AN APPRAISAL OF THE LEGAL CONSEQUENCES OF HEALTHCARE TECHNOLOGIES IN NIGERIA

CHUKWUJIEZE, WISDOM NMESOMACHI

(2020/LW/13054)

A PROJECT SUBMITTED TO THE DEPARTMENT OF LAW, FACULTY OF LAW ALEX EKWUEME FEDERAL UNIVERSITY NDUFU ALIKE IKWO (AE-FUNAI) EBONYI STATE, IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF BACHELOR OF LAWS

SUPERVISOR

DR. ONYEGBULE KELECHI G

SEPTEMBER, 2025

AN APPRAISAL OF THE LEGAL CONSEQUENCES OF HEALTHCARE TECHNOLOGIES IN NIGERIA

BY

CHUKWUJIEZE, WISDOM NMESOMACHI

SUPERVISOR

DR. ONYEGBULE KELECHI G

SEPTEMBER, 2025

DECLARATION

I hereby declare that this project work titled "**AN APPRAISAL OF THE LEGAL CONSEQUENCES OF HEALTHCARE TECHNOLOGIES IN NIGERIA**", submitted to the Faculty of Law, Alex Ekwueme Federal University Ndufu Alike Ikwo, Ebonyi State is a record of an original work done by me under the guidance of Dr. Onyegbule Kelechi G, Head of Department, Public and Private Law. This project work is submitted as a partial fulfilment for the requirement for the award of the degree of Bachelors of Laws. The results embodied therein in this thesis has not been submitted to any other University or Institute for the award of any degree or diploma.

I hereby assume full responsibility of the integrity, accuracy and validity of this research.

Signature and Date ----------
Name ----------
Registration Number ----------

CERTIFICATION

This is to certify that this long essay titled "**AN APPRAISAL OF THE LEGAL CONSEQUENCES OF HEALTHCARE TECHNOLOGIES IN NIGERIA**" has been accessed and approved by the Undergraduate Studies Community of the Faculty of Law, Alex Ekwueme Federal University, Ndufu Alike Ikwo, Ebonyi State, as an Original research work carried out by Chukwujieze, Wisdom Nmesomachi, with the Registration number 2020/LW/13054 in the Faculty of Law, Alex Ekwueme Federal University, Ndufu Alike Ikwo, Ebonyi State, under the guidance and supervision of Dr. Onyegbule Kelechi G

---------- ----------

Dr. Onyegbule Kelechi G Date

(Project Supervisor)

---------- ----------

Dr. Onyegbule Kelechi G Date

(Project Coordinator)

---------- ----------

Prof. Eseni Azu Udu Date

(Dean, Faculty of Law)

---------- ----------

(External Examiner) Date

DEDICATION

I dedicate this work to the first five most valuable inclinations of my life; First to God Almighty who has looked beyond my flaws and led me through these years. And to my Sweet Mum, Mrs. Adaku Okafor whose consistent prayers has been a lamp, and to my brothers, Victor Odinakachi Chukwujieze and Chiubuike Godgift Chukwujieze whose unwavering supports have been a source of encouragement, and finally to my Dad, Mr. Cyprian Chukwujieze Okafor (of blessed Memory) who has always been there in Spirit.

ACKNOWLEDGEMENT

To ***El rio*** – the God who sees me, in my weakest and lowest moments, who has been a major source and clear revelation of my undergraduate journey, and for his faithfulness and mercies; "for the thoughts I have for you, saith the Lord, the thoughts of peace, and not of evil, to give you an expected end" *Jeremiah 29:11.*

My acknowledgement will be incomplete without specially recognizing my fatherly mentor and supervisor, Rev. Dr. Kelechi Goodluck Onyegbule, for your constant mentorship, unwavering advice, unending guidance, and Godly correction aimed at making me distinct from my peers. Your academic and analytical supervision to this project is deeply appreciated, Thank you, Dr. Sir.

My unalloyed gratitude goes to the Dean Faculty of Law, Prof Eseni Azu Udu, whose fatherly leadership in the faculty has been a source of encouragement and academic growth to me. And to all my amazing lecturers, from Barr. P. O. Olebara, the Staff Adviser under whom I served, to Dr. O. Eni, Dr. C. C. Ituma, Dr. O. T. Eze, Dr. N Amadi, Barr. G. Awoke, Barr. N. Nweze, Barr. U. Anoke, Barr. Charity, Barr. Chukwudifu, and Barr. Ekechi Agwu, I deeply acknowledge the efforts that has put into molding and ensuring that I am an excellent lawyer.

How much more can a Hen shield her chick? The unending love that flows from a mother's heart, my Sweet Mum, who beyond all challenges ensured that I got here, whose prayers is a top source of my degree journey, I am most grateful Mummy, Mrs. Adaku Olivia Okafor.

To my Senior brother, Engr, Victor Odinakachi Chukwujieze, whose fatherly love, and unwavering care has led me all these years. My utmost gratitude goes to your unending trust and brotherly mentorship has been a role-models benchmark to my overall life and career path.
To Chukwujieze Chibuike Godgift, my junior brother, who has shown me more love than any friend. Thanks Nna. To Ven. Daniel Onuoha, thank you for insisting on my excellence.

Finally, and again, if not for the unbiased love of God, how else can I explain researching on a novel topic and writing and editing this volume of long essay with just my mobile phone. This is nothing but an unfathomable love of God, unmerited. And to Nwokpor Cynthia who within the last days of submission of this work, graciously volunteered her laptop for my project compilation even without me asking, and to all my friends, course mates, and LAWSA'ites, who have stood with me all these years, and supported my academic journey, thank you all and God bless!!!

TABLE OF CASES

TABLE OF STATUTES

African Charter on Human and Peoples' Right 1981

Constitution of the Federal Republic of Nigeria, 1999 (as amended)

Convention on Human Rights and Biomedicine, 1997.

Medical and Dental Practitioners Act, M8 2004, Laws of the Federation of Nigeria,

National Health Act 2014, Cap N55 Laws of the Federation of Nigeria 2014.

Section 1(1)

National Health Insurance Act 2004, N42 Laws of the Federation of Nigeria

National Health Policy, 2016

Nigeria Data Protection Act (NDPA) 2020 Act No 37.

Patients Safety Agency of Nigeria Bill, 2019

Patients Safety Right Charter 2013

Universal Declaration on Bioethics and Human Right (2006)

Universal Declaration of Human Rights 1948

World Health Organization, Constitution of the World Health Organization (adopted 1946, entered into force 1948, amended 2005)

World Health Organization, Patients Safety Right Charter, 2022

LIST OF ABBREVIATION

A.I	Artificial Intelligence
A.M.R	Autonomous Mobile Robots
A.R	Augmented Reality (AR)
C.A.G.R	Compound Annual growth rate
C.R.I.S.P.R	Cluster Regularly Interspaced Short Palindromic Repeats
C.T	Computerized Tomography
D.R	Diagnostic Radiography (X-rays)
E.H.R	Electronic Health Records (EHRs)
F.M.o.H	Federal Ministry of Health
G.H.T.F	Global harmonization task force
G.M	Glucose Monitor (glucometer)
H.C.O	Healthcare organizations (HCO),
H.W	Healthcare Workers (HW),
I.M.D.R.F	International Medical Device Regulators Forum
IoT	Internet of Things
M.D.S.A.P	Medical Device Single Audit Program
M.I.S	Minimal Invasion Surgery
M.R.I.	Magnetic Resonance Imaging
N.D.P.A	Nigeria Data Protection Act 2023 (NDPA),
N.G.O	Non-Governmental Organization
N.G.S	Next Generational Sequencing
N.H.A	National Health Act

N.H.I.S	National Health Insurance Scheme
R.A.S	Robot Assistant Surgery
R.S	Robotics Surgical Systems
S.D.G	Sustainable Development Goals
U.H.C	Universal Health Coverage
V.A	Virtual Assistant (VA) Technology:
W.H.A	World Health Assembly

TABLE OF CONTENTS

ABSTRACT.

With modern advances in the technological space, the 21st-century world has embraced technological growth in humans' daily involvement. These modern advances span through Healthcare Technologies, particularly the Introduction of robotics in our healthcare and medical system. This research critically examined the deployment of technologies in the healthcare system, particularly health robotics, focusing on its impact on patients' safety and further explored the legal consequences of these Healthcare Technologies. However, this involves the improvement of patient care, Patient diagnosis and treatment, and long-range healthcare management. Furthermore, the need to checkmate the Safety of patients arises, following its legal consequences and addressing the risks that might be incurred in the deployment and of these technologies in the healthcare and medical practice. This research adopted the doctrinal approach; the research examined the comparison of Healthcare Technologies and the use of robotics in the medical practice. This study further provided insights into legal approaches and existing laws. Healthcare Technologies have greater potential to enhance patient safety and improve the healthcare system of patients, and laid impacts by reducing human errors, enhancing medical surgery precision, and ensuring easy and prompt attendance and discharge of medical patients. However, the research observed risks attached to these laid down impacts, which ranges from, system malfunction, software bugs, poor training of healthcare robotics to perform tasks effectively, poor medical Infrastructures, lack of standardization and insufficient knowledge on the use of healthcare technologies, which might jeopardize the patient's safety and life. The key legal issues identified are informed consent, legal liability on whom it lies, and lack of proper Legislation, and its resulting consequences in relation to patients' safety. In light of these challenges, the study recommended the enactment of a comprehensive legal framework, establishment of regulatory agencies, enhanced liability framework, public education and awareness, enhanced training of medical professional on the use of healthcare technologies and recognition of patients right as a distinctive right.

CHAPTER ONE.

INTRODUCTION:

1.1 Background of study:

As the search for a proficient healthcare system evolved, down from the ancient era, through the Medieval Period, to the 20th century, the basic essence of this evolution has all been centered towards ensuring the safety of people and also diagnosed patients.

In a bid to hold fast, and secure the safety of patients, there have been numerous advancements in the medical sector. Upon the dawn of the 21st century, across the board, there have been numerous advances in technology and the evolution of Robotics in our day-to-day activities. Ontological concepts held by scholars over the years have been that human evolution in time and space is inevitable and that technology will continue to advance at a rapid pace.[1]

However, in today's world, technological and robotics evolution have become inevitable as the digital landscape becomes more complex, expanding, and interconnected within the daily living of humans in society. Technological evolution however is gradually emerging in the modern health law in the world, where the need for replacing practitioners with robotics and medical technologies are being put in place.

Furthermore, the fast evolution of healthcare technologies has simply revolutionized the general traditional medical and healthcare procedures and has introduced a wide range of approval and opportunities in the society ranging to the general acceptance of Technologies and Robotics in Hospitals and Medical clinics towards improved service delivery.

[1] Somit A, and Peterson S. A '*the Dynamic of evolution'* (eds. Cornell University Press, 1992) 35

Hence, Robotics Surgical systems (RS), AI diagnostic platforms, Surgical Technologies, and Patients Care monitoring devices further exemplifies how modern tools are becoming generally acceptable in healthcare and medical delivery; and an evolution of minimally invasive surgery that combines medical science, robotics, engineering, and technology.[2]

In the Global Statistical report today, Medical Robotics market size has grown rapidly in recent years. This went from $14.59 billion in 2024, to $17.86 billion in 2025 at Compound Annual growth rate (CAGR) of 15.6%.[3]

However, the Healthcare Technologies and Medical Robotics Global Market size I expected to see exponential growth in the next few years, it will grow to $35.66 billion in 2029 at a compound Annual growth rate (CAGR) of 20.6.[4]

Summarily, in line with the foregoing, the report shows that these growths are attributed to the increasing demand of nations Healthcare and medical need of robotics and healthcare technological assistants, and further digs deep to the increasing global acceptance of Minimal Invasion Surgery (MIS), Core investments in medical Technologies and Robotics, Vast advancement in medical surgical techniques. Thus, the rise in the evolution of global advancement of Healthcare Technologies and Health Robotics.

Above all, despite the global advancement in technology, accompanied with its greater potential, which spans through enhancing patients' safety and improving surgery precision, ensuring prompt

---

[2] Rivero-Moremo Y, Echevarria S, Vidal-Valderrama C, 'Robotic Surgery: A comprehensive review of the literature and current trends', *Journal of Cureus* [2023] (15)(7)

[3] Medical Robotics Global Market Report, 2025 < https://www.thebusinessresearchcompany.com/report/medical-robotics-global-market-report. > accessed 16 April 2025

[4] Ibid

attendance and discharge of medical patients. Healthcare Technologies and Robotics are not without its attendant challenges and thus legal challenges, examining its coloration in patients' safety. However, risks attached to these laid down impacts, which ranges from, system malfunction, software bugs, poor training of healthcare robotics to perform tasks effectively, poor medical Infrastructures, lack of standardization and insufficient knowledge on the use of healthcare technologies, which might jeopardize the patient's safety and life. The key legal issues identified are informed consent, legal liability on whom it lies, and lack of proper Legislation in many jurisdictions in issues of medical technologies and robotics and its resulting consequences in relation to patients' safety.

Against the backdrop, this study seeks to explore urgent Healthcare needs for technological and robotics protection of Patients Safety. Hence, by examining the implications accrued by the use of technology and robotics on patients' safety, this research aims to contribute to the novel discourse surrounding ethical and legal consequences posed by these technological innovations. Consequent upon the lack of adequate framework and policy guiding this Healthcare innovation, this study tends to advocate for proper Legislations and legal framework, on the legal consequences that may jeopardize patients' safety in the execution of these evolving Healthcare Technologies and Robotics, thereby safeguarding human life and safety.

1.2 Statement of Problem.

Following technological advancement, there has been rapid development in the integration of healthcare technologies and health robotics globally, and these modern medical practices have led to the transformation and evolution of healthcare service delivery. In its simpliciter, this evolution in healthcare is two-edged, yet divergent. On one hand, it offers tremendous benefits as with any

technological advancement and on the other hand, poses significant risk, challenges and concern regarding patients' safety, legal accountability and legal consequences.

In order to carefully analyses the objective of this research, these research questions will guide this analysis.

a. What are these Healthcare Technologies and Health Robotics, and how do these innovations affect patient safety?
b. What are the ethical and primary challenges associated with the use of healthcare technologies, and its legal impact in medical practice, and how these challenges may affect patients.
c. What are the legal consequences of misuse, malpractice, and negligence of Healthcare Technologies and Robotics in examination of patients' safety.
d. Who bears the legal liability and responsibility upon malfunction or misuse of medical Robotics
e. What strategy can be implemented to ensure effective regulatory framework, global policies and national legislation are made to govern the use of medical and surgical Robotics, technological advancement in healthcare and patients' safety.

1.3 Aims and Objectives.

The primary aim of this study is to examine the concept and role of healthcare technologies and health robotics in modern medical practice, focusing majorly on the examination of Patients Safety, and to also examine the legal consequences arising from these technological innovations, safety of patients, liability and negligence. And to keenly advocate for a uniform healthcare technologies and robotics legal framework. The specific objectives of this study include

1. To examine the advancement of Healthcare Technologies and health robotics in modern practice
2. To explore the influence of healthcare technologies and health robotics with patients' safety
3. To Identify the legal challenges and consequences posed by healthcare technologies and robotics in line with patients' safety
4. To analyze existing regulatory framework governing these healthcare innovations and evaluate the need for patients' safety.
5. To propose the strategies and recommendations to ensure patients safety as top priority and to address the legal consequences associated with the use of these healthcare technologies and health robotics.

1.4. Scope and Limitations of Study.

The aim of this study primarily focuses on health robotics and healthcare technologies, such AI diagnostic tools, Robotic surgical system, automated patients care devices, diagnostics technologies, etc. Furthermore, this study examines legal implications arising from the use of medical technologies and further considers both national frameworks and international policies and standard practice, and advises on more implementation of policies and legislation of law guiding these technologies and robotics. Thence, this study centers on the impact of these healthcare technologies and health robotics on patients' safety further examining its attendant legal consequences and effect of law and policy.

This study is subject to several limitations. Firstly, examining the general complexity of technology, and the highly technical nature of health robotics in its general sense, this study may

not fully lay hold on all engineering technological concepts or all robotic tools. This analysis is conducted from a legal point of view than an engineering standpoint. Secondly, jurisdictional limitations, this study may not exhaustively review the medical nature of all jurisdiction globally, rather it will discuss Nigeria and some African countries as its major focus of research. Finally, the research relies on secondary sources such as academic literature, legal cases, reports, and expert commentary from practitioners.

1.5 Significance of Study.

The significance of this research is partly based on the need for examination of patients' safety in exploring healthcare technologies and robotics, and its attendant legal consequences and implications that may arise when harm occurs.

As Healthcare Technologies and health robotics advances rapidly in society, there is a need to ensure that the safety of patients upon the use of these technologies in medical practice are consciously checked. This study poses significant impacts by aiming to inform policy and law makers on the need to sharpen the future and policy framework in response to healthcare technologies and health robotics.

Furthermore, this study aims at examining not only patients' safety, but also an inclusion of patients' rights. And to further clarify the legal responsibilities of healthcare providers/practitioners, technologies and robotics manufacturers, and institutions and to further offer legal insight upon misuse or negligence of these innovative healthcare technologies that could guide judicial reasoning.

1.6. Research Methodology.

This research study seeks to examine patients' safety in the use of modern healthcare technologies and healthcare robotics and its legal consequences; this study will adopt a doctrinal research approach in analyzing the use of healthcare technologies and health robotics by healthcare providers in medical clinics and practice. The doctrinal research approach is used because it is the most relevant methodology used by researchers especially as it pertains to this study, and doctrinal research methodology further seeks to determine what law is and how law should be applied in certain evolving circumstances.

This research methodology involves gathering both the primary and secondary data. The primary research data includes consultation of relevant statutes, legal frameworks, policy proposals, and case laws. Secondary data research includes data collected from various sources such as; textbooks, academic journals, legal documents, online sources, government reports, research papers, experts' commentaries and news articles, to support the finding and build theoretical foundations for the analysis of Patients safety in the use of healthcare technologies and health robotics.

1.7 Chapter Analysis.

Chapter one of this study started by providing clear background evolution of Healthcare Technologies and health Robotics, and their growing advancement in modern medical practice. The statement of problems provides legal consequences and challenges that may be recorded with the use of healthcare technologies and health robotics and provide clear strategy on how to tackle these challenges. The aim and objectives provide specific goals which this study seeks to achieve. The scope and limitations address the boundaries of this research and necessary limitations in view.

The significance of this study is based on the examination of patients' safety in the use of healthcare technologies and health robotics, and analyzing its legal consequences. Research Methodology analyses the data and method of data collection for this research analysis, which includes the use of primary and secondary source material for this research study. The Chapter Analysis further analyses the chapters and what is necessarily expected from this research study, and guides readers through the research and its organization.

The chapter two of this study provides detailed clarifications on the necessary concepts of this study, this spreads wide to the conceptual clarifications of healthcare technologies, concept of healthcare robotics, and a clear understanding of medical practice in the digital age, conceptualizing Patients' safety. This further explores the interception and interdependences of Healthcare, Technologies and Law. Additionally, it delves into the theoretical foundations relating to healthcare technologies and health robotics in examination of patient's safety. This chapter concludes with a literature review.

Chapter three of this study understudies legal Framework and institutional Frameworks of healthcare and medical practice. This chapter further pays attention to global policy and looks further to international frameworks of countries that are Fastly adopting the use of technologies and robotics in their healthcare system, both within Africa and the world.

Chapter four, goes to identify critical issues and concerns in the adoption of healthcare technologies and health robotics. These critical issues are keenly the imperative of patient safety in the modern Healthcare era of healthcare technologies and robotics, and thence, addresses these challenges. Further it delves into analyzing the legal liability and accountability that may arise upon misuse of this healthcare technologies and robotics.

The final chapter provides a comprehensive summary of this study, and particularly highlighting the key point discussions in this study, based on the foregoing recommendations put forward to ensure patients safety and curtail misuse, negligence, poor professional training of these healthcare technologies and healthcare providers. This chapter further proposes contributions to this research and existing knowledge, and finally commends on areas of further studies

CHAPTER TWO

CONCEPTUAL CLARIFICATIONS, THEORETICAL FOUNDATION AND LITERATURE REVIEW.

2.1. Conceptual clarifications:

The advancement of medical technology is fast evolving. Medical technology is advancing at a rapid rate than either layperson can comprehend or legal or ethical standards can address.[5] These technological advancement in the medical and healthcare system has brought cumbersome innovations and goals in advancing the health care of patients. These innovations since its introduction about two decades ago, surgical robots are becoming increasingly used in many surgical operations, hence, these emerging technologies have increased the efficiency, reliability, and precision of surgical procedures, it has further minimized overall post-operations complications and held faster patients recovery.[6] While these healthcare technologies and health robotics seeks to provide efficient and fast delivery of medical procedures, this however, cannot be overlooked as the safety of the citizens and patients are top priority of the state, hence the examination of patients safety and its legal implications.

Hence, this chapter seeks to explore these key concepts in healthcare systems, healthcare technologies, health robotics, health, patients' safety, medical practical and equally trying to understand radical practice in the digital age, for a better understanding of these concepts.

---

[5] Marcia A. Lewis, and Carol D. Tamparo, *Medical Law, Ethics, and Bioethics, for health professions* (6th edn, Philadelphia: F. A Davis company, 2007) 7

[6] Tunde A. Oyebaniji, 'Robotic Surgery in Nigeria: An Uncertain Possibility' *International Surgery Journal,* [2020] (7)(11) 3876

2.1.2 Healthcare system:

The Nigeria healthcare system is defined as a complex network of public and private providers, delivering a range of health services to the population, with the overall goal of improving health outcomes and quality of life.[7] It is also important to note that the primary goal of a Healthcare system is to improve health through preventive and creative measures, while reducing health inequalities and challenges amongst patients. It is however important to note that this definition connotes Healthcare system as an organization, people and actions whose primary intent is to promote, restore or maintain health, this however includes the efforts to influence determinants of health as well as more direct health improving activities.

Furthermore, the National Health Act (NHA)[8] a core-framework in Health law further stipulates what consists and defines a healthcare system. The act further states that there is established for the federation the National Health Act, which shall define and provide a framework for standard and regulations for healthcare service without prejudices to the extant professional regulatory laws.[9] The Act further stipulates that the healthcare system are saddled with standards and regulations which encompasses public and private providers of health services,[10] and further provides for persons living in Nigeria the best possible healthcare services within the limit of available resources,[11] and finally the healthcare system is set to protect, promote, and fulfil the right of the people of Nigeria to have access to healthcare service.[12] In line with the above stated, the healthcare system is said to be a body or regulations saddled with the function of providing

[7] World Health Organization, '*The World Health Organization statistical profile'* (Nigeria, 2019)
[8] The National Health Act 2014, Cap N55 Laws of the Federation of Nigeria 2014.
[9] National Health Act 2014, Cap N55 LFN 2014, Section 1(1)
[10] Ibid, Section 1(1)(a)
[11] Ibid, section 1(1)(c)
[12] Ibid,section 1(1)(e)

adequate healthcare, a comfortable medical environment and safeguarding the health of citizens and patients.

2.1.2 Healthcare Technologies

Healthcare technology, or "health tech" refers to the use of technologies developed for the purpose of improving any and all aspects of the healthcare system, these technologies range from telehealth to robotic-assisted surgery.[13] In a bid to hold still a qualitative view of what healthcare technologies is, and its general overview on this study, healthcare technologies is further referred to as any IT tools or software designed to boost hospital and administrative productivity, give new insights into medicines and treatments, or improve the overall quality of healthcare provided.[14] This definition insures the provisions of healthcare technologies in administrative discharge of healthcare to patients by healthcare providers, this further goes to the administrative use of technology to ensure safe discharge of medical practice. This is seen in the healthcare practice potential to trim off traditional healthcare scenes, and minimize skyrocketing costs, cutting patients' unbearable wait times, and to scrap inefficiencies in drug development by healthcare providers.

Furthermore, Healthcare technology consists of tools and applications – such as medical devices, health IT systems, computerized surgical procedures, electronic medical record systems, telehealth, electronic prescriptions, digital order entries, and medical testing.[15] It is important to note that all of the above healthcare technologies are potentially manufactured to ensure an efficient and better patients health management and also ensure a better care and safety of patients upon discharge of practitioners medical obligations and duties. Upon the vast evolution of these

[13] "Healthcare Technology: What It Is and How It's Used | Built In" < https://builtin.com/healthcare-technology > accessed 31 August 2025
[14] Ibid
[15] What is Healthcare Technology? | Virtusa < https://www.virtusa.com/digital-themes/healthcare-technology > accessed 31 August 2025

technological innovations, the healthcare system has employed the use of healthcare technologies to assist medical practitioners and medical teams improve care management in the discharge of their medical duties. According to the World Health Organization (WHO) Health technologies are all the resources used in order to meet the health needs of healthy or sick people, either individually or collectively, including medicines, medical equipment and devices, medical procedures, and the organizational models and support systems employed.[16]

Classification of Healthcare Technologies

a. Gene Technologies

b. CRISPR (Cluster Regularly Interspaced Short Palindromic Repeats)

c. Laboratory Medical Technologies

d. Transfusion Medicine

e. Robotics Surgeries

f. Diagnostic Technologies, which includes,

a) Magnetic Resonance Imaging (MRI)

b) Computerized Tomography (CT)

c) Diagnostic Radiography (X-rays)

d) Glucose Monitor (glucometer)

e) Next Generational Sequencing (NGS)

2.1.3. Health Robotics.

Health Robotics are simply defined as any machine, especially one which is programmable by a computer which is efficiently capable of carrying out a complex series of medical actions,

[16] World Health Organization, Essential Health Technologies (WHO 2006, Geneva) <https://www.who.int/health-technology/essential/en/ > accessed 31 August 2025.

surgeries, and medical treatment automatically, which can be guided by an external control device or the control may be embedded within[17].

Hence, Robotics may be put as a technological branch, while health robotics may be put to be a branch of healthcare technologies, it efficiently deals in the construction, operation and application of robots, this further deals with construction and application of computer systems for control and information processing.

Furthermore, Robotics can simply be said to be physically embodied systems capable of enacting physical change in the world, this is enabled by the use of effectors which can move the locomotion's, robots, or objects in the environment[18].

Therefore, Health Robotics are Medical and assistive robotics technologies encompassing practice areas within health robotics and are mainly concerned with the development and use of robots to assist in a variety of surgical operations in clinics and hospitals.[19] The inception of robots in medical and healthcare practice have recorded an increasing record in the discharge of duty in medical practice which will enhance patient care and healthcare system, thence technological advancement in medical practice have enabled robots carry out complex and surgical roles in healthcare.[20]

Types of Health Robotics.

a. Robot Assistant Surgery (RAS)

b. Da Vinci surgical system

c. Zeus Robotics surgical system

---

[17] Wikipedia, 'Robotics' (Wikipedia, Free encyclopedia) <https://en.wikipedia.org/wiki/Robotics> accessed 31 August 2025.

[18] Riek L D. Healthcare Robotics, *communications, of the ACM*, [2017] (60)(11) 68.

[19] Johnson M J, Bui K & Rahimi N, 'Medical and Assistive Robotics in Global Health' *Handbook of Global Health* (Springer Cham, 2021) 1815–1860.

[20] Morgan, A. A, Robots in Healthcare: A Scoping Review. Current Robotics Reports, (2022) 3(4), 271–287

d. Laboratory Automations

e. Robotics Prescription Dispensing

2.1.4. Patient Safety.

The World Health Organization has recorded in its statistics that around 1 out of every 10 patients is harmed in healthcare service delivery, and a record of more than 3 million deaths occurs annually due to unsafe care of patients.[21] It is quite unannounced the death records that occur in clinics and hospitals due to lack of care of patient's safety.

Hence, patient safety is defined as the absence of harm to a patient and reduction of risk of unnecessary harm associated with healthcare to an acceptable minimum of risk, and ensuring the safe conditions of patients who require medical treatment.[22]

Where patients' safety may be seen to be in jeopardy in relation to the application of healthcare technologies, the court in the case of ***Medical and Dental Practitioners Disciplinary Tribunal v Dr. A. A. Adeyemi***[23] Where the Tribunal faulted the use of robotics medical devices during a gynecological surgery, ruling that the Medical Practitioner be suspended for violating patients' safety protocol and adequately not obtaining an informed consent about the technological device used.

Furthermore, the National Health Act, has further stipulated in its provisions the need for Practitioner to maintain safety of patients and healthcare users in the hospital, it is also however important that the need of patient's safety as entrenched in the act spans through the right of patients, informed consent and need for proper treatment and maintenance in healthcare system[24]

---

[21] Slawomirski L, & Klazinga N, *The economics of patient safety: From analysis to action* (OECD Health Working Papers No. 145, OECD Publishing, Paris, 2022)

[22] "Patient safety"< https://www.who.int/news-room/fact-sheets/detail/patient-safety#:2 > accessed 6 August 2025

[23] Unreported, MDPDT, Case no. 6/2010.

[24] National Health Act 2014, Cap N55 LFN 2014, section 20 and Section 23.

2.1.4.1 Legal Aspects of Patient Safety.

a. Legal duty of Care:

The first medical duty of the health practitioners is to adequately ensure that the health needs are provided and the safety of patients are adequately ensured. The locus classicus of this principle is established in the case of ***Donoghue v Stevenson***,[25] wherein Lord Atkin stated in his judgment that "the rule that you are to love your neighbor becomes in law; you must not injure your neighbor." However, the neighbor principle has extended the confines of duty of care not just to the neighbor but to your immediate party.[26] Healthcare practitioners are under the duty of care to ensure the patients are not injured or harmed in the administration of their medical treatment, and further spread to the use of healthcare technologies is the discharge of medical treatment or procedures, therefore any breach of duty of care results to negligence.

b. Patients Right.

The concept of patient Rights may however be traced to Constitution of the Federal Republic of Nigeria, 1999 as amended which guarantees to Nigerian citizens the right to health and this stipulates that, "The state shall direct its policy towards ensuring that, the health, safety and welfare of all persons in employment is safeguarded and not endangered or abused[27], and there are adequate medical and health facilities for all persons"[28] This gives rise to the safety and rights of patients and healthcare users. The Nigeria Patients' Bill of Right has further stated rights accrued to patients who desire healthcare attention, following includes the right of patients

---

[25] [1932] AC 562
[26] Obot O. E, *'The Snake is in the Court: Bringing a law suit Against a Doctor for Medical Negligence'* (Uyo, Jubilee Chambers, 2019) 71.
[27] Constitution of the Federal Republic of Nigeria, 1999 (as amended) section 17 (c)
[28] Ibid, section 17 (d)

a. Right to information:[29] Patients have right to be informed of the benefits and the risks, cost, and consequences, generally associated with the healthcare options[30]

b. Right to refuse or assent to treatments.[31]

c. Right to receive reasonable continuity of care.

d. Right to maintain privacy and confidentiality [32]

e. Right to be treated with patients and dignity.

c. Liability:

This refers to any legal responsibility of healthcare providers, hospitals, or legal practitioners for any harm or injury that has been negligently or carelessly caused to the patients during the course of discharging their medical duty or care. Generally, liability to negligence, errors, lack of care, injury or harm, may be both civil or criminal liability. Medical negligence, medical malpractice by healthcare providers or healthcare technologies or robotics, lack of duty of care to patients, and breach of professional or medical duty are sources of medical liability in breach of patient's safety.

2.1.5 Understanding Medical Practice in the Digital Age.

It is important to note that the evolution of medical practice can be traced down to the early civilizations, where medical practices were solely based on religious and ethical principles. This moved down to enactment of the code of Hammurabi and Hippocratic oath which provisionally emphasized the need for patient care and confidentiality. Importantly, the medieval period birthed the influence and use of traditional medicine in medical practice and means of medical procedures. The evolution of regulations and frameworks added to the growth of medical practice; this advancement led to the codification of provisions that guides the healthcare and safety of patients.

[29] National Health Act 2014, Cap N55 LFN 2014, Section 23(1)
[30] Ibid, Section 23(1) (c)
[31] Ibid, section 23(1)(d)
[32] Ibid, section 26

This is generally noted first-hand in the Universal Declaration of Human Rights which granted the right to health care and patients' rights[33]

Upon the dawn of the 21st century, there were vast technological innovations which led to healthcare technological growth, rapidly ranging from robotic surgical systems, use of Artificial intelligence in healthcare delivery, and other healthcare technologies that led to the advancement of medical practice in the world. The advancement of technology in the digital age grew rapidly and the same still encompassed different eras, which includes, medical system and healthcare providers which led to digital transformation in healthcare.

Medical practice in the digital age evolved so rapidly upon the reception of technological and robotics in the medical and healthcare system. This innovation is like a two-edged sword, which includes administrative technologies involving the use of telemedicine, Artificial intelligence (AI) in medical diagnosis, administrative efficiency and use of IoT, and wearable medical devices, which assist medical practice and procedure. While on the other hand, this evolution in the medical age involves the use of healthcare technologies and robotics in surgical operations, and major medical assistance in clinics or hospitals. This medical technology evolves.

While there are attendant medical advantages, attached to use of technologies in the digital age, it is also imperative to note that they have legal and ethical considerations, which have given rise to frameworks, and legislations, including, data protection laws, National Health Act, liabilities attached to medical negligence or technological misuse.

Finally, in the same light, it is important to note that upon the reception of innovations in medical practice, there are attendant challenges in digital medical practice, ranging from cyber security, AI

[33] Universal Declaration of Human Rights 1948, Article 21 and 23

biases, breakdown of robotics and technology, and lack of technological knowledge by healthcare providers.

2.2. THEORETICAL FOUNDATION.

The protection of Patients Safety in healthcare delivery systems are a basic priority especially drawing towards the advancement of Technologies and healthcare robotics. This innovation requires a robust theoretical framework. To Grand and Osanloo, theoretical foundation is the 'blueprint' or guide for research[34].

Hence, this chapter lays the theoretical foundation for understanding Healthcare technologies and health robotics by analyzing key theories that covers a great need of patient's safety in medical practice. We will therefore review the relevant theories applicable to the present research and discuss how they will inform our study.

A. NATURAL LAW THEORY.

Buslam Qui in his principles of natural law categorically stated that natural law comprises rules which necessarily agrees with nature and the state of man, that without properly observing the necessities of these rules, the preservation of the peace and happiness of the society may be lost.[35] The natural law theory further postulates the inherent nature of Human Right to all individuals which are based on human nature.[36] This theory further foresees the fundamental human rights of a person. These are acknowledged rights conferred on a person by reason of being a person, which this guarantees equality, dignity, freedom, right to right, all human rights, safety of human person,

[34] Grant C and Osanloo A 'Understanding, selecting, and integrating a theoretical framework in dissertation research: creating the blueprint for 'House', *Administrative Issues Journal: Connecting Education, Practice and Research [2014]* 12-22 DOI: 10.5959/2014.4.2.9

[35] Curzon L. B, *Jurisprudence* (2nd edn, Cavendish Publishing Ltd, London 1995) 37.

[36] Finnis. J, *Natural law and Natural Rights* (2nd Edn, Oxford University Press, 2011).

etc. These are further in line with the contemporary International Human Right law which are deemed applicable and operative in states and nations which are parties.

The applicability of natural law theory may be used to cover areas where technological advancement and innovations undermine basic human rights. This infringement of rights spans across the patients' rights in the healthcare system and is more prominent in the evolution and the use of healthcare technologies in medical practice. These rights are sine qua non to the rights to privacy, consent, bodily autonomy, patients' safety, confidentiality that are accrued to patients by healthcare providers in discharge of medical practice. In line with same, we uphold the view of Prof. Ross who propounded that "like a harlot, natural law is at the disposal of everyone".[37]

Put differently, nature is at the back and call and the service of all and has been used to advance humanity and human dignity and now focuses on safety and rights of humans.

On the other hand, this theory emphasizes the protection and safety of patients, narrowing it down to the concept of human dignity. It is further emphasized that the evolution of technology and its attendant consequences may only be checkmated when the rights and the safety of patients are legally examined, and on great consideration that the right to healthcare and safety of patients should be inalienable rights and must be ipso facto justiciable.

It is pertinent to note that natural law theory as postulated by Rene Descartes who laid greater emphasis on man, being a creation of the Almighty God and has acquired some of qualities of his creation, one of which is Intelligence and the other is reasoning power, same has Aquinas added. This is degenerated to note that what man mostly does may not be a reflection of his mental exercise, but may sometimes be reflected in the power of his will and choice, and this can be solely traceable to the intelligence of man in innovation of healthcare technology and health robotics

[37] Alf Christian Ross, *law and justice* (Stevens & Sons, London 1958) 261

which may be a product of man's idea and intelligence and may fail at any time, hence the need to be regulated both naturally and positively.

B. LEGAL POSITIVISM THEORY.

In view of legal positivist theory, it is important to recognize its stiff opposition to natural law and has maintained a core standing which seeks to implement scientific approach to the study of law and focusing basically on things that can be experimented, observed, and demonstrated.

John Austin in his philosophical thoughts propounded the legal positivist theory, where he greatly emphasized that law set by the superior who is the sovereign for the inferior, and which are backed up by sanctions upon infractions. He further proposed that the positivist theory are laws by analogy, and thus laws properly so called. The former are rules made and enforced by mere opinions by anybody in regards to human conduct.

Austin's theory therefore rests on a trinity-based definition which includes, sovereign, command, and sanction. To him, 'the proper purpose of a political government is the greatest possible advancement of human happiness.'

Furthermore, Thomas Hobbes defined a sovereign as "the sole legislator, having powers to make and repeal laws, when he pleased".

Jeremy Bentham further added by offering a similar definition of law, "as conceived or adapted by the sovereign of the state". While Bodin saw a sovereign as "he who makes laws for the subject, abrogates the law which is already made and amends the obsolete laws".

Importantly, sovereignty depends on the circumstances shared amongst the state, its organ, and the people, Chapter 2 of the Constitution of the Federal Republic of Nigeria, sovereignty solely lies on the people of Nigeria.

Austin's legal perception came also as a command; Hence, the term command simply means the superiority of the sovereign over the inferior persons who must obey the command and such command includes laws, rules, regulations, and legal frameworks. It can be simply put that if such command does not proceed from such a commander, then it may not be considered law despite the amount of goodness conveyed in it.

Finally, Austin's positivists theory embodies an element of coercion, which is characterized by the sanction principles, retrospectively, Thomas Hobbes initial writing that a law without sword is but a mere word. The importance of sanction is to ensure that consequences are meted on defaulters of the laws and regulations as it so guides. For instance, criminal law may be disregarded and underestimated if it only prohibited theft and other offences without stipulating the attendant legal consequences of any of such violations, such as payment of fines, damages, restitution, or imprisonment.

With the above, it is generally important to note the necessity of positivist theory to this study, which highlights the important role of the legislation and legal framework of healthcare technologies and Health Robotics in regulation of patient's safety. While on the other hand, it further looks into necessary sanctions which can be applicable upon breach of patient's safety in the delivery or use of technology or robotics which may arise.

H. L. A. Harts asserts that rights and safety measures are valid only when codified with a legal framework.[38] On the other hand, this theory further emphasizes the importance for a growing legal framework to protect the rights and safety of patients especially as it relates to the use of healthcare technologies and health robotics in medical practice. A legal examination of this study by

[38] Harts H. L. A. *The Concept of Law* (Oxford University Press, 1994).

providing a structured pathway for the establishment of patient's safety within a legal jurisdiction and an applicable legal framework.

C. UTILITARIAN THEORY.

Jeremy Bentham, one of the foremost proponents of utilitarian theory viewed the theory from a utility-based perspective, which has to do with the usefulness and the value of a thing or product, machine or policy, etc. Wherefore, Bentham further stated that law has utility which satisfied the greatest happiness of the greatest number, which in all can be said cared for the greater interest of the people in a society. He further supported his principles of utility by stating that the most important quality of human beings was derived from two great abilities, the ability to feel pain and the ability to feel pleasure.[39] Which greatly supports the reception of technologies that produce the greatest good, notwithstanding its calculation.

Furthermore, it is important to note that this theory is greatly anchored on the basic principles of utility and thence implies the quality of an object or which is enhanced with the production capacity of deriving good, satisfaction, happiness, and benefits on one hand, and further on the other hand, greatly aims to prevent and reduce pain, evil or mischief this principle in its general perception deals in greater number the usefulness of an act or an item to the Society. Wherein a product lacks utility, it is best described as useless and considered to lack usefulness.

Where this theory propounds the usefulness of healthcare technologies and health robotics, it then dawns on us that this product or machine commands in greater number its peripheral usefulness to the society and such usefulness as have been overtime emphasized in line with the attendant benefits of AI, Robotics, medical machines, helps and provides individual happiness, good, satisfaction, and benefits.

---

[39] Jeremy Bentham, *An Introduction to the principles of morals and legislation* (Batoche Books 2000, 1789)

Moreso, the utilitarian theory in this study is used more beyond individual actions, but can also be used to measure the goodness and badness of the law of a state, put that laws that benefits greater number of individuals in the society has utilitarian value and must be overly accepted and promoted globally and nationally, to ensure that the safety of patients are protected and to further enhance promotion of technology, and robotics in the society for the greater good of the society. This theory lays greater basis on the quality of legislations and principles of legislators in carrying out their duty of making laws and regulating the conduct of the people.

Bentham in his work distinguished between the 'science' of legislation and the 'art' of legislation. The former is the ability of legislatures to know the good, while the latter is the ability of legislators to promulgate laws that would have the effect of promoting the good and reducing the bad.

This propounds that the legislatures make laws for the general good of the people and links the same to the value of utility. This study in line with this theory appreciates the evolution of innovations through technological and robotics advancement in healthcare, and from thence, depicts same for the greater good of the people and further sways with the path of the utilitarian legislation to make a clarion call on legislatures in line with the theory to enhance their legislations in these evolving areas of law, that greatly affects the happiness and the satisfaction of the people in its greater number and to examine the safety of patients in healthcare technology and health robotics and its attendant consequences enacted in a legal framework.

2.3. LITERATURE REVIEW.

The evolution of technology and rapid advancement of technology and the growth of robotics in medical practice have attracted a growing number of literatures, legal and academic review from

scholars, and this work tends to understudy and review this academic and literally work in line with this study.

Okeke in his work, "Critical review of Nigeria Health Law: making a case for legal framework on patients' safety in Nigeria"[40]. This work of review as it is relevant to the present study. His research was on National frameworks; the National Health Act and other healthcare legislation and how they regulate the health care system in Nigeria. According to Okeke, the healthcare system in Nigeria was at its deteriorating rate and lacked necessary health enforcement, hence, laws and regulations guiding the healthcare system and medical practices in Nigeria were on a new pedestal of enforcement in Nigeria, and thus risked the safety of patients' lives and care. He further argued in his work that patients who subscribe to hospitals and clinics for treatment sustain treatment errors occasioned by healthcare providers or through healthcare facilities, which have birthed the need for Patients' safety, and he critically argued on the lack of enforcement of the legal framework and proper healthcare regulations enforcement to ensure the safety of patients in healthcare delivery systems. In a bid to know more, Okeke further in his research work further took a step ahead to decry the lack of proper framework and poor enforcement of the growing regulations on ground, while trying to engage healthcare delivery it may be a challenge to properly apportion liabilities in terms of healthcare care negligence or lack of patient's safety, misuse of facilities in the medical system. While his work offered necessary suggestions, it failed to look beyond the manual system and traditional medical system, while this research has dwelt partly on healthcare facilities it failed to extensively discuss these healthcare facilities and relate them to our fast-growing society. However, this study aims to fill these gaps and suggest for a clearer framework in the Nigeria healthcare system that will embody and clearly stipulate the necessities and use of

[40] Okeke, H 'Critical review of Nigeria Health Law: making a case for legal framework on patients' safety in Nigeria' *Calabar University Law Journal* [2023] (2) 1-18

healthcare facilities, healthcare technologies and health robotics and a framework that will clearly speak on the liability of healthcare providers when the Safety of patients is in question. Also, proper enforcement of healthcare framework, laws and regulations in relations to patients' safety. The work of Gupta & Vaisshalli's "Robotics in healthcare"[41] Posed greater relevance in the research of healthcare technologies and robotics. This research centered very much on the innovation of robotics and advancement of technology in healthcare delivery. He argued that the use of robotics and technology was mostly behind the scenes and are yet to be fully regulated by states. He further stated the relevance of these technologies and robotics in healthcare in the nearest future, where they projected robotics surgery to be a larger feature of surgery in the nearest future.[42] This research work discussed extensively on the importance of robotics surgery in the healthcare and medical system, and how the evolution of technologies, through the integration of robotics can be used to assist surgical operations, and to carry out surgeries in hospitals and clinics. However, it fails to critically examine the risks and disadvantages of technologies and the risk of these surgical Robotics to human lives when they malfunction. It however paid attention to its growing advancement rather than putting the safety and lives of patients first. Hence, this research tends to fill this gap by examining the risks that are attached with healthcare technologies and robotics surgeries, and collating the same with patient safety and sifting its consequences when such risks are not averted promptly by healthcare providers.

In line with same, in their research work looked basically and paid rapt attention to the future and how robotics and technologies can avail in the future healthcare practice, this research work however, researched beyond the future, and focuses on the safety of patients today and how the

[41] Apar Gupta & Vaisshalli G. R, 'Robotics in Healthcare' *Asian Journal of Applied Science and Technology* [2022] (6) (2) 32-35

[42] Ballantyne G. H, & Moll F, 'The da Vinci telerobotic surgical system: the virtual operative field and telepresence surgery. Surgical Clinics of North America' *Surgical Clinics North America,* [2003] (83) 1293-1304.

lives of patients can be safeguarded in their quest for good healthcare and proper treatment and look not just run over the future, while today is not get guaranteed

Furthermore, Eduard Fosch-Villaronga, P. Khanna, H. Drukarch and Others, underscored the "Role of Human in surgery Automation: exploring the influence of automation on Human-Robotics interaction and Responsibility in surgery innovation"[43] Where it explores the relevance of healthcare technologies and surgical Robotics. According to the researchers, the innovation of technology has promised unparalleled potential in healthcare system, a recent innovations contributing this is the Robot Assistant Surgery (RAS), however they held that introducing robotics to traditional surgeries has its grown risk to the Foschi patients recovery, and where risk suffices the outcome of the surgical procedure may not be limited to healthcare Practitioners, healthcare providers or surgeons alone, but extends to the technology manufacturers and the hospital. While this paper critically examined the challenges and risked that will be faced by healthcare providers and hospitals upon malfunction or failure of surgical robots, this paper further suggested the involvement of healthcare providers in robotics surgeries, this is in a bid to raise a better human responsibility and liability standard. This study further aim to address the risk appurtenance to the use of healthcare technologies and surgical Robotics and further aims to fill the gap between the Patients, healthcare providers and Robotics, this is achieved through proper accrued rights of patients, right to informed consent and medical knowledge of the patients which this research work overlooked, and a proper risk management of robotics and technologies, and provide efficient safety of patients in the use of this surgical and healthcare robotics.

[43] Eduard F, Khanna P, Drukarch H, and Others, 'Role of Human in surgery Automation: exploring the influence of automation on Human-Robotics interaction and Responsibility in surgery innovation' *International Journal of social robotics* [2023] (15) 564-580.

CHAPTER THREE

LEGAL REGIME AND INSTITUTIONAL FRAMEWORK OF HEALTHCARE AND MEDICAL PRACTICE.

3 0. LEGAL FRAMEWORK.

The emergence and evolution of technology in the 21st century world has introduced greater advancement in the execution of projects in the general sphere. The overall advancement of robotics and Artificial intelligence (AI) has eased human efforts in carrying out different projects, the advancement of healthcare technologies and health robotics has posed legal and ethical challenges, and these challenges have given rise to the need for comprehensive legal and institutional Frameworks.

Study has it that Healthcare technologies and health robotics, notwithstanding its relevance in aiding medical and healthcare advancement, has high potential risk, which spans through misuse, negligence, poor technical and technological knowledge which highlights the need for patients' safety and legal protection and consequences.

In a world where technological and robotics advancement is at its peak, nations are accepting and establishing these technologies in all sectors of the society and economy. The acceptance and introduction of these technologies and advancement of technology in our healthcare sector, calls for the rise of legal framework, both domestic and international framework.

Furthermore, this chapter examines national legal frameworks and international frameworks, outlining key statutes, treaties, and conventions, for the legal consequences and ensures Patients' safety and incorporates the advancement of technology and health robotics. By analyzing these frameworks, we seek to cover existing gaps between these healthcare technologies and patients' safety and eradicating all risk and imposing requisite legal consequences.

3.1. National Legal Frameworks.

National frameworks lays foundations for the protection of Patients Safety in the use of Healthcare Technologies and health robotics in medical practice, and to further examine attendant legal consequences. These legal frameworks are national legislation as enacted by the National Assembly binding the nation-Nigeria. These National frameworks in Nigeria further include, Constitutional provision, statutory laws, and regulations

3.1.1. The constitution of the Federal Republic of Nigeria, 1999 (as amended.)

The 1999 Constitution of the Federal Republic of Nigeria is the grundnorm, and as such supersedes every other law in the land, the Constitution in its social objectives, guarantees the right to health and further provides that, the state shall direct its policy towards ensuring that the health, safety and welfare of all persons in employment are safeguarded and not endangered or abused,[44] And that there are adequate medical and health facilities for all persons[45]. This section of the constitution guarantees to all Nigerian persons the adequate healthcare and safety of all persons, this is not just limited to persons of employment, but expands to all persons as seen in subsection (d) of the constitution. The provision of this section further ensures adequate medical and healthcare facilities, which extends to technological facilities and robotics and to ensure that these facilities are adequate for use the of persons and patients. It further goes a step to rekindle how the constitution appreciates the advancement of technologies and healthcare facilities in both the healthcare sectors and medical procedures or operations, but it is important to note the necessity which the constitution has placed on the life and health of persons.

[44] Constitution of the Federal Republic of Nigeria (1999 as amended), Section 17(3)(c)
[45] Ibid, section 17(3)(d)

Consequently, Chapter five of the constitution of the Federal Republic of Nigeria (1999 as amended) further stipulates the requisites right accrued to citizens, and the question of whether rights too are accrued to patients may arise, and it is important to state that the constitution has laid befitting foundation as to same. The Right to Life;[46] The constitution has guaranteed a right to life to all of its citizens, and no one shall be deprived intentionally of his right to life. In the case of ***Medical and Dental Practitioners Disciplinary Tribunal v. Dr. John Emewulu Nicholas Okonkwo***[47] The Supreme Court held in the course of medical procedures, that medical practice must uphold constitutional rights accrued to a person, particularly right to life and dignity.

Furthermore, this section of the constitution, has embraced in its fullness that patients are guaranteed their rights to life and same should not be deprived by a technological advancement, technological or robotic negligence, tech-misuse or failure in healthcare. And ensures the state regulates these technologies and robotics to prevent both medical and legal consequences.

Section 34(1)[48] Has granted to all persons the right to dignity, and this dignity partly extends to medical patients, as extended to the patients right to dignity of human person, right to privacy, medical consent, confidentiality, right to be fully aware of medical knowledge as may be critical to this context.

Where the provisions of Chapter Two of the Constitution may have been expressly declared non-judiciable[49], and thus crippling the people from seeking recourse in court when there are inadequate health facility and lack of healthcare provision by the state, however in line with this study, it is important to note that by the provision of right to life and liberty stipulated in section

[46] Ibid, Section 33(1)
[47] [2001]) 7 NWLR (Pt. 711) 206
[48] Constitution of the Federal Republic of Nigeria, 1999 (as amended)
[49] Ibid, section 6(6)(c)

33(1) and (2)[50] Patients can seek redress in court when attempts are made to deprive their right to life and liberty

3.1.2. National Health Act, Cap N55 LFN, 2014.

The National Health Act (NHA) is a national legislation which aims to regulate the healthcare delivery and medical system of Nigeria, it grants access to quality health delivery to patients by the healthcare providers and practitioners. In shaping the health policies, establishing better standards for health services, and providing adequate safety of patients, this legislation plays a crucial role in the growth of the healthcare sector. In line with international human rights provision, this legislation emphasizes the importance of protecting individuals' rights, extended to patients' rights, within the healthcare system. This legislation further speaks on the need for adequate healthcare technology and healthcare facilities which must be maintained to ensure the safety of patients.

Consequently, Part 2 of the Act[51], made provisions for the classification of health established and technologies, which ranges from section 12-19 of the National Health Act, 2014.

While section 12 stipulates that in the Health establishment and technologies, the minister by regulation shall classify health establishment and technologies in different categories, based on their role and functions within the national Health system.[52] In line with same, a person, entity, government, or organization, shall not, without being in possession of certificate of standards, construct, modify, establish, or acquire health technologies or health establishment[53], nor provide healthcare service or acquire health technologies at any specified health sector or health

[50] Ibid.
[51] National Health Act, Cap N55 Laws of the Federation of Nigeria 2014.
[52] Ibid, section 12(1)(i)
[53] Ibid, section 13(1)(a)

establishment[54], nor continue to operate a health establishment or health technologies, 24 months after the establishment of the NHA.[55]

Notably, the National Health Act, has made a step towards ensuring the safety of patients especially as it relates to technological advancement and advancement of healthcare establishment, hospitals, and clinics. However, Part 2 of the NHA establishes the use of Technologies and provides adequate measures to ensure that Health establishments may be dully registered and possesses certification before they can acquire health technologies and run medical services, partly to ensure the overall Patients Safety, and the Act stipulates due penalties for commission of such offences.[56]

Furthermore, for the reception of healthcare technologies and health robotics in the Medical Practice, all health establishment and hospitals shall comply with quality requirements and standards prescribed by the National Council of Health[57], it is further important to note that the quality and standard required from the healthcare establishment may include but not limited to Human resources, health technologies, equipment, premises, delivery of health services, medical practice, patients safety and manner in which users are accommodated and treated.[58] The provision of healthcare as earlier stated is the duty of the state, though it is non-justiciable, however, in other to decentralize this, the state certifies all health sector and establishment to carry out healthcare services and must comply with adequate quality requirements and standards. This is hence, a bid to ensure that healthcare technologies and robotics in medical practice are consciously affected to ensure safety of patients.

[54] Ibid, section 13(1)(b) and (c)
[55] Ibid, section 13(1) (d)
[56] Ibid, section 14.
[57] Ibid, section 19(1)
[58] Ibid, section 19(2)

Importantly, to maintain safety of patients against all healthcare facilities, the National Health Act have provided patients with Rights to healthcare personnel who shall ensure adequate treatment.[59] On the same ground, to maintain patients' safety, every health establishment shall implement measures to minimize injuries or damages to the persons, and disease transmission.[60] Hence, while healthcare providers are charged to ensure the treatment of patients, they are also obliged to ensure that patients are carefully treated against contaminating further disease or acquiring unprecedented injuries or damages.

In the ***Okonkwo v Medical and Dental Council of Nigeria***.[61] The court held that the legal responsibility of healthcare providers and health establishment is waged towards maintaining due professional care in health care delivery.

It is important to note that The National Health Act, stipulates great ground for full disclosure of knowledge to the health user or patient, in other words this simply implies that the user must have full knowledge and relevant information pertaining his state of health and necessary treatment,[62] relating to the users health status,[63] range of diagnostic procedure and treatment options[64], benefits, risks, cost, and consequences associated with each options[65], users ' right to refuse health services and implications, cost and risks of such refusal.[66]

In other words, it is crucial for healthcare providers to disclose full knowledge and information as regards the health of the patients and the mode of treatment, especially where the use of healthcare technologies or health robotics will be used for healthcare delivery, adequate information and

[59] Ibid, section 21(1)
[60] Ibid, section 21(2)(a) and (b)
[61] [2001] 7 NWLR (Pt. 711) 206
[62] National Health Act, Cap N55 Laws of the Federation of Nigeria 2014, section 23(1)
[63] Ibid, section 23(1)(a)
[64] Ibid, section 23(1)(b)
[65] Ibid, section 23(1)(c)
[66] Ibid, section 23 (2)(d)

knowledge must be fully disclosed to the patients, who may exercise his right to acceptance or refusal of the treatment method, as long as the health risk and consequences were also disclosed. The National Health Act, has in its provisions has only laid little but fewer foundations on the regulation of technologies and have not specifically dealt with rapid innovations of technology and robotics advancement in technology healthcare, and has not solely addressed same in relation with patients' safety. Therefore, the rapid advancement of healthcare technologies and health robotics necessitates an additional framework that generally and explicitly incorporates the Patients Safety and its legal consequences.

3.1.3. Medical and Dental Practitioners Act, M8 2004, LFN, 2004.

The medical and dental practitioners Act is a legal framework which regulates the medical and dental practice in Nigeria, consequently, the Act stipulates necessary regulations and requirements for medical practice for healthcare providers, and necessarily establishes the Council[67] for regulation and enrollment of medical Practitioners[68] The council further regulates and oversees the professional training, registration and professional conduct of medical practitioners. This is to ensure that all practitioners are adequately eligible to practice.

Section 8 and 9[69] of the Act, provides for adequate standard of knowledge and skills required for registration of a person as a medical practitioner, and thus regulates the professional conduct and ethics supervising medical and dental training. The Act further regulates the registration of medical and dental practitioners, and offers certificates of registration and practice to medical practitioners to adequately practice, after undergoing professional training.[70] Notably, this serves as a crucial check to ensure that patients safety is at the peak of medical professional procedures, and further

[67] The medical and Dental Practitioners Council
[68] Medical and Dental Practitioners Act, M8 2004, Laws of the Federation of Nigeria, Section 1.
[69] Ibid
[70] Ibid, section 11.

ensures that only professionals may handles healthcare Technologies and robotic, the reverse of same is simply that when technologies are handled by untrained and uncertified professionals it grossly risks the life and safety of patients who are meant to receive adequate treatment.

Upon the enactment of the Medical and Dental Practitioners Act, which established the Medical and Dental Practitioners Council, the council is vested with the duty to ensure that practitioners and healthcare providers carry out their duty in professional conduct and respect to patients, this however led to the enactment of the provision for disciplinary tribunal and investigative panel[71] where the panel is charged with the duty of considering and determining cases referred to it, say cases of misbehavior, serious misconduct, negligence, dishonesty, fraud, or malpractice of medical practitioners in executing their medical duties, the council is further levied to employ sanctions and penalties[72] upon any of the cases mentioned in Section 15 of the Act.

In line with the same, this principle reinforces the necessity of respecting Patients Safety and this is achieved by ensuring that Practitioners are certified and must have undergone necessary training to validate their practice in the medical profession. Healthcare of patients deals variably with lives and safety of patients and the council has made moves to ensure that this safety is evident, this further has both a direct and an indirect sprays to the use of healthcare Technologies and robotics, it simply entails that the use of technologies for both surgical procedures and healthcare practice in the medical system must be carefully done by qualifying professionals who are adequately certified to practice, and use same.

In conclusion, despite the indirect and slimly picked provisions of the Medical and Dental Practitioners Act, the act doesn't expressly recognize healthcare technologies and the practice of health and medicine by robotics, or the penalties and sanctions when the safety of patients is

[71] Ibid, section 15
[72] Ibid, section 16 and 17

jeopardized. These challenges occasioned by technological advancement necessitates a revolution of the Act to accommodate evolving medical areas and technological advancement and to further focus on prioritizing patients' safety and rights especially when they are infringed by healthcare providers and practitioners.

3.1.5. Patients Safety Agency of Nigeria (Establishment) Bill 2019

The patient Safety Bill regulates and maintains the quality of patients care through training, clinical audits and clinical risk management[73], it also makes and ensures the enforcement of regulations relating to patients' safety and management. [74] While it is important to note that the establishment of this Agency is aimed at ensuring that ultimately the safety of patients in healthcare, improving patients' safety and accessing safety and quality of healthcare and public health services, regulating health licensing, independent complaints of patients about health services unresolved by healthcare providers.[75]

The Bill further aims at defending patients' rights, which includes the right to humane treatment and freedom from abuse, promote the use and quality safety of medicine for patients.[76] Thence, adequate regulation of the Safety of patients encompasses the measures of care to be carried out by healthcare practitioners in discharge of their medical duties, hence the examination of patient's safety. The standard for safe health service provision by healthcare providers[77] is a core requirement to ensure that the safety of patients is adequately provided. Section 18 further provides that to ensure that healthcare provision is qualitative and safe, the health providers must — adhere to the fundamental standard of care established by the professional body, continuous improvement

[73] Patients Safety Agency of Nigeria Bill, 2019, Section 3(1)(b)
[74] Ibid, Section 3(1)(g)
[75] Ibid, section 8(a)-(I)
[76] Ibid, section 8(m) and (r)
[77] Ibid section 18.

in the standard of care.[78] This entails that healthcare providers must ensure adequate use of healthcare technologies and ensure that health technologies are not prone to harming patients or causing injuries to patients, this is where the examination of patients safety comes into play, however the bill ensures the safety of patients in medical procedures.

Furthermore, Patients Safety Agency Bill covers that Health service provider which causes moderate harm, severe harm, or causes death of patients in care, he shall be required to explain the harm to the patients, or his family, tender an apology, and report himself within 10 days to 2 weeks of causing such harm[79]. Section 22 provides adequate sanctions and penalties.

It is important to note that the Bill expressly regulates the Safety of Patients, and this safety relates to the medical use of technology for healthcare, hence, healthcare providers which cause harm to patients either while executing their medical duties or while enhancing their duty with healthcare technologies shall be subject to the Bill upon implementation. However, despite its comprehensive provisions, the Patients Safety Agency Bill is not fully enforced as it is a bill and not legally enforceable, it will make a great deal if the Bill in line with the deteriorating healthcare condition of Nigeria is enforced, and made to accommodate the Technological and robotic evolvement.

3.1.6. National Health Policy (2016).

The emergence of the National Health Policy was enacted to address the healthcare system of Nigeria. It examines the flaws of the current Health system and holistically addresses the attendant challenges of the system. The emergence of the 2016 National Health Policy, came shortly after the enactment of the first National Health Act 2014, this policy came at the most fortunate times, especially when the global health sector is laying on the system of health different considerations to appreciate the safety of patients and adequate quality delivery of health and medical systems.

[78] Ibid, section 18(1)
[79] Ibid, section 18(2)

This emergency is also witnessed at a time when there is global re-commitment to a new development framework appreciating global health technologies, the Sustainable Development Goals (SDGs), and an increasing global support for the attainment of Universal Health Coverage (UHC).[80]

In furtherance, the Policy stipulates glaringly the lack of availability of health facilities which doesn't translate into the availability of quality healthcare services.[81] It however speaks to the unavailability of health facilities and technology to a certain number and sector of the country, stating the constant disruption of healthcare service around the country. On a clearer stance, this speaks on poor competence in diagnosis and disproportionate management of clinic illness, while adherence to clinical guidelines is low[82]

Addressing healthcare technologies, the policy expressly states that there is shortage of biomedical and biotechnological engineers, and poor institutional capacity for the maintenance of equipment, medical devices and healthcare technologies. Poor maintenance specifications are adequately included or followed up in terms of contracts.[83]

This directly affect the implementation of the healthcare technologies and use of same in Nigeria, it however indicates and speaks volume to the challenge of poor maintenance of healthcare facilities and technologies in Nigeria, hence where there is little or no engineers to adequately maintain health facilities and healthcare technologies, it only exposes the Patients to harms, injuries and poor safety in the healthcare system.

[80] Isaac Folorunso Adewole, 'Forward' *on National Health Policy* (Federal Ministry of Health, 2016)
[81] National Health Policy, 2016, Article 2 (5) (2) 11
[82] SDI 2014
[83] National Health Policy 2016, Article 2 (5) (5) 21

With extensive policy objective and initiative, this legal framework clearly exposes clear initiatives to these challenges with glaring goals[84]

Pursuant to the National Health Policy, 2016, it expressly stipulated the need for careful diagnosis and instructed healthcare delivery and providers to ensure adequate patient safety. Health Service Delivery and Healthcare Providers shall ensure the following;

a. The goal is to provide and ensure access to, and use of, high quality and equitable health care services, by all Nigerians
b. To strengthen governance and accountability of service delivery units to improve the management of health facilities
c. To ensure the provision of adequate and appropriate treatment of patients at all times
d. To ensure timely, accessible, affordable, and reliable laboratory, technological and radiological investigations for enhancing accurate diagnosis
e. To improve the quality of health services and ensure patient safety at all levels of the health system.[85]

In conclusion, the policy ensures that there is implementation of adequate, accessible, and accessible healthcare technologies in healthcare systems.

In this bid, it is important to relate the policy aims and objectives to the Safety of patients as relates to the accessibility of healthcare facilities and technology in Nigeria, and also considering the poor state of the healthcare system in Nigeria, it then aids to the advocating voice of examination of Patients Safety before implantation of healthcare technologies and in the use of healthcare technologies and robotics in discharge of medical duty.

[84] Ibid, Article 4 (1)(4) 34
[85] Ibid, Article 4 (2)(2) 44

3.2. INTERNATIONAL LEGAL FRAMEWORK

3.2.1. African Charter on Human and Peoples' Rights (1981).

The African Charter on Human and Peoples' Right is a regional international framework made for the people of Africa, the core aim of the Charter is to protect human and people's rights. These rights are to be recognized by States members of the Organization of Africa unity.

The Charter presents to all persons and humans, the right to life, as entrenched in Article 4 of the Charter, hence, every human shall be entitled to respect to their life, and integrity of his person. And no person shall be arbitrarily deprived of their right to life.

The Charter further grants every individual the right to attain affordable and quality physical health, this goes further to establish that the state chapter will take necessary measures to protect and provide equitable health for their people and that they receive adequate medical attention when sick.[86]These serves as a critical check to evaluate the existence of good healthcare facilities and medical systems in member states, it is however important to note that the right to adequate health of person and human, is translated to the adequate safety of patients, the right to life of patients, and further entails that technologies or equipment put in place to ensure that the healthcare and medical system of persons succinctly are strictly to leverage the life, living conditions and healthcare condition of the patients, and not to jeopardize the safety of patients.

However, despite the right to health's protective provision, the charter is not tailored to, expressly, accommodate the right to patient safety and the inception of medical advancement technology in the digital age.

Therefore, these challenges will necessitate a revaluation of this Charter by national Organization, and to further lay strong enforcement hold on member states, to adequately enforce the Charter,

[86] African Charter on Human and Peoples' Right 1981, Article 16

and to repeal and incorporate these rights that addresses patients' safety in the digital age, using medical and health technologies.

3.2.2. World Health Organization Global Strategy on Digital Health (2020)

The World Health Organization, Global strategy on digital health was adopted at the seventy-third World Health Assembly (WHA), the strategy was a draft document regulating the healthcare system and adopting the use of digital technologies in the health system.

The global strategy is documented in a way that acknowledges and introduces each country to its own digital health action plan basically built on the strategy, within the country's national context. The global strategy is developed to ensure that health is relatively sustainable in development goals of counties and firmly introduces the use of technologies in diverse national health systems, basically aiming towards protecting the rights of patients and safety of patients, in dispensing medical procedures.

However, it is important to note that the health global digital strategy holds four guiding principles which aims to orient global strategy through a sustainable adoption of digital health technologies within the context of nations health strategies and health sector, which includes;

a. An acknowledgement that institutionalization of digital health in the national health system requires a decision and commitment by countries
b. Recognizes that successful digital health initiatives require an integrated strategy.
c. Promotes the appropriate use of digital technologies for health
d. Recognizes the urgent need to address the major impediments faced by least-developed countries implementing digital health technologies

The advancement of healthcare technologies and digital health system is fast growing within the global field, the World Health Organization (WHO) through the World Health Assembly (WHA) has laid down necessary steps and strategies to ensure that nation-states subscribe to the advancement of digital health technologies and apply same in different countries. Furthermore, it can be rightly put that the global strategy is placing a right on national citizens to access digital health technologies upon health medications.

The strategy is not just health limited; it further exposes the necessary strategy to ensure that the safety of patients is of core essence.

The global strategy, in a bid to ensure global health transformation and strengthen synergies by healthcare providers to improve health outcomes using digital health technologies, and to mitigate associated risks at all levels and prioritizes patients' safety in medical procedures, the global strategy outlines necessary objective strategy to achieve the necessary objectives.

And this strategic objective includes;

a. Promotion of global collaboration and advance the transfer of knowledge on digital health: This implies that healthcare providers of developing countries are expected to be equipped with requisite training on the use of digital health technologies in other to ensure the safety of patients in discharge of medical procedures.
b. To advance the implementation of national digital health strategies: This strategic objective aims to stimulate and support every country to own, adapt and strengthen its strategy on digital health in a way that best suits its vision, national context, health situation and trends, available resources and core value, ensuring patients safety [87]

[87] World Health Organization, *Global health strategies on digital health; strategic objectives*, (WHO 2020) 22

c. Strengthening health governance of digital health technologies at all stages, both globally and nationally, stating requisite policy options, outcomes and output.
d. Advocate people-centered health systems that are enabled by digital health: This strategic objective places the people and patients at the core center of health delivery and further ensures equitable patients care system and health delivery.

3.2.3. Council of European's Convention on Human Right and biomedicine (1997)

The Convention on Human Rights and Biomedicine, commonly known as the Oviedo Convention, was adopted by the Council of Europe in 1997. This legal framework addresses the ethical and legal challenges posed by advancement in the medical systems, biomedicine, and biotechnology generally evaluating and emphasizing the need to protect human rights in the context of medicine and healthcare system and procedure.

The general provision of the Oviedo Convention is to protect the dignity and identity of all human beings and guarantee everyone, without discrimination, respect for their integrity and other rights and fundamental freedoms with regard to the application of biology and medicine.[88]

Above all, it is notably important to state the key aspects of the Oviedo Convention as it relates and impacts healthcare systems and health technologies, with a plain examination of Patients Safety.

a. Equitable access to health care: Parties, taking into account health needs and available resources, shall take appropriate measures with a view to providing, within their jurisdiction, equitable access to health care of appropriate quality.[89] This simply entails that healthcare providers are saddled with the obligations and objectives of providing an

[88] Convention on Human Rights and Biomedicine, 1997 article 1
[89] Ibid, article 3

adequate healthcare system for the patients, this healthcare system and facilities generally relates to provision of adequate health technologies and robotics to facilitate the dispensation of medical and healthcare procedures, and to ensure adequate patients safety and healthcare delivery.

b. Professional standards: Any intervention in the health field, including research, must be carried out in accordance with relevant professional obligations and standards.[90]

   This implies that in order to maintain adequate healthcare and safety of patients in the course of medical treatment, and the ability to handle medical equipment and technology. Hence, this further grant equitable access to healthcare to all citizens and patients.

c. Consent: An intervention in the health field may only be carried out after the person concerned has given free and informed consent to it. This person shall beforehand be given appropriate information as to the purpose and nature of the intervention as well as on its consequences and risk.[91]

   The requirement of consent is a general principle in the Oviedo Convention, this simply entails that adequate consent of the patients must be sought before any official medical treatment is commenced, these further lays hand that consent must be sought before the use of technological or robotic equipment for treatment of patients. In line with the accessible adequate consent, Patients should be informed beforehand, and also given appropriate information on the purpose of the use of any healthcare technologies for treatment, or even at instant health robots and adequately informed of the consequences and risks attached to the use of the healthcare and medical procedures.

[90] Ibid, article 4
[91] Ibid, article 5

d. Infringement of the rights and Sanctions: The Parties shall provide appropriate judicial protection to prevent or to put a stop to an unlawful infringement of the rights and principles set forth in this Convention at short notice.[92]

This however ensures that there is adequate healthcare safety and health protection of patients, and where the safety or rights of patients are infringed, the parties shall provide adequate judicial protection in line with the legal consequences. Where infringement is due, there shall be adequate compensation for undue damage. The person who has suffered undue damage resulting from an intervention is entitled to fair compensation according to the conditions and procedures prescribed by law.[93] Furthermore, they shall be provision of sanctions, Parties shall provide for appropriate sanctions to be applied in the event of infringement of the provisions contained in this Convention[94]

3.2.4. United Nations Declaration of Human Rights (1948)

The Universal Declaration of Human Right, as adopted and proclaimed by the General Assembly resolution 217 (A) (111) of 10 December, 1948, aims to ensure the recognition of the inherent dignity and of the equal and inalienable rights of all members of the human family is the foundation of freedom, justice and peace in the world. The declaration has made it an inalienable right to all rights that pertains to humans, ranging towards the right to healthcare and right to adequate medical facilities.

The Declaration essentially provides for an adequate standard of living for the health and wellbeing of himself and his family, this further ensures that there is adequate medical care and necessary

[92] Ibid, article 23
[93] Ibid, article 24.
[94] Ibid, article 25

social services provided for all citizens.[95] Hence, it ensures that all persons are entitled to good healthcare and an efficient healthcare system to better their living.

3.3. INSTITUTIONAL FRAMEWORK

In a bid to address the legal impact and the attendant legal consequences of healthcare technologies and expanding the same to patient safety, institutional frameworks play a pivotal role in ensuring the safety of patients, and regulating the use of healthcare technologies and health robotics.

Further, these institutions both national institutions and international institutions, tend to provide a regulatory framework and safeguards patients against harms and injuries that threaten the safety of patients while receiving medical treatment, either occurring through the use of healthcare technologies or health robotics.

3.3.1 National Health Insurance scheme.

The National Health Insurance Scheme, otherwise known as the NHIS was established in Nigeria in the year 1999 by the Federal Government of Nigeria, National Health Insurance Act, act 35 with the overall goal of enhancing quality accessibility and affordability of health care service to all Nigerian citizens. It took some time before it became fully operational in Nigeria, in a bid to foster the objective of the Scheme, it became operational in 2005 and targets universal coverage of all Nigerians by 2015,[96] by ensuring that the act supersedes workers widely and extends to all citizens, including patients, children, women, and all Nigeria citizens.

However, the establishment of the National Health Insurance Scheme solely aimed towards providing insurance and applicable primary source of funding and financing to the healthcare

[95] Universal Declaration of Human Rights 1948, article 28.

[96] Chinyere M, and Kevin E M, 'Evaluation of National Health Insurance Scheme: Benefits and challenges in Eastern Nigerian', *South America journal of public health* [2014] (2)(4)

system and the medical sector, it transcends to a social health insurance program established by the Federal Government of Nigeria. This scheme further ensures the improvement of access to healthcare, quality and equality healthcare system for the majority of Nigeria.[97]

The National Health insurance undoubtedly is established to grow towards assisting civil servants and workers to access quality and equitable health care. Importantly, civil servants are known for playing a very vital role in the society, to ensure a significant growth in the economic growth of every nation. There must be an equitable and efficient delivery of quality healthcare to all persons including the civil servants to enable them deliver efficient service towards the growth of the economy.[98]

Notably, the National Health Insurance Act established the National Health Insurance Scheme, with the objective 'to ensure access to quality health care services for Nigerian citizens and to avert suffering and privation faced by the financial obligations of the health sector'[99]. The scheme is to be funded by contributions from employees, this covers the access to quality healthcare service to be delivered to all citizens of Nigeria.

The provision of an equitable and quality healthcare system to all persons generally extends to the ability to handle every medical equipment and healthcare technologies, ensuring safety of patients. This National Healthcare scheme further ensures that the healthcare system of all persons is the priority and major focus of medical practitioners in equitable health delivery.

Furthermore, the scheme is intended to ensure the equitable distribution of healthcare cost amongst the different income classes; to also maintain a high standard of healthcare delivery services while

[97] Akinyemi O O, Owopetu O F and Others, 'National Health Insurance Scheme: Perception and Participation of Federal Civil Servants in Ibadan' (2021) (19)(1) 44-55

[98] Onwujekwe O, Uzochukwu B, Obikeze E, 'Investigating determinants of out-of-pocket spending and strategies for coping with payments for healthcare in southeast Nigeria'. *BMC Health Services Research*. [2010] (10)(67).

[99] National Health Insurance Act 2004, N42 Laws of the Federation of Nigeria, section 1

ensuring the adequate distribution of health facilities and the availability of funds to the healthcare sector for improved service.[100]

Benefits of NHIS.

a. The major benefit of the National Health Insurance Scheme is ensuring that the majority of the population of Nigeria have equitable access to qualitative healthcare services in all health care delivery systems in Nigeria.
b. The NHIS guards' families against financial hardship of medical emergency bills, which may be caused by the use of advanced medical technologies and medical equipment.
c. The NHIS controls quality and equitable distributions of healthcare among different income groups, and social class. Further ensuring and enhancing equality in the medical rights of patients.
d. The NHIS further ensures proper distribution of health facilities within the federation, this expands to quality distribution and handling health facilities and technologies towards ensuring that the safety of patients are core-priority and equitable patronage of all levels of healthcare system, going through the use of robotics, and different healthcare technologies.

3.3.2. Federal Ministry of Health (FMoH).

The Federal Ministry of Health plays a special role in ensuring the dispensing of equitable healthcare in Nigeria's medical system. The Federal Ministry of Health states that,

'Access to essential medicines and other health products is not only a human right irrespective of setting or socio-economic status but also an important strategy to realizing the sustainable development goals (SDGs)'[101]

[100] Yinka Olomojobi, *Medical and health law* (Lagos; Princeston and Associate Publishing Co, 2019) 59.
[101] Federal ministry of Health, department of food and drug services, National Health products supply chain strategy and implementation plan (2021-2025) (Federal Ministry of Health, 2021)

This generally evaluates the medical system where technologies, equipment's, products and medical systems are deployed for the efficient treatment of patients. This further lays on the healthcare table, a proper and efficient discharge of medical practice in consonance with patients' safety.

The Ministry in its efforts to ensure that the healthcare system of Nigeria is well checked, and further established the National Health Supply Chain. The development of the National Health Supply Chain Strategic and Implementation Plan (2021 – 2025) was carried out with due consideration of the legal and regulatory provisions, which stipulates the necessary procedures and guidelines for procurement, storage, distribution and use of medicines and other healthcare products, equipment's, and laboratory equipment's in Nigeria. The Ministry of Health through the Department of food and drug service further stipulates regulations guiding the deployment of medical equipment, products or drugs to ensure the safety of patients.

Simply put, Federal Ministry of Health is a body that generally regulates every medical equipment, products or technologies, before they can be used for patient treatment. It generally underscores the principles of patient safety in the application of any medical procedures or practice.

Furthermore, the Federal Ministry of Health (FMoH) is the primary federal agency of the government that is basically in charge of the general health needs of the people of Nigeria, and fulfills the needs of the Nigerians as it relates to the discharge of healthcare in the country at large. The general responsibility of the FMoH amongst many others includes;

a. The body prepares an annual review of the general health condition of the people in the country, and stipulates efficient long-term plans, while outlining necessary health needs, which states in detail mode the goals, objectives, promotions, implementation and procedures to solve problems and healthcare challenges in the country. This simply

stipulates that the FMoH owes the objectives to decipher and regulate the goals and challenges that pairs alongside healthcare Technologies and robotics, and provide viable solutions before public consumption.

b. The Federal Ministry of Health, a primary federal agency of the government, provides a health plan which comprises the health plan from the state by their ministries of health, which makes up the general health records.
c. The FMoH provides adequate guidelines for planning, it also provides health approaches and medical standards and ensures equitable health records are prepared.
d. The FMoH formulates the guidelines for the organization of Nigeria health system, it plans the Nigeria health system and develops towards every advancement recorded in the medical sector. It treats and accommodates all patients' complaints, gathers appropriate recommendations and suggestions, and works on ensuring the general safety of patients.

3.3.3. Medical and Dental Council of Nigeria.

A Medical Practitioner is one who has met the requirements for registration as a medical practitioner and has been so licensed to practice medicine by the Medical and Dental Council of Nigeria,[102] he must have fulfilled the qualifications for approval for medical registration and practitioners licensing.

Medical and Dental Practitioners are trained personnels who ensure that the medical and health condition of patients are in good, adequate and safe condition upon treatment. The medical and dental council as established by the medical and dental practitioners Act, regulates the establishment and medical procedures of practitioners. This body further ensures that practitioners

[102] Medical and Dental Practitioners Act, Cap M8, Laws of the Federation of Nigeria 2004, Section 8

go through the necessary medical training before they can be fully certified to practice and take care of patients as medical practitioners.[103]

Furthermore, The Medical and Dental Practitioners Act, 2004, section 1, provides for the duties and functions of the Council, these includes;

a. The Council approves institutions for the training of practitioners to be able to carry out their medical duties and maintain safety of patients in the long run. The Council recommends the approval of the training practitioners on the use of healthcare technologies to enable practitioners get acquitted with advancing technologies and robotics.
b. The Council is saddled with the exclusive right to train medical doctors, and dental surgeons only which includes inculcating the need for medical law and maintaining adequate patients' safety and carefulness when carrying out medical procedures on patients.
c. The Council brings to notice the practitioners of necessary guidelines, educating them on issues of patients consent, patients' safety, confidentiality, legal consequences, patients right, medical negligence and necessary sanctions. It further extends to the operations and evolution of medical and healthcare technologies and the reception of robotics where necessary, and its relationship with patients and her safety.
d. The Council in course of training these practitioners, the standard of training given depends on the availability of physical facilities, this however entails the need for availability of medical facilities and technologies for training upcoming practitioners, this assists and eradicates issues of patient's safety and negligence.

[103] Ibid, section 9 (1) and (2)

3.3.4. World Health Organization. (WHO)

The World Health Organization is a major institutional framework aimed at regulating state members' health systems. The constitution of the world health organization which was adopted and enacted in New York during the international health conference in the year 1946, solely by representatives of the 61 state members. The constitution however was entered into force on the 7th April, 1948 and has undergone multiple amendments by the World Health Assembly (WHA). The fifth amendment of the WHA was the 15th September, 2005 amendment which led to the incorporation of the WHO constitution to a text.

Furthermore, the constitution in its provision reinforces the objective of World Health Organization which shall be the attainment of the highest possible of health by all persons.[104] The Organization presupposes to provide an adequate health care system to all persons through respective member states.

In other for the Word Health Organization to achieve its sole aimed, the organization is rested with functions which is aim towards advancing the healthcare system of every person globally, being the primary objective of the WHO, and these functions includes;

i. To act as Director and coordinator on international health work.[105]
ii. To assist Governments, upon request, in strengthening health services[106]
iii. The WHO furnishes appropriate technical assistance and assists in emergency aid[107]
iv. Provides and assists upon request of the UN, health services, health facilities, and healthcare technologies and further contributes to the advancement of health [108]

[104] World Health Organization, Constitution of the World Health Organization (adopted 1946, entered into force 1948, amended 2005), Article 1.
[105] Ibid, Article 2 (a)
[106] Ibid, Article 2 (c)
[107] Ibid, article 2 (d)
[108] Ibid, article 2 (e) and (j)

v. Promotes improved standard of teaching and training in the health, medicine and related professions.

Furthermore, the World Health Organization in an agreement with the Southern Centre, standing on the objectives of the WHO, they cooperate on some issues with the Southern Centre countries on issues relating to health and development, including access to medicines and other healthcare technologies, and issues of medical research and development into medicines and other health technologies, as it pertains patients' safety.[109]

Consequent upon the objective of WHO, the organization has adopted a charter that will enhance the safety of patients against all forms of harm, and to generally identify causes to patient's harm and ensure the prevention of future harm done to patients. The Patients Safety Right Charter by the WHO includes 10 patients' safety rights, which includes.

1. Right to timely, effective and appropriate care
2. Right to safe health care processes and practices
3. Right to qualified and competent health workers
4. Right to safe medical products and their safe and rational use
5. Right to safe and secure health care facilities
6. Right to dignity, respect, non-discrimination, privacy and confidentiality
7. Right to information, education and supported decision making
8. Right to access to medical records
9. Right to be heard and fair resolution
10. Right to patient and family engagement[110]

[109] *Agreement between the World Health Organization and the Southern Centre* (2013)
[110] Patients Safety Right Charter 2013, Article 1 - 10.

These Rights incubated and birthed the requisite care that should be matted on a patient to ensure that safety of patients amongst other things are prioritized. Upon the World Health Global Conference Engaging Patients for Patient Safety, which took place on 12 and 13 September 2023 at WHO headquarters in Geneva brought an immediate enforcement and applicability of the Charter in all clinics and hospitals. The world health further calls on national leaders to domesticate and adopt this charter for the general safety of all persons and citizens.[111]

3.3.5. International Medical Device Regulators Forum (IMDRF)

The International medical device regulatory forum was launched in February 2012, which initially succeeded the Global harmonization task force (GHTF). The primary aim of IMDRF involves regulating international market products, especially as emerging technologies are evolving,[112] It further involves the act of clinical evaluation, medical device single audit program (MDSAP), quality systems, clinical safety and performance, and ensuring quality management systems. This further entails that the Regulators Forum aims at ensuring that all medical devices and evolving medical equipment and technology are appropriately regulated to ensure patients safety. During the Global COVID pandemic, the IMDRF acknowledged the impact of numerous medical devices and its significant impact in countries, the Forum ensures that all devices from Syringes, Oxygen concentrators, ventilators, test kits, and surgical face masks were equitably regulated and transmitted to all countries for the best Safety of patients.[113]

Furthermore, the mission of IMDRF is to be able to accelerate international medical device regulatory convergence strategically and to promote the right efficiency and effectiveness in the

[111] The applicability and enforceability of the Patients Safety Right Charter, 2013.
[112] International Harmonization and International medical device regulators Forum <http://www.imdrf.org/consultations/consultations.asp > accessed1 September 2025
[113] International Medical Device Regulators Forum" <https://www.imdrf.org> accessed 31 August 2025

Forums regulatory model for medical devices, medical equipment and medical technologies, examine the emerging challenges in the sector while protecting and maximizing public health and Patients safety.

International Medical Device Regulators Forum (IMDRF) is established towards effective and efficient regulation of medical device and equipment production, and the emergence of new technologies, and robotics. Hence basic structures are put in place to regulate the medical devices by the forum, this is however considered based on appropriate, equitable and regulatory inputs of the forum and stakeholder.

The following are the objectives of the IMDRF

a. The IMDRF regulates international medical devices and the regulatory convergence.
b. The forum supports medical innovation and timely access to safe and effective medical devices globally
c. The forum facilitates frequent change of policy and regulatory information of common interest to regulatory authorities and identifies approaches to overcome unnecessary barriers in enforcement of these regulations, maintaining safety.
d. Promotes and ensures convergence in areas of advanced and innovative technologies.

Notably, it is keen to note that in areas of technological advancement in the medical and healthcare system, the IMDRF plays an important role as an institutional framework to ensure that devices, medical and operational equipment, healthcare technologies, robotics advancements are effectively and efficiently regulated for the safety of patients. Hence, the forum ensures that medical devices are transmitted in an equitable convergence globally and that every person has an

equitable access to healthcare and medical procedures may be carried out on patients without medical complications.

However, technologies are without its attendant consequences, hence the Forum in order to mitigate the challenges and adverse incidents that occur from healthcare devices, has set up working groups and committees who take up to handle basic issues and ensure that some challenging issues are resolved, and appropriate enforcement is enhanced.

CHAPTER FOUR.

ANALYSIS OF THE LEGAL CHALLENGES IN THE APPLICATION OF HEALTHCARE TECHNOLOGY IN NIGERIA

4.1 Brief overview of Healthcare Technologies and Health Robotics and its Relevance to Medical Practice.

In line with the general global evolution, there has been a transition in the sphere of human relations, which leads to the evolution of technology which has become dynamic to the changing state of society. The advancement of Technology globally and nationally has transformed almost every sphere of human life, and has continued to have a viable impact on the lives of people around the world. The overall acceptance of technology in human development spans through all aspects of humanity either positively or negatively, and particularly in its revolutionary way of changing human activities.[114] This technological evolution has been translated to the healthcare sector and medical procedures. Importantly, global and national digitalization has become inevitable as more aspects of human life have evolved generally from the then manual, traditional, and analog methods to more advanced methods. In this regard, the healthcare system is not left behind. Particularly there has been significant evolution and particular development of the healthcare system and services, medical practice and operations, generally facilitated by technological advancement and robotics evolvement in medical practice and the healthcare system which have displaced the previous traditional practice of medicine and healthcare.

However, for a long time, robotics has been introduced in the healthcare sector and used in health delivery in hospitals and clinics. A good number of medical technologies and robotics in the

[114] Owoeye J O, 'Information Communication Technology (ICT) Use as a Predictor of Lawyers' Productivity', *Library Philosophy and Practice Paper* (2015) 662

healthcare and medical system have increased in the global space over the years, which have significantly assisted medical practitioners in carrying out medical procedures.

Furthermore, Health technologies are applied to all the resources used to meet the health needs of sick patients, either individually or collectively, which range from medicines, medical equipment and devices, medical procedures, and the organizational models and support systems employed.[115] Robotic surgery is projected to become a larger feature of surgery in the future[116]. Importantly, soon robotics will be able to handle all surgeries and provide solutions to general medical questions.

However, the first introduction of robots in the medical field was in the 1980s where the first robotic assistant was used to provide surgical assistance especially in the robotic arm technologies, down to the 21st century where technological advancement has become fast evolving and leading to the use of Artificial Intelligence, Computer vision, and data analysis which have generally transformed the face of medical practice, and medical robotics deployment, expanding its horizon into different areas of healthcare practice.[117] Technological advancement through the introduction of health robotics has gained great relevance in medical practice. Hence, healthcare Technologies and Robotics play a pivotal role in medical operating rooms and in clinical settings, assisting healthcare providers in medical operations and healthcare workers to enhance patient care.

The advancement of Healthcare Technologies and health Robotics has its attendant relevance to medical practice, and this relevance includes;

---

[115] World Health Organization, '*Essential health technologie;s Report by the secretariat'*, (WHO 2006) Executive Board, 118th session, Agenda Item 5.5, (1)

[116] G H Ballantyne, & F Moll 'The da Vinci telerobotic surgical system: the virtual operative field and telepresence surgery. Surgical Clinics of North America', (2003) (83) 1293-1304.

[117] Robotics in Healthcare: The Future of Robots in Medicine – Intel <https://www.intel.com/content/www/us/en/learn/robotics-in-healthcare.html#:> accessed 26 August 2025

a. Healthcare Technologies and Robotics enhance high-quality patient care, support minimally invasive procedures, customized monitoring of patients with chronic disease, and assist medical practitioners in surgical operations.
b. Reduces physical demand on human workers through streamlined clinical workflow of autonomous mobile robots (AMR) and ensures consistent processes through assisting in addressing staffing shortages and assisting medical practitioners in surgical operations.[118]
c. Enhances medical precision and assists in the efficient delivery of medical practice. This is practical in robot-assisted surgery in the minimally invasive procedures aimed at assisting human practitioners and reducing human errors.
d. Aimed at improving patient safety and reducing human errors through AI diagnostic and health monitoring tools which help to regulate misdiagnosis of drugs by patients.
e. Medical technologies analyze patients' data and medical records, which are used to ensure the precision of patients' medication to ensure seamless medications.

4.2. Emerging/ evolving Healthcare Technologies and Health Robotics:

The emergence of Technology and Robotics in Medicine is used in investigations, diagnosis, therapeutic use, patient monitoring, research, patient information recording, medical operations assistance, and health facility administration.

4.2.1. Healthcare Technologies:

1. MRI - (Magnetic Resonance Imaging):

The MRI is a non-invasive imaging technique that is used to get a view of what is happening within the body without surgically opening the body. It uses magnetic fields and radio waves,

[118] *Ibid*

compared to other imaging devices[119]. It is safer because it does not make use of radioactive elements. The MRI is best used for brain, muscle, and joint imaging. It is also used to detect diseases early, especially for neurology - the brain, oncology - for cancer, and cardiology - for the heart.

But it is time-consuming, expensive, and is not comfortable for claustrophobic patients because of its enclosed space for scanning.[120] Due to its magnetic fields, it interferes with metallic implants like pacemakers, put in the heart to help the heart send electrical impulses around itself it also helps for continuous pumping of blood around the body.

2. CT - (Computer Tomography)

It is an imaging technique that uses X-rays and computer processing to produce 3D images of tissues and bones in cross-sectional areas. It is more precise compared to X-ray because it is capable of getting areas and positions of the tissues in the body, enabling a proper and thorough diagnosis.[121]

It is used for imaging of the head after trauma, stroke, or other neurological conditions to be able to detect if there is an aneurysm, hemorrhage (bleeding), increase in any content of the intracranial space (brain, cerebrospinal fluid, and blood)[122]. Also used for viewing the chest to detect lung disease, for the heart to detect cardiac disease or dysfunction, abdomen, and musculoskeletal

[119] National Institute of Biomedical Imaging and Bioengineering (NIBIB), Magnetic Resonance Imaging (MRI) <https://www.nibib.nih.gov/science-education/science-topics/magnetic-resonance-imaging-mri.> accessed 4 September 2025

[120] Ibid

[121] J T Bushberg, J A Seibert, E M Leidholdt and J M Boone, *The Essential Physics of Medical Imaging* (3rd edn, Lippincott Williams & Wilkins 2011).

[122] F A Mettler, M J Guiberteau and C A Kelsey, *Essentials of Nuclear Medicine and Molecular Imaging* (7th edn, Elsevier 2018).

(bones, joints, and muscles), used to check blood vessels for blockage of clot, bleeding, aneurysm, or accumulation of lipid or substances forming plaques which can result in hypertension[123]

3. Telemedicine Technology:

Telemedicine provides access to medical care for patients notwithstanding their location. This becomes possible when there is an acceptance of virtual consultation and remote monitoring of patients who are in different locations.[124]

Telemedicine allows patients to communicate with the robotic healthcare provider at their convenience, and these robotic healthcare providers are programmed to provide healthcare medical attention from time to time.

Telemedicine Technology is of two types;

a. Virtual Assistant (VA) Technology: The VA Technology can be used to provide immersive training for healthcare professionals and used for physical compilation of patients. This further translates to a medical relationship between the Patients and the Robotic healthcare provider.
b. Augmented Reality (AR): This basically provides for remote surgical and medical procedures and medical education to patients.

4. Robotic Assisted Surgery:

Robotic-assisted surgery is defined to be a minimally invasive procedure where a surgeon performs the surgery by controlling robotic arms that hold and manipulate surgical instruments.[125] This medical robotics assists in medical operations and medical procedures in hospitals. The evolution

[123] American Heart Association. (2022). Cardiac computed tomography (CT). <https://www.heart.org/en/health-topics/heart-attack/diagnosing-a-heart-attack/cardiac-computed-tomography-ct> accessed 29 August 2025

[124] Exploring the different kinds of telemedicine for healthcare management solutions <https://www.commercial.healthcare/telemedicine-types-of-telemedicine-technology> accessed 2 August 2025

[125] Advantages of Robotic-Assisted Surgery Jan, 2025. <https://www.washingtonhealth.com/news/2025/january/advantages-of-robotic-assisted-surgery/> accessed 2 August 2025

of technology in medicine and robotics now solely performs surgical operations and handles basic medical issues and concerns. Robotic surgical systems also utilize a high-definition camera that provides the surgeon with a clear view of the surgical site on monitors at the console where he or she sits. Robotic Assisted Surgery is used for gynecological surgery, prostate surgery, kidney and lung surgery.

Other Types of Robotic-Assisted Surgery:

a. Da Vinci Surgical Robots - This is a single-port system designed for minimally invasive surgery through a single incision.[126]
b. Mako - Smart Robotics - This is primarily used for knee and hip enlargement.

Other Healthcare Technologies and Robotics include:

a. Companion/ Physiotherapy Assistant Robots - These robots mainly help physiotherapy patients provide companionship and ease their stress.
b. Diagnostic and Imaging Technology - This Technology diagnoses patients for early illness detection.
c. Robotic prescription dispensing - These robots act alone to describe and dispense medications, drugs, and treatment to patients.
d. Transportation Robots - Transportation Robots assist patients in developing their steps and movement in hospitals

4.3 Addressing the Challenges of Healthcare Technologies and Health Robotics

The vast evolution of healthcare robotics and its implementation in different healthcare systems has been considered disruptive in the execution of medical practice. This means that these

[126] 'Robotic Surgery Types | Texoma Medical Center, Denison, Texas' <https://texomamedicalcenter.net/services/surgery/robotic-surgery/robotic-surgery-types/> accessed 29 August 2025

technologies and robotics innovations are built with the relevant capacities to bring about change in the medical sphere and cause a radical change in the Healthcare field.

Whereas, on the other hand, these are seen as tools to enhance medical practice and procedures in the medical sectors, medical robotics goes to another extent to enhance surgical operations and procedures, with these procedures being similar to so many other counterpart surgeries, it becomes easier for medical robotics and Technologies to engage in these repetitive medical surgical processes.[127]

However, the enhancement of these technologies and robotics in medical surgery and practice comes with its challenges. These challenges affect the patients, the clinic, the healthcare practitioners, and the Society. Importantly, challenges emanating from technologies when not properly curbed develop to become an overbearing challenge to society.

These challenges include:

4.3.1. Ethical Challenges

Ethical concerns become a great challenge, where the question of who becomes liable when a malfunction occurs in the use of technologies and robotics to discharge duties arises.

The incorporation and advancement of technologies and robotics into healthcare system delivery poses great ethical challenges, this challenges spans through the ethical concern of informed consent and patient decision-making autonomy. Patients and practitioners must ensure that these technologies and robotics are trusted and without any malfunctions. These ethical challenges further include, data privacy, bias, trust, accountability, and human oversight.

4.3.2. Technological Challenges

[127] Royal College of Surgeons of England, *'Robotics Assisted Surgery: A pathway to the future'*, (2023)

Healthcare technologies and Health robotics are prone to breakdown and malfunctions over time. Robotics breakdowns are almost unpredictable and this puts the safety of patients in jeopardy. The risk of having robotics and medical technology malfunction during the surgical operations or medical procedures becomes a huge challenge in the adoption of medical robotics for carrying out medical procedures in hospitals and clinics.

The high cost of healthcare technologies and robotics poses a challenge to acquiring these technologies and robotics. However, where medical robotics and Technologies are most times acquired by medical facilities or hospitals the cost for maintenance becomes high, and thus may be unable to be maintained. This further poses a challenge to the patients, where poorly maintained technologies may be deployed for carrying out medical procedures on patients.

4.3.3. Challenges of Data Protection and Privacy

Patients Safety faces numerous data protection and Privacy challenges, the use of Electronic Health Records (EHRs) in gathering patients' data may pose a challenge to the protection and privacy of these data, when robotics such as Artificial Intelligence and health technologies access these data. Robotic surgical systems, telemedicine platforms, and artificial intelligence (AI) powered diagnostic tools, depend on vast amounts of patient data to carry out medical procedures. The digitization of healthcare is a double-edged sword, while enabling precision and efficiency, it exposes sensitive patients' data to vulnerabilities, and at most times fails to use a set of data for the procedure it requires. In ***Chukwunweike Akosa Araka v Ecart internet service ltd & Eat ''N' Go ltd*** [128] The Court held that in discharge of the duty of care the respondent must ensure that he uses the data acquired from the Appellant for the specific purpose it was obtained. However, the court noted that under the Nigeria Data Protection Act 2023 (NDPA), the processing of personal data

[128] FHC/ABJ/CS/195/2024 (Federal High Court, Abuja, 18 February 2025)

must be limited to the purpose for which it was obtained and given,[129] as the applicants only gave consent to the processing of his personal data for food order. Therefore, the processing of patient's data must be duly protected for medical treatment alone, and none other. Any other use of patient's data by technologies or robotics for none treatment violates patients' privacy and data protection rights.

4.3.4. Professional Challenge

The innovation of technology and robotics in medicine requires skillful and knowledgeable professionals when using this medical and healthcare equipment, therefore robotics and Technologies require the use of a fully skilled workforce to be able to operate robots. This further entails that surgeons will undergo rigorous, expensive, and time-consuming training in any of the Assisted Surgeries to be performed. Poor knowledge or unskilled medical practitioners may become a challenge to the discharge or medical procedures, which requires that healthcare professionals need training to understand the use of technology and robotics to achieve the best outcome.[130] Nevertheless, studies across a variety of surgical procedures seem to demonstrate significant advantages of RAS, particularly when performed by experienced robotic surgeons, on appropriately selected patients and in advanced programs.[131] These benefits accrued from the use of Robot Assisted Surgery, become properly executable upon deployment of long learning programs for medical practitioners and surgeons before the use of these medical robotics for medical procedures.

---

[129] Nigeria Data Protection Act (NDPA) 2020 Act No 37, section 24(1)(b).

[130] Robots in medicine: <https://eithealth.eu/news-article/robots-in-medicine-the-robotics-start-ups-making-a-difference-in-healthcare/answerpack/able-human-motion/what-are-the-challenges-in-deploying-products-into-healthcare-settings-versus-other-industries> accessed 5 August 2025

[131] Ibid

However, where there is less exposure of trainee surgeons to in-depth procedural training, and poor skills and knowledge on the use of medical technologies and robots, it poses a professional challenge, where practitioners are expected to go through time-consuming training to become conversant in the use of these medical technologies and robotics.

4.4 Examination of Patient Safety

The Latin maxim, 'primum non nocere' which means, 'first, do no harm', is the first principle of healthcare, as embellished in the Hippocratic oath,

> 'I will use treatment to help the sick according to my ability and judgment, but never with a view to injury and wrongdoing.'[132]

Primum non nocere is one of the fundamental principles in the Hippocratic tradition of medical ethics that requires the physician to intentionally refrain from actions that would cause harm to their patients.[133] This simply entails that the safety of patients becomes a top priority when medical procedures and healthcare are provided by the medical Practitioners. Upon advancement of Healthcare Technologies and the evolution of robotics through the use of robots for medical procedures and assistive surgeries in hospitals and clinics, the safety of patients has become growingly complex, and a major concern.

Hence, patient care and safety require optimum coordination between healthcare providers and healthcare technologies. This further makes modern hospitals one of the most vulnerable and high-risk places, conversely exposed to making mistakes that may result in death and paralyze patients, when adequate care and safety measures are not employed in the use of technologies and robotics for the discharge of medical procedures.

---

[132] W H S Jones, Hippocrates, Volume I (Harvard University Press, Cambridge MA 1923) (Loeb Classical Library)
[133] A R Ferreres, 'Foundations and Principles of Surgical Ethics: Principles and Practice' (2019) 50.

In line with the 10 Patient Safety rights[134] It significantly provides for the rights of patients to safety, which includes the right to safe healthcare process and practice, Patients have the right to expect that health workers follow safe processes and practices and implement measures to identify, prevent, and manage risks and reduce preventable harm to patients.[135]

This entails that upon ensuring adequate safety of patients, medical practitioners must maintain safe medical procedures and risk preventive measures in medical operations and surgeries.

Furthermore, the Patient Safety Rights also include the Right to qualified and competent health workers.[136] This conversely questions the use of robotics for surgeries and medical procedures, however, *Articles 5 and 6*[137]*,* provides for the rights of patients to safe medical products for their use, and the right to safe and secure healthcare facilities. Hence, the use of medical robotics and healthcare technologies must be in line with the preservation rights of patient safety, and avoidance of risk and harm while carrying out medical procedures using Robotics and healthcare technologies.

4.4.1. Ensuring Transparency, Accountability, and Trust in Healthcare Technologies and Health Robotics.

Health care, however, is a complex, safety-critical domain in which technological failures can lead directly to patient harm.[138] Patients' harm caused by decisions made by technologies and robotics has become of great concern and generally what the current practice of accountability, transparency, and safety focuses to eradicate. This simply entails the lack of trust that has clouded patients' minds on grounds of accountability and transparency.

---

[134]World Health Organization, Patients Safety Right Charter, 2022
[135] Ibid, Article 2
[136] Ibid, Article 3
[137] World Health Organization, Patients Safety Right Charter, 2022
[138] D F Sittig, & H Singh, 'A new socio-technical model for studying health information technology in complex adaptive healthcare systems; Cognitive informatics for biomedicine' (Berlin, 2015) 59–80.

In the use of medical robotics and healthcare technologies, medical practitioners and hospitals are expected to be transparent with patients on the use of healthcare technologies to carry out medical procedures and surgeries. Most often, healthcare practitioners fail to uphold transparency and trust, in their doctor-patient relationship, which requires trust, accountability, and transparency, to carry out medical procedures on the patient. Considering the safety of the patients. The need for safety assurance proves accountability and transparency, wherein a document is signed ensuring that the safety of patients is paramount. The safety case mostly emanates from the technology developers who assure that the use of a healthcare technology or robotic system is generally safe for medical exercise, and used as an explicit demonstration that a particular technology and system is acceptably safe to operate on under specific circumstances.

To ensure trust, the principle of confidentiality must be adopted, where medical practitioners, healthcare technologies, hospitals, and clinical facilities must ensure that a standard of trust has been established between the medical practitioners and the patients. This trust is mostly relied on through the principle of confidentiality.

It is therefore the duty of physicians and other health professionals to respect the privacy of the patient and ensure that he/she does not communicate information revealed in the course of treatment to anyone else without the patient's consent.[139] In ***Hunter v Mann***[140], it was held that "the doctor is under a duty not to (voluntarily) disclose, without the consent of the patient information, which he, the doctor, has gained in his professional capacity."

4.4.2. Impact of HealthCare Technologies and Health Robotics on patients' safety and legal consequences upon breach.

[139] Doyal (56) 122

[140] [1974] QB 768, at 772; [1974] 2 All ER 414, at 417.

The safety of all Patients who require medical attention in hospitals and clinics is vital to the right of every person to treatment. Medical practitioners are saddled with the duties and obligations to ensure the safety of patients, especially while delivering medical treatment.

The advancement of Technologies and Robotics in the healthcare system is established and has evolved to ensure the improvement in patient safety through technological efforts. These advancements of healthcare technologies and robotics have a positive impact on patients' safety, through

a. Enhance precision
b. Ensure fast delivery and recovery of patients
c. Consistency and quality in healthcare delivery, and medical efficiency
d. Medical technology and robotics enhance accuracy in patient treatment
e. Reduces invasiveness, limiting the loss of blood during surgical procedures.
f. Health Technologies enhances and improves treatment and diagnosis.

However, it is important to note that healthcare technologies and the use of healthcare robotics introduce their attendant risks, challenges, and biases when used for medical procedures and assistive medical surgeries. These risks include,

a. High cost of technology and robotics for healthcare procedures.
b. Breakdown of healthcare technologies and the Technologies
c. Mechanical and system malfunctions of robotics leading to complications
d. The use of a fully skilled workforce in the operation of robotics, requires surgeons and medical Practitioners to undergo rigorous and time-consuming training to effectively use the RAS system.
e. Raises ethical concerns of who should be liable when any harm is occasioned to a patient.

f. Loss of patients' trust in healthcare professionals and the service they render.[141]

The legal consequences points at the liability accrued in line with the impacts of healthcare technologies, in ***Roger v Whitaker,***[142] the court held the Defendant hospital liable for breach of duty of care and proper information, the doctor failed to properly inform the Patients on the risks attached to the surgical operations that was carried out in the right eyes which affected the patient's left eye, it was held that it is the duty of care levied on the Medical Practitioners and Hospital to properly inform the Patients on the treatment method, the sickness and surgical system to be applied on the patient during the course of the medical procedure. Also, in the case of ***Sideway v. Bethlehem Royal Hospital Governors,***[143] The House of Lords failed to hold the medical Practitioners liable for breach of negligence, but was held liable for failure to properly inform the Patients of the risk attached to the medical procedure which relieved her neck pains but affected her spinal cords. Hence it is the duty of the Medical Practitioners to properly inform the Patients on the risk of the medical procedure and the challenges that go with the use of medical technologies and robotics.

Therefore, the attendant legal consequences of medical technology and robotics arise through liability of hospitals, clinics, medical practitioners, or robotics manufacturers, and the payment of damages.

4.4.3. Human Rights in Healthcare Technologies and Medical procedures by practitioners.

In an era marked by unprecedented technological advancement and evolution of the healthcare system ascertaining global advancement, and the introduction of healthcare technologies and robotics in its healthcare and medical system, the need for the check of human rights has become

[141] Robots In Healthcare | Benefits, Disadvantages and Future of Medical Robots. <https://www.delveinsight.com/blog/robotics-in-healthcare> accessed 25 August 2025
[142] [1992] 175 CLR 479 (HCA).
[143] [1985] 1 ALL ER 643 HL

very crucial to sustain this technological growth and secure the conditions of the social life of man.[144]

Every human shall be entitled to the right to health, and any medical malpractice, or breach of contract of medical and healthcare services,[145] or medical negligence[146], or medical malfunction and incompetence are clearly a breach of the medical and healthcare rights of the patients. The failure to render adequate medical care using healthcare technologies and Robotics may result in diminished health conditions of patients leading to more severe health conditions or death. The deployment of medical technologies and healthcare robotics including the use of Robotics Assisted Surgery (RAS), Artificial Intelligence (AI), Telemedicine, and other technological tools has transformed the delivery of healthcare and ensured a growing change in healthcare service and centers. Yet, these technological advancement in the healthcare system raises complex questions about the protection of the Fundamental Human Rights of patients. These rights of patients and men must first be considered while the administration of patient treatment and deployment of healthcare technologies and robotics. These rights include.

a. Right to Life:

Patients are afforded the right to Life. Access to medical treatment and healthcare systems grants access to life to all persons, as provided in the African Charter.[147] Every human being shall be entitled to respect for their life and the Integrity of their person[148]. The right to life of patients shall be fully considered when medical and healthcare services are being afforded to them, and the use of medical technologies and healthcare robotics in treatment and surgical procedures of patients,

---

[144] U. U. Chukwumaeze, *socio-economic and cultural rights - the Panacea to Threats on Prospect of successful democracy in Nigeria*, *In search of legal scholarship* (Essays in Honour of Earnest Ojukwu, Abia State University, Law Center) 34

[145] *Lafleur v Cornelis* (1979) 28 NBR (2d.) 569.

[146] *Felicia Osagiede Ojo v Dr. Gharoro & UBTH Management Board* (unreported) Suits No. B21/94.

[147] African Charter on Human and People's Right (Ratification as Enforcement Act) Chapter 10 LFN 1990, Article 4.

[148] The Constitution of the Federal Republic of Nigeria, 1999 (as amended) section 33

shall be offered with high consideration of the right to life of the patient. Therefore, any failure to render adequate healthcare while using these technologies and robotics amounts to a breach of the human right of patients to life and an infringement of the right to the highest attainable standard of health.[149]

b. Right to Dignity and Bodily Autonomy:

Despite the opportunities that healthcare technologies and robotics provide, there is a high human rights risk and digital technological risk that infringes the right to dignity of a human person caused by bodily harm. It becomes important to note that technological advancement and robotics in medical care of patients infringe the dignity of the human person, where the technologies develop a system error in carrying out their medical procedure.[150] Data Breach of Patients, bias, or harm occasioned during a surgical procedure, may lead to the infringement of the right of the patients to dignity.[151] In ***Okonkwo v Medical and Dental Practitioners Tribunal,***[152] The court held that the Patients had the right to the dignity of a person, to their body, and shall exercise the right to consent or refuse treatment, even when refusal may lead to death, this becomes applicable to technological and healthcare robotics devices used for the treatment of patients

c. Right to Privacy and Data Protection:

The Right to Privacy of a person is granted in Section 37 Constitution of the Federal Republic of Nigeria. However, with the advancement of healthcare technologies, the use of technological healthcare records to keep information of patients and refer properly to robotics for medical procedures, however, a tendency to infringe on the privacy of patients becomes possible.

---

[149] International Covenant on Economic, Social and Cultural Right (ICESCR), Article 12
[150] African Charter on the Human and People's Right (Ratification as Enforcement Act) Cap 10 Laws of the Federation of Nigeria 1990, Article 5
[151] Data Breaches: In the Healthcare Sector," Center for Internet Security. <www.cisecurity.org/blog/data-breaches-in-th> acessed 3 September 2020.
[152] (2001) 7 NWLR (pt. 711) 206

4.5. Critical Examination of Liability and Accountability in Healthcare Technologies and Robotics.

The vast integration and accommodation of robotics and technologies into healthcare practice and medical care is practically revolutionizing and evolving the patient care system and procedure in patient care.[153] While the advancement in medical and healthcare through technological and robotic evolution offers several significant benefits in relation to patients' healthcare, however, it becomes significantly important to address the legal challenges that are birthed by the use of healthcare technologies and robotics and the liability of these legal challenges occasioned by the healthcare technologies and robotics.

The question of liability arises where a surgical malfunction or failure occurs in the course of medical operations or procedures, by healthcare technologies and medical robotics, it becomes challenging to decipher who bears the liability.

4.5.2. key legal issues.

4.5.2.1. Informed Consent

Accordingly, it is a settled principle of law that doctors must not administer medical treatment to patients without the patient's valid consent and any competent person may deny medical practitioners consent to treatment no matter how beneficial or necessary the treatment may be.[154] However, the practice of medicine and the treatment of patients transcends from the core motive of the public good, competence, proficiency, or display of prowess in the treatment of diseases.[155] As a general rule, patients cannot be required to accept treatment that they do not want or fully

[153] F De Micco, S Grassi, T Tomassini, G Di Palma, G Ricchezze and E Scendoni *'Robotics and AI into healthcare from the perspective of European regulation: who is responsible for medical malpractice'* (2024)
[154] Uwakwe Abugu, *'Principles and Practice of Medical Law and Ethics'* (Page Link Nigeria Limited Abuja, 2018)
[155] Ibid

understand, no matter how painless, and beneficial the treatment may be, and no matter how direct the consequences of refusing treatment may be.[156] Furthermore, the issue of informed consent becomes a key ethical principle and legal rule, generally founded on the principle of respect for autonomy and patients' rights.

Hence, in a constantly evolving healthcare landscape appreciating technological and robotics advancement, it is trite that patients must be duly informed before medical procedures are carried out on them, requiring that patients be given adequate information about the nature of the treatment and the state of Medical Technology or robotics to be deployed for patients' treatment. Patients shall be adequately informed of the benefits, the risks, and the necessary alternatives to medical procedures. This fully embodies the respect for patients' autonomy and is protected under international instruments.[157] In the case of ***Sidaway v Board of Governors, Bethlehem Royal Hospital,***[158] Lord Scarman stated 'that the court should not allow medical opinions on what is best for the patient to override the patient's right to decide for himself whether he will submit to the treatment offered to him'. Further, in the case of ***P v West Berkshire Health Authority*** [159], the court per Lord Donaldson M. R. observed at the Court of Appeal that prima facie, all or almost all medical treatment and surgical treatment of an adult is unlawful, in the absence of consent, however beneficial the treatment might be. Also, in the case of ***Allan v New Mount Sinai Hospital***[160] His Lordship, Linden, J, held that 'without consent, either written or oral, no surgery may be performed, this is not a mere formality, but an individual right to have control over one's body, even when medical treatment is involved'. In line with the above it becomes important to

[156] London Sweet & Maxwell, '*Medical Negligence' (1996)* 253
[157] Universal Declaration on Bioethics and Human Right (2006), article 6.
[158] [1985] 1 ALL ER 643 HL
[159] [1989] 2 All ER 545
[160] [1980] 109 DLR, 634

note that in medical treatment, and where the use of healthcare technologies and robotics is deployed, it is the patient, not the doctor, who decides whether surgery will be performed using robotics or technologies, where, when, and by whom it will be done. Hence, doctors must transparently disclose all material risks, challenges, and benefits attached to a procedure, leaving the patients to consent to the medical procedure.

4.5.2.2. Legal Liability, on whom it lies.

The liability and accountability in healthcare technologies and medical robotics shall be borne by

1. Manufacturer of the Robots - Product liability
2. Doctors, Surgeons, Practitioners Liability - Professional Negligence
3. Hospital and other Healthcare systems - Vicarious liability

1. Manufacturer of Robots - Product Liability

The European Parliament in 2017, proposed for a recognition of a joint human-robot, to effectively carry out technological action, and serve as an electronic person with the possibility of robots becoming liable and adequately compensating for any damage caused.[161]

Where the personality of robots is to be recognized for actions taken in the course of medical procedure and healthcare delivery, medical technologies and robots could be classified to become liable on three models

a. The perpetuation of another liability model:[162] This is where programmers of the medical robotics and Technologies are held liable for medical negligence and technological default faced by the

[161] European Economic and Social Committee (EESC), Opinion of the European Economic and Social Committee on 'Artificial intelligence; The consequences of artificial intelligence on the (digital) single market, production, consumption, employment and society' <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016IE5369> accessed 15 April 2024).

[162] F De Micco, S Grassi, T Tomassini, G Di Palma, G Ricchezze and E Scendoni *'Robotics and AI into healthcare from the perspective of European regulation: who is responsible for medical malpractice'* (2024)

b. The natural probable consequence liability model:[163] In the Natural probable model, the liability may be vested on the programmer to the user, in instances where medical robots or technologies commit an injury or fail in a medical procedure, the liability shall be on the users of the medical robots for medical procedures.

c. Direct liability model: This is prevalent to detect the action of the robot in medical malfunctions, and identify its connection towards causing harmful actions. The action may be performed through the movement of the robotic arm, or an omission in performing a surgical act by the robot or the controller of the robot.[164]

Recognizing Robots and healthcare technologies as Electronic personalities in healthcare becomes partly visible and legally actionable in legal practice, as robots and technologies even though ascribed to be liable as human medical practitioners or hospitals, may be unable to pay any form of compensation when found liable, and the robot-agent may not have deterrent powers towards any violation of law or medical negligence.[165] Therefore, while it may be possible to hold healthcare technologies and robotics liable for medical misconduct in medical procedures and surgeries, it becomes practically impossible to hold these technologies liable for any medical and healthcare breach caused to patients while delivering healthcare and medical services.

In several jurisdictions, like the European Parliament, Medical misconduct, negligence, injuries, or harm caused by robotics and healthcare technologies while carrying out medical procedures, hold Healthcare Workers (HW), Medical Practitioners, Doctors, Robotics Producers, and Healthcare organizations strictly liable.

---

[163] Ibid

[164] Hallevy Gabriel, The Criminal Liability of Artificial Intelligence Entities. (2010). Available at: <https://ssrn.com/abstract=1564096> accessed 15 April 2024

[165] P Lin , K Abney, & BA Berkey, *Rights and ethics In Robot ethics: The ethical and social implications of robotics.* (New York,MIT Press 2012) 299–300.

However, regulatory bodies and manufacturing companies have specified duties towards ensuring that only safe medical technologies and healthcare robotics, and devices are placed in the market,[166] and the liability rests on the manufacturer of Healthcare Technologies and Robotics when they fail to properly inform purchasing hospitals and Healthcare centers on the effectiveness and safe use of these technologies in line with the safety of patients - a product liability on the producers of these technologies.

In Europe, Healthcare Technologies and Robotics are under strict rules of the European States to ensure that all Technologies and Robotics are produced for the safety of patients and hospitals. Therefore Liability lies with producers of the healthcare technologies and robotics when the manufacturer of these products fails to effectively communicate the defect to the hospital or users, the product instructions, manufacturing defects, lack of data management, and product post-market monitoring obligations.[167] For example, a producer can be held liable under product liability laws in case of a failure to provide adequate warnings, which could characterize a defect in Product Liability Directives.[168]

2. Doctors, Practitioners, and Surgeons Liability - Medical Negligence.

Under current legal conditions, it becomes impossible to hold robots liable for acts or omissions that cause damages to patients' safety, ruling out the possibility of granting technologies and robotics an electronic personality.[169]

---

[166] The Medicare Europe, 'The liability challenges in AI medical technologies' (2022) 2

[167] Council Directives, 'The European States Product Liability Directive' *Official Journal of European Communities* [1985] (210) (29) 374.

[168] Medicare Europe, *'The liability challenges in AI medical technologies'* (August 2022) 3

[169] Jan Reyes, A. C. Reyes, & J. A. Vera Calderón, 'Medical Liability arising from the use of Surgical Robotics' *Journals of population therapeutics and Clinical Pharmacology,* [2023] (30)(12) (2023) 528-539

Globally, approximately 20,000 medical malpractice suits are filed, with over 250,000 medical errors and negligence fatalities recorded annually[170] The advancement of technologies and robotics in healthcare has also fueled these errors jeopardizing the safety of patients when not properly handled by practitioners and when poor duty of care is exercised.

However, Medical negligence has remained the primary legal basis for liability in healthcare occasioned by the medical practitioner. It hence, the duty of a medical practitioner, and health workers to exercise due duty of care when handling medical technologies and robotics when delivering medical procedures to patients.

In ***Okonkwo v Medical and Dental Practitioners Disciplinary Tribunal***[171] The Supreme Court emphasized the duty of the medical professionals to act with reasonable skill and care while delivering medical treatment and procedures to patients, and this applies to robotics and healthcare technologies, where any misuse of surgical robots or healthcare technologies attaches liability on the medical practitioners who used the robotics for surgical procedures.

In examining the principles of malpractice, it is a fundamental principle that the harm does not necessarily equate the malpractice, and that medical Practitioners are not expected to be flawless.[172]

When Healthcare practitioners directly control and use robotics and Technologies during healthcare treatment and as an assistant during surgery or medical procedures, liability shall rest on the Healthcare practitioners as medical negligence or malpractice.[173] It becomes pertinent for

---

[170] Medical Malpractice Statistics, THORSNES BARTOLOTTA MCGUIRE LLP (May 20, 2024), <https://www.tbmlawyers.com/blog/statistics-medical-malpractice.> accessed 27 August 2025

[171] [1999] 9 NWLR (Pt. 617) 1

[172] A. Michael Froomkin, 'When AIs Outperform Doctors: Confronting the Challenges of a Tort-Induced Over-Reliance on Machine Learning', (2019) Arizona Law Review (61) 33

[173] Alice Guerra, 'Liability for Robots I: Legal Challenges', *Journal of Institutional Economics* [2022] (18) 331, 334.

the patient's asserting liability on the Doctor to prove four elements to prevail in their liability claim of negligence or malpractice, these include.

a. The medical Practitioners or doctors owed the patient a legal duty of care.
b. The doctor breached that duty
c. The doctor's breach was the cause of the patient's injury or damages
d. the patient suffered resulting injury or damage.[174]

In medical misuse or failure of medical technologies and robotics, it becomes important to note that human involvement is generally important for proper liability, hence, Doctors operating on these patients become clearly liable for any breach of patient safety while using these technologies and robotics for healthcare procedures and surgeries.[175] Furthermore, Medical Practitioners may also be held liable for harm derived from practitioners' failure to critically evaluate the robotic or technological recommendations, to exercise an adequate standard of care, and Doctors' poor decision to implement an improper robotics, AI, or technological healthcare system in medical procedure and practice.

3. Hospital and other Healthcare systems - Vicarious liability

Vicarious liability is the resultant effect of actions taken by workers or practitioners on behalf of the hospital. A hospital, clinic or healthcare center maybe vicariously liable on actions taken by Medical Doctors, while operating the robotics or technologies, the hospital stands in the gap of liability as an employer to the Doctor who only has employment service to deliver medical service

[174] J. L. Mezrich, Is Artificial Intelligence (AI) a Pipe Dream? Why Legal Issues Present Significant Hurdles to AI Autonomy, and Clinical Decision Support Software, Guidance for Industry and Food and Drug Administration (FDA) Staff, *AM Journal of Roentgenology.* [2022] (1) (9) 152

[175] Jason Chung & Amanda Zink, Hey Watson, 'Can I Sue You for Malpractice? Examining the Liability of Artificial Intelligence in Medicine', *Asia Pac Journal on Health, Law and Ethics* [2018] (51) (51)

for the hospital, therefore, any result, act or omission, shall become an accrued liability on the hospital, in line with the vicarious liability principles.

Although, the medical practitioners and surgeons carry out the medical procedures and operations, the hospital or medical facility has the obligation to ensure that the correct technological and robotic infrastructure, proper instruments, and adequate training are in place to guarantee that robotic surgery and the use of healthcare technologies for medical procedures are safe and effective for patient safety.[176]

Therefore, any error that may arise during surgery and medical procedures resulting from a system malfunction, robotic system maintenance, inadequate training, or, the hospital may be held liable. Hospitals and healthcare facilities must ensure that robotic system maintenance is in excellent condition, and hospitals shall be held accountable when using means of robotics and technological systems to carry out surgical procedures in the hospitals.[177] The hospital is also held liable when a robotic system fails due to inadequate maintenance, or inability to replace a malfunctioning healthcare technology or robots, or a component of it. The hospital is also held liable when it fails to ensure that equipment and technologies are in proper order, and when the hospital fails to ensure that the Medical Practitioners acquire improved skills in line with technological advancement. The hospital is expected to be fully aware of the probable failure, drawbacks, and hazards of the technology and when to avoid it.[178]

[176] M.B. Bagwan,Tanya Joshi, Rahul Atul Goswami, R. S. Patil,Vandana Sharma, & L. K. Wani, 'Antidiabetic Potential of Emodin in Streptozotocin-Induced Type-2 Diabetic'; *Journal of Neonatal Surgery*. [2025] (14) (2), 70-77.

[177] Ibid

[178] S Kutana, D. P. Bitner, P. Addison, P. J. Chung, M. A. Talamini, F. Filicori, *Objective assessment of robotic surgical skills: Review of literature and future directions.* (2022), 36, p. 3698–3707.

Therefore, Healthcare organizations (HCO), Hospitals, Medical Facilities and Clinics become liable for failing to provide adequate training to Doctors, Practitioners and healthcare providers, ensuring that the required updates, supports and maintenance are adequately provided towards

4.5.2.3. Lack of Legislation.

Nigeria and most jurisdictions lack adequate legislation to address prevalent medical issues. There is no comprehensive legislation addressing advancement of technology and robotics in medical practice, and patents safety. Existing legal frameworks were developed and enacted for traditional medical treatment, and the advancement of technology now calls for a need to address major technological issues through definitive legislative enactments addressing use of healthcare technologies and health robotics, robotics errors, misuse, and misfunction of healthcare technologies, legal liability and patients' safety. Reliance on existing legislations such as the National Health Act, the Medical and Dental Practitioners Act, etc., none specifically provides for the regulations of healthcare technologies and health robotics in line with patient's safety.

4.5.3. Recommendations for National Legal Frameworks for regulations of Healthcare Technologies and Robotics:

The evolution and advancement of technologies and robotics in medical practice call for a recommendation for a National Legal framework, which shall regulate all healthcare technologies and robotics and decide their health impact, economic value, social and ethical objectives, in ensuring patient safety. A society without law may be seen to be lawless and in an anarchical state. It hence becomes important that policy makers in Nigeria, consider the vast evolution of technology in medical practice, and in maintaining patient safety, they shall enact legislation that will regulate the safety of patients and the use of healthcare technologies and health robotics.

This recommendation goes towards the establishment of a comprehensive legal framework, such as the Healthcare Technologies and Health Robotics Regulations Act, which shall stipulate the scope and registration of healthcare technologies and robotics, their applicability, standard of safety, and defined liability. The establishment and creation of the National Agency for Healthcare Technologies and Robotics becomes increasingly important, this agency just like the National Agency for Food and Drug Administration Control (NAFDAC), shall regulate healthcare technologies and health robotics from the Manufacturing or producing company, ensuring that the technologies produced and sent out to the market are in good condition securing patient Safety. This Healthcare Technology and Robotics agency shall ensure the registration and approval of all healthcare technologies and robotics being sold in the market, and shall monitor the safety and efficiency of these technologies. Establishment of a liability and compensation framework becomes important in giving a clear and definite provision of who bears the liability upon infringement of patients' safety in healthcare technologies and robotics.

Finally, the establishment of the Healthcare Technologies and Health Robotics Commission becomes very vital in ensuring that upon breach of patients' safety, the commission shall have the authority to investigate and ensure that the safety of patients is of utmost importance and shall regulate the actions of healthcare technologies manufacturers, hospitals, and medical practitioners.

CHAPTER FIVE

CONCLUSION.

5.1 Summary of findings.

This study critically analyses the advancement of healthcare Technologies and health robotics in medical practice, and a critical examination of the intersection of patient safety arising from the use of healthcare technologies and robotics, and the legal consequences birthed from the use of healthcare technologies and health robotics.

The key findings of the study are;

1. The advancement of technology and the evolution of robotics into medical practice, ushering these advancement in delivery of fast and reliable medical procedures, through significant enhancement of medical diagnosis, robotics assisted surgical procedures, precision in treatment delivery, healthcare robotic and healthcare technological enhancement, telemedicine, Artificial Intelligence driven diagnosis, and electronic health record, in medical practice, which have enhanced medical efficiency, fast and assistive delivery of healthcare in medical practice.
2. Patients' safety concerns in the use of healthcare technologies and health robotics become susceptible due to high medical risk which may arise therefrom, such as, system malfunction, software errors, poor medical training of medical professionals and technological inefficiency, and a lack of proper and clear framework, addressing the challenges of healthcare technologies and robotics in medical practice
3. The advancement of healthcare through rapid deployment of surgical robotics and technologies has transcended the existing legal paradigm outpacing the current legal framework, leading to uncertainty in the responsibility and accountability.

4. Determination of legal liability upon the breach of patients' safety, which may arise through medical errors, or system malfunction, or poor safety during surgical procedures, and whether responsibility rests on the Hospital or medical facility or clinic, or the Manufacturer of the Healthcare Technologies and Robotics, or the Medical Practitioners or Doctors.
5. The issue of Informed Consent and poor information and knowledge of the risks attached to the use of technologies and robotics. Patients are most often not properly informed, and consent sought for the use of technological and robotics devices in medical procedures. This finding further deliberated and examined the need for informed consent of the patient and adequate information ensuring that the safety of patients is held in esteem.
6. The impact of Human Rights in healthcare technologies and robotics, such as the right to health and patients' safety as guaranteed by national and international legislations.
7. Examined the legal consequences arising from the breach of human Rights, and patients' safety by using healthcare technologies and health robotics in the delivery of healthcare services.
8. Nigeria lacks comprehensive legislation regulating the use of healthcare robotics and technologies in medical practice, and there are poor provisions of Nigeria's Acts expressly specifying the right to the safety of persons in relation to the use of healthcare technologies and robotics for medical procedures.
9. Public awareness and education initiatives targeting patient safety and prevention of negligence medical attention using Robotics and technologies by healthcare facilities are presently insufficient.

10. Enactment of Legislation and regulations that will adequately regulate the overall use of medical technologies and healthcare robotics in medical practice, ensuring efficient delivery and use by product manufacturers, hospitals, and medical practitioners.

These findings highlight novel areas for improvement in Nigeria's healthcare delivery system legislation and enforcement, emphasizing the need for the enactment of legislation for maintaining the safety of patients. Uncovering the public awareness gap, it becomes important to highlight the need for educating healthcare practitioners, Doctors, members of the public and policy maker on professional, ethical, and legal stakes in ensuring an overall safety of humans, and fostering informed debates and enacting sound regulatory framework towards enhancing the use of medical technologies and robotics and examining the maintenance of the safety of patients.

5.2 Recommendations

In line with the findings of this research work, there is an urgent need for the enactment of legal frameworks both national and international legal frameworks to protect patient safety through the use of healthcare technologies and healthcare robotics, and to specifically address the ethical, legal, and social challenges posed by healthcare technologies and healthcare robotics in medical practice. The following recommendations carefully outline practical steps that can be adopted by policymakers, legal bodies, government organizations, and international organizations towards ensuring adequate safety application and proper use of these healthcare technologies and health robotics in medical practice.

1. **Enactment of Legislation regulating healthcare technologies and robotics:**

Considering the rapidly evolving healthcare technologies and robotics in medical practice, there is a need for the enactment of specific legislation that regulates healthcare technologies and health robotics in medical practice. This legislation can be the Healthcare Technologies and Robotics Regulation Act, which will aim towards addressing issues of liability, patient consent, safety

standards, use of technologies and robotics in healthcare, accountability, and adequate information on risks and benefits of healthcare technologies and robotics to patients.

2. **Establishment of Regulatory Agencies:**

Considering the recommendations of efforts championed towards eradicating technological errors, glitches or misuse while carrying out medical procedures or operations, it becomes important to establish regulatory agencies, commissions, or regulatory authorities, whose sole function is to go regulated manufacturing companies, and examine hospital on the use of these technologies and further to instill the best standard of healthcare technologies and robotics regulations aimed at ensuring the safety of patients. These regulatory agencies shall be established under the Federal Ministry of Health, and located at every State Ministry of Health in all states, headed by the commissioners and Minister of Healthcare Regulations.

3. **Advocating for the Right to Informed Consent:**

We recommend the right to informed consent which is based on the right to proper information on the risks, challenges, and benefits of every medical procedure and the use of every medical technological and robotic device for medical procedures. To facilitate fair and general patient-centered safeguards, it becomes important to adequately inform and obtain their consent of patients before every medical procedure. Advocating for the right to informed consent of patients undergoing robotics-assisted surgery procedures or the use of any other medical technological tools for medical procedures - there is a need for proper explanation of the risks, challenges, and benefits of the medical procedure.

4. **Enhanced Liability Framework:**

The provisions of the law should expressly and clearly define liability. In situations where technological error and misfunction causes injury and death to patients, it raises a different

question of liability. An enhanced liability framework will provide expressly for the distribution of liability amongst the medical Practitioners or doctors, the hospital or healthcare facilities, and the manufacturers or Producers of the healthcare technologies and robotics.

5. **Ethical and Human Rights Compliance:**

Steps towards adoption of ethical guidelines and directives towards ensuring that just as human medical practitioners performing surgical procedures and rendering treatment to patients, that healthcare technologies and health robotics uphold the right to health, patients' dignity, privacy, care, safety and overall human rights of persons, also ascribed to patients are strictly adhered to as enshrined in national and international human Right instruments.

6. **Public Education, Continuous Training and Certification:**

A comprehensive public training, education campaign should be launched to raise awareness about patient safety and the use of healthcare technologies and health robotics in medical practice. This public awareness should importantly be channeled first, in hospitals and clinics, sensitizing practitioners and healthcare workers on the use of healthcare technologies and robotics, and the need to maintain patient safety in healthcare delivery. This should also be extended to individuals to adequately understand the risks and benefits attached to all medical procedures, and why consent is exclusively the personal reserve of patients. This will enable public individuals and healthcare practitioners to understand the potential risks and benefits of interacting with these technologies and encourage informed decision-making. Governments, educational institutions, and NGOs should collaborate to ensure that public discourse includes discussions about patient safety and the examination of healthcare technologies and robotics.

Continuous training and certification programs to professionally train healthcare practitioners and healthcare workers to properly manage and effectively operate healthcare Technologies and

healthcare robotics. The need for the recommendation of continuous training and certification is on the basis that most medical Practitioners may not be technology literate and as such may be unaware of how to properly and effectively operate a healthcare robotics to effectively carry out a medical procedure. Continuous training and certification grant these medical practitioners the requisite knowledge required to operate these healthcare technologies and provide adequate safety measures to patients.

5.3 Contributions to Knowledge

This study significantly contributes to the body of knowledge on the advancement of healthcare technologies and health robotics in medical practice, and it further contributes to the knowledge of examining patient safety and the resulting legal consequences upon breach of patient safety, using healthcare technologies and health robotics. By conducting a critical analysis this research funding contributes to the body of knowledge by examining the major challenges and the risks attached with the use of healthcare technologies and health robotics in medical, considering its rapid advancement in society, hence the need for patient safety.

Through this study, several contributions to knowledge are made, not just within the legal context of the scope of patient safety challenges on medical technologies and robotics, but also offering reliable recommendations that address ethical and legal implications, liability, and consequences of healthcare technologies and health robotics in medical practice.

The key contributions are,

1. **Advances in Understanding of Patients' Right to Safety.**

This study advances an understanding of the right of patients to safety when admitted to receive healthcare in hospitals or clinics. Amongst other rights accrued to humans, medical patients are afforded the right to safety when receiving treatments and during medical procedures in the hospital. Therefore, any treatment afforded to patients must be given in line with all safety

measures as this research finding contributes to the rights of patients to safety is a human right. Furthermore, the research further contributed towards ensuring the recognition of patients right to safety as core human Right which derives its bearing from right to life, right to health, and the right to dignity of human person, emphasizing their importance towards protecting the overall human rights of patients, and ensuring that adequate healthcare service is granted to patients with all due diligence and care from medical practitioners during medical procedures.

2. **Highlights the legal and ethical gap within the existing legal framework**

This research identifies critical gaps in the current legal framework and carefully highlights how existing legal frameworks failed to enact adequate guidelines for the use of specific technological advancements in healthcare legislation, and failed to accommodate the use of healthcare robotics in medical practice properly safeguarding patients' safety. This study focuses on the inadequacies and challenges of existing ethical standards, emphasizing the need for a comprehensive framework that addresses issues of patient safety in line with Healthcare Technologies and Robotics.

3. **Establishes the link between Patient Safety, Human Rights, and Technological advancement.**

This research work established the link between patient safety and narrowed it to human Rights, and further relating how technological advancement may affect these Human Rights. It becomes important to note that this research work made a contribution towards ensuring the establishment of patient safety as a human right and which must be strictly adhered to by medical Practitioners during medical procedures. In an evolving social landscape where technological advancement is at its rapid state, this research further contributes to the knowledge that healthcare technologies and health robotics in medical practice should be used for the right of patient safety.

4. **Bridging the Gap between Law, Medicine, and Ethical Consideration.**

This research work bridges the gap between legal theory, medicine, and ethical considerations and calmly offers an interdisciplinary approach to the challenges posed by healthcare technologies and the risks attached to medical robotics in carrying out medical procedures and surgical operations. This research further integrates and establishes medical considerations occasioned through technological advancement and aligning with its legal consequences and ethical considerations. By focusing on ethical challenges surrounding consent, liability, privacy, rights, duties, and obligations, the study enriches medical discussions and calls for a new ethical framework that addresses the challenges of medical and healthcare robotics in technologies and robotics.

5. **Laying Foundation for the Future of Healthcare Technologies and Robotics Legislation and Patient Safety.**

This research work lays a critical foundation for the future of healthcare by fully adopting technological advancement and the use of robotics in the healthcare system. This research significantly contributes to enhancing scholarships, through future legislative enactments and establishment of regulations and guidelines in Nigeria and around the globe, enacting laws that regulate the use of technologies and robotics in medical practice, and importantly ensuring patient safety and stating provision for legal consequences and liability.

5.4 Areas for Further Studies

The rapid evolution and advancement of technology and robotics in the healthcare system and healthcare delivery, raise the call for an urgent need for further research into the safety measures afforded to patients, and a further need to research on prevailing implications and challenges that span through the use of medical technologies and healthcare robotics. However, this study has laid appropriate groundwork for understanding the medical, legal, ethical, and societal challenges posed by healthcare technologies and healthcare robotics.

However, there are several areas for further exploration. The following outlines key areas for future studies.

1. **Educational and Enlightenment Programs for Medical Technologies and Robotics:**

Research on the implementation and introduction of educational programs aimed at enlightening healthcare practitioners, Doctors, and health workers on the safe use of healthcare robotics and its surrounding ethical and legal implications will be important. This aims at raising potential awareness generally, on the side of the medical Practitioners, patients, healthcare facilities, and healthcare robotics and technologies manufacturers. The program also aims to raise legal awareness amongst stakeholders, policy makers, and government parastatals. The impact of the introduction of these educational and Enlightenment programs for medical Technologies and Robotics is a potential area of research.

2. **Interdisciplinary approach to Medical Technologies and Robotics towards Patient Safety:**

Collaborative research efforts aimed towards enhancing the safety of patients through other interdisciplinary approaches, which include law, health science, medicine, technology science, and general science, which explores how different disciplines take steps towards addressing legal, ethical, and social concerns of healthcare technology and health robotics. Interdisciplinary research tends to bring together different efforts accumulated from other practice areas, which aim at enhancing the use of technology, robotics, and other evolving areas in medical practice practically to ensure patient safety.

3. **Role of Technological Companies in shaping Patient Safety through Healthcare Technologies.**

The role of technology manufacturing companies and robotics companies raises a critical question regarding the accountability and governance of technologies and robotics that are manufactured for healthcare purposes, medical assistant purposes, and medical operations.

A critical examination of companies' manufacturing technologies, ensures that these technologies and robotics go through valuable tests and scrutiny before they are made available in the market and hospitals for medical procedures. Further research on the legal implications of these manufacturing companies and the legal steps undertaken by these companies to ensure public safety and patient safety while using these technologies for medical procedures is vital.

4. **Bridging the Gap between Healthcare Technologies & Robotics and Liability:**

Further research on bridging the existing gap between the advancement of healthcare technologies and the evolution of robotics in medical practice and painstakingly attributing liability becomes a very vital and potential area of research. Comprehensive and concise research can be further conducted on the necessary areas in healthcare technologies and robotics, and on establishing liability.

5. **Risks and Challenges of Healthcare Technologies and Healthcare Robotics in the Medical Practice:**

Comprehensive legal research can further be made on the different risks and challenges posed by healthcare technologies and robotics. It becomes important to note that further findings can be made to combat pressing health challenges and risks occasioned by medical technologies and healthcare robotics. Further enlightenment and findings can be made on examination of the attendant risks and challenges that may arise from the malfunction or misuse of healthcare technologies and robotics in the medical treatment of patients.

6. **Ethical Considerations in Medical Robotics Caregiving:**

There is a poor expansion and exposure of ethical considerations in medical robotics in caregiving. Further research is warranted to explore the ethical considerations of the advancement of healthcare technologies and the introduction of robotics in medical practice. Future research should further explore moral, legal, social, and ethical considerations associated with healthcare technologies and robotics in medical practice. These ethical implications and concerns span through consent, patients' privacy, liability, duties, and medical care.

7. **Other areas of further research include;**
    a. Comparative analysis of the international legal framework
    b. Comparative analysis of patient safety as a human right.
    c. Intersection of technology and artificial intelligence (AI) in ensuring the safety of patients in healthcare delivery
    d. Impact of healthcare legislation in considering liability occasioned through healthcare errors, negligence, malpractice, or malfunction in medical procedure.
    e. Consequences of data breach and manipulation of healthcare Technologies and health robotics in medical practice.

5.5 Conclusion

The general impact of technological advancement and the acceptability of robotics and artificial intelligence is on a rapidly evolving stage; every step and practice of the world has adopted in different means the use of technological tools to enhance human actions. There is a shift in human advancement, welcoming the use of robotics and clear adoption of artificial intelligence in every stage of human endeavor, which is currently on the rise.

The advancement of technology and the evolving state of healthcare robotics are on a rapid stage, while these technological advancements are with its benefits, they go in line with its attendant

consequences. Along with this, there is a lack of proper legislation to regulate the use of technologies and robotics in medical practice, and this lacuna has purely not given a definite concept or proper definition of Patient Safety and what it fully entails in the use of healthcare technologies and robotics. Over the years, the traditional medical system to treat patients and perform surgical procedures has been the sole duty of the medical practitioners, and health workers, and the liability that may arise in the course of medical negligence or malpractice during surgical procedures and treatment is a strict liability on the Medical Practitioners. The evolution of medical technologies into healthcare practice grants a major shift in determining the liability - on whom it lies, when errors, malpractice, or fatal injuries occur. Determining elements now state when liability lies on healthcare robotics manufacturers, healthcare workers or medical practitioners, or the hospital or medical facility. When Medical Practitioners directly control the robotics without exercising an adequate measure of care leading to medical negligence, victim patients typically assert medical negligence claims holding the medical practitioner liable for medical negligence. However, where there is a record of manufacturing defects, design defects, and failure to properly warn the buyers or hospital purchasers of necessary guidelines and loopholes detected in healthcare technologies and robotics, Patients whose safety has been jeopardized can hold the manufacturer liable, and available legal consequences can follow. Also, where the medical facility or hospital fails to follow stated guidelines and appropriate measures to ensure care and delivery of medical technologies, and when the Technologies and Robotics are in a bad medical state, any error or malfunction that occurs, the hospital or clinic shall be held vicariously liable.

Furthermore, the advancement of technologies and robotics in healthcare systems requires proper education of practitioners. This entails that medical practitioners are expected to undergo medical

training and skillful growth on how to adequately regulate healthcare technologies and robotics. It becomes important to note that failure to train medical practitioners and workers poses a risk to the safety and lives of patients. It behooves the medical practitioner to ensure that there is an adequate enforcement of human rights, which includes the rights of patients to life, the right to adequate health, the right to the dignity of a human person, and the right to information. Where these rights are not adequately enforced the safety of patients is infringed.

However, consent to treatment must be duly granted by the patients. Where medical technologies and robotics are to be used for treatment, it becomes important, to adequately inform the Patients of the attendant risks and the benefits that are accrued through the use of healthcare technologies and a definite robotics for such medical procedures. Hence, failure to adequately inform the Patients of the attendant risk and benefit, and the type of technology or robotics to be used for such procedure endangers the safety of patients and goes with its attendant legal consequences. Furthermore, investing in education and awareness on the safety measures for the use of medical technologies and healthcare robotics, and awareness on the education of its legal consequences to teach healthcare practitioners, public individuals, and policy makers on the adequate use of healthcare technologies and robotics, and the safety rights accrued to patients and a possible legal framework to be enacted by policy maker. It becomes important for the government to work closely with international partners and law enforcement agencies to ensure that patient safety is of utmost importance and adequate safeguards in medical procedures and adequate legal consequences are meted out on medical practitioners, hospitals, or manufacturers, when care is not taken while using healthcare technologies and robotics for medical treatment and surgical operations. By implementing a more comprehensive approach that includes protection, detection, prevention, and punishment, of patient's safety in line with the use of medical technologies and

robotics for medical practice, Nigeria can better protect its citizens and medical Patients from fatal injuries, healthcare negligence, technical mismanagement, technological errors, medical accident, and death occasioned from adoption of healthcare technologies and healthcare robotics in medical practice.

BIBLIOGRAPHY

A. TEXTBOOKS

Alf Christian Ross, *law and justice* (Stevens & Sons, London 1958)

Bushberg J T, Boone J M, & Others, *The Essential Physics of Medical Imaging* (3rd edn, Lippincott Williams & Wilkins 2011).

Curzon L B, *Jurisprudence* (2nd edn; Cavendish Publishing Ltd, London 1995)

Ferreres A R, *Foundations and Principles of Surgical Ethics: Principles and Practice* (2019)

Finnis J, *Natural law and Natural Rights* (2nd Edn, Oxford University Press, 2011).

Harts H L A, *The Concept of Law* (Oxford University Press, 1994).

Jeremy Bentham, *An Introduction to the principles of morals and legislation* (Batoche Books 2000, 1789)

Johnson M J, Bui K and Rahimi N, *Medical and Assistive Robotics in Global Health' Handbook of Global Health* (Springer Cham, 2021)

Jones W H S, *Hippocrates Volume I* (Harvard University Press, Cambridge MA 1923) (Loeb Classical Library)

Lewis A, and Carol D T, *Medical Law, Ethics, and Bioethics, for health professions* (6th edn, Philadelphia: F. A Davis company, 2007)

Lin P, Abney K, & Berkey B A, *Rights and ethics In Robot ethics: The ethical and social implications of robotics.* (New York, MIT Press 2012)

London Sweet & Maxwell, *Medical Negligence (1996)* 253

Mettler F A, Guiberteau M J, and Kelsey C A, *Essentials of Nuclear Medicine and Molecular Imaging* (7th edn, Elsevier 2018).

Somit A, and Peterson S A, *The Dynamic of evolution* (eds. Cornell University Press, 1992) Marcia Uwakwe Abugu, *Principles and Practice of Medical Law and Ethics* (Page Link Nigeria Limited

Abuja, 2018)

Yinka Olomojobi, *Medical and health law* (Lagos; Princeston and Associate Publishing Co, 2019)

B. JOURNALS ARTICLES

Akinyemi O. O, Owopetu O. F and Others, 'National Health Insurance Scheme: Perception and Participation of Federal Civil Servants in Ibadan' (2021) (19)(1)

Alice Guerra,'Liability for Robots I: Legal Challenges', *Journal of Institutional Economics* [2022] (18)

Apar Gupta & G. R. Vaisshalli, 'Robotics in Healthcare' *Asian Journal of Applied Science and Technology* [2022] (6) (2)

Bagwan MB, Tanya, & Others,'Antidiabetic Potential of Emodin in Streptozotocin-Induced Type-2 Diabetic'; *Journal of Neonatal Surgery*. [2025] (14) (2)

Ballantyne, G.H, & Moll F, 'The da Vinci telerobotic surgical system: the virtual operative field and telepresence surgery. Surgical Clinics of North America' *Surgical Clinics North America,* [2003] (83)

Chinyere M, and Kevin E M, 'Evaluation of National Health Insurance Scheme: Benefits and challenges in Eastern Nigerian', *South America journal of public health* [2014] (2)(4)

Council Directives, 'The European States Product Liability Directive' *Official Journal of European Communities* [1985] (210) (29)

Council Directives, 'The European States Product Liability Directive' *Official Journal of European Communities* [1985] (210) (29) 374.

De Micco F, Grassi S, Tomassini T and Others, *'Robotics and AI into healthcare from the*

perspective of European regulation: who is responsible for medical malpractice' (2024)

Eduard F, Khanna P, Drukarch H, and Others, 'Role of Human in surgery Automation: exploring the influence of automation on Human-Robotics interaction and Responsibility in surgery innovation' *International Journal of social robotics* [2023] (15)

Grant C and Osanloo A, 'Understanding, selecting, and integrating a theoretical framework in dissertation research: creating the blueprint for 'House', *Administrative Issues Journal: Connecting Education, Practice and E Research [2014]* (4)(2)12-22 DOI: 10.5959/2014.4.2.9

Jan R, Reyes AC, & Calderón JAV, 'Medical Liability arising from the use of Surgical Robotics' *Journals of population therapeutics and Clinical Pharmacology,* [2023] (30)(12)

Jason C, Amanda Z, & Hey Watson, 'Can I Sue You for Malpractice? Examining the Liability of Artificial Intelligence in Medicine', *Asia Pac Journal on Health, Law and Ethics* [2018] (51) (51)

Medicare Europe, *'The liability challenges in AI medical technologies'* (August 2022)

Mezrich J L, Is Artificial Intelligence (AI) a Pipe Dream? Why Legal Issues Present Significant Hurdles to AI Autonomy, and Clinical Decision Support Software, Guidance for Industry and Food and Drug Administration (FDA) Staff, *AM Journal of Roentgenology.* [2022] (1) (9) 152

Okeke H, 'Critical review of Nigeria Health Law: making a case for legal framework on patients' safety in Nigeria' *Calabar University Law Journal* [2023] (2)

Onwujekwe O, Uzochukwu B, Obikeze E, 'Investigating determinants of out-of-pocket spending and strategies for coping with payments for healthcare in southeast Nigeria'. *BMC Health Services Research*. [2010] (10)(67).

Riek L D, Healthcare Robotics, *communications, of the ACM*, [2017] (60)(11) 68.

Rivero-Moremo Y, Echevarria S, and Vidal-Valderrama C, 'Robotic Surgery: A comprehensive review of the literature and current trends'*, Journal of Cureus* [2023] (15)(7)

The Medicare Europe, 'The liability challenges in AI medical technologies' (2022) 2

Tunde A. Oyebaniji, 'Robotic Surgery in Nigeria: An Uncertain Possibility' *International Surgery Journal,* [2020] (7)(11) 3876

World Health Organization, '*The World Health Organization statistical profile'* (Nigeria, 2019)

C. CONFERENCE PAPERS

Chukwumaeze U U, *Socio-economic and cultural rights - the Panacea to Threats on Prospect of successful democracy in Nigeria*, *In search of legal scholarship* (Essays in Honor of Earnest Ojukwu, Abia State University, Law Center)

Owoeye J E, 'Information Communication Technology (ICT) Use as a Predictor of Lawyers' Productivity', *Library Philosophy and Practice Paper* (2015)

Sittig D F, & Singh H, 'A new socio-technical model for studying health information technology in complex adaptive healthcare systems; Cognitive informatics for biomedicine' (Berlin, 2015)

Slawomirski L, & Klazinga N, *The economics of patient safety: From analysis to action* (OECD) Health Working Papers No. 145, OECD Publishing, Paris, 2022)

D. INTERNET/WEBSITE CONTENT

Advantages of Robotic-Assisted Surgery Jan, 2025. available at:

<https://www.washingtonhealth.com/news/2025/january/advantages-of-robotic-assisted-surgery/> accessed 2 August 2025

American Heart Association. (2022). Cardiac computed tomography (CT). available at:

<https://www.heart.org/en/health-topics/heart-attack/diagnosing-a-heart-attack/cardiac-computed-tomography-ct> accessed 29 August 2025

European Economic and Social Committee (EESC),

Opinion of the European Economic and Social Committee on 'Artificial intelligence; The consequences of artificial intelligence on the (digital) single market, production, consumption, employment and society',available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016IE5369> accessed 15 April 2024).

Exploring the different kinds of telemedicine for healthcare management solutions. available at:

<https://www.commercial.healthcare/telemedicine-types-of-telemedicine-technology> accessed 2 August 2025

Hallevy Gabriel, The Criminal Liability of Artificial Intelligence Entities. (2010). Available at:

<https://ssrn.com/abstract=1564096> accessed 15 April 2024

"Healthcare Technology: What It Is and How It's Used | Built In"

available at: <https://builtin.com/healthcare-technology > accessed 31 August 2025

International Harmonization and International medical device regulators Forum, available at:

<http://www.imdrf.org/consultations/consultations.asp > accessed1 September 2025

International Medical Device Regulators Forum, available at:

<https://www.imdrf.org> accessed 31 August 2025

Medical Malpractice Statistics, THORSNES BARTOLOTTA MCGUIRE LLP (May 20, 2024), available at: <https://www.tbmlawyers.com/blog/statistics-medical-malpractice.> accessed 27 August 2025

Medical Robotics Global Market Report, 2025, available at: <https://www.thebusinessresearchcompany.com/report/medical-robotics-global-market-report. > accessed 16 April 2025

National Institute of Biomedical Imaging and Bioengineering (NIBIB), Magnetic Resonance Imaging (MRI) Available at <https://www.nibib.nih.gov/science-education/science-topics/magnetic-resonance-imaging-mri.> accessed 4 September 2025

"Patient safety" available at: < https://www.who.int/news-room/fact-sheets/detail/patient-safety#:2 > accessed 6 August 2025

Robots In Healthcare | Benefits, Disadvantages and Future of Medical Robots. available at: <https://www.delveinsight.com/blog/robotics-in-healthcare> accessed 25 August 2025

Robotics in Healthcare: The Future of Robots in Medicine – Intel. available at: <https://www.intel.com/content/www/us/en/learn/robotics-in-healthcare.html#:> accessed 26 August 2025

'Robotic Surgery Types | Texoma Medical Center, Denison, Texas'. available at: <https://texomamedicalcenter.net/services/surgery/robotic-surgery/robotic-surgery-types/> accessed 29 August 2025

Royal College of Surgeons of England, *'Robotics Assisted Surgery: A pathway to the future'*, (2023) Robots in medicine:

available at: <https://eithealth.eu/news-article/robots-in-medicine-the-robotics-start-ups-making-a-difference-in-healthcare/answerpack/able-human-motion/what-are-the-challenges-in-deploying-products-into-healthcare-settings-versus-other-industries> accessed 5 August 2025

Wikipedia, 'Robotics' (Wikipedia, Free encyclopedia) available at:

<https://en.wikipedia.org/wiki/Robotics> accessed 31 August 2025.

"What is Healthcare Technology? | Virtusa, available at:

< https://www.virtusa.com/digital-themes/healthcare-technology > accessed 31 August 2025

World Health Organization, Essential Health Technologies (WHO 2006, Geneva) available at:

<https://www.who.int/health-technology/essential/en/ > accessed 31 August 2025.

E. REPORTS/REVIEWS

Federal Ministry of Health, Department of food and drug services, National Health products supply chain strategy and implementation plan (2021-2025) (Federal Ministry of Health, 2021)

Isaac Folorunso Adewole, 'Forward' *on National Health Policy* (Federal Ministry of Health, 2016)

Kutana S, Bitner D P, Addison P and others, *Objective assessment of robotic surgical skills: Review of literature and future directions.* (2022)

Michael Froomkin A, 'When AIs Outperform Doctors: Confronting the Challenges of a Tort

Induced Over-Reliance on Machine Learning', (2019) *Arizona Law Review* (61)

Morgan A A, Robots in Healthcare: A Scoping Review. Current Robotics Reports, (2022) 3(4)

World Health Organization,*Global health strategies on digital health; strategic objectives*, (WHO 2020)

World Health Organization, 'Essential health technologies Report by the secretariat', (WHO 2006) Executive Board, 118th session, Agenda item 5.5(1)

AGREEMENTS

Agreement between the World Health Organization and the Southern Centre (2013)