E-Health as a Tool in Health: Prospects and Challenges in Nigeria

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Abstract:

This study explores the prospects and challenges of E-Health in Nigeria, focusing on its impact on nursing. E-Health, a dynamic field combining medical informatics, public health, and technology, holds the potential to reshape healthcare delivery. The study covers various aspects of E-Health, including telemedicine, m-Health, Tele-care, e-Public health, e-Mental health, and tele-health. While electronic health records (EHR) emerge as a crucial tool for real-time updates, challenges such as patient identification, standardization, and privacy concerns hinder seamless integration. Examining the prospects, the study highlights E-Health's potential to overcome limitations like limited access, geographical barriers, and the impact of the COVID-19 pandemic. Challenges, including limited electricity, low internet penetration, and user perceptions, are investigated. Exploring specific E-Health components like telemedicine, mHealth, big data, GIS, blockchain, IoT, AI, and machine learning, the study analyzes their contributions and challenges. Despite hurdles, E-Health offers benefits like rapid diagnostics, enhanced patient care, and efficient healthcare services. The study emphasizes the pivotal role of nursing in this transformative era, emphasizing the need for informatics-proficient nursing professionals. Integrating E-Health into nursing education and practice is crucial for aligning with global standards. The conclusion underscores E-Health's potential to redefine healthcare in Nigeria, presenting opportunities for improved patient care, streamlined processes, and enhanced nursing practices.

Keywords: E-Health, Prospects, Challenges,

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Introduction

E-Health is a dynamic discipline that combines medical informatics, public health, and business to deliver and improve healthcare services and information using the internet and related technologies (Evans, 2016). E-Health is a comprehensive term that encompasses various subcategories such as telemedicine, m-Health, Tele-care, e-Public health, e-Mental health, and tele-health (Hans & Lisette, 2016). E-Health refers to the utilisation of contemporary information and communication technology to address the requirements of citizens, patients, healthcare professionals, healthcare providers, and policy makers. Nevertheless, their capacity to effectively influence the health system has been less than ideal in numerous places (Makinde et al., 2016). The utilisation of clinical documentation is essential for enhancing the quality of treatment through electronic health records, optimising clinical outcomes, maximising operational efficiency, ensuring patient safety, and facilitating effective inter-professional communication. The predominant format among them is the Electronic Health Records (EHR), which serve as a real-time means of updating the healthcare team on the patient's condition. The Electronic Health Record (EHR) of a patient contains relevant information that aids the healthcare team in making well-informed decisions and ensuring the provision of high-quality care throughout the patient's treatment process. The Health Information System (HIS) is commonly recognised as the fundamental basis of public health, playing a crucial role in facilitating data-driven decision-making (Makinde et al., 2016).

This inadequacy is particularly noticeable in poor and middle-income nations, where there is a greater need for evidence-based resource allocation yet a scarcity of data. The absence of dependable health data originates from inadequate procedures and systems, insufficient human resource capacity, and the substantial expenses associated with data administration (Ogaji & Anyanwu, 2021). The deployment of e-Health in Nigeria's Public Health Care (PHC) has faced numerous obstacles in its development in recent years. This article will specifically address the obstacles to implementing it and the potential for its continuation. One of the causes driving the issue of e-Health is the dependence on human data entry and the execution of basic coordination tasks or activities. The importance of implementing efficient and well-managed automated health data systems has been emphasised to enhance the effectiveness of the healthcare system. (Eysenbach, 2001).

This inadequacy has become more noticeable.According to the World Health Organisation, e-Health refers to the efficient and secure use of information and communication technology to assist in various aspects of health and associated sectors, such as healthcare, health surveillance, health education, knowledge, and research.

The Kogi State Specialist Hospital in Nigeria is among the limited number of healthcare facilities in the country that utilise an integrated electronic health record system. The technology functions in a manner that allows real-time evaluation of ongoing consultations by other departments within the hospital. This could be the initial stage of the transition to electronic systems in Nigeria's healthcare sector, the economically disadvantaged and middle-income (Booth, 2006).

The study examines prospects and challenges of E-health as a tool in health in Nigeria. The study specifically:

- explores the meaning of e-Health;

- examines the prospects of e-Health in Nigeria;
- explores the challenges of e-Health in Nigeria; and
- investigates the implication of e-Health to nursing.

Literature Review

Concept of E-Health

E-health is a pioneering advancement in healthcare in the 21st century. It refers to the combined use of electronic communication and information technology in the healthcare sector, as well as the use of digital data that is transmitted, stored, and retrieved electronically for clinical, educational, and administrative purposes. This can be done both locally and remotely (Clark et al., 2009). The implementation of e-health has revolutionised the healthcare industry and been widely adopted.E-Health encompasses the utilisation of internet and other advanced technologies within the healthcare sector. E-Health refers to the electronic transmission of health materials and healthcare services. It refers to the use of electronics, informatics, and telecommunications in healthcare. Telemedicine refers to the provision of healthcare services through the use of advanced electronic information and communication technology, enabling healthcare providers and patients to engage remotely without direct physical touch. The World Health Organisation (WHO) defines e-Health as the efficient and secure utilisation of information and communications technologies to support various aspects of health and health-related fields, such as healthcare services, health surveillance, health literature, health education, and health research (WHO 2020).

From a broader perspective, the word e-Health represents the technological advancements aimed at extending healthcare services at the local, national, and global levels through the utilisation of information and communication technology. E-health tools encompass a range of technologies, such as electronic medical records (EMRs), personal health records (PHRs), mobile apps, patient portals, information repositories, and various internet-based programmes or software. These tools are designed to assist patients in monitoring and managing their health. E-Health refers to the electronic interchange of many types of health data, including Telemedicine and Tele-health. Instances of e-Health encompass activities such as exchanging messages with healthcare providers through email, retrieving medical records, and conducting health-related research (Sardi et al., 2017).

E-Health tools that use multimodal content and provide the possibility for direct communication with providers have a higher adherence among vulnerable groups. However, most of the e-Health tools are not embedded within the health care system. They are usually focused on specific problems, such as diabetes or obesity. Hence, they do not provide comprehensive services for patients. This limits the use of e-Health tools as a replacement for existing health care services (Oderanti et al., 2021).

The healthcare industry has seen significant digital revolutions as a result of the widespread adoption of information and communication technology (ICT) in the field. Numerous individuals face limited access to healthcare services as a result of insufficient awareness about the availability of such treatments, physical or mental impairments, geographical distance, military blockade, lockdown measures, and other potential factors. The availability of healthcare services has been influenced by several advancements such as electronic health records, artificial intelligence, sensors, wearable devices, the Internet of Medical Things, blockchain, big data, and other applications (Omole, 2015). The COVID-19 pandemic has

necessitated the use of telehealth and telemedicine services to obtain healthcare, since several countries have implemented lockdowns and physical distancing measures. Digital health has been utilised to enhance the capabilities of individuals, both in general and patients specifically, by providing them with the means to conveniently access healthcare services either in person or at a distance. Healthcare professionals have been utilising digital health technologies to augment their expertise, capabilities, and, most importantly, to facilitate their ability to connect with patients in order to offer guidance and support. The utilisation of digital health solutions presents various problems encompassing legal, ethical, infrastructural, human and material resources, training, education, attitudinal, cultural, organisational, and behavioural aspects. Various national, regional, and international institutions have embraced resolutions and formulated policies to facilitate the implementation of digital health in different nations. This chapter presents several instances of how information and communication technology (ICT) is being utilised to enhance and streamline access to healthcare services. These examples highlight the importance of good national planning in the implementation of digital health initiatives (Wicks et al., 2014).

It is acknowledged that the promotion of health among this demographic can lead to a longer and better lifespan. Several ailments in the elderly population can be partially or entirely avoidable if individuals adopt a wholesome lifestyle. Physical activity with a balanced diet can effectively mitigate the risk of obesity, cardiovascular illnesses, hypertension, diabetes, and premature mortality. This systematic analysis examines the design and implementation aspects of e-Health solutions utilised by vulnerable populations. The adherence rate was employed as the impact size measure in the meta-analysis (Sardi et al., 2017). The adherence rate refers to the proportion of individuals that repeatedly utilise the eHealth technology, indicating several instances of usage. In addition, we conducted a meta-regression study to investigate the impact of various design and implementation factors on the rate of adherence. Presently, e-Health tools are being utilised by vulnerable populations, albeit to a limited degree. E-Health technologies incorporating multimodal information, such as videos, and enabling direct engagement with healthcare practitioners, have been found to enhance adherence rates among vulnerable populations (Wicks et al., 2014).

Challenges of Electronic Health Record

Healthcare institutions may avoid implementing of E-records due to a number of issues they face, which automatically limit access to healthcare services by people (patients and non-patients). These challenges are;

1. The lack of proper patient identification in a record greatly hinders and renders unfeasible the provision of health care. The lack of a distinct identifier for each patient can result in both delays in the delivery of healthcare services and potential medical mistakes.
2. The absence of standardised vocabulary and a standardised structure for data communication hinders the effectiveness of data exchange by impeding semantic interoperability. These issues will result in service delays, reporting difficulties, increased costs, and most importantly, medical mistakes.
3. Healthcare providers, patients, and the community have raised concerns over the privacy, confidentiality, and the reliability and precision of electronically produced data. Enhanced security technologies, such as blockchain, along with increased legal and ethical understanding, can potentially alleviate anxiety.

4. Patients may exhibit distrust towards electronic health records (EHR) due to concerns related to both hardware and software. Disrupted electrical supply, incorrect algorithms, inadequate system training, and other factors all impede access to healthcare services.

Despite all these challenges, benefits of an EHR system to collectively enable fast and reliable access to healthcare services have been documented. These can be:

1. Medical information and statistics. Instantaneous retrieval of crucial data. Enhancing carers' capacity to make informed clinical judgements promptly would be beneficial.
2. Outcome administration. Rapid accessibility of both current and historical test findings by all healthcare practitioners involved in the patient's treatment across various healthcare settings. Implementing this measure would enhance patient safety and improve the efficiency of healthcare delivery.
3. Management of orders. Capability to input and retain orders for prescriptions, diagnostics, and other services in a computerised system. This will optimise readability, minimise redundancy, and maximise the efficiency of order execution;
4. Assistance in making decisions. Utilising reminders, prompts, and alerts to enhance adherence to optimal clinical protocols, guarantee consistent screenings and other preventive measures, detect potential drug interactions, and streamline diagnosis and treatments;
5. The utilisation of electronic means to facilitate communication and establish connections. Streamlined, fortified, and easily attainable communication between healthcare providers and patients. Implementing this will enhance the consistency of healthcare provision, expedite the identification and treatment of medical conditions, and decrease the occurrence of negative outcomes.
6. Provision of assistance to patients. Health record access tools for patients. Implementing this solution would facilitate dynamic patient education and enable them to conduct home monitoring and self-assessment, hence enhancing the management of chronic illnesses.
7. Administrative procedure. Automated administrative tools, such as scheduling systems. Implementing this solution would enhance the operational efficiency of hospitals and clinics, resulting in more prompt and efficient service delivery to patients.
8. Documentation. Utilisation of standardised data formats for electronic data storage. This will facilitate healthcare organisations in promptly addressing personal, federal, state, and private reporting obligations.

Telemedicine

While telemedicine is not a novel idea, its utilisation has significantly increased in the past two years as a result of the COVID-19 outbreak. Telemedicine, as defined by Evans in 2016, refers to the use of information and communication technologies by healthcare professionals to provide healthcare services, regardless of distance. This includes exchanging valid information for purposes such as diagnosis, treatment, prevention of diseases and injuries, research, evaluation, and continuing education of healthcare providers. The ultimate goal is to improve the health of individuals and communities. Telemedicine and telehealth are sometimes used interchangeably, however they have distinct differences. Telemedicine primarily involves delivering health services to an individual, whereas telehealth

encompasses the supply and evaluation of healthcare services for a larger population. Aina et al., (2023) suggested that telehealth could become an essential requirement for the general community, healthcare practitioners, and COVID-19 patients, particularly during periods of quarantine. This technology allows individuals to interact with healthcare providers in real-time, seeking guidance on their health concerns. The primary objective of telemedicine is to offer prompt, secure, and cost-effective healthcare services without requiring the physical presence of the patient and healthcare professional in the same location. This implies that the patient does not need to physically travel to the point of care in order to obtain healthcare services. The use of social/physical distancing measures during the COVID-19 pandemic has led to a significant surge in the utilisation of telemedicine services worldwide. This programme was implemented to prevent interaction between patients and healthcare practitioners who may have tested positive for COVID-19, while also ensuring the uninterrupted provision of primary, secondary, and in some cases, tertiary healthcare services. Telemedicine services are offered to ensure prompt access to excellent information and care, including preventive and protective services, provision of public health support, facilitating patient engagement with other patients, family members, and healthcare providers. The more advanced support includes screening for diagnosis and disease detection, as well as supporting eLearning for both healthcare providers and recipients.

Mobile Health (mHealth)

mHealth is a healthcare practice that utilises mobile devices, including mobile phones, smart phones, the Internet, patient monitoring devices connected to mobile phones, personal digital assistants (PDAs), and other wireless devices, to support medical and public health efforts. mHealth support include the utilisation of digital technology, including specialised applications called APPs, by patients, care-takers, chemists, and other healthcare workers, in addition to the aforementioned equipment. According to the WHO global study, the six main categories in which mobile phones are used for health purposes are: toll-free emergency services, health call centres, appointment reminders, community mobilisation, information dissemination, and mobile telehealth and emergency management systems, as well as mHealth applications. Mobile applications, commonly known as mobile apps, are software programmes designed to operate on smartphones and other mobile communication devices. Additionally, they can serve as appendages that are affixed to a smartphone or other mobile communication devices, or a fusion of appendages and software (Clark et al., 2009).

These applications assist patients or users in independently managing their disease or condition without offering specific treatment recommendations. They offer patients straightforward tools to arrange and monitor their health information, provide convenient access to health-related information and treatments, aid patients in documenting, displaying, or communicating potential medical conditions to healthcare providers, and facilitate interaction between patients or providers and Personal Health Records (PHR) or Electronic Health Record (EHR) systems.

Currently, there is a vast assortment of mobile health applications that enable both patients and non-patients to conveniently access healthcare services and information. The issues encompass various aspects, including infrastructure, culture, law, and ethics. Typically, these applications have been employed in various domains like sports and fitness tracking, diet and nutrition, weight loss guidance, pharmacy services, sleep cycle analysis, stress reduction and relaxation techniques, meditation, and symptom assessment. The user has access to a range

of medical services and resources, including personal health records, digital imaging, electronic chart review, laboratory results review, life scan for diabetes patients, remote heart monitoring, ECG viewer, remote oxygen level check, telehealth services, prescription management, appointment reminders, International Classification of Diseases (1CD) reference guide, evaluation and management coding, specialised medical reference material, pregnancy and baby develop

Big Data

Big data in health encompasses vast datasets that are systematically and automatically gathered, electronically recorded, and stored. It is reusable in the sense that it may be used for multiple purposes and involves combining and linking existing datasets to enhance health and health system performance. Utilising big data to identify patterns and forecast diseases is beneficial for medical researchers and health leaders. This enables a deeper comprehension of disease distribution at a national or local level. If employed effectively, it can aid in the development of sustainable healthcare systems, foster collaboration to enhance care and outcomes, and ultimately enhance healthcare accessibility. It should be noted that a significant portion of medical data is unstructured and clinically significant. This data is spread across several sources such as individual electronic medical records (EMR), laboratory and imaging systems, physician notes, medical correspondence, claims, etc. Data analytics, which is closely associated with the concept of big data, is rapidly developing as a very promising discipline. It involves extracting valuable insights from massive datasets, leading to enhanced outcomes and cost reduction. The transformative capacity of big data in healthcare has been recognised. The field of data science and the growing recognition of data as a valuable asset in healthcare have had a significant impact on the study of healthcare. This influence extends to the assessment of cost-effectiveness, efficiency, illness prevalence, and accessibility in healthcare, as anticipated by Asthana et al. (2019).

Geographic Information Systems (GIS) For Health

One of the primary obstacles to getting healthcare services is a lack of awareness of their availability, unfamiliarity with the distance between one's location and the healthcare facility, and the inability to afford transportation to the facility. Brown listed five potential advantages of adopting GIS into healthcare IT: recognising patterns in health, monitoring the transmission of contagious diseases, leveraging personal devices, integrating social media, and enhancing healthcare services. Brown's conclusion states that GIS is a potent instrument that has effectively been utilised to tackle many noteworthy health concerns, spanning from disease management to enhanced services. Geolocation technology in the field of health have simplified the process of finding the closest healthcare facility, providing comprehensive information on the facility, and determining the most efficient way to reach it. Integration of geographic data elements (locations) and the thematic data in a database combines the best of the two worlds as it has become feasible to pinpoint the site where a specific type healthcare services occurs.

Block Chain in Healthcare

Blockchain in healthcare is a decentralised system that records and preserves transaction data. It creates a shared and unchangeable record of peer-to-peer transactions, constructed from interconnected transaction blocks and saved in a digital ledger. It enables the secure transfer of ownership of units of value through the use of public key encryption and proof of work mechanisms. The lack of trust in a system by patients is primarily due to concerns

around security and data privacy. Distrust in a system is a significant barrier to accessing healthcare services. Enhancing security measures and fostering confidence would incentivize a greater number of individuals to utilise healthcare systems. Blockchain technology enables patients to make payments using cryptocurrency, a growing trend in the financial industry. Drug traceability, particularly the tracking of counterfeit medicine, is being utilised to monitor patient safety. The exponential growth of personal health data from many sources has led to increased awareness among patients on the need for enhanced security and restricted access to their data by unauthorised entities (Procter 2001).

The Internet Of Things (IOT)

The Internet of Things (IoT) is defined as an interconnected system of tangible items that utilise connectivity to facilitate the transmission of data. The Internet of Medical Things (IoMT) enables patients to remotely transmit their health data to specialised centres for monitoring, allowing them to remain at home or at any location. The integration of medical equipment and applications with healthcare information technology systems through networking technologies allows patients to receive healthcare services remotely. Wearable health monitoring devices are technological tools designed to be worn on the human body. These devices have grown increasingly prevalent in the technology industry as firms have developed smaller wearable devices equipped with advanced sensor technologies capable of gathering and transmitting information about their environment (Wicks et al., 2014). A wearable gadget is commonly utilised to monitor the wearer's physiological indicators, such as vital signs, as well as collect data pertaining to their health, fitness, and location. These may encompass many technologies such as continuous glucose monitoring devices, smart bandages, smart medications, remote patient monitoring, tracking patient's movement, and nutritional systems. drug adherence enables patients to take their medications promptly and also notifies healthcare providers if the patient fails to comply with the prescribed drug regimen. Wearables offer numerous benefits to patients and also assist healthcare practitioners by enhancing access to healthcare services and enabling real-time collecting of health data, thereby saving time. Home care and monitoring are offered to elderly patients, patients with chronic illnesses, and individuals who, for economic or logistical reasons, are recommended to remain at home. Digital health solutions facilitate access to healthcare services for these individuals (Booth, 2006). Hospital to Home Healthcare (H2H) has emerged as the preferred alternative and is an essential component of the health service delivery system. These technologies have been employed to minimise superfluous hospital visits and alleviate the strain on healthcare systems by facilitating the connection between patients and their physicians. This is achieved by enabling the transmission of medical data through a secure network and empowering individuals to exert greater control over their overall health, well-being, and physical fitness. The mobile device, whether it be a smartphone or a device with internet connectivity, is connected to a medical device within the home and is also linked to a health centre. It has the capability to transmit signals pertaining to the patient's vital signs. The functionality of these gadgets is contingent upon the specific type or purpose for which they are offered. These measurements may encompass the real-time monitoring of body temperature, blood pressure, blood glucose levels, heart rate, respiration, and air flow for patients requiring kidney dialysis devices.

Medical wearables equipped with artificial intelligence and big data are enhancing healthcare by offering additional benefits in the areas of diagnosis, treatment, patient monitoring, and

prevention. Wearables facilitate access to healthcare by offering various benefits. Wearable devices applied to healthcare offer multiple advantages to healthcare professionals as well as the patients:

1. Premature identification of a medical condition. Wearable gadgets enable the timely identification of symptoms due to their enhanced accuracy in measuring medical data. Additionally, these devices offer customisation options.
2. The doctor can efficiently generate a programme tailored to the patient's requirements with the assistance of software.
3. Early detection. The accurate medical parameters in wearable devices enable the early identification of symptoms.
4. Telemedicine for monitoring patients remotely. Healthcare providers can remotely and instantaneously monitor patients using wearable devices. This allows for real-time monitoring and enables medical experts to make remote adjustments to the treatment if needed. Furthermore, patients have the ability to manage their health condition by conveniently connecting the device at any time and location.
5. Medication compliance. Wearable gadgets facilitate timely medication intake for patients and can also alert medical personnel if the patient neglects to comply to their medication regimen.
6. Data registry. The data is stored instantaneously, enabling a more comprehensive analysis of the material. This leads to a more comprehensive and accurate documentation of the patient's medical background, which can be readily shared with other healthcare professionals
7. Optimal decision made by the doctor. The doctor have the capability to compare and analyse data in order to make a more precise clinical choice, hence improving the patient's quality of life.

Using wearable technology for remote healthcare offers the benefit of saving time and increasing mobility by eliminating the need for patients to be regularly transported to medical facilities.It is acknowledged that certain patients necessitate the use of several technologies, leading to the development of a system that aims to simplify the process of collecting, delivering, and utilising data. The Internet of Medical Things (loMT) refers to the integration of medical devices and applications that can establish connections with healthcare information technology systems through networking technologies (Ogaji & Anyanwu, 2021).

Artificial Intelligence and Machine Learning in Health

Based on a survey conducted by the World Health Organisation (WHO) in 2017, over 400 million individuals lack access to vital healthcare assistance and services. While artificial intelligence (AI) has the potential to decrease this figure, the main obstacle is in its execution, which requires substantial financial backing. One of the causes for this situation is that people are unable to obtain healthcare treatments due to several social determinants of health. Al offers a virtual means of reaching out to individuals who lack access to healthcare services. This is achieved through the use of image recognition and interpretation, diagnostic aid, the creation of reminders and alerts, and therapeutic planning. Artificial intelligence (AI) offers several advantages to the healthcare sector, particularly for patients (Aina et al., 2023).

It offers rapid and precise diagnostics, minimises human errors, and aids in cost reduction by allowing patients to receive doctor's guidance without the need to physically visit hospitals or clinics, resulting in cost savings. Virtual assistants facilitate remote patient care by enabling

patients to input their data more regularly using online medical records. Additionally, they support the virtual presence of patients through telemedicine services, which enable professionals to assist patients residing in remote areas. Doctors can utilise a remote presence robot to interact with their workers and patients at hospitals or clinics, providing assistance and addressing any inquiries they may have.

Monitoring, Evaluation and Quality Management of Healthcare Services

Monitoring is the regular and continuous process of verifying that healthcare services are progressing as intended, whereas evaluation is specifically aimed at assessing the significance, efficiency, and effectiveness of healthcare services and their influence on people's health. Quality data is crucial in both scenarios and necessitates the establishment of a baseline against which progress or lack thereof can be assessed. An automated health information system, typically computer-based, that systematically gathers and presents data on the provision and expenses of healthcare services, as well as patient demographics and health condition. Monitoring and evaluation (M&E) encompasses the process of gathering, storing, and analysing data. This data is then transformed into valuable information, knowledge, and evidence. These insights can be utilised to inform evidence-based policies, decisions, and actions. M&E relies on a specific set of indicators and quantifiable targets, necessitating the use of 1CT technologies to meet the requirements of data collection, storage, trend analysis, comparison of successes with targets, and the formulation and application of evidence. The concept of quality in health services refers to the acknowledgement and active pursuit of enhancing the standard of healthcare provided at all levels of a healthcare system. This pursuit is consistently encouraged within a supportive environment that fosters participation, communication, transparency, and responsibility.

The Challenges of E-Health in Nigeria

The challenges encompass issues such as limited electricity availability, low internet penetration, user perceptions, difficulties in accessing electronic health information due to the digital divide, ethical concerns regarding privacy and security, fostering distrust and interference in the doctor-patient relationship, common cost challenges, and difficulties in learning and utilising the software, among others (Oderanti et al., 2021).

Benefits of E-Health in the Public Health Care Sector

The utilisation of electronic health records and e-Prescription has already surged in industrialised nations and is projected to continue its upward trajectory in the future. These systems depend on compatible digital systems to facilitate the sharing of health operations. In the future, this information would be transmitted across borders to enhance healthcare management (Evans, 2016). This will enable citizens who have travelled to other nations, such as for a holiday, to obtain all necessary healthcare documentation and prescriptions for medication from a drugstore in that country. Furthermore, this will also have a positive impact on the medical tourism sector. Artificial intelligence and robotics will experience a surge in utilisation in the forthcoming years. While fully autonomous robots performing medical procedures on humans are still a long way off, the utilisation of robotic components to aid healthcare personnel has already seen a rise (Evans, 2016).

In Nigeria, e-Health systems are designed to cater to the unique challenges of operating in areas with limited access to electricity, harsh environmental conditions (such as dust, heat, and humidity), and a workforce with limited technical expertise. These systems aim to provide solutions and services that can function effectively under such circumstances. The

implementation of e-Health's information system involved a three-month trial phase, which successfully led to the development of electronic forms for all clinical areas. This implementation significantly minimised data duplication and streamlined the monthly reporting process, reducing the time required from days to minutes (Omole, 2015). E-Health not only offers innovative technologies, but also has six significant ongoing projects. As an illustration, the e-Health Institute of Human Virology, Nigeria (HIVN), has created a Clinical Information System using Open MRS for 27 health facilities in Nasarawa State, Nigeria. In January 2011, e-Health Nigeria created the mCBS platform, which was built upon the Rapid SMS technology.

The mCBS platform gathers SMS reports from traditional birth attendants, community health extension workers, and community midwives regarding crucial occurrences concerning mother and infant health. The community response team of health experts, located at Ahmadu Bello University Teaching Hospital in Zaria, Nigeria, receives vital events reports for the purpose of emergency reaction and subsequent care (Ogaju & Anyanwu 2021). Generally,

1. E-Health has the potential to enhance the quality of healthcare by enabling comparisons among various healthcare providers
2. The project would prioritise quality assurance by directing patients to the highest quality suppliers.
3. E-Health involves enhancing patients' understanding and availability of their own electronic records through the internet.
4. This opens up new possibilities for patient-centered medicine and enables evidence-based patient decision-making.
5. E-Health facilitates the education of physicians and consumers using online platforms, providing ongoing medical education and other resources. Additionally, it fosters information exchange and communication among healthcare facilities in a standardised manner.
6. E-health expands the scope of healthcare beyond its traditional limits.
7. E-health enables users to easily get health treatments online from overseas providers. These facilities can vary from basic guidance/recommendations to more complex interventions or treatments.
8. E-health is a time-efficient solution that reduces waiting time.

Innovations in e-Health

Priority in many upper income nations undergoing late demographic and epidemiological transition is the development of a healthcare delivery system that is more adaptable to future population issues. The United Kingdom (UK) is not exempt from this. In the middle of 2014, the mean age in the United Kingdom surpassed 40 years for the first time. According to projections, by 2040, almost 1 in 7 individuals will be above the age of 75. This demographic shift is expected to coincide with a rise in the occurrence of chronic illnesses, multiple health disorders, cognitive impairments, and long-term physical weakness (Asthana et al., 2019). The Innovations in e-health panel showcased upcoming advancements in technology and apps that would enhance clinical decision-making, enhance the quality and efficiency of care, include individuals in clinical decision-making, and empower them to adopt healthy behaviours. The presenters also discussed the possible drawbacks of current systems and the potential hazards associated with e-health applications (Wicks et al., 2014).

E-Health innovations present great opportunities for health and social care systems to address these difficulties and enhance the quality of life for older individuals. Nevertheless, the adoption of e-Health by users is unexpectedly limited, and achieving successful implementation is uncertain until the concerns of important stakeholders are more effectively acknowledged. Although numerous prior studies have focused on the technology components of e-Health advances, the business models that support these innovations are sometimes disregarded (Oderanti et al., 2021).

Implications to Nursing Pratice

Nursing is currently experiencing a really transformative period in its history due to the introduction of electronic health (e-Health) technologies that aid in providing care to clients.

Nevertheless, the mere presence of technology will not bring about a revolution in healthcare unless there are proficient professionals with a solid understanding of informatics who can effectively operate within this novel framework of patient care. The reference "Booth, 2006" is provided.

eHealth will enable nurses to effectively attend to a diverse group of patients and enhance their patient care by leveraging the internet to explore novel concepts.

The ultimate outcome of nurses and e-health will be determined by the nursing profession itself. In the 21st century, there is a constant emergence of increasingly intricate technologies, including nanotechnology, biotechnology, RFID, and remote home monitoring.

The purpose of the Nurse Educator on e-Health Resource is to assist faculty in incorporating eHealth knowledge and skills into entry-level courses. It also aims to increase nursing faculty's understanding of the importance of national and provincial eHealth guidelines and how they affect nursing practice (Clark et al., 2009).

Additionally, the inclusion of an Introduction to Computer-Based Training (CBT) in the curriculum of nursing schools would facilitate nurses in acquiring proficiency in computer usage.

Conclusion

Nurses play a crucial role in providing direct patient care. Based on a survey of nurse practitioners (NPs), the majority of nurses stated that the adoption of electronic health records (EHR) enabled them to more effectively track patient advancement, enhance precision in their tasks, and increase efficiency. Specifically, the implementation of e-Health in Nigeria will enable nurses to align with global nursing standards and practices.

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