

THE IMPACT AND CHALLENGES OF INFORMATION AND COMMUNICATION TECHNOLOGY ON HEALTH CARE DELIVERY IN NIGERIA¹

Abstract

The accessibility and utilization of e-healthcare services in Nigeria is very low thus, the need to improve on the application Information Communication Technology (ICT) in healthcare delivery in Nigerian hospitals is very essential. E-health is the application of information communication technology in health care management. ICT application in health sector will promote healthcare services support, improve monitoring of patients' conditions, improve adequate storage of patients' records, time saving, increase resources and aid referral system, ensure reduction in medical error and so on. However, most of the Nigerian hospitals still operate on paper-based healthcare delivery system despite the challenges of meeting increasingly demands of citizens who are in need of medical attention due to the large population. Many factors contribute to the poor state of ICT in medical sector of Nigeria, such as epileptic power supply, Illiteracy, high cost of ICTs equipment, lack of clear-cut law and policy, lack of expertise, corruption and so on. This paper adopts a doctrinal method of research which involves the use of primary and secondary sources of materials such as statutes, online publications, text books, articles, online dissertation and so on. However, this work concludes that the dream of ICT drive in health sector will be realizable in Nigeria if the present and subsequent government can reduce corruption, improve national infrastructures, especially in the areas of e- health technology and electricity.

Keywords: Health Care, Information and Communication Technology, Impact and Challenges.

1.0 Introduction

Among the biggest challenges facing the health sectors are improper management of resources and poor technological infrastructures which are in their worst state due to negligence and corruption.² Some of the health professionals are not well trained due to inadequacy of basic tools and laboratories needed for training and research.³ Presently, the world is operating on the internet and every facet of human endeavors should be carried along especially the Nigerian health sector that is why there is a need for a

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²O. Onwujekwe, P. Agwu, C. Orjiakor, et al, 'Corruption in the health sector in Anglophone West Africa: Common forms of corruption and mitigation strategies', *Journal of Anti-Corruption Evidence*, 2018, pages 13-14

³A. Omotosho, P. Ayegba Et. al, 'Current State of ICT in Healthcare Delivery in Developing Countries' Article in *International Journal of Online Engineering (iJOE)*, 2019, Page 9

shift in paradigm and innovative solutions in health workforce development to the usage of Information Computer Technology (ICT) in health delivery.⁴

After Nigeria got independence in 1960, the nature of health sector has not maximally achieved its purpose, by now an average Nigerian would expect that our health sector would have been better by far but it is a pity that our health sector is still at a crawling stage.⁵ The Nigeria General hospitals which are government-owned organizations with basic responsibility to safeguard the health and social well-being of Nigerian citizens have suffered tremendously over the years and risk shutdown from time to time due to inadequacy of required technologies to improve quality health care delivery and unpaid salaries of health workers after several unfulfilled promises from the government.⁶

Thus, for there to be an increase in the effectiveness of healthcare services in Nigeria in order to meet with the global standard, there is a need for an improvement in medical care through application of Information Computer Technology (ICT) to healthcare delivery systems. This is due to the generated heightened life-threatening ailments some of which have defied all curative measures.⁷ The application of ICT to the health system in Nigeria will promote Electronic health (e-health) which can contribute immensely to health delivery through the provision of quality health service with easy access at a lower cost.⁸

ICT has proven to be very useful in several sectors of the world's economy and it is believed that the use of computers and technologies will help a lot to improve productivity, efficiency, coverage, and delivery of good health care at a reduced cost.⁹ According to the World Health Organization, the life expectancy of most of the developing countries, Nigeria inclusive, is low.¹⁰ About 20% of children die before the age of 5, the life expectancy at birth for males is 48.95 and for females is 55.33 years of age.¹¹ Thus, to increase survival rates under the Nigerian health sector, information telecommunication in the health sector is *sine qua non* in the business of saving lives. This work is aimed to discuss the relationship

⁴Ibid

⁵'The State of the Nigerian Health Sector in 2017' Published by Nigeria Health Watch. Available online at <https://nigeriahealthwatch.com/the-state-of-the-nigerian-health-sector-in-2017/#.Xx68Z357m00>. Accessed on 18/12/2020

⁶E. Onyeji and N. Adebawale, 'Health workers' strike: Abuja hospitals partially comply', reported by Premium Times on 18/04/2020. Available online at <https://www.premiumtimesng.com/health/health-news/265390-health-workers-strike-abuja-hospitals-partially-comply.html>. Accessed on 18/12/2020

⁷A. E. Idowu, T. A. Amusan, and M. Ozoya, 'ICT and Health Delivery System in Nigeria' Being a chapter in a book titled 'A Panoply of Reading in Social Science, Lessons for and from Nigeria.' Edited by David O. Lmhonopi and Ugochukwu M. Urim (Published Department of Sociology, College of Development Studies, Covenant University, Ota, Nigeria 2013) Page 359

⁸'Nigeria slumbers on national e-Health policy strategy', Posted by Tedge News on 23/01/2020. Available online at <https://itedgenews.ng/2017/01/23/nigeria-slumbers-on-national-e-health-policy-strategy/>. Accessed on 19/12/2020

⁹A. Omotosho, P. Ayegba Et. al, 'Current State of ICT in Healthcare Delivery in Developing Countries' Article in International Journal of Online Engineering (iJOE), 2019, Page 96

¹⁰O. T. Popoola, 'Population Growth and Life Expectancy in Nigeria: Issues and Further Considerations', *Journal of Humanities and Social Science Research*, Vol.1, No.1, 2018, pages 32-33. See also, Sola Ogundipe, 'How illnesses reduce life expectancy of Nigerians', reported by Vanguard New Paper on 3/4/2020. Available online at <https://www.vanguardngr.com/2018/04/illnesses-reduce-life-expectancy-nigerians/>. Accessed on 19/12/2020, and 'Nigerian's Life Expectancy: 4 Reasons why it's so low', published online by Nigerian Finder, 2016, Available at <https://nigerianfinder.com/nigeria-life-expectancy/>. Accessed on 20/12/2020

¹¹T. O. Abolade and A. E. Durosinmi, 'The Benefits and Challenges of E-Health Applications in Developing Nations: A Review Journal from the Proceedings of the 14th iSTEAMS Multidisciplinary Conference, AIHikmah University, Ilorin, Kwara State, Nigeria, 2018, page 38

between the ICT and health sector, importance of ICT in health sector, challenges of ICT in health sector, possible ways of resolving the challenges with some recommendations.

2.0 The concept of ICT in health sector

ICT in health sector can be used interchangeably with the term e- health or health information technology which comprises of telemedicine and Medical informatics.¹²The concept of changing from a paper based for record keeping and reference purposes in our health sector to a computer based approach will be a fantastic idea because it will go a long way in securing patient information and keeping it safer in case of fire or any emergency.¹³In well developed countries, daily lifestyle is now ICT-driven and in the next few years, it appears daily existence and experiences will be further defined and refined by the role of ICTs in the society.¹⁴With e-health method, healthcare givers can easily accessed medical records and prescriptions in a timely manner without going through lots of files placed on shelves.¹⁵ With the use of ICT in health sector, many problems such as the time spent by the patients waiting for their turn, missing cards and files of patients, lack of information and so on will be solved and there will be better service for the patient. The chance of survival will also be high and adequate care will be given to people because there is more information about them that will hasten the doctor's work in order to satisfy the patients.¹⁶

Recently, ICT is a tool of expression for healthcare workers such as medical doctors, nurses, medical laboratory scientist and radiologist in modern healthcare. ICT has become well assimilated into healthcare delivery system especially in developed countries that few doctors can imagine a day without using computers or network for the purpose of prevention of disease and injury, promotion and maintenance of health, relief of pain and suffering, care and cure of those with malady, avoidance of premature death, and pursuit of a peaceful death.¹⁷

Through the internet, it is possible to set up facilities for intensive patient monitoring service which can enable doctors to watch their patients at a remote site, monitor their vital signs in real time as well as give advice for treatments. ICTs can also be used for exchange of information between different health

¹²Telemedicine is defined as the use of electronic information and communications technology to provide health care when distance separates the participants. It includes all forms of electronic communication between patients and providers and among providers, starting from telephone to interactive video and web-based communication. While Medical informatics is defined as the field of information science concerned with the analysis and dissemination of medical data through the application of computers to various aspects of health care and medicine.
¹³C. Burger, P. Eaton, K. Hess, et al., 'A System-Based Approach to Managing Patient Safety in Ambulatory Care (and Beyond)', 2017. Available online at <https://www.psqh.com/analysis/system-based-approach-managing-patient-safety-ambulatory-care-beyond/>. Accessed on 26/12/2020 See also, 'Bahlol Rahimi, Anna Moberg, et al. ,Implementing an integrated computerized patient record system: Towards an evidence-based information system implementation practice in healthcare', an online article available at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2655989/>. Accessed on 26/12/2020 and R. S. Dick, E. B. Steen and D. E. Detmer, 'The Computer-Based Patient Record: Revised Edition: An Essential Technology for Health Care', an online article of Institute of Medicine (US) Committee on Improving the Patient Record, Published by National Academies Press (US); 1997. Available online at <https://www.ncbi.nlm.nih.gov/books/NBK233055/>. Accessed on 27/12/2020

¹⁴ Ibid

¹⁵L. Oyegoke, 'Adoption and Utilization of ICT in Nigeria Hospitals (Government Owned)' Bachelor's Thesis of Degree programme in Business IT, HAAGA-HELIA University of Applied Science, 2013 at Page 13

¹⁶Ibid 14

¹⁷O. A. Olorode and O. E. Oladunni, 'E-Health in Biomedical, its Role and Challenges in Bayelsa State, Nigeria, African Journal of the 1st Proceedings of International Technology, Education and Environment Conference (c) African Society for Scientific Research (ASSR). Page615

professionals.¹⁸ Surgery can be made easier and more effective by giving surgeons the ability to visualize the area of the body that will be the subject of the operation by using endoscope, scanned images of tumours or other technological devices to aid surgical interventions with minimal complications.¹⁹ However, it is important to point out that inadequacy of ICT in health systems will not only hamper individual's social and economic development, but also they may cause detrimental effects on national economic prospects especially in developing countries like Nigeria. The recent Covid 19 outbreak in the world has caused economic downturn and almost brought to halt economic activities worldwide.²⁰

Although, the Nigerian government has proposed a generic and unifying Health ICT strategy that can be used to generate demand for an increase to improve the quality of health services and implementation of appropriate IT solutions in health.²¹ Part of the ways to achieve this purpose is the establishment of the National Health Promotion Policy in 2016, which created an ICT department to support the health sector electronically through digitizing and automating the various healthcare processes. The Policy also provides solid infrastructure and technical support for solutions with the help of 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.²²

3.0 Importance of ICT in health sector

A country like Nigeria with daily rising in population of over 190 million people with most of its citizen attending a public hospital (Government owned) should have a more advanced way of attending to people and giving them proper care.²³ Every organization especially the health sector in Nigeria needs ICT in their endeavors in order to flourish and achieve its potentials in the management and planning of their programmes. Thus, the importance of ICT in Nigerian health sector cannot be over emphasized. Below are some of the advantages ICT can bring into the Nigerian health sector.

- i. **It can link the patients and health care providers through information support networks:** Instead of coming to the clinic for information about a particular illness patients can find information on the health center website through telehealth and the e-health schemes and can apply it.²⁴ This will reduce long queue in the health center and it will give the doctors more time to attend to other patients for their needs. ICT will also facilitate networking and collaboration between healthcare service delivery practitioners, this will enhance knowledge sharing and better health delivery results. With ICT, new drugs can easily be modelled to test

¹⁸E. Ndukwe, 'Information and Communications Technology Science and Medicine in the 21st Century Nigeria' being paper delivered at a landmark public lecture event held by the College Of Medicine University Of Nigeria Enugu Campus Rotary Hall, Thursday, October 21, 2004, Page 10

¹⁹Ibid 11

²⁰L. Mimbi and F. Bankole, 'ICT and Health System Performance in Africa: A Multi-Method Approach' Journal of the 26th Australasian Conference on Information Systems, 2015, Page 1.

²¹I. Gambo and A. H. Soriyan, 'ICT Implementation in the Nigerian Healthcare System' an online article published by IT Professional, 2017, page 4

²²W. Nwankwo, 'Harnessing E-healthcare Technologies for Equitable Healthcare Delivery in Nigeria: The Way Forward' *International Journal of Science and Research (IJSR)*, Volume 6 Issue 3, 2017, Page 1878

²³**T. Aworinde** 'Nigeria's population now 190 million, says NPC', **reported by Punch News Paper on 10/07/2019. Available online at** <https://punchng.com/nigerias-population-now-190-million-says-npc/>. **Accessed on 10/01/2021**

²⁴S. Mace, A. Boccanelli and M. Dormond, 'The Use of Telehealth Within Behavioral Health Settings: Utilization, Opportunities, and Challenges' an online article of Behavioral Health Workforce Research Centre, 2018, pages 3-4. See also, 'Telemedicine, Telehealth, and Health Information Technology' an online paper published by The American Telemedicine Association, 2006, Pages 3-4.

its effects on the ultimate consumers, facilitate clinical trials online as well as facilitate collaboration, information and knowledge sharing between international teams of medical researchers' within real time.

- ii. It can be used to monitor patient's health conditions:** ICT can provide collection and analysis of a large quantity of data related to the patients' medical history to other clinical studies.²⁵ With the use of ICT a medical practitioner can monitor, report on outbreaks of diseases, disseminate guidelines for controlling, treating such diseases and administer drugs to the patients by checking their chart.²⁶ In addition, scientific knowledge and research findings among professionals in the health community can also be shared through the use of ICT in health sector.
- iii. It provides adequate storage of patient's record:** With the help of ICTs, patients' records can be stored in computer-aided database, and at the click of a button, patients' medical history such as prescribed drugs and what illness the patient has suffered in the past can be tracked easily. Recently, equipment such as the body scanner is now ICT-aided and can be used to process data into readable formats. Also, microprocessors can now be used to control a variety of medical devices such as blood pressure.²⁷ In addition, electrocardiogram can be used to measure electrical activity generated by the heart and blood oxygen can be used to monitor the amount of oxygen in a patient's blood. Pacemakers and computer guided lasers can also be used in very delicate operations such as removal of brain tumors through the use of ICT.²⁸ In most advanced countries prescription given out by a doctor is no longer on paper, but is either written on the patient card, or stored over a network (or in the cloud), and the patient card will be used as the secure key to gain access to it when the pharmacist delivers the medicines.²⁹
- iv. It saves a lot of time, resources and aid referral system:** Computer-aided equipment saves a lot of time, increases performance and reduces patients' waiting time. Interestingly, surgeons can now perform operations remotely through tele-conferencing and prescribe drugs through tele-medicine.³⁰ ICT in health sector helps to facilitate a robust referral system. The lengthy time it takes to refer and transfer patient from one health facility to another with the required technical capacity makes emergency interventions come late. But in a situation in which hospitals are ICT connected, patients' diagnostic results and tests can be sent electronically to another hospital where the consultant that will handle the patient's case will be able to examine the tests and results in order to propose right treatment without any loss of documents.³¹
- v. It can be used to save lives through reduction in medication error rates**

²⁵ **J. Fitzpatrick**, 'Information and communication technologies to support patients with long term condition', an online article available online at <https://www.nursingtimes.net/clinical-archive/long-term-conditions/information-and-communication-technologies-to-support-patients-with-long-term-conditions-26-10-2009/>. Accessed on 13/01/2021

²⁶ Ibid

²⁷ A. E. Idowu, T. A. Amusan, and M. Ozoya, 'ICT and Health Delivery System in Nigeria' Being a Chapter in a Book titled 'A Panoply of Reading in Social Science, Lessons for and from Nigeria.' Edited by D. O. Lmhonopi and U. M. Urim (Published Department of Sociology, College of Development Studies, Covenant University, Ota, Nigeria 2013) Page 363

²⁸ Ibid

²⁹ K. J. Adebayo and E. O. Ofoegbu, 'Issues on E-health Adoption in Nigeria' an online Journal of I.J. Modern Education and Computer Science, Volume 9, 2014, page 39

³⁰ A. E. Idowu, T. A. Amusan, and M. Ozoya, 'ICT and Health Delivery System in Nigeria' Being a Chapter in a Book titled 'A Panoply of Reading in Social Science, Lessons for and from Nigeria.' Edited by David O. Lmhonopi and Ugochukwu M. Urim (Published Department of Sociology, College of Development Studies, Covenant University, Ota, Nigeria 2013) Page 368

³¹ Ibid

Another vital benefit of ICT in health sector is that it can be used to perform life-saving operation via robots. For example if someone who has a bad heart condition is in need of a vital operation and the health professional was unable to perform it then a robot can perform the operation by the commands of another surgeon elsewhere.³²The use of online integrated intelligent healthcare delivery portals often reduce errors in medical diagnosis and treatment by providing large base knowledge across various areas of specialization.³³

- vi. **It aids even distribution of healthcare to people:** The usage of ICT in Nigerian health sector will increase equity in access and quality of health services, information, and financing for better coverage of health services especially among the people living in rural areas which form more than 60 percent of the Nigerian population through the effective use of civil registration and vital statistics.³⁴The usage of ICT in health sector will also help to promote transparency among the health care providers especially those in National Health Insurance Scheme.
- vii. **It helps to promote healthcare insurance:** Patients in other countries with an E-Health system are generally happier to have their medical expenses paid directly by public and private insurances rather than to pay for medical expenses upfront and later be reimbursed. Such a system is therefore recommended for patients in Nigeria even though other systems of payment could still be used such as mobile money or online payments. A country like Nigeria where many people live in abject poverty will depend much on the assistance the government can render for them for their survival and one of the best way to go about this is have a health insurance for Nigerian citizens through ICT devices for proper connection and documentation.³⁵

4.0 Challenges affecting adequate usage of ICT in health sector

It is not a gain saying that health facilities are inadequate in Nigeria, especially in rural areas. Beside the scantiness of facilities, the country is also faced with deficiency of human resources, poor quality of care, lack of drugs and equipment, ineffective referral systems and so on especially in the remote areas which slow the development of good health care delivery in Nigeria.³⁶ Besides these general challenges in health sector, the introduction and usage of ICT in Nigerian health sector has also been hampered due to certain factors. Thus, ICT application in the Nigerian health sector is amputated by some of the following challenges:

- i. **Epileptic power supply:** Power is needed in every sector especially health sector because they deal directly with lives. It is so unfortunate that one of the less productive sectors in Nigeria is the power sector.³⁷Nigeria has been characterized as a country with epileptic power supply with high importers of generator sets for power supply and virtually, 3 out of 5 household of people living in urban centers in Nigeria will have generator sets in their respective

³²O. A. Olorode and O. E. Oladunni, 'E-Health in Biomedical, its Role and Challenges in Bayelsa State, Nigeria, African Journal of the 1st Proceedings of International Technology, Education and Environment Conference (c) African Society for Scientific Research (ASSR). Page 615

³³ W. Nwankwo, 'Harnessing E-healthcare Technologies for Equitable Healthcare Delivery in Nigeria: The Way Forward' *International Journal of Science and Research (IJSR)*, Volume 6 Issue 3, 2017, Page 1878

³⁴I. Gambo and A. H. Soriyan, 'ICT Implementation in the Nigerian Healthcare System' an online article published by IT Professional, 2017, page 5

³⁵Ibid

³⁶I. Omoleke and B.A. Taleat, 'Contemporary issues and challenges of health sector in Nigeria', *Research Journal of Health Science*, Vol. 5, NO. 4, 2017, available online at <https://www.ajol.info/index.php/rejhs/article/view/165775>. Accessed on 18/01/2021.

³⁷U. K. Nkalo and E. O. Agwu 'Review of the Impact of Electricity Supply on Economic Growth: A Nigerian Case Study', *Journal of Electrical and Electronics Engineering*, , Volume 14, Issue 1, 2018, pages 33-34

houses.³⁸Most ICT facilities rely on electric power to function otherwise, they will be useless. Most of the government owned hospitals which is the hope of a common man are experiencing power failure. Failure of reliable power supply can lead to interruption of electricity while surgical operation is going on which will be detrimental to patients undergoing such operations. Before ICT can be maximally utilized in Nigerian health sector, it is very essential and germane for our power sector to be refined for adequate output.

- ii. **Illiteracy:** To access information and make meaningful decision out of information received, the parties involved must be educated with some level of proficiency in computer or digital education. Most rural dwellers are illiterate and have never come in contact with computer or ICT tools. Some of the urban dwellers are more concerned with basic necessities of life and a large number are not versatile with the benefit of ICT in health system. Literacy goes beyond mere skill of reading and writing. It is a process of transformation that empowers an individual and broadens critical thinking. There are also problem of low level of education and illiteracy among health officials which has created scarcity in skills and expertise.³⁹ Nigeria is quite a world of its own considering its heterogeneity evidenced by the presence of over 250 ethnic nationalities with diverse beliefs, customs, ideologies, organization, practices, behaviors and languages.⁴⁰These factors cannot be overlooked as they are vital to the implementation of ICT usage in delivering health care in Nigeria.⁴¹
- iii. **High cost of ICTs equipment:** Among the number of factors affecting access to the usage of ICT and Internet in Nigerian health sector is high cost of ICT health sector related equipment. In addition, most Nigerian General Hospital do not have connection with the Internet Service Providers (ISPs) because of the huge amount of money it costs.⁴²The government are not ready to spend enough on health sector, since many of them receive treatment abroad and they do not see any good reason why they should invest more on health sector. Besides, some of the private owned hospital are handicapped in terms of financial capability. Most private owned hospitals cannot afford adequate modern technological equipment because they are very expensive.⁴³
- iv. **Lack of clear-cut policy:** Implementation of e-health as an integral part of the whole healthcare delivery system requires vibrant and dynamic legal frameworks owing to the rapid changes that are associated with advancement in technology. Dynamism here is stressed because it would be difficult for any health personnel to go extra mile in providing care without the necessary assurance that he/she is protected by the law. The laws in this regard must be dynamic and enforceable to the effect that its provisions must take cognizance of the rapid rate of technology

³⁸Heavy use of generators puts Nigeria's climate plans in jeopardy' reported by Punch New Paper on 28/12/2017 available online at <https://punchng.com/heavy-use-of-generators-puts-nigerias-climate-plans-in-jeopardy/>. Accessed on 20/01/2021. See also, C. Obinna, 'Nigeria spends N3.5trn annually on power generators' reported by Vanguard New Paper on 16/01/2013. Available online at <https://www.vanguardngr.com/2013/01/nigeria-spends-n3-5trn-annually-on-power-generators/>. Accessed on 25/01/2021

³⁹A. E. Idowu, T. A. Amusan, and M. Ozoya, 'ICT and Health Delivery System in Nigeria' Being a Chapter in a Book titled 'A Panoply of Reading in Social Science, Lessons for and from Nigeria.' Edited by D. O. Lmhonopi and U. M. Urin (Published Department of Sociology, College of Development Studies, Covenant University, Ota, Nigeria 2013) Page 368

⁴⁰O. V. Ojo, 'Ethnic Diversity in Nigeria: A Purview Of Mechanism For National Integration' *Afro Asian Journal of Social Sciences* Volume 7, No 3, , 2016, pages 1-2

⁴¹W. Nwankwo, 'Harnessing E-healthcare Technologies for Equitable Healthcare Delivery in Nigeria: The Way Forward' *International Journal of Science and Research (IJSR)*, Volume 6 Issue 3, 2017, Page 1880

⁴²C. Obinna, 'Nigerian hospitals: Houses of health or homes of death? Reported by Vanguard News Paper, on 26/02/ 2013, available online at <https://www.vanguardngr.com/2013/02/nigerian-hospitals-houses-of-health-or-homes-of-death/>. Accessed on 30/01/2021.

⁴³B. Idowu , E. Ogunbodede and B. Idowu 'Information and Communication Technology in Nigeria The Helath Sector Experience' *Journal of Information Technology Impact* Vol. 3, No. 2, 2003, page 71

advancement so as to include appropriate clauses that would cover such developments.⁴⁴ Definitely, one of the most important factors related to allocation and development of E-health is provision of laws and policies to regulate its practices. Some of the legal challenges of electronic health system in most countries especially developing countries like Nigeria are; lack of following government's ratified laws, poor support of national and universal standards, inadequacy of existing suitable laws regarding personal rights and keeping patients' private surroundings. The need to develop a legal framework for managing health care delivery in Nigeria is very essential.⁴⁵ Many health policies are implemented wrongly while some shabbily made by the authorities responsible for it. More efforts are needed to turn things around especially in the area of ICT in health.

- v. **In adequate of expertise:** In the year 2014, the estimated figure for registered hospitals nationwide stands at around 4,000, excluding the 700 health care centers, 1,670 maternity centers and the 12 University Teaching Hospitals which handles tertiary care; it is believed that it would have increased greatly by now.⁴⁶ However, the challenge here is the qualifications and experiences of the health practitioners coordinating or managing these health delivery centres. It is axiomatic that one cannot give what he or she does not have. Thus, the level of the experience and exposure of medical experts in Nigeria will determine how far they can go with the usage of ICT to improve their health care delivery to the masses. Ability to purchase technological equipment is different from the knowledge of its usage which is more important. Thus, for there to be an improvement on the connection between ICT and Nigerian health sector, there is a need to increase the number of our medical experts who must be versatile with the usage and application of ICT to develop our health sector. The state of educational system in which the doctors are being trained in Nigeria is not in the best position and that is another challenge contributing to inadequacy of experts in health sector this is because a few universities have enough facilities for training.⁴⁷ Many government owned institutions in Nigeria where medicine are studies are not well equipped and as a result, the output of such institutions might find it difficult to compete with other contemporaries globally. Thus, adhering to best practice is important as well as providing adequate measure to achieve the expected results.
- vi. **Corruption:** This is regarded as a social problem which connotes an act or a form of behavior that constitutes concern to a significant proportion of the society which warrants a common solution by that society.⁴⁸ Social problems are serious behavioural deviations hindering the functioning of society and inhibiting the needs and goals of society.⁴⁹ Corruption is responsible

⁴⁴W. Nwankwo, 'Harnessing E-healthcare Technologies for Equitable Healthcare Delivery in Nigeria: The Way Forward' *International Journal of Science and Research (IJSR)*, Volume 6 Issue 3, 2017, Page 1880

⁴⁵T. O Abolade and A.E Durosinmi, 'The Benefits and Challenges of E-Health Applications in Developing Nations: A Review Journal from the Proceedings of the 14th iSTEAMS Multidisciplinary Conference, AIHikmah University, Ilorin, Kwara State, Nigeria, 2018, page 42

⁴⁶K. J. Adebayo and E. O. Ofoegbu, 'Issues on E-health Adoption in Nigeria' an online *Journal of I.J. Modern Education and Computer Science*, Volume 9, 2014, page 38

⁴⁷A. O. Malu, 'Universities and medical education in Nigeria', *Nigerian Medical Journal*, Vol. 51, Issue 2, 2010, available online at <http://www.nigeriamedj.com/article.asp?issn=03001652;year=2010;volume=51;issue=2;spage=84;epage=88;aulast=Malu>. Accessed on 05/02/2021.

⁴⁸D. O. Iyanda, 'Corruption: Definitions, Theories and Concepts', *Arabian Journal of Business and Management Review (OMAN Chapter)* Vol. 2, No.4, 2012 pages 38-39

⁴⁹A. E. Idowu, T. A. Amusan, and M. Ozoya, 'ICT and Health Delivery System in Nigeria' Being a chapter in a book titled 'A Panoply of Reading in Social Science, Lessons for and from Nigeria.' Edited by D. O. Lmhonopi and U. M. Urim (Published Department of Sociology, College of Development Studies, Covenant University, Ota, Nigeria 2013) Page 366

for perpetual collapse of infrastructure and institutions and it can be said to be the cause of the endemic poverty in Africa.⁵⁰ Corruption is behind the underdevelopment and cyclical failure of democracy because corrupt government officials can shift government expenditures to areas they can collect bribes easily.⁵¹ Corruption is one of the biggest factors affecting the development of the health sector in Nigeria and it has eaten it up to the highest level. Nigerian government pays little attention to the health sector especially before the breakdown of the current Covid 19 pandemic because they can afford to go abroad for better healthcare. Thus, the usage of ICT in health care system is not only hampered but crippled by corruption. In addition, poor state of social and physical infrastructure such as power supply, roads, and ambulance service have been immensely affected due to corruption.

vii. Lack of political will is another grave challenge to consider. Quite often, lack of good quality leadership within the public service has been more closely linked to poor performance of the public sectors than to lack of national resources. Many developed countries that have successfully improved healthcare delivery have had strong political commitment, creating policies and devoting resources to ensure improvement.⁵² In Nigeria, different government wants a different approach or policy to implement its agenda which does not correspond with the existing one and there is no plan for continuity. In addition, political leaders are not determined to do anything about it because they are not affected by it and they seem to overlook many things through negligence. Recent records of Covid 19 has shown that the poor political will of our leaders and their negligence which has never benefited the general masses.

viii. Inadequate and inequality access to infrastructural facilities: Inequality access to ICT facilities in Nigerians health sector is a serious problem as computers, telephone lines, satellite dishes and so on which are necessary for internet connectivity are not evenly distributed in Nigeria especially in the rural rears.⁵³ Also lack of provision of ICT devices in Nigerian General Hospitals and installation of internet are serious challenges. Many healthcare workers in General Hospitals do not have computers individually, even projectors and other digital electronics and most of these electronic health machines such as computerized tomography (CT), Magnetic Resonance Imaging (MRI), are expensive to set up.⁵⁴ In addition, the state of some of the health centres are nothing to write home about, they are in their worst state and the government is not ready to do much. Presently, most of the isolation or treatment centres during this pandemic period are not well facilitated neither are they conducive for patients' proper treatment. Whereas, at this period ICT is needed more in health sector for proper testing and treatment but on the contrary, those in charge of procuring the technological facilities prefer to

⁵⁰M. E. Brown, *Corruption and Violence in Africa: A case study of Nigeria*, edited by E. Nduku and J. Tenamwenye, in *Corruption in Africa A Threat to Justice and Sustainable Peace* published by Globethics.net Focus No. 14 at pages 103-104

⁵¹A. E. Idowu, T. A. Amusan, and M. Ozoya, 'ICT and Health Delivery System in Nigeria' Being a Chapter in a Book titled 'A Panoply of Reading in Social Science, Lessons for and from Nigeria.' Edited by D. O. Lmhonopi and U. M. Urim (Published Department of Sociology, College of Development Studies, Covenant University, Ota, Nigeria 2013) Page 368

⁵²Ibid

⁵³B. M. Kuboye, B. K. Alese and F. I. Imasuen, 'A Twin Approach to Internet Service Provision in Sparse Rural Community in Nigeria' *International Journal of Networks and Communications*, Vol. 2(5), 2012, available online at <http://article.sapub.org/10.5923.j.ijnc.20120205.06.html>. Accessed on 05/02/2021. See also, E. J. Egbe, 'Rural and Community Development In Nigeria: An Assessment' *Arabian Journal of Business and Management Review (Nigerian Chapter)* Vol. 2, No. 17, 2014, pages 25-26.

⁵⁴O. A. Olorode and O. E. Oladunni, 'E-Health in Biomedical, its Role and Challenges in Bayelsa State, Nigeria, Africa', *Journal of the 1st Proceedings of International Technology, Education and Environment Conference, African Society for Scientific Research (ASSR)*. Page 617

pay less attention to such procurement or better still, purchase inferior facilities because of their financial gains

5.0 Likely issues that may arise in the usage of ICT in health care sector

i. **Whether ICT in health will not breach patient's rights on privacy and confidentiality:** Privacy and confidentiality are part of the rights every patient should enjoy in the medical parlance.⁵⁵ However, with the usage of ICT to store patients' data and confidential medical information via ICT specifically telemedicine and cyber medicine can result in ambiguous doctor-patient relationships. This is because such an information can be leaked to other health professionals who have access to the same server where the information is stored. The communication between physician and patients via e-mails lacks human touch and is fragile in terms of privacy and confidentiality. Before a patient can enjoy the right of privacy and confidentiality in healthcare delivery through the usage of ICT, proper measure should be put in place and the medical practitioner should protect patients' information about their health condition as much as possible, otherwise, some patients will feel uncomfortable using applicable ICT devices in health sector.

ii. **Whether a health care personnel can be held liable for failure of ICT facilities:**

The failure of health personnel through ICT could come in diverse ways, it could be through wrong assessment of patients' data due to the malfunction of the ICT facilities or where upon the directive of health personnel, a patient over reliance on electronic health devices and equipment which latter lead to death or incapacitation of such a patient. A close example is what happened in America where a radiation therapy machine accidentally gave patients overdoses of radiation, leading to 3 patients death.⁵⁶ It is important to start here that the machine cannot operate on its own and at the same time the operator must pay a kin attention to how the machine or any ICT related device in health sector works before a reliance is placed on such a machine for usage. It will be wrong for a health practitioner not to pay a close supervision to the usage of machines or robot while treating a patient. Thus, where an ICT facility malfunctions and lead to the death of a patient, the writer is of the opinion that many things should be put into consideration before a health personnel can be held responsible. Where a health personnel can adequately prove that the ICT facility is functional as at the time of usage without any sign of malfunctioning and it was used for the purpose for which it was made with adequate supervision and close monitoring, the health personnel should not be held liable because it is difficult to expect even the most sophisticated of computing system to discharge all its duties to provide a safe and reliable answer at hundred percent.⁵⁷

6.0 Possible way out

ICT in health sector will be impressive if it can be predicated upon four major pillars which are; Information surveillance, research management of health services, human resources and financing.⁵⁸ In developed countries where literacy level is high, little effort is needed for application of ICT in any

⁵⁵D. Mendelson and G. Wolf, "Health Privacy and Confidentiality" Chapter 23 in *Tensions and Traumas in Health Law*, edited by I. Freckelton and K. Petersen, 2017, pages 2-3

⁵⁶O. A. Olorode and O. E. Oladunni, 'E-Health in Biomedical, its Role and Challenges in Bayelsa State, Nigeria, Africa', *Journal of the 1st Proceedings of International Technology, Education and Environment Conference*, African Society for Scientific Research (ASSR). Page 617

⁵⁷ Ibid at 618

⁵⁸Improving Health, Connecting People: The Role of ICTs in the Health Sector of Developing Countries: A Framework Paper an online Working Paper no. 1, 2007, page 14

sector and at any level. For Nigeria to benefit fully from ICT, it requires people-centred development programmes, which must be supported by an appropriate mix of adequate resources, good and strong political will for policies implementation.⁵⁹

Thus, these are some of the approaches to resolve the challenges combating ICT in health sector;⁶⁰

- i. Developing Internet information portals;
- ii. Using mass media to broadcast widely;
- iii. Developing interactive programming on broadcast media;
- iv. Making more effective use of existing communication systems; and
- v. Developing community access points (CAPs).

7.0 Conclusion

The use of ICT within the field of healthcare is becoming increasingly important in aspect of clinician's professional practice, delivery of health services, communication between health care workers, as well as enhancing the decision-making process through the efficient flow of information. Nigeria is blessed with skilled human resources in relevant areas such as computing, telecommunications, health care, social psychology, and so on. However, it is observed that much attention has not been paid to Nigerian health sector in terms of ICT usage to aid its delivery despite a number of advantages which come with. This paper has discussed some of the challenges that can hamper the effective usage of ICT in Nigerian health sector and some possible solutions that can be put in practice to help out. For a successful incorporation of ICT in national health sector or programmes in Nigeria, there is a need for special panel or committee on e-healthcare to be chaired by the Federal Ministry of Health, with representatives from the other agencies such as the Nigerian computer society, National Information Technology Development Agency, Ministry of Health, Nigerian Communications Commission Telecommunications Companies, Institute of Software Practitioners of Nigeria, Federal Ministry of Health and Nigeria Law Review Commission. The mission of this committee should be to look for the best practice and usage of ICT in Nigerian health sector and to produce an e-health policy blueprint that clearly defines things which are needed to be implemented under e-healthcare legal framework and policies and what would constitute acceptable standard for any system implemented to undertake e-healthcare services.

8.0 Recommendation

- i. The government should ensure they provide ICT infrastructure and train medical staff on how to use software and this should include part-time staff as well.
- ii. Government should accelerate provision of broadband internet connectivity in both rural and urban areas. This can be done through fibreoptics layout nationwide or setting up a law for mandatory internet provision by all telecoms service provider at all medical facilities in the countries as part of their corporate social responsibility.

⁵⁹A. E. Idowu, T. A. Amusan, and M. Ozoya, 'ICT and Health Delivery System in Nigeria' Being a chapter in a book titled 'A Panoply of Reading in Social Science, Lessons for and from Nigeria.' Edited by D. O. Lmhonopi and U. M. Urim (Published Department of Sociology, College of Development Studies, Covenant University, Ota, Nigeria 2013) Page 369

⁶⁰E. Blantz, '4 Key Challenges and Solutions to ICT Deployments for Rural Healthcare', 2010, an online article available at <https://www.ictworks.org/4-key-challenges-and-solutions-ict-deployments-rural-healthcare/#.Xx77mX57m00>. Accessed on 23/07/2020. See also, Improving Health, Connecting People: The Role of ICTs in the Health Sector of Developing Countries: A Framework Paper an online Working Paper no. 1, 2007, page 24

- iii. The government should invest massively in ICT infrastructure in hospitals, healthcare centers, tertiary institutions (Universities, Polytechnics and other tertiary institutions)
- iv. Another effective approach is to manage the utilization of ICT in medicine through the use of legislative and regulatory measures by looking into legal reforms to enhance the privacy of health information.
- v. Government should improve electricity generation and distribution.
- vi. The Nigeria government should consider rural areas and carried them along with the project in terms of affordability and accessibility of ICT facilities.