through the implementation of an e-Health care system to improve and provide accessibility to health care services. The current and future governments should create internet information portals, use mass media to broadcast widely, create interactive programming for broadcast media, utilise current communication systems more effectively, and create community access points in order to fully implement the e-healthcare system in Nigeria**.**

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